



Subnational Fiscal Disparities and Intergovernmental Transfers in LAC

ANDRÉS FELIPE MUÑOZ

GUSTAVO AXEL RADICS

CLAUDIA BONE

*Inter-American Development Bank**

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Abstract

We document the presence of fiscal disparities among subnational governments (SNG) in Latin America and show the limitations of existing intergovernmental transfer systems to reduce them. For 11 countries in the region during 2000-12, we find that, although transfers reduce disparities in own revenues, the remaining fiscal disparities among SNG are still considerable. We also show that fiscal transfers are distributed without consideration of fiscal capacity and explicit measures of expenditure needs, hampering their equalization potential. Our findings suggest that the introduction of equalization transfers can contribute to tackle more effectively the subnational fiscal disparities and hence improve regional equity.

Key words: decentralization, fiscal disparities, inequity, transfers, equalization.

JEL Classification: H25, H71, H73, H77.

1. Introduction

Slowly and perhaps inadvertently, decentralization could be contributing, ala Prud'homme (1995), to accentuate regional inequality in Latin America and the Caribbean (LAC). Intergovernmental transfer systems in the region are not leveling the playing field enough to allow subnational governments (SNGs) to provide similar bundles of public goods and services. In particular, transfers do not explicitly tackle the sharp regional fiscal disparities. In some cases, they have even led to an inefficient allocation of resources and to an increase in fiscal disparities among SNGs (Martínez-Vázquez and Sepúlveda, 2011). Hence this gap may be causing unequal access to subnational public services.

The considerable variations in population size, economic bases and fiscal effort among SNGs partly explain the large and, in some cases, growing subnational fiscal disparities in

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LAC. In spite of the high regional inequality and the importance of transfers in the subnational fiscal structure, no country in LAC has adopted an explicit equalization transfer system, exclusive and sizable, that compensates for the different fiscal capacities and expenditure needs of SNGs. Instead, most countries have implemented revenue sharing systems that frequently display design problems: They seek to simultaneously attain multiple goals, including efficiency, equity and national standards in public services; are subject to the volatility and pro-cyclicality inherent to the underlying fiscal revenue stream; and their tendency to increase over time can stimulate soft-budget constraints in SNGs, which may also discourage own revenue effort. Although the allocation formulas in these systems have some equalization criteria, they do not incorporate estimates of fiscal capacity and only approximate expenditure needs through indexes of subnational relative need.

If no actions are taken, the evolving process of fiscal decentralization in the region will probably exacerbate these differences, since tax mobilization efforts will focus on some of the wealthiest SNGs. LAC's rapid urbanization and the growing concentration of economic activity in urban agglomerations are also dynamics that will likely increase regional fiscal disparities (UN Habitat, 2012). In turn, fiscal and economic crises, such as the financial crisis of 2008-9, along with the volatility in natural resources (commodity) prices, with its heterogeneous effects in the countries' regions, will also be contributing factors to regional economic divergence, further reinforcing horizontal fiscal inequality.

There is currently a knowledge gap about the effectiveness of current transfer systems to compensate for fiscal disparities among SNGs in LAC. There are some country studies in the region that analyze the redistributive impact of transfers. Nonetheless, the regional comparative approach is largely missing¹. Our research seeks to fill this gap by showing evidence of the equalizing effect of the transfers systems for a large number of LAC countries, discriminating by level of subnational government and by type of transfers.

We find that, although transfers reduce on average the initial disparities in own revenues by over one third, the remaining fiscal disparities post-equalization are still sizable —reaching differences of over 300 percent on average between the most fiscally capable intermediate governments and the least. This equalizing effect of transfers has remained virtually unaltered during the past decade, in spite of the rapid growth in transfers experienced in many LAC countries. We also show that the allocation of transfers does not explicitly consider the high variance in fiscal capacity and expenditure needs within each country, hampering the equalization potential of existing transfer systems. In light of these findings, we argue that the introduction of equalization transfers has the potential to ameliorate regional fiscal inequality, and hence to contribute attaining the promises of decentralization in the different SNGs of the LAC region.

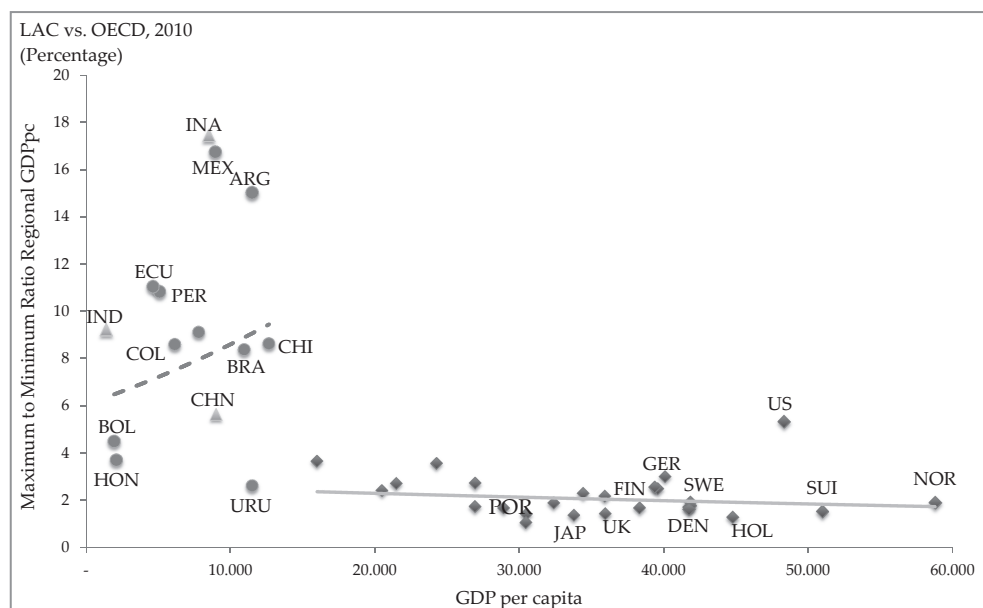
This paper is organized as follows: Section 2 examines the economic and fiscal disparities prevalent among LAC's SNGs; Section 3 summarizes the key concepts of fiscal equalization and the existing literature; Section 4 describes the current structure of transfer systems in LAC; Section 5 describes the empirical methodology and Section 6 presents the equalization effects of transfers in sample countries, comparing them to the performance

of OECD countries, and the results of the econometric analysis. Lastly, Section 7 summarizes our findings and suggests next steps for future research.

2. Regional disparities

LAC countries present high disparities in their regional economic bases. In a typical representative country, the ratio of the per capita gross domestic product between the wealthiest and poorest intermediate government is nine times. Figure 1 shows that, on average, LAC countries have four times the level of regional disparity relative to OECD countries (IDB, 2015). Nonetheless, there is large variation among LAC countries, as this ratio ranges from around 16 times in Argentina and Mexico to three times in Uruguay and Honduras. As opposed to the OECD case, the economic disparities appear to increase with the size and economic development of the region's countries.

Figure 1. Maximum to minimum Ratio, Regional GDP per capita

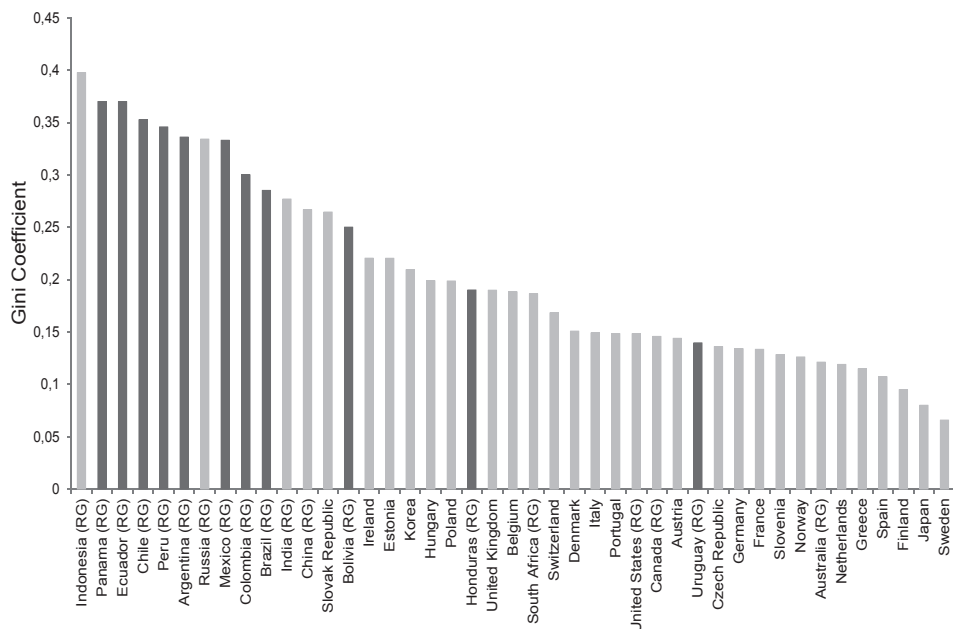


Source: own estimates based on the IDB's subnational fiscal database, World Bank Indicators, and OECD (2014)

Similarly, measured by the Gini coefficient, LAC countries exhibit much higher inequality in the distribution of regional income among SNGs, vis-à-vis developed and other developing countries. Figure 2 shows that, except for Uruguay, all countries in the region are at the top of the distribution. On average, the region's Gini coefficient (0.30) is twice that of OECD countries (0.15).

Figure 2. Gini Coefficient, Regional GDP per capita

LAC vs. OECD, 2010



Source: own estimates based on IDB's subnational fiscal database, World Bank Indicators, and OECD (2014)

The unequal regional distribution of wealth may translate into sharp fiscal disparities. This is more likely to happen when subnational taxes, such as those assigned to intermediate governments in LAC, levy economic activities, (*i.e.* incomes from production, commercialization and sales in Argentina and Brazil), consumption (*i.e.* beer, liquor, etc. in Colombia), and payroll (*i.e.* Mexico) (Frete and Ter-Minassian, 2015; Artana *et al.*, 2015; Pineda and Rasteletti, 2015; Bello and Espitia, 2011), which are unequally distributed across territories.

As in the case of regional GDP, the disparities in tax revenues among SNGs are also very large (Table 1). For example, the ratio between the 10 percent of intermediate governments with highest tax collection and the 10 percent with lowest tax collection is, on average, more than eight times, and in Mexico more than 11 times². Measured by the coefficient of variation (CV), the revenue disparities seem to have decreased on average between 2000 and 2012, although very slowly and with high volatility. In some countries they even have increased. On the other hand, the disparities in expenditure per capita at the intermediate level have narrowed consistently in all countries during the same period. Hence, in all countries and levels of government the disparities in own revenues are higher than in expenditure per capita, which is explained by the differences in the level of regional economic bases and, as we shall show, by the compensatory effect of intergovernmental transfers.

Table 1
FISCAL DISPARITIES, REGIONAL AND LOCAL GOVERNMENTS
Per capita levels of own revenues, tax revenues and total expenditures selected LAC countries
(coefficient of variation)

Country	Category	2000	2005	2012
Regional Governments				
ARG	Own Revenue	0.53	0.68	0.57
	Tax Revenue	0.82	0.79	0.78
	Expenditure	0.58	0.6	0.58
BRA	Own Revenue	0.49	0.48	0.43
	Tax Revenue	0.5	0.49	0.44
	Expenditure	0.55	0.35	0.35
COL	Own Revenue	1.37	1.45	1.43
	Tax Revenue	0.81	0.81	0.96
	Expenditure	0.64	0.65	0.61
PER	Own Revenue	0.55	1.22	0.61
	Expenditure	0.43	0.33	0.35
URU	Own Revenue	0.65	0.72	0.66
	Tax Revenue	0.71	0.94	0.93
	Expenditure	0.4	0.41	0.3
Average	Tax Revenue	0.68	0.85	0.83
	Expenditure	0.52	0.47	0.42
Local Governments				
BRA	Tax Revenue	4.23	1.4	1.39
	Expenditure	1.82	0.55	0.48
COL	Tax Revenue	1.31	1.13	1.22
	Expenditure	1.02	0.71	0.69
PER	Tax Revenue	14.09	13.18	9.66
	Expenditure	7.15	3.58	2.44
ECU	Own Revenue	3.78	3.46	3.26
	Tax Revenue	11.34	8.05	7.39
	Expenditure	2.95	2.94	6.04
CR	Own Revenue	-	0.87	0.58
	Tax Revenue	-	1.03	0.79
	Expenditure	-	0.42	0.23
CHI	Own Revenue	-	1.6	1.89
	Tax Revenue	-	1.67	2.09
	Expenditure	-	1.65	1.73
HON	Own Revenue	1.94	1.82	1.31
	Tax Revenue	2.22	2.05	1.67
	Expenditure	1.23	1.23	0.8
Average	Tax Revenue	6.54	5.16	3.55
	Expenditure	3.33	1.80	1.30

Source: own estimates based on the IDB's subnational fiscal database. For regional governments, for Brazil and Argentina the last period corresponds to data from 2010. For local governments, the first period corresponds to data from 2001 for Ecuador and 2002 for Honduras; for the second period, 2006 for Costa Rica and 2009 for Chile; and for the last period, 2010 for Brazil and 2009 for Colombia and Ecuador.

3. Conceptual framework

Horizontal fiscal imbalances among SNGs stem from differences in expenditure needs, defined as the cost of providing a standard bundle of public goods and services; and fiscal capacities, defined as the own revenues that a SNG would collect if it applied an average tax effort. The difference between these two traits constitutes the *fiscal gap*, which in the absence of transfers becomes a source of fiscal inequalities among SNGs.

In the case of expenditure needs, the provision of a standard bundle of goods and services has different costs among SNGs due to two main reasons: (i) different costs of inputs, and even production functions for public goods and services, owing to the geographic characteristics and access to markets; for example, the cost of providing services differs in the coast, highlands or jungle, and tends to increase in SNGs with low population density; and (ii) different needs of the population related to their demographic and socio-economic characteristics: SNGs may differ in the proportion of their population in school age, and/or their students may require on average a higher educational effort.

Different to fiscal capacities, there is less agreement on the preferred method to estimate expenditure needs, partly because the normative considerations in this case are more prominent (Kim and Lotz, 2008). On the one hand, the cost standards may be defined centrally (top-down) based on a rigorous estimation of the cost of provision for each service. This allows a better cost control but it is very intensive in the use of information and may not be accurate in capturing the different preferences and needs of the population. A simpler alternative that is used in many countries is the allocation of transfers based on weighted indexes of relative needs, using indicators such as population, density and poverty that proxy the determinants of cost differentials among SNG.

On the other hand, the demand approach (bottom-up) is based on the effective cost of service delivery. It is supposed to capture subnational preferences and needs, as evidenced by the allocation decisions and costs of SNGs. However, it may encourage inefficient expenditure patterns that do not reflect the true demand, and it may create the incentive in SNGs to “inflate” their costs in the expectation of obtaining additional transfers. The Representative Expenditure System (RES) method is an alternative of the demand approach, consisting of identifying the determinants of subnational expenditure using independent variables that explain the differences in costs. The RES is also very intensive in information, complex to communicate and subject to model specification problems (omitted variables, reverse causality, multicollinearity) that may yield imprecise estimates. Therefore, in this context the literature is inclined towards the use of standard unit costs for individual services, adjusted to account for variations in geography and demand (OECD, 2014).

The differences in fiscal capacity among SNGs, assuming they have the same sources of own revenue, are explained by: (i) the size of their tax bases, which is a function of their income and wealth; and (ii) the tax collection capacity of each entity, which in turn depends on their fiscal effort, the effectiveness of the tax administration and the compliance culture of taxpayers. On measurement, the most rigorous estimation method of fiscal capacity is the

representative revenue system (RRS), which assesses the revenue that a SNG would generate if it applied an average fiscal effort. It requires measuring the tax bases of each SNG and calculating the representative tax rate for each levy. The fiscal capacity results from multiplying the representative tax rate by the estimated tax base for each SNG. Those SNGs whose tax capacity is below a certain standard receive equalization transfers, in proportion to their distance to the established standard. This method is not easy to adopt, since the information required on tax bases is usually not available at the subnational level. Thus researchers are often left with no option but to work with proxy variables such as the effective tax collection, which is not a good alternative since it can create disincentives to improve fiscal effort.

The main rationale for equalization transfers is to reduce, if not eliminate, the fiscal gap. They are used to enable each SNG to provide similar opportunities to its citizens, by delivering a standard set of public goods and services, based on an average effort to collect own revenues (Boex and Martínez-Vázquez, 2007; OECD, 2014; Boadway, 2014). The extent to which this fiscal gap is filled is intrinsically a normative question related to the weight each country assigns to regional equity and solidarity (Spahn, 2007).

In their purest form equalization transfers are conceived as unconditional in their use, with clear funding sources and transparent allocation rules (Martínez-Vázquez and Sepúlveda, 2011). They seek to compensate those SNGs that collect less own revenues, as well as those that have higher costs of service provision. In this regard the objectives of interregional redistribution are to be distinguished from interpersonal redistribution: equalization is concerned with eliminating differences in net fiscal benefits that the public sector provides to otherwise identical households residing in different regions (Buchanan, 1950)³, rather than concerned with reducing differences in real incomes among households (Boadway, 2003).

In addition to this equity argument, there is an efficiency rationale for equalization transfers: if SNGs differ in their fiscal capacities, those with above-average fiscal capacities will be able to provide a given level of public services at lower tax rates than SNGs with below-average fiscal capacities. Similar households residing in these two groups of SNGs would obtain different fiscal benefits from their jurisdictions, providing an incentive to migrate across regions. Migration in this case is not based on productivity factors but on differences in the fiscal capacity of the SNG, giving rise to inefficiencies in the allocation of resources (Boadway, 2014). Also important is the risk sharing role of equalization transfers, which protects SNGs from regional business cycles or asymmetric shocks (OECD, 2014). Other considerations used for the introduction of equalization transfers include the prevention of secessionist tendencies, in countries with relatively high regional tensions (Spahn, 2007; Martínez-Vázquez and Searle, 2007).

Besides these normative considerations, the political economy of each particular country is crucial to understand the allocation of transfers to SNG, often at the expense of the equity and efficiency arguments laid out above. Some of these political economy factors include the over-representation of less populous SNG in Congress (see Atlas, Gilligan, Hendershot and Zupan, 1995, in the case of the United States; Porto and Sanguinetti, 2003, for Argentina; and Rodden, 2002, for the European Union); the political affiliation of SNG with regional or

central government authorities (see Brollo and Nannicini, 2011, for Brazil; and Curto, Solé Ollé and Sorribas-Navarro, 2011, for Spain); whether transfers are decided in direct or representative democracy (see Feld and Schaltegger, 2005); and the maturity of the democratic process (see Gonçalves and Pinho, 2007, for Portugal), among others.

Based on which level of government provides the transfers, equalization systems can be classified as horizontal, when wealthy SNGs directly provide resources to poorer ones (also called Robin Hood or solidarity systems), or vertical, when it is the central government that allocates the transfers. The latter is much more prevalent in developing countries, partly due to the lower fiscal capacity of SNGs and the political difficulty of convincing wealthier SNGs to resign their own revenues. The prominent vertical cases among developed countries are Canada, which implements the RRS to equalize fiscal capacity; and Australia, which uses a demand approach to estimate both fiscal capacity and expenditure needs, under the administration of an independent technical body (the Commonwealth Grants Commission).

There is a growing body of empirical studies about the more general redistributive effects of intergovernmental transfers systems. Most studies focus on individual countries, analyzing the equalization capacity of existing systems and proposing alternatives to reduce horizontal imbalances. Some examples include the cases of United States (ACIR, 1986 and 1988, which conduct estimates of the Representative Revenue System for the states); the Russian Federation (Martínez-Vázquez and Boex, 1999); Indonesia (Brodjonegoro and Martínez-Vázquez, 2005) and Canada (Ruggeri and Yu, 2000). Regional studies include the analysis of five federal countries (Germany, Australia, Canada, Spain and Switzerland, see Hierro, Atienza and Patiño, 2007); fiscal disparities in East Asia (China, Indonesia, Philippines, Thailand and Vietnam, see Hofman and Cordeira Guerra, 2005); and more recently the analysis for OECD countries (OECD, 2014). This last study shows that most OECD countries have equalization transfers, which represent on average around 50 per cent of total transfers. Their effect on regional fiscal disparities appear to be substantial: on average, measured by the Gini coefficient of income of SNG, fiscal disparities are reduced in two-thirds, and in countries like Australia, Germany and Sweden, these disparities almost disappear.

In the case of LAC some of the country specific studies include the cases of Peru (Herrera, 2008; and Gómez, Martínez-Vázquez and Sepúlveda, 2008), Panama (Gómez and Martínez-Vázquez, 2009), Nicaragua (Martínez-Vázquez and Sepúlveda, 2007); Brazil (Politi and Mattos, 2013); Argentina (Brosio and Jimenez, 2015, with focus on non-natural resource revenues); and Mexico (Cabrera y Lozano, 2010). Martínez-Vázquez and Sepúlveda (2011) analyze practices in transfer design in the region, providing some examples of transfer systems that include equalization criteria. However, they do not assess the equalizing effects of each type of transfer system across several LAC countries (except for the case of Peruvian municipalities). More recently, Capello, Airaudo and Degiovanni (2015) compare the equalization capacity of Argentina's transfer system to intermediate governments to that of seven other countries, including Brazil, Colombia and Mexico in LAC, along with Australia, Canada, India and Spain.

In general, equalization transfers entail redistribution from urban to rural areas. The design of the system should: (i) consider all existing transfers to seek to reform those with

less redistributive capacity; (ii) limit the equalization fund in order to avoid over-compensation, which may stimulate soft budget constraints and affect incentives for economic growth and fiscal effort in more prosperous SNG (OECD, 2006); (iii) use simple and standard indicators for expenditure needs, in order to reduce the space for cost manipulation of SNGs (OECD, 2014); (iv) try to establish growth patterns that are counter-cyclical and avoid common-pool problems (a good example is the use of Chile's structural fiscal rule); and (v) create the technical expertise to estimate and manage the system.

Based on these concepts a few features stand out with reference to LAC: First, equalization transfers can serve as a guideline not only to address the horizontal gap, but they can also contribute to closing the vertical gap (difference between expenditure and own revenues of SNGs), along with revenue sharing and conditional transfers (Martínez-Vázquez and Sepúlveda, 2011). This less emphasized insight of equalization transfers provides a rationale to estimate expenditure needs and fiscal capacity as accurately as possible, in order to define the amount of transfers that SNGs need to comply with their functions. Second, the relative relevance of expenditure needs and fiscal capacity is closely related to the financing structure of SNGs, whether it is mainly based on own revenue (for example, Canada), in which case the estimation of their fiscal capacity becomes prominent; or mainly based on transfers (for example, Australia), in which case not only is it important to estimate fiscal capacity, but also to have good measures of expenditure needs. This latter situation is prevalent in LAC, a region that stands out due to the high dependence of SNGs on transfers (IDB, 2015).

4. Intergovernmental Transfer Systems

In the region there is not any explicit and sizable equalization scheme that seeks to address horizontal fiscal imbalances and that includes precise measures of fiscal capacity and expenditure needs of SNGs (see Table 1 in the Annex) (Martínez-Vázquez and Sepúlveda, 2011; Martínez-Vázquez, 2010). The Chilean Municipal Common Fund (*Fondo Común Municipal* or FCM) constitutes the experience most closely in line with this definition of equalization transfers. The FCM's solidarity approach redistributes shared revenues from municipalities with greater to lower economic capacity.

Although the reasons behind the lack of equalization schemes in LAC merits further research, it can be explained by a number of factors. Perhaps the most important one is that transfer systems are developed within particular political economy contexts that most likely have not prioritized interregional equity. And, even though in a number of countries in LAC the objectives to be achieved with intergovernmental transfers are not explicit, in some countries where interregional equity is clearly delineated, as in Argentina with the constitutional reform of 1994, equalization transfers could not be implemented (Porto, 2015). On the one hand, this could be due to the perceived need of central governments to achieve multiple national objectives and to their reluctance to give greater autonomy to SNGs through non-earmarked transfers. On the other hand, it is likely that the regionalism and political economy restrictions existing in various countries hinder cooperation and coordination among SNGs to implement redistributive reforms.

Most countries in LAC have revenue sharing systems that are usually funded through central government revenues. These schemes seek to achieve multiple objectives that simultaneously include efficiency, equity and the fulfillment of national standards. In a few cases, such as the shared revenues in Mexico, Ecuador and Nicaragua, transfers seek to reward SNGs for their fiscal effort; in Peru, Bolivia and Brazil, the systems attempt to reduce regional poverty based on a wide array of indicators of relative wellbeing and rurality levels; and Colombia prioritizes the equal access of the population to social and basic infrastructure services. Thus, practically all revenue sharing systems in LAC tend to emphasize a greater level of subnational equity, working mainly on the expenditure needs side of the fiscal formula.

Revenue sharing systems employ earmarked and non-earmarked transfers alike, and generally there are explicit and transparent formulas for their distribution. Only does Uruguay employ ad hoc rules for transfer allocation respectively contained in the budget law set every five years (Muinelo *et al.*, 2015), as well as Argentina does through the Coparticipation Law of 1988 and further modifications (Porto, 2015). Nonetheless, these schemes also include some redistributive criteria.

In current distribution formulas, there are not explicit measures of fiscal capacity and/or expenditure needs. On the one hand, the most glaring omission is the lack of attention to differences in fiscal capacity among SNGs, maybe because of the limited tax bases assigned and the relatively little autonomy granted to them (with the exception of provinces and states in Argentina and Brazil, and large cities like Bogota in Colombia). On the other hand, many distribution formulas have elements that seek to compensate for relative need, through the inclusion of proxy variables such as population size, rurality, territorial extension, density and/or poverty levels. As mentioned in the previous section, the use of simple indicators is to be explained by the complexity involved in estimating expenditure needs and its sensibility to normative criteria. The lack of timely, complete and quality data at the subnational level further complicates calculations. This situation is particularly complex at the municipal level due to the larger number of government units, the significant heterogeneity among them, and the growing differences in fiscal capacity and expenditure needs.

In some LAC countries, particularly those of the Andean region (Bolivia, Colombia, Ecuador and Peru), the revenue sharing systems coexist with parallel schemes for distributing royalties and revenues from the exploitation of natural resources. These transfers have grown significantly during the past 15 years, showing also very high volatility due to the boom in international prices (IDB, 2015). Oil, iron, coal, copper and gold steadily increased their prices between 2000 and 2009; however, ever since 2012 commodity prices have suffered a downturn (Ardanaz and Tolsa, 2015). As a result, in Colombia, royalties grew from 0.33 percent of GDP in 1999 to 1.5 percent of GDP in 2012, but fell sharply to 1.1 percent in 2013-14 (Bonet-Morón and Ayala-García, 2015).

Royalties schemes usually work based on the derivation principle, where producing regions and municipalities receive most of the windfall revenues. For instance, in Colombia, Peru and Brazil, only those territories involved in the exploration, exploitation or logistics of transportation of non-renewable natural resources, have been the main beneficiaries of royalty payments. As a consequence, in Colombia three departments (having 5 percent of the

population) received 54 percent of the total royalties distributed; and, while more than 40 percent of the Colombian municipalities did not receive any royalty payments at all, only 10 percent of municipalities received 88 percent of total municipal royalties. In Brazil, the state of Rio de Janeiro alone concentrates 83 percent of the total royalty payments at the state level, while the top 1 percent of municipalities account for more than 70 percent of total royalty payments (Ardanaz, 2014).

Finally, there is a wide variety of smaller funds for distribution of capital transfers, structured similarly to matching grants, which seek to partially finance investment projects. Some experiences in the region include the Regional Development Fund in Chile (*Fondo Nacional de Desarrollo Regional, or FNDR*), the co-financing schemes in Colombia, the Investment Fund for Regional and Local governments (*Fondo de Promoción a la Inversión Pública Regional y Local, or FONIPREL*) and the Regional Compensation Fund (*Fondo de Compensación Regional, or FONCOR*) in Peru, and the *Convenios* in Brazil. Although these capital transfer systems incorporate some compensatory elements and have clear rules for accessing the funds, more often they are distributed based on the synergy between the regional development agendas of the national government and those of SNGs⁴. During the execution phase, however, these funds face some problems that constrain their objective of regional convergence, including the limited size of the funding pool and the requirements to compete for funding, all of which ultimately skew the targeting.

In addition, in recent years some countries have witnessed the growth of discretionary transfers, which are allocated according to political negotiations between central and SNGs. In Argentina these transfers increased from 0.5 to 1.5 percent of GDP between 2000 and 2012 (Porto, 2015); in Peru (local governments) they went from being negligible in 2008 to reach an average of 0.7 percent of GDP during 2009-14 (MEF, 2015); and in Mexico discretionary transfers represent 10 percent of all transfers to SNGs (Revilla, 2012).

5. Empirical Strategy

5.1. Equalizing Effects

We conduct two statistical analyses to identify the equalizing effects of intergovernmental transfers in LAC⁵. First, for ten countries⁶ we estimate the existing disparities in fiscal capacity among their SNGs, using the per capita level of own revenues as a proxy variable⁷. We calculate the Gini coefficient and the ratio of the maximum to the minimum values of per capita own revenues⁸. The equalizing effects are captured comparing the values in these statistics before and after receiving central government transfers. Lower values after transfers would provide evidence of the global effectiveness of the systems to reduce disparities in own revenues. For illustration purposes, we compare our results with those of OECD countries (OECD, 2014).

Second, we estimate for each country the equalizing effects of the main components of their transfer systems, individually and cumulatively, to identify which transfers equalize in

greater or lower degree the own revenues of SNGs. We also employ the Gini coefficient, the coefficient of variation and the max-min ratio, all variables constructed in per capita terms. Based on Martínez-Vázquez (2015), our strategy is to begin analyzing the distribution of own revenues in each country, then calculate the dispersion and concentration of each component of the transfer systems, and then, by adding components one at a time, identify the cumulative effects each has on previous distributions, until reaching total revenues. Reductions in the values of the statistics would signal the presence of equalizing effects, while increases in them would suggest a regressive effect.

5.2. Determinants of Transfer Allocation

As a complement to the analysis of the equalizing effects of transfer schemes, we conduct econometric analyses to identify the determining factors of variations in transfer allocations in LAC. This exercise seeks to understand particularly how the size of intergovernmental transfers given to SNGs varies with respect to their differences in proxy measures of fiscal capacity and expenditure needs, among other factors. In light of the purpose of fiscal equalization we address the following questions: Do SNGs with lower revenue-raising capacities receive more transfers? Likewise, do SNGs with greater levels of expenditure needs receive more transfers?

The present analysis focuses on local and intermediate levels of government of seven countries⁹ in the region, typically for the period 2000-12. We run multiple regression analyses, employing various econometric techniques, including pooled regressions and panel data regressions with fixed effects. The general model to be estimated for each country is:

$$TRFR_{it} = \beta_1 FC_{it} + \beta_2 EN_{it} + \beta_3 POP_{it} + X_{it}\beta + \mu_i + \lambda_t + e_i$$

Where $TRFR_{it}$ is the per capita level of transfers received by the regional or local government i in year t ; FC_{it} is the potential fiscal capacity of the regional or local government i in year t , measured by the per capita gross regional domestic product; EN_{it} represents the expenditure need of the regional or local government i in year t , as measured by the poverty rate or the index of unmet basic needs¹⁰; POP_{it} is the size of the population; X_{it} is a vector of additional exogenous characteristics to control for expenditure needs, including population density, the profile of the population, and urbanization rate, among others¹¹; μ_i are individual fixed effects that control for all specific time-invariant variables; λ_t represent time fixed effects that control for all time-specific effects; and e_i is a random term.

The dependent variable includes all sources of transfers received by regional or local governments in a country, such as shared revenues, royalties, co-financing and compensation grants. As main independent variables we first use the per capita level of gross regional domestic product (GDP) as a proxy measure of the potential fiscal capacity of SNGs. Our logic is that the sum of all of the economic activities in a region determines the tax base and the level of public revenues that could potentially be realized. We consider that this is a good

proxy measure since the type of taxes assigned to SNGs in the region, such as the Value-Added Tax (VAT), the turnover tax, the tax on industrial and commercial activities, the property tax, and the payroll tax in Brazil, Argentina, Colombia and México, respectively, capture the size and dynamism of the economy. Therefore, we expect that as economic activities grow, SNGs are able to collect more taxes and other revenues. Ultimately, we hypothesize that if transfers are equalizing of the subnational fiscal capacities, there should be a negative association between the per capita level of transfers received and the GDP, represented by a negative coefficient of a relevant magnitude.

For local governments, except for Brazil where authorities do produce official statistics for municipal GDP, following Sánchez *et al.* (2012) we employ a proxy variable calculated as the total revenue collected in a municipality (*e.g.*, Bogota) divided by the total municipal revenue collected in the Department where it is located (*e.g.*, the Department of Cundinamarca), multiplied by the departmental GDP. Due to data availability, for Uruguay's intermediate governments we use the per capita level of tax revenues as a proxy for fiscal capacity.

In addition, we use the index of unmet basic needs and the poverty rate to capture differences in socio-economic levels across regions and as proxy measures of the relative expenditure needs of SNGs. We expect that higher poverty levels reflect higher levels of expenditure needs. For countries where data are available, we also use the profile of the population, specifically the percentages of elderly population (aged 65 and older) and children (aged 14 or less) as additional variables capturing the demand for public services and other expenditure needs.

If transfers are equalizing, then the intermediate and local governments with greater expenditure needs should receive higher levels of per capita transfers. Also, we incorporate variables indicating the degree of rurality and the urbanization rate, to partially control for the differential cost of providing services in different territories —and thereby capture higher levels of expenditure needs. Due to restrictions in obtaining longitudinal data, we use these variables in pooled regressions for intermediate level of government only.

Finally, we include in the models the size of the population, given that almost all countries in our sample use this variable as a criterion to distribute transfers. As long as there are scale economies in service provision, and thus lower expenditure needs, we would expect that the more populated regional and local governments would receive smaller amounts of per capita transfers.

Although estimating the fiscal capacity and expenditure needs of SNGs requires more sophisticated calculations, in the context of the regional comparative analysis herein, and the lack of data available on tax bases and expenditure norms, we use proxy variables that possibly cannot capture integrally the revenue potential and the degree of fiscal need of SNGs. Although we extensively use individual and time fixed effects, it is also possible that estimates suffer from omitted variable bias. The broad coverage embracing a large number of countries and years and the traditional lack of data available at the subnational level inhibit the inclusion of variables that would make for a more complete model. Similarly, due to the

likely presence of endogeneity between transfer allocation and GDP, as well as among other explanatory variables such as the poverty incidence, we lag the model one period—although we are aware that this strategy does not fully address biases originating in reverse causation.

We obtained the fiscal, economic and demographic data for both intermediate and local governments from the IDB's Subnational Government Fiscal Database. Budgetary data herein were collected from official reports and converted to the IMF's government finance statistics accounting standards according to the 2001 methodology. Social and poverty indicators were obtained from IDB's Smartmap database which in turn collects these data from official censuses and household surveys.

6. Results

Table 2 contains the results for the analysis of the equalizing effects of current transfer systems. We find that, on average, transfers reduce disparities in own revenues in approximately one third, as indicated by the Gini coefficient of own revenues per capita, and in about one half, when judged by the max-min ratio. Although no country in the region has explicit and sizable systems of equalization transfers, it is possible to explain these equalizing effects based on the various compensatory elements usually incorporated into the revenue sharing schemes, such as equalization per capita, poverty, or rurality of local governments.

Table 2
EQUALIZING EFFECTS OF THE TRANSFER SYSTEM, FISCAL CAPACITY
Subnational Governments, Selected LAC countries, 2005-12
(Population Weighted Gini Coefficient and Maximum to Minimum Ratio)

Country	Weighted Gini Coefficient				Maximum to Minimum			
	Before		After		Before		After	
	2005	2012	2005	2012	2005	2012	2005	2012
<u>LAC (RG)</u>								
Argentina*	0.18	0.16	0.14	0.16	10.84	7.09	4.34	4.02
Brazil	0.21	0.21	0.15	0.16	6.71	5.81	3.75	3.67
Colombia	0.37	0.34	0.25	0.23	48.89	35.07	12.40	13.00
Mexico	0.45	0.39	0.10	0.09	17.06	14.23	2.49	2.18
Uruguay	0.28	0.25	0.19	0.16	8.00	7.56	3.21	3.58
Average	0.30	0.27	0.17	0.16	18.30	13.95	5.24	5.29
<u>LAC (LG)</u>								
Bolivia**	0.27	0.32	0.16	0.22				
Brazil	0.49	0.46	0.24	0.22				
Chile**	0.46	0.52	0.27	0.27				

Country	Weighted Gini Coefficient				Maximum to Minimum			
	Before		After		Before		After	
	2005	2012	2005	2012	2005	2012	2005	2012
Costa Rica**	0.40	0.34	0.33	0.27				
Colombia	0.46	0.43	0.25	0.23				
Ecuador**	0.58	0.51	0.35	0.36				
Honduras	0.52	0.45	0.37	0.33				
Average	0.46	0.43	0.28	0.27				
OECD								
Germany	0.06	0.06	0.02	0.02	1.70	1.70	1.20	1.10
Australia	0.05	0.07	0.00	0.00	4.80	7.50	1.00	1.00
Canada	0.10	0.11	0.07	0.08	2.40	2.40	1.70	1.80
China	0.33	0.31	0.25	0.18	14.40	10.30	9.50	5.30
Denmark	0.08	0.06	0.04	0.03	2.20	1.40	2.00	1.20
Spain	0.15	0.13	0.04	0.05	2.10	3.00	1.40	1.40
Finland	0.11	0.12	0.03	0.05	1.80	1.80	1.10	1.40
Italy	0.21	0.19	0.10	0.04	6.10	4.50	1.30	1.30
Norway	0.13	0.13	0.05	0.04	2.20	2.10	1.30	1.20
Sweden	0.06	0.07	0.01	0.01	1.40	1.50	1.10	1.10
Switzerland	0.15	0.17	0.11	0.11	3.80	4.30	2.50	2.60
Average	0.13	0.13	0.07	0.06	3.90	3.68	2.19	1.76

Source: own estimates based on the IDB's subnational fiscal database, World Bank Indicators, and OECD (2014)

* For the second period, Argentina and Brazil use data from 2010, for regional governments; and Chile from 2013, for local governments.

** For the first period, Bolivia, Ecuador and Chile use data for 2009 and Costa Rica from 2006; for local governments.

The equalizing effect however varies significantly across countries. At the intermediate level, the transfer system in Mexico exhibits the greatest degree of fiscal equalization, reducing disparities among states in about two thirds. By contrast, Brazil, Colombia and especially Argentina have less potent transfer schemes. In the case of local governments, transfer systems in Brazil, Colombia and Chile are more effective in reducing disparities in revenue-raising capacities (up to one half).

In addition, the size of the equalizing effects remained constant between 2005 and 2012, with no improvement whatsoever despite the surge in central government transfers experienced in LAC during this period. Notably, the remaining disparities in own resources after transfers are considerable, exceeding on average more than 300 percent between the intermediate government with the greatest revenue-raising capacity and the one with the lowest capacity.

As a comparison, the transfer systems of a sample of OECD countries equalize the fiscal capacities of their SNGs in more than one half (OECD, 2014). This equalizing effect is very similar in all countries, contrary to the marked differences found in LAC. In Australia, Germany and the Scandinavian countries the disparities practically disappeared after SNGs re-

ceive transfers. In the same period, on average, OECD countries were able to increase the equalizing power of their transfer systems.

Table 3 shows that current transfers systems in LAC also generate undesirable re-rankings among intermediate governments which further undermine their equalization potential. When decomposing the Reynolds-Smolensky index¹², the re-rankings produce high losses of equalization power in Argentina, Brazil and Uruguay. The table also shows that, with respect to the initial ranking of SNGs by their level of own revenues, transfers systems affect the position of these governments in about 90 per cent, on average, typically generating more losers than winners —except for Mexico.

Table 3
RE-RANKING EFFECTS OF THE FISCAL TRANSFER SYSTEM
(Unweighted Gini Coefficient and Reynolds-Smolensky Index)

Country	Gini before Transf.	Gini after Transf.	RS Index	Re-Rank Effect	Number of SNG	Changes due to Re-Rank	Ratio of Changes vs. Initial Rank	Winners
Argentina (2010)	0.4816	0.2563	0.2253	0.1798	24	21	0.8750	10
Brazil (2011)	0.2368	0.2520	-0.0152	0.1041	27	25	0.9259	10
Colombia (2009)	0.2867	0.3554	-0.0687	0.0885	32	31	0.9688	14
Mexico (2013)	0.2707	0.1141	0.1566	0.0629	31	27	0.8710	15
Peru (2014)	0.3380	0.1800	0.1579	0.0411	24	23	0.9583	11
Uruguay (2012)	0.3298	0.1838	0.1460	0.1186	19	15	0.7895	7
Average	0.13	0.13	0.07	0.06	3.90	3.68	2.19	1.76

Source: own estimates based on the IDB's subnational fiscal database and Porto (2015)

In Table 4 we show that revenue sharing schemes have significant equalizing effects among intermediate levels of government¹³. In practically all countries the revenue sharing transfers reduce, on average, one third to one half the initial disparities in own revenues. In Mexico, both non-earmarked (*Participaciones*) and earmarked (*Aportaciones*) transfers display more uniform distributions that compensate for the unequal yet very low levels of state own revenues. In Brazil, the shared revenues with states (*Fundo de Participação dos Estados e Distrito Federal, or FPE*) are distributed in a more unequal fashion, although they are mostly concentrated among the poorer states of the Northern and Northeastern regions. Nonetheless, the obsolescence of the FPE distribution criteria, fixed since 1989, no longer captures the remarkable economic and social progress made, for instance, by states in the Mid-West region (Ter-Minassian, 2013; Prado, 2011).

Table 4
EQUALIZING EFFECTS OF THE FISCAL TRANSFER SYSTEM BY COMPONENT
(Weighted Gini Coefficient)

Country	Year	Carryover Funds						
		Own Rev.	1 + Shared Rev.	2 + Discre- tional Transf.	3+ Royalties	4 + Cofinan. / Capital Transf.	5 + Condi- tional Transf.	6+ Total Revenue
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Regional Governments								
Argentina	2010	0.3125	0.2097	0.2088	0.2269			0.22698
Brazil	2011	0.2158	0.1440		0.1424			0.1609
Colombia	2009	0.2734	0.1784		0.2215	0.2215		0.2201
Mexico	2013	0.2277	0.1192		0.1264		0.1864	0.1528
Peru	2014	0.3186	0.1414		0.1396			0.1396
Uruguay	2012	0.2550	0.1541				0.2050	0.1541
Local Governments								
Chile	2013	0.4410	0.1940			0.2200		0.2730
Colombia	2009	0.4670	0.2147		0.2245	0.2181		0.2266
Peru	2014	0.6540	0.4060		0.4800			0.4980

Source: own estimates based on the IDB's subnational fiscal database

Despite the sizable equalizing effects, the evidence also shows some fundamental discrepancies between the own resources of SNGs and the per capita level of shared revenues. In Uruguay, the correlation between own revenues and per capita transfers, although negative, is weak. In Argentina, the same correlation is even positive. In this case, the Province of Tierra del Fuego, for example, which has the smallest population size and the highest levels of per capita own revenues in the country, receive more per capita transfers than any other province. Santa Cruz, having similar demographic and economic characteristics, receives the greatest per capita levels of non-earmarked transfers.

Royalties and other transfers from extractive industries tend to be regressive and worsen further existing inequities in per capita own revenues among regions. Notably in Argentina, Peru and Colombia, and to a lesser extent in Mexico, royalties increase such disparities, showing values greater than those of own revenues or shared revenues, suggesting the extremely high inequality embedded in its distribution formulas. When looking at the cumulative effects, in the cases of municipalities in Peru, provinces in Argentina and states in Mexico, and both municipalities and departments in Colombia, the introduction of royalties in the analysis reverse the equalizing effect of the FONCOMUN, the *Coparticipaciones*, the

Participaciones and the general revenue sharing system (*Sistema General de Participaciones, or SGP*), respectively. This regressive effect can be mainly explained by the allocation of royalties and related transfers on a derivation principle, which mostly benefits a minority of regions and municipalities nearby or where exploitation takes place.

Likewise, for Colombia and Brazil, the co-financing schemes have regressive effects on the distribution of SNG own revenues. In Chile, capital transfers, primarily the FNDR, also increases the existing disparities in per capita municipal revenues. This result could be due to the fact that the most developed regions and municipalities are at the same time the most capable, technically and administratively speaking, intermediate and local governments to comply with the requirements set forth in the public investment system to access grants, or the best positioned financially to co-finance the projects or access credit markets.

Finally, the transfer schemes with more promising equalizing elements in the region, Peru's FONCOMUN and Chile's FCM, contribute to reducing in one half the disparities in own revenues. Despite this important equalizing effect, there remain considerable fiscal disparities, perhaps signaling the limited size of their funding pools vis-a-vis the large differences in fiscal capacities that they are intended to reduce. This funding constraint, as well as the use of some equalizing criteria (*i.e.* per capita equalization in the FCM formula), poses significant challenges to equalize capacity with sufficiency.

Next, to begin with the identification of the factors determining the allocation of inter-governmental transfers in LAC, we first look at statistical correlations between transfer levels and various socioeconomic and fiscal characteristics of SNGs that are generally incorporated in distribution formulas. As expected, for both levels of government in a sample of countries circa 2010, there is a positive and moderate correlation between per capita transfers and poverty levels—Brazil constitutes the exception. In a similar way, the level of transfers allocated to local and intermediate governments are also negatively correlated with coverage rates of basic infrastructure services like water and sanitation (Spearman correlations from -0.16 to -0.4). Third, there is a strong negative correlation between per capita transfers and population density, for intermediate governments in all countries in the sample (the only level of government for which data is available), a correlation coefficient ranging from -0.47 to -0.96. These preliminary results indicate that current transfers exhibit some equalizing effects as they distribute more resources to local and intermediate governments facing greater expenditure needs or higher differential costs of service provision in their territories.

Tables 5 through 8 display the results from estimating the econometric model. We find that generally transfer systems in the region do not take into account the potential fiscal capacity of SNGs as a key factor in their distribution. In fact, in most cases at the regional level, the estimated coefficient for fiscal capacity is not statistically significant. Only for departments in Colombia do we obtain a positive and significant coefficient for GDP, perhaps reflecting the regressive distribution of royalties and transfers from extractive industries. Similarly, at the municipal level, the coefficient for GDP turns out to be positive and sig-

nificant, showing a regressive effect. All else being equal, the more fiscally capable the municipalities are, the more transfers they receive. Nonetheless, the economic relevance of the estimated parameter for local governments is rather small.

In addition, there is a large variance in the degree to which current transfer systems promote fiscal equalization through expenditure needs considerations. On the one hand, at the intermediate level of government, for Mexico, Colombia (also for municipalities) and Peru, the estimated coefficient for the poverty level/incidence is positive and significant, suggesting that transfer systems give more resources to those regions with more acute needs. On the other hand, in Argentina and Uruguay at the intermediate level, and Brazil at the municipal level, we obtain opposite results, showing statistically significant coefficients yet inverse relationships, indicating that transfer systems in these cases, on average, do not tend to benefit the most needed regions. In Chile we did not find any significant association between transfer levels and expenditure needs. Consistent with our findings from the more qualitative work on transfers systems in LAC described in previous sections, results suggest that there is considerable diversity in the elements used for equalization and compensation, and only a few countries seem to employ measures of poverty as equalizing criteria for expenditure needs.

Our results also show that equalization based on the size of the population is the most important and prevalent criterion in the LAC region. For both levels of government, the more populous regions and municipalities, on average, receive less per capita transfers. In all instances, the coefficient for population size is negative and significant, and this factor explains a large share of the variability in the allocation of transfers to SNGs. As documented, in several revenue sharing systems in the region resources are distributed for example on the basis of population density and level of rurality.

Another equalizing element on the expenditure side seems to be urban population size, in the case of Colombia, where there is an inverse relation between transfer levels and urbanization rates, a result presumably associated with the lower costs of providing public services in the presence of scale economies. The proportions of younger and older population in the regions and municipalities do not appear to have any explanatory power on the variation of per capita transfers, thus these factors do not seem to constitute key criteria for transfer allocation¹⁴.

Overall, the results from this simple econometric exercise suggest that the equalizing effect of current transfer systems in LAC are limited due to the lack of explicit equalizing criteria that accounts for differences in fiscal capacity among SNGs. Similarly, despite the wide array of experiences, countries do not calculate accurately the expenditure needs of SNGs and the use of criteria that capture the intensity of poverty to promote equalization is not widespread. The equalizing effects described in the previous section primarily stem from the allocation of transfers based on the size and concentration of population, considering that the densities found in urban agglomerations tend to produce scale economies, which redistributes resources to rural areas.

Table 5
PANEL DATA REGRESSIONS-TRANSFERS AND FISCAL CAPACITY
Subnational Governments, Selected LAC countries, 2000-12

VARIABLES	Argentina				Brazil				Colombia			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Population		-1.530* (0.753)	-3.148*** (0.962)			-0.921*** (0.291)	-1.096** (0.469)			-0.890*** (0.297)	-0.902*** (0.298)	
GDP	0.471 (0.321)		-0.875 (0.529)		0.314* (0.179)		0.265 (0.190)		0.636* (0.313)		0.640* (0.321)	
GDP(t-1)				-0.549 (0.338)				0.134 (0.166)				0.248* (0.124)
Population (t-1)				-2.619** (1.134)				-0.423 (0.363)				0.113 (0.288)
Constant	2.760 (2.899)	27.78** (10.22)	57.64*** (17.01)	47.51*** (18.05)	-9.081*** (0.285)	5.350 (4.357)	7.553 (7.219)	-2.595 (5.460)	-11.85** (4.880)	9.841** (3.974)	0.123 (6.844)	-7.147 (5.105)
Observations	240	240	240	240	232	284	232	206	414	414	380	380
R-squared	0.918	0.924	0.927	0.927	0.460	0.422	0.474	0.583	0.366	0.348	0.380	0.251
No. of RG	24	24	24	24	26	26	26	26	32	32	32	32
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VARIABLES	Mexico				Peru				Uruguay			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Population		-0.940*** (0.303)	-0.918*** (0.218)			5.098 (6.457)	22.19** (8.847)			-0.841*** (0.172)	-0.862*** (0.169)	
GDP	0.236* (0.125)		0.0893 (0.0914)		1.027 (1.266)		1.512 (1.513)		-0.0212 (0.0750)		-0.0325 (0.0715)	
GDP(t-1)				0.0545 (0.118)				1.441 (2.172)				-0.132 (0.0922)
Population (t-1)				-0.970*** (0.203)				7.798 (16.31)				0.283 (0.590)
Constant	-4.295*** (0.298)	8.763* (4.446)	8.822*** (3.189)	9.506*** (2.976)	-11.49*** (2.770)	-76.56 (86.50)	-311.8** (119.0)	-115.9 (220.7)	-6.094*** (0.516)	3.101 (1.984)	3.131 (1.877)	-10.59 (6.984)
Observations	319	415	319	287	144	321	144	120	241	241	241	222
R-squared	0.824	0.831	0.854	0.830	0.612	0.527	0.628	0.644	0.758	0.761	0.761	0.726
No. of RG	32	32	32	32	24	25	24	24	19	19	19	19
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

All variables are expressed in Log form. Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Own estimates based on the IDB's subnational fiscal database, World Bank Indicators, and OECD (2014)

Table 6
POOLED REGRESSIONS-TRANSFERS, FISCAL CAPACITY AND EXPENDITURE NEEDS
Subnational governments, selected lac countries

Variables	Argentina					Brazil					Colombia				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
GDP	-0.115 (0.217)				-0.711*** (0.225)	-0.349* (0.175)				-0.187 (0.261)	-0.321** (0.159)				0.130 (0.0833)
Poverty		0.167 (1.530)		-0.955 (1.027)	-7.099*** (1.646)		1.052** (0.501)		-0.102 (0.392)	-0.522 (0.652)		1.926*** (0.311)		0.420* (0.241)	0.617** (0.280)
Population			-0.468*** (0.0795)	-0.476*** (0.0739)	-0.563*** (0.0879)			-0.531*** (0.0716)	-0.536*** (0.0672)	-0.539*** (0.0708)			-0.447*** (0.0276)	-0.412*** (0.0270)	-0.410*** (0.0285)
Constant	8.378*** (1.943)	7.293*** (0.290)	13.69*** (1.044)	13.94*** (0.891)	22.56*** (3.112)	-8.111*** (0.229)	-8.949*** (0.201)	-0.507 (1.071)	-0.392 (1.018)	0.0491 (1.347)	3.744 (2.489)	-2.159*** (0.163)	4.683*** (0.349)	4.016*** (0.412)	1.864 (1.551)
Obs.	48	48	48	48	48	51	51	51	51	51	64	64	64	64	64
R-squared	0.012	0.000	0.480	0.488	0.645	0.040	0.054	0.588	0.588	0.592	0.055	0.309	0.719	0.729	0.735

Variables	Mexico					Peru					Uruguay				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
GDP	0.145*** (0.0457)				0.150*** (0.0411)	1.091*** (0.361)				1.758*** (0.442)	0.00468 (0.192)				-0.114 (0.131)
Poverty		0.207 (0.192)		0.431*** (0.136)	0.710*** (0.164)		-0.379 (1.163)		0.0492 (1.117)	3.850*** (1.174)		-1.060 (1.520)		-1.779** (0.807)	-2.221*** (0.958)
Population			-0.179*** (0.0252)	-0.192*** (0.0261)	-0.171*** (0.0242)			-0.629*** (0.212)	-0.631*** (0.218)	-0.494** (0.227)			-0.638*** (0.0727)	-0.663*** (0.0768)	-0.662*** (0.0768)
Constant	-4.374*** (0.112)	-4.807*** (0.0962)	-2.065*** (0.373)	-2.090*** (0.367)	-2.188*** (0.343)	-12.14*** (0.900)	-9.650*** (0.515)	-1.297 (2.873)	-1.298 (2.897)	-8.496** (3.574)	-6.112*** (1.287)	-5.699*** (0.689)	1.180 (0.858)	2.204*** (1.066)	1.629 (1.220)
Obs.	64	64	64	64	64	48	50	50	50	48	37	37	37	37	37
R-squared	0.134	0.013	0.398	0.453	0.563	0.137	0.001	0.096	0.096	0.280	0.000	0.019	0.545	0.598	0.605

All variables, except for Poverty, are expressed in Log form. Robust standard errors in parentheses

*** p < 0.01, ** p < 0.05, * p < 0.1

Source: Own estimates based on the IDB's subnational fiscal database, World Bank Indicators, and OECD (2014)

Table 7
DATA PANEL REGRESSIONS-TRANSFERS AND FISCAL CAPACITY
Local Governments, Selected LAC countries, 2000-12

Variables	Brazil				Colombia				Chile				Peru			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
GDP	0.110*** (0.00535)		0.0478*** (0.00457)		0.0340*** (0.00794)		0.0309*** (0.00770)		0.0126 (0.367)		-0.0382 (0.371)		0.0155*** (0.00586)		0.0150** (0.00585)	
Population		-0.674*** (0.0153)	-0.637*** (0.0158)			-0.414*** (0.0934)	-0.394*** (0.0928)			-1.940** (0.872)	-2.411** (1.117)			-1.201*** (0.0659)	-0.151 (0.164)	
GDP(t-1)			0.0277*** (0.00449)				0.0155** (0.00661)				0.423** (0.210)					0.0218*** (0.00638)
Population(t-1)			-0.210*** (0.0180)				-0.0653 (0.0858)				-2.457** (1.170)					-0.544*** (0.153)
Constant	10.55*** (0.00712)	16.96*** (0.143)	12.64*** (0.170)		-1.702*** (0.0124)	2.271** (0.895)	2.061** (0.889)	-1.190 (0.820)	2.822** (0.408)	22.09** (8.656)	26.81** (11.25)		-3.049*** (0.0136)	6.332*** (0.561)	-1.697 (1.465)	1.902 (1.363)
Observations	58,362	58,435	58,362	51,416	10,524	10,524	10,524	9,544	1,370	1,713	1,370	1,368	7,074	26,250	7,074	7,056
R-squared	0.778	0.805	0.807	0.795	0.254	0.256	0.259	0.301	0.071	0.073	0.077	0.096	0.184	0.713	0.185	0.154
No. of LG	5,562	5,562	5,562	5,557	1,084	1,084	1,084	1,084	345	345	345	345	1,451	1,833	1,451	1,450
Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

All variables are expressed in Log form. Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Own estimates based on the IDB's subnational fiscal database, World Bank Indicators, and OECD (2014)

Table 8
CROSS-SECTIONAL REGRESSIONS OF TRANSFERS, FISCAL CAPACITY AND EXPENDITURE NEEDS
Local Governments, Selected LAC Countries

Variables	Brazil 2010			Chile 2012			Peru 2007			Colombia 2009		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
GDP			0.0252*** (0.00307)			0.0723 (0.0589)			0.0434*** (0.0127)			0.0361*** (0.0103)
Population		-0.256*** (0.00447)	-0.235*** (0.00511)		-0.572*** (0.0391)	-0.560*** (0.0415)		-1.378*** (0.0134)	-1.358*** (0.0203)		-0.257*** (0.0175)	-0.259*** (0.0172)
Poverty	-0.649*** (0.0286)	-0.680*** (0.0200)	-0.630*** (0.0206)	1.852*** (0.432)	-0.448 (0.376)	-0.144 (0.477)	2.155*** (0.240)	0.207** (0.0876)	0.683*** (0.129)	0.877*** (0.0657)	0.673*** (0.0494)	0.751*** (0.0518)
Constant	11.51*** (0.00985)	13.93*** (0.0412)	13.68*** (0.0507)	2.654*** (0.115)	8.939*** (0.432)	8.668*** (0.515)	-3.767*** (0.165)	9.127*** (0.126)	8.681*** (0.221)	-1.663*** (0.0307)	0.878*** (0.161)	0.836*** (0.161)
Observations	5,212	5,212	5,212	314	314	314	1,759	1,759	1,169	1,079	1,079	1,079
R-squared	0.075	0.577	0.583	0.052	0.452	0.455	0.061	0.860	0.846	0.147	0.542	0.546

All variables, except for Poverty are expressed in Log form. Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Own estimates based on the IDB's subnational fiscal database, World Bank Indicators, and OECD (2014)

7. Conclusions

In this study we document the existence of large fiscal disparities among SNGs in LAC and present evidence of the equalizing effects of current transfer systems in the region. We find that transfers reduce disparities in subnational own income, although to a lower degree than in OECD countries, mainly due to the role of revenue sharing schemes that typically incorporate some equalizing elements. The equalizing effect has remained practically constant during the last decade, and in some cases the transfer systems seem to be losing equalizing power. This performance is mostly a result of the regressive effect of royalties and other transfers from the extractive industries, from discretionary transfers and from convergence funds. We also show that the remaining inequality in revenues among SNGs, after the allocation of transfers, is still large. In addition, we find that there are no explicit equalization transfers in LAC, and that transfers are distributed without considering the different subnational fiscal capacities and without precise measures of expenditure needs of SNGs. The lack of attention to these two issues constrains the potential of the systems to more effectively address horizontal fiscal imbalances.

The significant fiscal disparities among SNGs and the limitations of current transfers systems to reduce them could be affecting negatively regional equity and the overall effectiveness of decentralization reforms. The evidence shown in this paper highlights the need to make current transfers more compensatory, specifically through the design of explicit and sizable equalization transfer schemes. The consideration of subnational fiscal capacity in transfer distribution is a pending task in LAC, particularly in those levels of government and countries where the potential for equalization is greater. In those countries with favorable political and economic conditions, reforms of current systems should incorporate explicit formulas that estimate fiscal disparities on the basis of measuring the fiscal capacity and expenditure needs of SNGs.

The international experience emphasizes the influential role of political economy factors operating during the design and introduction of equalization transfers. Perhaps a good starting point in the region would be to keep the current size of the transfer fund, a strategy that could help to reduce the political costs of reforms and to focus attention on regional equity during political negotiations. Such redistributive reform in itself has high political costs associated to yielding winners and losers among SNGs. It is therefore sensible and more politically viable to implement a gradual reform that takes into account a transitory period towards the targeted equalization level, perhaps initially keeping the actual level of transfer assignments unchanged, and reducing the extent of re-rankings among SNGs. This strategy would not affect abruptly the financing level of losing SNGs, while equalization would begin on the margin, based on the estimated fiscal disparities. Also in this sense, policymakers and analysts must identify which particular component of current transfer systems are best candidates for reform. Our findings suggest the reform of the most regressive transfers, namely royalties and transfers from extractive industries, and discretionary transfers. In particular, there is a growing consensus indicating the desirability and viability of including non-natural resources revenues into equalization grants (Brosio and Jimenez, 2015). Reform opportuni-

ties in these areas would likely entail relatively lower political costs particularly for discretionary transfers, since these transfers tend to benefit few SNGs and that they do not have clear and transparent rules.

The absence of more precise estimates of expenditure needs inhibit us to identify whether current transfer systems compensate for them in an appropriate way. Future research efforts should address this important issue, and ultimately estimate fiscal gaps and disparities among SNGs.

Notes

1. See Martínez-Vázquez and Sepúlveda (2011) for an analysis of practices in transfer design in LAC, including examples of equalization transfers. Capello, Airaud and Degiovanni (2015) compare the equalization capacity of Argentina's transfer system to that of seven other countries, including three in LAC.
2. Due to the larger number of SNGs and the greater concentration of economic activities and population in a few cities, this ratio is likely to be much higher for local governments.
3. Net fiscal benefit is the difference between the utility that households derive from consuming public services and the taxes they pay for producing these services, standardized to take differences in preferences and tax rates into account (OECD, 2014).
4. Peru's FONCOR is the exception as it uses a distribution formula that incorporates measures of expenditure needs.
5. Given the regional coverage of the present study and the lack of consistent and comparable data available on public finances, economic conditions and population profiles disaggregated by levels of subnational governments, the various empirical analyses herein use different countries as samples for different estimations.
6. Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Ecuador, Honduras, Mexico and Uruguay.
7. We use this variable because, with the data at hand, it is impossible to calculate the potential revenues that SNGs could get from exerting a common tax effort on their respective tax bases. Therefore, the use of this proxy variable has limitations as it cannot fully capture the potential revenue generation and the likely variations in own tax effort of SNGs. Also, when comparing within and between countries, this variable is unlikely to capture differences in tax revenue assignments.
8. There are other statistics that can be —and have been— used to measure inequality in tax systems, including the Kakwani and Theil indexes. Our paper uses the Gini coefficient, the coefficient of variation and the max. to min. ratio because these are the most popular and easily understood measures of inequality and dispersion, and because this choice enables us to compare our results to those found in the OECD (2014). We obtain very similar results when using the Kakwani and Theil indexes (available from the authors upon request).
9. Argentina, Brazil, Colombia, Chile, Mexico, Peru and Uruguay.
10. Unmet basic needs as a measure of poverty refers to a household that is affected by a number of factors: overcrowded housing, housing units lacking of basic services, high economic dependency (i.e. many people depending from a household head), and school-age children not receiving formal education.
11. As mentioned in the conceptual framework, political factors are essential to understand the allocation of transfers among SNGs. Unfortunately, due to a lack of data, it is impossible to include political variables in our model.
12. The Reynolds-Smolensky (RS) is another useful way to measure the equalizing effect of transfers, by comparing the level of inequality among SNGs (based on Gini coefficients) before and after receiving transfers, using the correct ranking. The RS index can be expressed as $RS = (Gb-Cda) - (Ga-Cda)$, where Cda captures the concentration of total revenues (own plus transfers) based on the initial ranking of SNGs —the re-ranking

effect (Porto, 2015; Reynolds and Smolensky, 1977). Although transfers may be equalizing, they may lose their impact as re-rankings can allow some SNGs that initially had lower levels of resources, to gain relatively more than others after transfer and thereby escalate positions in that same ranking.

13. The detailed results regarding the equalizing effects of each component of the transfers systems for each country are available from the authors upon request.
14. Results from estimations using these demographic variables are available upon request.

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Resumen

Este trabajo aporta evidencia acerca de la existencia de diferencias fiscales en los gobiernos subcentrales en América Latina y muestra las limitaciones de los sistemas de transferencias intergubernamentales para reducirlas. Para once países de la región durante el periodo 2000-2012, los resultados muestran que, aunque las transferencias reducen las diferencias en términos de ingresos, el resto de las disparidades fiscales entre gobiernos subcentrales permanecen y son considerables. El trabajo también aporta evidencia de que las transferencias se distribuyen sin tener en cuenta la capacidad fiscal o indicadores de necesidades de gasto, lo que minora el potencial nivelador de aquellas. Nuestros resultados sugieren que la introducción de transferencias de nivelación puede contribuir de manera efectiva a reducir las disparidades fiscales y mejorar el nivel de equidad interregional.

Palabras clave: descentralización, disparidades fiscales, inequidad, transferencias, nivelación.

Clasificación JEL: H25, H71, H73, H77.

Annex

Table 1
EQUALIZATION IN SUBNATIONAL TRANSFER SYSTEMS

Country	Funding and Composition	Objectives and Distribution Criteria	Distribution Formula	Equalizing Transfers	Equalizing Level
Argentina	Transfers represent 62% of total provincial revenues, from which 70% are automatic (Revenue sharing system) and 30% are non-automatic (discretionary).	The revenue sharing system incorporates redistributive and proportional distribution criteria, such as population, development gap, and dispersion of population. Reforms to the system have not sought an explicit objective but have been "patches", which have resulted in the so-called «labyrinth coparticipation» (Porto, 2015). A rapid growth of discretionary transfers in recent years is recorded.	Since 1988 ad-hoc percentage shares were established for each province in the national tax revenue sharing system, based on the historical evolution of transfers and political negotiations.	None	Moderate to equalize fiscal capacity. Limited redistributive nature: provinces with similar characteristics (in terms of poverty and income) receive different levels of transfers (both automatic and discretionary). Overall system loses effectiveness in recent years Automatic transfers strongly tied to the economic cycle affect provincial social spending (IDB, 2015). Royalties are regressive.
Bolivia	Shared revenues represent 20% of federal taxes. 35% of the direct tax on hydrocarbons (<i>Impuesto Directo a Hidrocarburos</i> - IDH) Other transfers: forest royalties 25%, mining royalties 15%, hydrocarbon patents 50% and mining patents 30%.	The sharing system is distributed according to the number of inhabitants. IDH has a specific destination for investment in education, health, public safety and infrastructure. In general they are not earmarked, but they have some parameters to target investment most than current spending.	Yes: (i) population.; and (ii) Geographic (more resources to regions with exploitation of hydrocarbons and mines). Do not recognize the institutional performance and accomplishment of development goals.	HIPC transfers to local governments use a formula based on population and poverty levels.	Both the IDH and the departmental royalties have created imbalances in the allocation of per capita income. The transfers are highly linked to cyclical trend in exports of natural gas making them more exposed to external shocks.
Brazil	Participation Fund of the States and the federal district, (<i>Fundo de Participação dos Estados</i> – FPE) is 21.5% of income and property tax. Participation Fund of the municipalities, (<i>Fundo de Participação dos Municípios</i> – FPM) is 22.5% income and property tax. Municipal participation in the Tax Sharing of the States (VAT, property tax and vehicle) Specific transfers for health, education and social programs.	FPE: population, area and per capita income. FPM: redistributive instrument that compensates for horizontal imbalances. Variable coefficients are applied according to the number of inhabitants (10% to state capital and 90% to the rest of the municipalities).	FPE: 85% for less developed regions of the North, Northeast and Midwest. 5% in terms of land area and 95% in inverse proportion to population income per capita. FPM: depending on the population and the inverse of per capita income.	Regional Development Funds for North, Midwest and Northeast. Fund for maintenance and development of basic education and strengthening education professionals. Health Fund.	FPE: Limited and the effect is being lost in recent years. The coefficients are fixed since 1989. FPM: Greater equalizing effect, reducing disparities in almost half, because index used favors municipalities with small populations.

Country	Funding and Composition	Objectives and Distribution Criteria	Distribution Formula	Equalizing Transfers	Equalizing Level
Chile	The Municipal Common Fund (<i>Fondo Común Municipal</i> - FCM) is a mechanism of solidarity redistribution funded from own revenues of municipalities (Robin Hood scheme). Central government transfers: budget items conditioned to management of education establishments and primary health (not automatic).	The FCM redistributes resources from municipalities with greater economic capacity to those with lower capacity (horizontal transfers).	Since 2008, FCM's formula includes: (i) 25% in equal shares; (ii) 10% according to poverty level; (iii) 30% according to the number of exempted properties from the property tax; and (iv) 35% according to permanent own revenues.	National Fund for Regional Development (<i>Fondo Nacional de Desarrollo Regional</i> - FNDR) is an instrument of fiscal transfers for regional convergence and territorial compensation, intended to finance social and economic infrastructure in the regions according to investment programs.	The FCM is not considered a proper equalizing transfer because the exemption policy on the tax base of the property tax particularly affects the poorest municipalities. The impact of the FCM is redistributive, of a significant magnitude, but a great heterogeneity remains in municipal per capita income, mainly due to the limited size of the FCM (Henriquez, et al, 201; Pineda et al, 2013), due to its small-scale financing. FNDR ends up being regressive while only some municipalities with greater institutional capacity have access to financing.
Colombia	General System of Participations (<i>Sistema General de Participaciones</i> – SGP): Unrestricted funds 5% and 95% earmarked to education, health, school feeding and water and sanitation. The SGP formula ensures real growth of transfers, without linkage to current income growth in the country. General Royalties System (<i>Sistema General de Regalías</i> - SGR) for oil production, hydrocarbons, coal and minerals. National co-financing for regional investment projects.	Seek to provide similar levels of per capita education, health and water in different territories. Multiple additional targets including poverty reduction and administrative efficiency. Until 2012, SGR was based on the principle of origin, but the reform is intended to distribute resources more equitably. Has transitional provision «hold harmless».	The distribution of SGP gives priority to factors that favor poverty (60%) and take into account the size of the population (40%).	None	SGP for Departments presents moderate redistributive effect. The SGP for municipalities presents an important equalizing effect, reducing by almost half disparities in own revenues per capita, due to its primary focus on smaller municipalities (usually the less affluent Category 6). Royalties have a regressive effect.
Costa Rica	Local governments receive 25% of hydrocarbons tax. Transfers from central government reached a maximum of 10% of ordinary income from the revenues and expenditures budget.	Transfers from hydrocarbons taxes have a redistributive approach. The cantons with the lowest HDI receive proportionately more resources. Do not look particularly to reduce differences in fiscal capacity.	Oil revenues are distributed: 60% based on extension of road network in each canton, and 40% according to the Cantonal Social Development Index (SDI) Distribution of central government transfers: 25% in equal shares, 25% in reverse proportion to SDI, 25% according to canton population, and 25% according to territorial extension.	None	The direct transfers in Costa Rica have contributed to reducing extreme and total poverty (UNDP, 2014).
Ecuador	Central government transfers: 21% of current revenue and 10% of capital income of the General Budget. Transfers to finance the exercise of new powers in the areas of irrigation, traffic, transport and road safety. Transfers for compensation when autonomous governments generate, exploit or industrialize nonrenewable resources.	90% of central government transfers are conditional: may finance up to 30% of permanent spending and a minimum of 60% of non-permanent expenses for fulfilling their functions and responsibilities. Of total transfers, 27% goes to provincial governments, 67% to municipal governments and 6% to rural parishes.	Each SNG receives a baseline amount in terms of resources received in 2010, plus an adjustment depending on population density, poverty, achievements in improving living standards, tax effort and compliance of the national development plan.	None	Limited. For instance, in 2013 municipalities with the highest incidence of poverty (as Guayaquil), received less transfers per capita than municipalities with lower poverty levels (as Cuenca).

Country	Funding and Composition	Objectives and Distribution Criteria	Distribution Formula	Equalizing Transfers	Equalizing Level
México	Shares (unconditional transfers): Main source is General Fund for Shares (<i>Fondo General de Participaciones</i> – FGP), which comes from 20% of federal tax revenues. Contributions (conditional transfers): special funds for education, health, social development and public safety. 10% of transfers are allocated by ad hoc methods.	The distribution of shares seeks to reward economic growth and fiscal effort. The distribution of contributions is based on cost reimbursement, particularly wages.	The shares are distributed through a formula that considers the level and growth of the state GDP and growth in tax revenues. Both formulas are transparent and clear rules, but with the 2007 reform became complicated by including minimum provisions «hold harmless».	None	Neither conditional nor unconditional transfers include elements in the formula for allocating more resources to states with low fiscal capacity. States with higher incomes and those with the highest concentration of poverty, receive more transfers per capita than low-income states (Revilla, 2012).
Peru	To regions: (i) ordinary resources for education and health; (ii) Regional Compensation Fund (FONCOR); and (iii) other transfers (discretionary and natural resources). To municipalities: (i) Municipal Compensation Fund (FONCOMUN); (ii) transfers of natural resources; and (iii) other transfers (discretionary).	FONCOR provides funding conditioned to capital expenditures and their allocation is based on objectives of equity and compensation. FONCOMUN incorporates redistributive allocation criteria (greater weight to rural and poor population of Lima)	FONCOR is distributed taking into account factors of poverty, location, population, tax contribution and efficiency in execution of investments. FONCOMUN is distributed among the 195 provinces from an index that considers population, and water, sanitation and electricity coverage. From this allocation 20% goes to provincial governments and 80% to their districts, depending on poverty, territory and municipal management.	Fund for Regional and Local Public Investment: cofinances projects in areas with higher poverty and lower transfers from natural resources.	FONCOMUN has a significant effect, halving disparities in own revenues per capita, but now is less important in the structure of municipal financing. Transfers from natural resources are regressive and concentrate on the areas of largest mining activity. Ordinary resources contribute to fiscal equalization modestly.
Uruguay	Global transfer of unrestricted funds to Departments. The amount and distribution criteria are defined in the budget law (since 2005 was set at 3.3% of the national budget). Earmarked transfers come from 33.5% of the Interior Development Fund (<i>Fondo de Desarrollo del Interior</i> - FDI)	The main criteria for distribution are: population, area, the inverse of the GDP and unsatisfied basic needs, including some partial adjustments, as the CPI.	No. The distribution of resources between departmental governments is defined in the five-year budget Law, but is not based on a formula. Reflects political negotiation capacities and historical trajectories, but no explicit matching criteria.	None	The transfers have diminished the gap in per capita income between departments. The current system of transfers shows a limited redistributive nature (Muineló et al, 2015). No correlation between per capita transfers and poverty levels of departments (Pineda et al., 2013)

Source: IDB 2015.