Intermunicipal Cooperation in Metropolitan Regions in Brazil and Mexico: Does Federalism Matter?

**Oliver D. Meza[1], Eduardo José Grin[2],
Antônio Sérgio Fernandes[3],
and Fernando Luiz Abrucio[2]**

Abstract

While Latin America is undergoing a process of metropolitanization, we argue that intermunicipal cooperation (IMC) arrangements may serve as a quality check of the region's metropolitan governance. We also adhere to the notion that IMC in a metropolitan region is affected not only by constitutional variables embedded in federalist arrangements but also in different ways. We test this assumption by building on a series of hypotheses taken from the literature on IMC. We then compare results from Mexico and Brazil, both federal countries with metropolitan regions. In testing the same variables, we observe different outcomes and a different explanatory power of the theoretical premises underlying IMC. We assign these explanatory differences to features of federalism, an understudied variable. We conclude that, while municipal drivers constitute relevant factors in predicting IMC within a metropolitan region, federalist arrangements modify the weight attributed to these factors.

[1]Center for Research and Teaching in Economics, Aguascalientes, Mexico
[2]Getulio Vargas Foundation, São Paulo, Brazil
[3]Federal University of Bahia, Salvador, Brazil

Corresponding Author:
Oliver D. Meza, Research-Professor in the Public Administration Division of CIDE, Center for Research and Teaching in Economics, Circ. Tecnópolo 117, Hacienda Nueva, Aguascalientes 20313, Mexico.
Email: oliver.meza@cide.edu

Keywords

Introduction

What factors encourage municipalities in a metropolitan region to engage in intermunicipal cooperation (IMC)? Do federalist arrangements influence engagement in IMC? Our interest in this subject has arisen on account of two ideas. First, that a quality check of a metropolitan region's governance is possible by means of looking at the ways the municipalities in a given metropolitan region cooperate in addressing policy issues (Lidström 2017; Savitch and Adhikari 2017). We believe there is still more to know about governance in metropolitan regions (Hawkins 2010) in a context of an increasing wave of metropolitanization in Latin America (Rodriguez-Acosta and Rosenbaum 2005). Second, federalism differs from country to country, while there is enough evidence and theoretical insights suggesting that federalism does affect IMC (Hulst and Van Montfort 2012; Tavares and Feiock 2018). Thus, as federalism affects IMC, we have set out to investigate the idea concerning the role of the metropolitan region seen as an effective polity scale that somehow mediates between local governments and supra-local governments (Cox 2010; Savitch and Adhikari 2017) or acts as a shield against upper-level governments (Grin and Abrucio 2016). The capacity of metropolitan municipalities to engage in IMC, as we will show, can be affected by the constitutional milieu afforded by their own federalist arrangements.

We investigate IMC in metropolitan regions (MR) in Brazil and Mexico. We compare the two federal countries by reviewing hypotheses from a diverse array of core theoretical frameworks, including the Institutional Collective Action Framework (ICA) (Feiock 2007, 2013); rational and public choice (Ostrom 1972); and new institutionalism (March and Olsen 1987). The ICA framework, however, has been widely used in IMC, especially in the United States (Feiock and Scholz 2009) but more recently applied to European countries (Tavares and Feiock 2018). Our work contributes to test this framework in Latin America focusing on metropolitan regions within federal systems. We arrange the theoretical insights around four main hypotheses we see fit for the purpose of this research:

Hypothesis 1 (H1): Financial dependency from upper levels of governments.
Hypothesis 2 (H2): Socio-demographic metropolitan characteristics.
Hypothesis 3 (H3): Local political institutions.
Hypothesis 4 (H4): Local government capacity.

Our main argument is that the IMC process is affected by features incorporated in the federalist arrangements, in addition to other features previously tested in other contexts. More importantly, when testing a theoretical framework, a usual shortcoming is to neglect the rationale behind the causal mechanisms (Cartwright 2013), in this case, the factors driving the promotion of IMC proliferation. For instance, it has been argued that New Public Management reforms have promoted IMC in Finland but not in England (Hulst and Van Montfort 2012). The difference is due to the constitutional features affecting the supporting factors behind the causal mechanism. Thus, we argue that, even though Mexico and Brazil are federal countries, nuances in their design can distinctly affect the likelihood of their building IMC within their metropolitan regions.

The paper is organized as follows. We first defined IMC to render it possible to compare the same phenomenon in different administrative contexts. We also explain how IMC can be used to understand metropolitan governance. In the section "What Makes Intermunicipal Cooperation Possible?" a theoretical framework is built to organize the available literature. Four main groups of testable implications were identified by which to compare the Mexican and Brazilian cases. The section "The Federalist Context of Intermunicipal Cooperation in Metropolises" describes the two countries' federalist arrangements by providing an overview of the situation and briefly comparing political and institutional designs. We then explain the research design, the econometric models, and the data used. Section five provides the "Results," immediately followed by a "Discussion."

We conclude that the explanations around IMC need to empirically account for the distinctive features of federalism. Brazil's federalist institutions, decentralized IMC policy, and municipal mandates in metropolitan areas reduce intergovernmental conflicts as compared with Mexico. The Brazilian context affords greater autonomy to local governments and a larger role to the states in the metropolitanization process, unlike what Mexican municipalities experience within their metropolitan regions, where these two conditions are weaker, more informal, and thus prompting more intergovernmental bargaining.

IMC in Metropolitan Regions

Globalization urges municipalities to collaborate to increase their economic competitiveness and to manage externalities. But metropolitan regions are ill-equipped to address flows of people, money, and issues that transcend the municipal boundaries (Ramirez De la Cruz 2012; Matkin and Frederickson 2009). Many studies have addressed IMC (Andrew 2009; Feiock 2007;

Hawkins, Hu, and Feiock 2016; Pacheco-Vega 2014); however, the need for cooperation in MRs is vital (Feiock and Scholz 2009; Lidström 2017) because of their interdependencies (Carr, Hawkins, and Westberg 2017). IMC is also less well studied in MRs (Hawkins 2010).

IMC captures the metropolitan quality of governance (Lidström 2017), as it deals with coordination problems through patterns of formal or informal interorganizational arrangements (Cravacuore and Clemente 2006; Matkin and Frederickson 2009) that go beyond organizational borders to achieve specific results (Teles 2016, p. 10). IMC often involves geographic proximity among cooperating municipalities. MRs represent a setting of municipalities in close proximity, involving local entities rooted in space, often a major city and its suburbs (Bel and Warner 2016, p. 99; Bel, Fageda, and Warner 2010; Tavares and Camões 2007; Zafra-Gómez et al. 2013).

A number of models exist that characterize IMC. Regular taxonomies are based on a cross-section of such dimensions as local autonomy, institutional formality, and political resistance (Nunn and Rosentraub 1997); decision and autonomy costs (Tavares and Feiock 2018); legally binding public-private arrangements (Lidström 2017); or hard-soft cooperation and high-low institutionalization (Teles 2016). These models represent an efficient way to determine the main variables shaping IMC diversity. A downside, however, is that context deeply matters in comparative endeavors (Collier and Mahon 1993).

Instead of asking what makes municipalities engage in a specific IMC scheme (public consortia, service contracts, multilateral partnership, or even multimunicipal associations), the challenge is to assess IMC as separate from the wider array of institutional schemes. A working definition of IMC is needed to compare metropolitan municipalities belonging to different contexts. This problem has been especially acute when dealing with local governance theories (Kantor and Savitch 2005; Pierre 2005, 2014; Sellers and Kwak 2011), but the quest to scale down to compare the uneven nature of local governance (Snyder 2001) begs for moving up the ladder of generality (Sartori 1970) as regards the definition of IMC. Such conceptual endeavor requires researchers to devise strategies designed to yield a traveling concept.

We proceeded with a radial strategy. According to Collier and Mahon (1993), primary categorizations provide core meanings. Thus, "the concept of inter-municipal co-operation [is] used in a broad sense. It included all arrangements where local governments co-operate with each other" (Hulst and Van Montfort 2012, p. 3). We rely on three primary categories. The first one defines IMC as a voluntary scheme where no supra-local entity formally obliges a municipality to enter into. This leaves out any formal vertical relation (Miller and Lee 2011) imposing an IMC scheme. It rules out secondary categories within the taxonomy seen in Tavares and Feiock (2017), for example, *imposed authority* schemes.

The second category posits that a cooperation scheme is a deal between two or more municipalities. Depending on the IMC scheme, public or private law becomes a salient attribute (Lidström 2017), one that nonetheless, as a secondary category, does not help to define conceptual lines. The third category assumes that IMC is premised on some territorial contiguity, proximity, or belongingness to the same geographic region. In this sense, it does not include those associations that share information (Teles 2016) without a territorial approach, possibly just aiming to increase their political power against supra-local entities or strengthen their institutional capacity. Entities such as *Asociación Mexicana de Municipios A.C* (AMMAC), international *United Cities and Local Governments* (UCLG), or *International City County Management Association* (ICMA) in the United States are examples thereof.

What Makes IMC Possible?

The literature is abundant from where to extract a well-defined set of factors affecting IMC proliferation. We present theoretical insights around four main hypotheses in an attempt to answer what affects IMC within metropolitan regions. These hypotheses serve as comparative leverage to contrast Mexico and Brazil. Explanations of their federalist features follow in a subsequent section.

Local Dependency on Supra-local Resources

The relationship between municipalities and supra-local levels of government influences public policy at the local level, as well as the extent to which IMC is formed (Agranoff and Radin 2014; Feiock and Scholz 2009; Kübler & Pagano 2012; Meza 2015, 2016; Miller and Lee 2011; Rodríguez-Oreggia and Tuirán 2006). A higher incidence of IMC is seen where intermediate tiers of government are either absent or deterred from making use of their competencies (Hulst and Van Montfort 2012, p. 129). However, the debate remains open when it comes to the connections between an IMC scheme in a given MR and the influence received from upper and middle levels of government (Brenner 2003; Cravacuore and Clemente 2006; Hulst and Van Montfort 2012; Kübler and Pagano 2012). For instance, government fragmentation and interjurisdictional collaboration between metropolitan governments positively affect the entities' ability to receive federal transfers (Bickers and Stein 2004; Post 2002).

But from a different perspective, dependency on upper levels of government may increase the cost of entry in IMC, since transfers tend to come attached to a stricter set of rules (Feiock 2007, p. 51). Alternatively, interlocal competition between municipalities that are highly dependent on supra-local resources may trigger lower levels of IMC, as transaction costs increase

(Krueger and McGuire 2005). Evidence from federal countries—Mexico, Argentina, Brazil, and the United States—show that fiscal, political, and administrative authority denied to municipalities weakens a local government and reduces its ability to start and keep up metropolitan collaboration (Spink, Ward, and Wilson 2012, p. 256). If, for instance, the capacity to generate own-source revenue (OSR) reduces supra-local dependency, then an increase in OSR should be associated with greater capacity to engage in IMC. A similar trend is expected with supra-local resources. Fewer supra-local resources, meaning less supra-local dependency, can be associated with higher IMC levels. Alternatively, the literature addressing this issue suggests that a higher rate of OSR reduces the probability of municipalities getting into IMC arrangements (Bel and Warner 2016; Feiock 2007; Feiock and Scholz 2009; Rodríguez-Oreggia and Tuirán 2006; Wolman 2012).

Municipalities' Socio-demographic Characteristics

The transaction costs involved in IMC are linked to characteristics of the MR. Findings suggest connections between IMC formation and social heterogeneity (Feiock 2007, 2013; Hawkins 2009, 2010; Ostrom 2010). Heterogeneity between metropolitan municipalities suggests the presence of significant asymmetries of power and resources, and increases uncertainty and imbalances regarding the formation of stable IMC (Bae and Feiock 2012; Feiock and Scholz 2009). Also the socioeconomic composition of the MR shapes mayors' preferences (Dlabac et al. 2018, p. 5). In general, metropolitan heterogeneity undermines IMC if it imposes higher transaction costs; larger differences make it more difficult to reach collaboration (Bel and Warner 2016; Feiock 2007; Frug 2001; Lowery 2000; Post 2002; Warner and Hefetz 2002).

For instance, large socioeconomic differences hinder the establishment of IMC because its benefits will appear less appealing to a wealthier community (Carr, Hawkins, and Westberg 2017; Tavares and Feiock 2018). Propensity to cooperate increases if the interests of a local government are addressed, while decreasing with higher costs or partners with lower financial capabilities (Bel and Warner 2016; Carr, Gerber, and Lupher 2007; Hawkins 2009, 2010; Lowery 2000; Lubell, Schneider, Scholtz, and Mete 2002).

Population differences are pivotal. *Ceteris paribus*, the greater the heterogeneity in population sizes within MRs, the lower the likelihood of IMC (Bel and Warner 2016; Hulst and van Montfort 2012; Maser 1998; Soukopová and Vaceková 2018). Small municipalities may seek to cooperate with each other as a strategy to reduce or share the cost of service provision (Bel, Fageda, and Mur 2014, p. 447), but larger ones tend to avoid such agreements. A tradeoff exists between IMC costs and individual plausible efficiency gains (Feiock 2007; Hawkins 2009; Kwon and Feiock 2010).

Since MRs represent a market of municipalities from where to engage in cooperative agreements (Bel, Fageda, and Warner 2010; Bel and Warner 2016, p. 99; Tavares and Camões 2007; Zafra-Gómez et al. 2013), notwithstanding metropolitan decision-making rules (LeRoux and Carr 2007), as a municipality's population growth rates increase with respect to others, incentives to cooperate diminish, since such municipality will leverage its own size to avoid the transaction costs incurred in IMC processes (Brown and Potoski 2003, p. 462).

Political Institutions in Metropolitan Local Governments

Political institutions used as an explanation for IMC are seldom used in empirical analysis (Bel and Warner 2016, p. 100). Another way of looking at this is by seeking to understand how political institutions affect membership. While certain organizational cultures can drive the disposition toward IMC (Bryson et al. 2014; Teles 2016), metropolitan membership is key to engage in a cooperative arrangement due to such resources as trust and reputation (Carr, LeRoux, and Shrestha 2009; Feiock and Scholz 2009, p. 367).

For instance, professional associations such as ICMA and other epistemic communities help to disseminate policy practices (Carr, LeRoux, and Shrestha 2009, p. 406), but the membership-effect suffers depending on the local political institutions. Since electoral and political processes are independent within metropolitan municipalities, party tenure and party fragmentation can limit the incidence of IMC. Metropolitan political fragmentation negatively affects these agreements (Andrew and Hawkins 2013; Carr, Hawkins, and Westberg 2017; Carr, LeRoux, and Shrestha 2009; Feiock 2007; Hawkins 2010). In the absence of institutions safeguarding intertemporal cooperative arrangements, even party alternation increases transaction costs, reducing the levels of mutual trust, credibility, and reputation (Carr, LeRoux, and Shrestha 2009; Feiock 2009, p. 367). Longer tenure reduces uncertainty and promotes decision-making based on long-term considerations of the collective benefits of collaboration (Brown and Potoski 2003; Clingermayer and Feiock 2014; Feiock 2007, p. 55; Hawkins 2017; Hefetz, Warner, and Vigoda-Gadot 2012, p. 756). Also ideological changes affect IMC; evidence suggests that right-wing mayors tend to cooperate less (Bel, Fageda, and Mur 2014; Dlabac et al. 2018), but this finding still remains to be confirmed in other parts of the world.

Metropolitan Governments' Institutional Capacities

Despite the economic advantages of IMC, local governments without institutional capacity are less likely to participate in IMC arrangements. While

fiscal stress or debt have been sought as IMC enablers (Andrew 2009; Bel and Warner 2016; Wolman 2012), evidence contradicts this notion or at least suggests that IMC is contingent on other features (Bel and Warner 2016; Bel et al. 2014). In general, absence of capacity increases transaction costs for IMC (Lubell et al. 2002). Fiscal resources and management skills were mentioned as important drivers for IMC in Argentina (Cravacuore and Clemente 2006, p. 7), in Mexico (Rodríguez-Oreggia and Tuirán 2006), and in Brazil (Grin and Abrucio 2016).

Building technical and financial capacity to respond to new, self-imposed metropolitan competencies poses a great challenge to municipalities (Lackey, Freshwater, and Rupasingha 2002; Teles 2016, p. 11). In this sense, professional management is an important driver for cooperation (Bel and Warner 2016; Brown and Potoski 2003; Hefetz, Warner, and Vigoda-Gadot 2012) as it helps to overcome technical challenges (Hefetz, Warner and Vigoda-Gadot 2012, 2015; Nelson and Svara 2012). Both public management profiles (Stoker 2009) and organizational culture may affect the likelihood that municipalities will engage in IMC (Bryson et al. 2014; Teles 2016).

The Federalist Context of IMC in Metropolises

We have argued that IMC offers a quality check of metropolitan governance. Federalism, however, is a constitutional-legal variable that affects both the metropolitan process and IMC expansion and levels. While the literature explaining IMC identifies a set of well-defined factors, we hold that federalist constitutional-legal frameworks have direct implications for IMC formation (Tavares and Feiock 2018). Our argument is well in line with Tavares and Feiock (2017) and Hulst and Van Montfort (2012). In the case of federalist systems, we argue that Mexico and Brazil share similarities yet also differences that affect the levels, depth, and coverage of IMC observed within metropolitan regions. The following paragraphs provide a deeper inquiry into this argument.

The metropolitan and IMC landscapes differ considerably between Brazil and Mexico. Brazil has 74 metropolitan areas,[1] encompassing 1,144 municipalities (almost 20% of the 5,570 Brazilian municipalities). IMC in Brazilian MRs is thriving, with most municipalities entering into IMC schemes with at least one other local government according to 2011 data. Mexico, however, is in stark contrast to Brazil. The country has 59 metropolitan zones (Consejo Nacional de Población 2010), naturally formed as city conurbations, with social and economic interdependences, which have only recently been officially recognized as metropolitan regions. Only 367, out of more than 2,400 municipalities, belong to an MR (15%), with only 45 of them engaging in IMC, according to the municipal census year 2011.

Table 1. Main Distinctions Between Brazil and Mexico Federalism.

	Brazil	Mexico
1. Political, fiscal, and administrative municipal autonomy[a]	Moderate to high	Moderate to low
2. Municipal government reelection	Yes	Not in the period of time studied
3. Public policy decentralization	Formally allocated (constitutionally defined, specially welfare state policies granted mostly by fixed fiscal transferences)	Partially formal but mostly based on fiscal incentives and subject to supra-local discretion
4. Constitutional and legal basis to establish intermunicipal cooperation schemes	Federal legislation protects and drives IMC schemes	Great heterogeneity across states, no federal legislation besides a line in the national constitution
5. Level of government responsible for establishing metropolitan regions	Formally through state level legislation	Initially naturally configured, but later acknowledged by state and federal legislation

Note. IMC = intermunicipal cooperation.
a.Autonomy as constitutionally established.

Considering this huge difference, what could explain the situation in both countries? Are the factors affecting IMC seen elsewhere applicable to Brazil and Mexico? How might nuances of federalism affect these factors? In the 1980s, Brazil and Mexico underwent a decentralization process that aimed to enhance local autonomy, local democracy, and government efficiency (Falleti 2010; Grin, Bergues, and Abrucio 2017; Rodden 2004). However, to Montero (2001), the distributional struggles opposing federal and subfederal levels of government that arose during that period explain the outcomes of the federalist arrangement. Five key outcomes characterize and distinguish Brazilian and Mexican federalism (Table 1).

First, the level of political, fiscal, and administrative autonomy significantly differs between the two cases. Even when state governments have the constitutional power to create metropolitan institutions, they usually take into account the capacity of local governments to act independently. Brazil is a unique case of three-tier federalism, in that, differently from other federalist countries (e.g., the two-tier federalism of Mexico), municipalities

constitutionally enjoy greater political, legal, administrative, and budgetary autonomy. In contrast, Mexican municipalities require state-level legislatures to issue their own fiscal appropriation laws.

Second, until recently, the possibility of mayoral reelection constituted an important difference. Lower levels of uncertainty and higher levels of trust are necessary conditions to engage in IMC. Reelection reduces transaction costs if continuing cooperation is taken more or less for granted by mayors with good chances of being reelected. Since 2000, Brazilian mayors are allowed to seek reelection for a second four-year term of office. In Mexico, at the time this paper was written, mayors stayed in office for only one three-year term, with no reelection.

Third, the policy decentralization process has clearly shaped Brazil's municipal agenda since the new Federal Constitution was adopted in 1988. The charter established common competences for central government, states, and municipalities[2]; more importantly, it established sources of revenue, thus halting federal discretion in policy-making (Abrucio 2005; Arretche 1999). Article 115 of the Mexican Constitution provides for a municipal policy agenda, but the decentralization process was highly affected as the federalist agenda (Montero 2001, p. 47) informally shaped and controlled local policy agendas through federal fiscal transfers, partisan interests, and state legislative reforms (Meza 2016).

Fourth, the legal basis to establish intermunicipal consortia has been enshrined in the Brazilian Constitution. The Public Consortia Law was approved in 2005 and established both state and private intermunicipal consortia (Grin and Abrucio 2016). The Brazilian Federal Constitution does not provide for the establishment of metropolitan governments, nor does the Mexican Constitution. Indeed, in contrast with Brazil, Mexico lacks a federal legal basis to regulate the creation of IMC schemes. At best, the Mexican Constitution allows municipalities to develop cooperation schemes, but no further legislation exists to operationalize or protect such arrangements.

Last, Brazil has a constitutional framework that provides for the establishment of MRs; state-level legislatures have the mandate to implement them. The Brazilian functional decentralization expanded rapidly (Montero 2001) in an attempt to quickly overcome the federal concentration of power carried out by the military regime in 1985. In Mexico, a number of state laws regulate metropolitan regions, mostly enacted after the natural formation of metropolitan cities as a result of conurbation and interdependence between neighboring cities.

Research Design

Two interrelated questions guide the research:

Research Question 1: To what extent does the available IMC theoretical frameworks explain intergovernmental arrangements in MRs in Mexico and Brazil?

Research Question 2: How do the federalist arrangements in Brazil and Mexico affect the explanations provided by the IMC theories available in the revised body of literature?

To attempt to answer these questions, we compare IMC in metropolitan regions in both countries using a comparable set of variables and the same quantitative analytical framework. International comparisons of IMC or metropolitan governance are fewer than single-country case studies, while the most recent works rely on qualitative case comparisons (Erkuş-Öztürk 2011; Taylor 2014; Wollmann 2010) or cross-country surveys (Sellers and Kwak 2011). We have conducted an international comparison using official data and comparable variables, and have sought the best means of comparison while addressing each country's data challenges separately.

Four general hypotheses and further testable implications based on the literature review were used as the main platform for comparison. We expected to find a clear different explanatory power across the two cases. According to the literature review, there is a plausible effect of supra-local governments on IMC in MRs (H1). Greater municipal financial dependency of municipalities on supra-local levels of government or lower own source revenues reduce the likelihood of IMC in metropolitan regions. Second, demographic and socio-economic characteristics within an MR affect IMC (H2). We tested for metropolitan heterogeneity (relative measures) and absolute measures of population, poverty, and gross product per capita (GPxC). Third, political institutions affect IMC (H3). We tested whether party alternation negatively affects IMC and whether a mayor's IMC-related ideology affects such arrangement too; yet for this last one, our theoretical expectations provided no clear answer. Fourth and last, we tested the municipalities' institutional capacity (H4). The literature suggests higher capacity is needed to engage in IMC; therefore, we used literacy as a comparable proxy and the bureaucracy's level of education. See Table 4, with a summary of hypotheses, variables and supporting literature discussed earlier.

Dependent Variables

We attempt to explain IMC in metropolitan regions (MR). Our main dependent variable is a continuous variable on the count of the collaborative arrangements in which a given metropolitan municipality has entered into for the provision of a service or a policy item with one or more

Table 2. Mexican Summary Statistics.

Variable	M	SD	Min	Max	N
Dependent variable					
Intermunicipal cooperation (IMC) (Count)	0.52	2.69	0	25	351
Independent variables					
Supra-local resources (SLR) (Percentage)	72.5	15.70	26.15	98.92	328
Own-source revenue (OSR) (Percentage)	16.21	11.77	0.90	61.60	328
Gross product per capita (GPxC) (Categorical)	1.31	0.46	1	2	350
Gross product per capita (Continuous)	105.35	360.92	0.83	5736.34	350
Poverty level (POV) (Categorical)	1.52	0.50	1	2	350
Population under poverty line (Percentage)	47.22	15.47	5.10	86.90	350
Population level (Pop) (Categorical)	1.32	0.47	1	2	350
Population (Continuous)	157024	274293	2772	1656107	350
Party alternation (PA) (Count)	2.70	1.30	1	6	325
Ideology of mayors (IM) (Categorical)	2.00	0.83	1	4	325
Bureaucracy Education (BEDU) (Percentage)	45.40	32.05	0	100	347
Literacy rate (Percentage)	80.88	3.32	59.73	87.88	350
Control variables					
Number of municipalities (Count)	23.19	26.25	1	76	350
Indigenous population (Percentage)	3.02	6.61	0.09	79.03	350

metropolitan municipalities. IMC average level of this variable in Mexico is 0.52, for a total of 13 policy items,[3] while the average in Brazil is 1.14, in a range of 11 policy items[4] under which to analyze IMC-related information. The standard deviation of the dependent variable is higher than the mean in both cases (Tables 2 and 3). From 306 actual observations in Mexico, only 45 exhibit a nonzero level of IMC, and distribution in Brazil is also skewed, which led us to consider a negative binomial regression model to analyze our data. The period of time analyzed comprises data mostly from 2010 in the case of Mexico and 2011 in the case of Brazil. The general model applied is equation (1). The following section explains the data used, but further details are available in the appendix.

$$IMC = SLR + OSR + GPxC + Pov + Pop + PA + IM + Bedu + \lambda + \varepsilon \quad (1)$$

Independent Variables

Two variables were used to test supra-local dependency (H1). The first one concerns supra-local resources (SLRs), as the percentage of total municipal budget coming from supra-local intergovernmental transfers, whether earmarked or not. The second variable is OSR, or the percentage

Table 3. Brazilian Summary Statistics.

Variable	M	SD	Min	Max	N
Dependent variable					
Intermunicipal cooperation (IMC) (Count)	1.136	1.449	0	11	1,155
Independent variables					
Supra-local resources (SLR) (Percentage)	84.10	12.53	32.91	108.5	1,155
Own-source revenue (OSR) (Percentage)	9.051	8.194	0.434	54.24	1,155
Gross product per capita (GPxC) (Categorical)	1.334	0.472	1	2	1,155
Gross product per capita (Continuous)	9.773	11.07	1.564	197.7	1,155
Poverty level (POV) (Categorical)	1.471	0.499	1	2	1,155
Population under poverty line (Percentage)	47.86	25.34	3.480	96.99	1,155
Population level (Pop) (Categorical)	1.158	0.365	1	2	1,155
Population (Continuous)	85.243	431.954	1.044	1.130E+07	1,155
Party alternation (PA) (Count)	0.873	0.658	0	2	1,155
Ideology of mayors (IM) (Categorical)	2.100	0.782	1	4	1,155
Bureaucracy Education (BEDU) (Percentage)	62.22	26.11	0	100	1,155
Literacy rate (Percentage)	82.77	11.29	46.03	100	1,155
Control variables					
Number of municipalities (Count)	21.43	12.24	0	49	1,155
Black population (Percentage)	5.447	5.003	0	55.11	1,155

of total municipal budget coming from locally generated resources such as local taxes, fees, and other local sources of revenue autonomously levied. All figures where previously converted to per capita terms.

Socio-demographic effects on IMC (H2) were tested by means of six variables. Relative and absolute specification of GPxC was used to test wealth in IMC. Relative GPxC is a dichotomous variable where 1 is a level < (below) the metropolitan mean and 2 is a level ≥ (equal or above) the metropolitan mean. An absolute measure of GPxC is a continuous variable measuring the level of GPxC in Mexican pesos and Brazilian reais in any given municipality. The absolute measurement of poverty (Pov) in Mexico and Brazil is the percentage of people living below the poverty line at the municipal level.[5]

The metropolitan relative level of poverty was constructed (1,2) similarly to the variable before. Finally, size of municipalities was measured in terms of the population (Pop). The metropolitan relative measurement constitutes a dichotomous variable (1,2) constructed as the others before. Absolute measurement is a continuous variable of the population (count) included in the analysis. The model avoids inadmissible levels of multicollinearity, despite the variable sources. Further evidence of this claim is available in the pairwise correlation of covariates (Appendix A) and through the variance inflation factor (VIF) test (Appendix B).

Table 4. Hypotheses, Associated Variables, and Support in the Literature.

Hypotheses	Variables	Source
H1		
Supra-local dependency	SLR—Supra local resources OSR–Own source revenue	Wolman (2012), Feiock (2007), Rodríguez-Oreggia and Tuirán (2006), Feiock and Scholz (2009), Bel and Warner (2016)
H2		
Local socio-demographic characteristics	Gross product per capita and Relative metropolitan level of gross product per capita Poverty levels and Relative metropolitan level of poverty Size in terms of population and Relative metropolitan level of population	Carr, Hawkins, and Westberg (2017); Dlabac et al. (2018); Post (2002); Bel and Warner (2016); Soukopová and Vaceková (2018); Hulst and Van Montfort (2012); Maser (1998); Bel, Fageda, and Mur (2014)
H3		
Political institutions	Political alternation Mayor ideology	Feiock (2007); Carr, LeRoux, and Manoj (2009); Bryson et al. (2014); Teles (2016); Bel, Fageda and Mur (2013); Dlabac et al. (2017); Carr, Hawkins, and Westberg (2017)
H4		
Local government's capacity	Bureaucracy's education level and Municipal level of literacy	Brown and Potoski (2003); Nelson and Svara (2012); Hefetz, Warner, and Vigoda-Gadot (2012, 2015); Stoker (2009)

Source: Authors' elaboration according to the literature review.

In testing political institutions (H3), two variables were constructed. Party alternation (PA) is a continuous variable measuring the frequency of party alternation experienced by a given municipality in a given number of past administrations. In the case of Mexico, data allowed us to go back up to eight administrations, whereas for Brazil, data go back up to three administrations, to the year 2011.[6] Mayor ideology (MI) is the second variable. As in other studies, ideology is associated with IMC (Bel, Fageda, and Mur 2014; Dlabac et al. 2017).

A frequent distinction is right- and left-wing parties. For the case of Mexico, Murillo and Martínez-Gallardo (2007) classified the three largest parties thus: PAN, right-wing; PRD, left-wing; and PRI, center party.[7] Similarly, with reference to Brazil, according to Carreirão (2014), the left-wing parties are PCdoB, PDT, PHS, PMN, PPS, PSB, PT, and PV; the right-wing parties, DEM, PTB, PP, PR, PRB, and PSC; and the centrist parties, PSDB and PMDB. Other smaller right-wing political parties responsible for governing 88 out of 1,155 municipalities are PRP, PRTB, PSDC, PSL, PTdoB, PTC, and PTN.[8] The MI variable is categorical, where 1 is a right-wing party, 2 is a centrist party, and 3 is a left-wing party. Coalitions have proliferated in Mexico since the year 2000, and in Brazil since 1988. Coalitions were classified according to the ideology of the largest party or to that of the coalition's leading party (1, 2, and 3). However, municipalities with parties not covered by the criteria adopted or run by a coalition made up of the two largest parties were classified as number 4.

Finally, the capacity of local governments (H4) was tested by using the formal education of municipal employees (bureaucracy education [BEDU]). In the case of Mexico, privacy laws allow the publication of information only for heads of department. The variable is specified as the percentage of heads of department with undergraduate studies or above. In Brazil, the proxy used was the average level of education of the whole bureaucracy. The assumption is that the general level of education and that of the heads of departments are correlated.[9] In addition, a comparable variable—municipal population literacy—was used, measuring the percentage of the population aged 15 years or more that can read and write both in Mexico and in Brazil.

Control Variables—λ

Two variables were used as controls. The literature suggests metropolitan size as a key explanatory variable for IMC. We control for this with the number of municipalities within a given MR. In the case of Mexico, the indigenous population may significantly characterize local conditions as regards both the size of municipalities and IMC levels. A percentage of the indigenous population is used as a country-specific control variable. In Brazil, Black population is the country-specific variable.

Results

Table 5 shows the results for Mexico and Table 6 for Brazil. Each country has several specifications to test the model with different combinations while addressing multicollinearity issues and country-specific relevant variables. Support to the IMC theoretical frameworks differs significantly between the

Table 5. IMC Nbreg Results for Mexico.

Model Specification	A	B	C	D	E
Variables	IMC	IMC	IMC	IMC	IMC
SLR	−0.0195		−0.0169	−0.0194	−0.0258
	(−0.0245)		(−0.0262)	(−0.0238)	(0.0234)
OSR	−0.0637***	−0.0535***	−0.0662***	−0.0638***	−0.0535***
	(−0.0165)	(−0.02)	(−0.0197)	(−0.0153)	(0.0156)
GPxC = 2	1.537**	1.542**	1.421**	1.536**	1.362**
	(−0.681)	(−0.692)	(−0.679)	(−0.675)	(0.655)
GPxC	−0.00623**	−0.00592**	−0.00597**	−0.00623**	−0.00606**
	(−0.00296)	(−0.0028)	(−0.0029)	(−0.0029)	(0.00290)
Pov = 2	0.289	−0.00551	0.51	0.29	0.311
	(−0.609)	(−0.583)	(−0.555)	(−0.624)	(0.608)
Poverty %	0.0284	0.0251		0.0286	0.0282
	(−0.0337)	(−0.034)		(−0.0316)	(0.0325)
Pop = 2	−0.404	−0.516	−0.376	−0.41	−0.298
	(−0.653)	(−0.808)	(−0.654)	(−0.708)	(0.640)
Population—cont.	−2.80E−08	4.22E−08	−2.22E−07		−4.23e−07
	(−1.38E−06)	(−1.36E−06)	(−1.24E−06)		(1.11e−06)
PA	−0.382**	−0.450**	−0.337*	−0.383**	−0.362**
	(−0.179)	(−0.224)	(−0.185)	(−0.192)	(0.171)
IM = 1	0.858	0.833	1	0.858	0.866
	(−0.646)	(−0.669)	(−0.653)	(−0.647)	(0.652)
IM = 3	−2.156*	−2.085*	−2.281**	−2.157*	−2.078*
	(−1.211)	(−1.22)	(−1.122)	(−1.215)	(1.205)
IM = 4	−15.59***	−15.63***	−15.24***	−15.59***	−15.01***
	(−0.552)	(−0.508)	(−0.488)	(−0.541)	(0.608)
BEDU	0.0160*	0.0157*	0.0147*	0.0160*	0.0129
	(−0.00861)	(−0.00924)	(−0.00816)	(−0.00898)	(0.00822)
Literacy %	0.472***	0.453***	0.411***	0.472***	0.410***
	(−0.14)	(−0.142)	(−0.111)	(−0.134)	(0.138)
No of Mun per MR—λ»	0.00293	0.00514	0.0032	0.00294	0.00219
	(−0.0131)	(−0.0126)	(−0.014)	(−0.0127)	(0.0123)
Indigenous %—λ»					−0.283**
					(0.142)
Constant	−38.06***	−37.67***	−32.14***	−38.10***	−32.27***
	(−12.85)	(−12.98)	(−9.535)	(−12.02)	(12.41)
Inalpha	2.440***	2.451***	2.448***	2.440***	2.363***
	(−0.161)	(−0.163)	(−0.17)	(−0.16)	(0.158)
Constant	−38.06***	−37.67***	−32.14***	−38.10***	−32.27***
Observations	306	306	306	306	306

Note. IMC = intermunicipal cooperation; SLR = supra-local resources; OSR = own-source revenue; GPxC = gross product per capita; IM = ideology of mayors; BEDU = bureaucracy education; MR = metropolitan regions; PA = Party Alternation.

Table 6. IMC Nbreg Results for Brazil.

Model Specification	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Variables	IMC	IMC	IMC	IMC	IMC	IMC	IMC
SLR	-0.00371	-0.0145**	-0.0140*	-0.0194***	-0.0142**	-0.0177**	-0.0143**
	(-0.00595)	(-0.00713)	(-0.00718)	(-0.00711)	(-0.00704)	(-0.00757)	(-0.00708)
OSR		-0.0183	-0.0230*	-0.0177	-0.0186	-0.0225*	-0.019
		(-0.0135)	(-0.0131)	(-0.0135)	(-0.013)	(-0.0135)	(-0.0134)
GPxC2	-0.0406	-0.0351	-0.0366	0.00889	-0.0197	0.00901	-0.0328
	(-0.106)	(-0.106)	(-0.109)	(-0.11)	(-0.104)	(-0.109)	(-0.108)
GPxC	0.000688	0.00185	0.00157	0.00268		0.0016	0.0013
	(-0.00485)	(-0.00491)	(-0.00494)	(-0.00518)		(-0.0048)	(-0.00496)
Pov = 2	0.292*		0.309*	-0.0505	0.303**	0.280*	0.300*
	(-0.157)		(-0.159)	(-0.131)	(-0.154)	(-0.161)	(-0.158)
Poverty %	-0.0131**	-0.00800**	-0.0141***		-0.0134***	-0.0168***	-0.0133**
	(-0.00535)	(-0.00405)	(-0.00536)		(-0.00521)	(-0.00524)	(-0.00531)
Pop = 2	-0.0326	-0.0163	-0.13	0.0149	-0.0366	-0.0401	-0.0344
	(-0.136)	(-0.141)	(-0.158)	(-0.14)	(-0.138)	(-0.14)	(-0.139)
Population—cont.	-4.34e-07**	-4.10e-07*		-4.56e-07**	-3.99e-07*	-3.63e-07*	-3.98e-07*
	(-2.09E-07)	(-2.19E-)07		(-2.17E-07)	(-2.09E-07)	(-2.02E-07)	(-2.12E-07)
PA	-0.00624	-0.0112	-0.0121	-0.00981	-0.011	-0.0164	-0.0116
	(-0.0534)	(-0.0533)	(-0.0544)	(-0.054)	(-0.0534)	(-0.0525)	(-0.0532)
IMI	-0.0839	-0.0865	-0.084	-0.103	-0.0872	-0.0686	-0.087
	(-0.0969)	(-0.0995)	(-0.0995)	(-0.099)	(-0.0983)	(-0.0984)	(-0.0981)

(continued)

Table 6. (continued)

Model Specification	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Variables	IMC	IMC	IMC	IMC	IMC	IMC	IMC
IM3	0.0697***	0.0715***	0.0709***	0.0726***	0.0699***	0.0671***	0.0699***
	(−0.0254)	(−0.0254)	(−0.0248)	(−0.0255)	(−0.025)	(−0.025)	(−0.025)
IM4	0.000494	0.00132	−0.0057	−0.00888	−0.0036	−0.00511	−0.00328
	(−0.0811)	(−0.0796)	(−0.0804)	(−0.0798)	(−0.0806)	(−0.0816)	(−0.0807)
BEDU	0.00263	0.00229	0.0019	0.00174	0.00219	0.0022	0.00221
	(−0.00182)	(−0.0018)	(−0.00179)	(−0.00174)	(−0.00177)	(−0.00178)	(−0.00178)
Literacy %	−0.0162***	−0.0146***	−0.0143***	−0.0211***	−0.0152***		−0.0151***
	(−0.00504)	(−0.00492)	(−0.00482)	(−0.00535)	(−0.00485)		(−0.0049)
No of Mun per MR λ	0.0101	0.0104	0.0104	0.0110*	0.0105	0.0121*	0.0105
	(−0.00646)	(−0.00637)	(−0.00643)	(−0.00647)	(−0.00646)	(−0.00642)	(−0.00645)
Black pop. % λ	0.00971	0.0123	0.011	0.0106	0.0122	0.00762	0.012
	(−0.0185)	(−0.0181)	(−0.0182)	(−0.0178)	(−0.0173)	(−0.0191)	(−0.018)
Constant	1.529**	2.626***	2.578***	3.197***	2.482***	1.695**	2.489***
	(−0.749)	(−0.779)	(−0.807)	(−0.784)	(−0.794)	(−0.741)	(−0.793)
Lnalpha	−1.066***	−1.066***	−1.066**	−1.028***	−1.084***	−1.057***	−1.084***
	(−0.406)	(−0.412)	(−0.415)	(−0.394)	(−0.412)	(−0.412)	(−0.414)
Observations	1.155	1.155	1.155	1.155	1.155	1.155	1.155
Pseudo R-squared	.0464	.046	.0453	.0431	.0475	.0445	.0475

Note. Cluster at metropolitan region level standard errors in parentheses. IMC = intermunicipal cooperation; SLR = supra-local resources; OSR = own-source revenue; GPxC = gross product per capita; IM = ideology of mayors; BEDU = bureaucracy education; MR = metropolitan regions; PA = Party Alternation.

*p < .1. **p < .05. ***p < .01.

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two cases. In the following section, we briefly explain the results; this is followed by a deeper discussion.

Unlike Brazil, Mexico shows statistically significant results concerning seven main independent variables. Both countries show a negative association between OSR and IMC, but in the Mexican case, this variable is statistically significant ($p < .01$) in all five specifications of the model, while in Brazil just in two models ($p < .1$). The association between SLRs and IMC is negative and exhibits statistical significance ($p < .05$ and $p < .10$, depending on the model) only for the Brazilian case. In the Mexican case, there is a positive association yet without any statistical significance at the conventional level.

In the Mexican case, the relative metropolitan level of GPxC is positively associated with IMC in all five model specifications. Model A shows a 1.5 coefficient with statistical significance at a 5% confidence level. The absolute version of GPxC, on the contrary, shows a negative correlation that is also statistically significant (at $p < .05$). No significant results were found for Brazil as regards the GPxC variable.

The poverty and population variables show no statistical associations for any of the specifications in the case of Mexico. On the contrary, Brazilian relative metropolitan levels of poverty show a positive coefficient (mostly at $p < .10$), while a negative association was found for absolute levels of poverty. Absolute size in terms of population was found negatively associated with IMC, at a 10% confidence level, in almost every model. In Brazil, the number of municipalities in MRs has a positive coefficient, at 10%, in two models.

Party alternation (PA) is negatively associated with IMC in the case of Mexico; however, the size of the coefficient and its statistical significance vary slightly across model specifications. In model A, the PA coefficient is -.38, significant at a 5% confidence level. PA in Brazil is negatively associated with IMC; however, the coefficient is relatively small, and the statistical association lacks significance at any conventional level.

MI is associated with IMC. The center-leaning party is taken as the point of reference. It appears that left-leaning governments (IM3) are negatively associated with IMC in Mexico. Coefficient size and statistical significance vary slightly across models. Model A presents a coefficient of -2.15 for IM = 3 ($p > .1$). In Brazil, however, left-leaning governments (IM3) are positively associated with IMC in all seven model specifications. With respect to other types of coalitions such as IM = 4, in Mexico—but not in Brazil—the association is strongly and consistently negative with IMC. Model (A) shows a coefficient of -15.5, significant at a confidence level of 1%.

The bureaucracy's level of education is positive and consistently associated with IMC in both cases, although coefficients in Brazil are not statistically different from zero. In Mexico, the coefficient size in model A is .016 at a 10% confidence level, and all model specifications are statistically different from zero. Literacy exhibits a highly significant association with IMC. In Mexico, the association is positive, while in Brazil, it is negative, although with small coefficients.

Control variables seem to capture the effect of additional covariates with efficacy. In Mexico at least, the percentage of indigenous people is negatively associated with IMC. In Brazil, the Black population does not show any significant statistical association. A higher number of municipalities within an MR does appear to be mildly relevant for IMC in both cases.

Model specifications across tables interchange variables to address suspicion of multicollinearity biasing the results. The coefficients, however, do not vary significantly, and results are mostly stable across all specifications. VIFs are provided in Appendix B. The VIF indicator for Brazil and Mexico allows ruling out any severe problem of multicollinearity.

Discussion

While the theoretical model used is mostly based on municipal individual characteristics, findings diverge as to the overall level of support brought to the model. The IMC model seems to predict Mexico faring better than Brazil. Paradoxically, Brazilian metropolitan municipalities show higher levels of IMC. Mexican municipalities, on the contrary, seem to engage in these arrangements facing far greater hardships.

The evidence suggests that context matters. Federalist nuances between countries become a salient explanation for the different outcomes in IMC within MRs. Brazilian federalism is characterized as being more formally decentralized than Mexico's. Brazilian municipalities also enjoy greater political and administrative autonomy as granted by constitutional rules, while reelection is possible. Brazilian policy decentralization is formally established, thus reducing vertical intergovernmental bargaining issues or, at least, organizing them on the basis of more systematic rules. Decentralization in Brazil encourages a different behavior because local governments have constitutionally guaranteed financial transfers, as well as greater autonomy to decide who engages or not in IMC without further interference.

Furthermore, IMC in Brazil enjoys legal provisions entrenched in the Federal Constitution and regulated by secondary legislation, while a metropolitan configuration is a prerogative of the state level. In Mexico, however, IMC

lacks such legal foundations, and until recently, metropolitan configuration was initiated without being legally recognized. The context in Mexico, relative to Brazil, suggests a greater weight of individual local characteristics explaining IMC. Variables such as own source revenue, socio-demographic characteristics, and local capacity offer a better explanation for IMC in Mexico than in Brazil. The federalist design supports these assumptions (for instance, the higher the supra-local transfers, the lower the probability of IMC in Brazil).

Hulst and Van Montfort (2012) contend that variations in IMC are triggered by mid-level government institutions. But, according to this line of thought, we may say that IMC is dependent on the kind of institutions being propagated by or embedded in the federalist arrangement. Brazil's mid-tier government affects MRs and IMC; however, the exact mechanism is different from that previously assumed. The lower transaction costs in Brazilian MRs stem from the clarity of the rules and an adequate legal framework safeguarding IMC that is based on the federal law. In Mexico, decisions are far more embedded in an intergovernmental struggle. IMC, there, is more vulnerable within MRs due to the informality of institutions and is, therefore, subject to local specific characteristics.

The hypothesis based on political institutions (H3) offers clear evidence of the latter argument. IMC in Mexico suffers in the absence of an institutional environment that protects intermunicipal arrangements from intertemporal party alternation (PA). While party fragmentation is arguably higher in Brazil, thus assumedly leading to a reduction in trust in IMC due to political competition, the evidence suggests, in line with Grin and Abrucio (2016), that since 2005, Brazil's federal legislation has increased IMC legal support, thus ensuring greater stability regardless of political parties.

Party tenure and fragmentation is associated with lower IMC capacity (Andrew and Hawkins 2013; Carr, Hawkins, and Westberg 2017; Carr, LeRoux, and Shrestha 2009; Feiock 2007; Hawkins 2010) but only in the absence of key institutions, as is the case in Mexico. The results held constant even after controlling for ideology of mayors (Bel, Fageda, and Mur 2014; Dlabac et al. 2017). It is also worthy of note that Mexico's unstable coalitions, such as the ones bringing together right- and left-leaning parties, or those made up of small parties, were systematically associated with lower IMC levels, thus supporting the idea of high transaction costs being experienced in these less stable coalitions.

The institutional capacity of metropolitan municipalities (H4) shows differences between the two federations. In Mexico, the bureaucracy's level of education was positively associated with greater IMC, as expected from the theoretical discussion (Bel and Warner 2016; Brown and Potoski 2003;

Hefetz, Warner, and Vigoda-Gadot 2015; Nelson and Svara 2012). Literacy was also positively associated with IMC in Mexico, though not in Brazil, where the direction seems counter-intuitive. The statistic parameter is low—close to .015 in all models—and, as the mean of the municipal population is not so high (almost half of Mexican municipalities), the rate of literacy—a proxy for the local capacity of public employees—is small. Thus, the lack of a skilled workforce helps to explain the negative association and the option for IMC as a surrogate to compensate for the poorer local availability of human resources. In fact, in Brazil, according to the federal Public Consortia Law, if metropolitan municipalities create a legally sheltered IMC institution, they are obliged to establish a special office to provide technical assistance to all the local government members of a given consortium, thus reducing the role of local bureaucracies to engage in IMC. This is another way to analyze the federalist effect on IMC in the Brazilian case.

IMC in Brazil's MRs was little associated with variations in OSR (H1). Higher OSR can either diminish supra-local influence, and logically positively promote IMC, or reduce IMC due to transaction cost avoidance. Mexican outcomes seem to support the second argument. The municipalities' efforts toward establishing IMC seems driven, rather than by independence from above, by a need to avoid higher transaction costs exerted from horizontal interdependencies. But, considering SLRs, according to the literature, higher dependency is associated with lower levels of IMC. This is the case in Brazil, which shows the influence of federalist rules on IMC partner municipalities.

Transaction cost avoidance was also seen as a driver of IMC within MRs according to the evidence regarding (H2) socio-demographic characteristics. IMC within metropolitan municipalities was negatively associated with higher absolute levels of poverty in Brazil and higher absolute levels of GPxC in Mexico. These findings support the idea around IMC expecting a decline whether from increasing of wealth in Mexican case or poverty in Brazilian case (Carr, Hawkins, and Westberg 2017; Tavares and Feiock 2018). The outcome is stable after controlling for other covariates. Size was also negatively associated with IMC, as municipalities leverage their own size to avoid transaction costs (Brown and Potoski 2003; Bel, Fageda, and Mur 2014; Bel, Fageda, and Warner 2010); still, these results were only statistically significant in Brazil, where economy of scale matters, especially in larger cities when they decide not to enter into IMC agreements.

The picture between countries diverges with reference to Brazil's relative levels of poverty or Mexico's GPxC. In other words, heterogeneity is effectively associated though differently. While a higher relative metropolitan

level of gross domestic product per capita is positively associated with IMC in Mexico, Brazil exhibits a positive association only with higher relative metropolitan levels of poverty. While further research is needed to account for this, interpretations for both findings are in line with the idea of power asymmetry and uncertainty as regards to IMC (Bae and Feiock 2012; Feiock and Scholz 2009). Metropolitan regions enter into IMC agreements as a way to support the region as a whole. Brazilian poorer municipalities might experience a lower IMC bargaining entry cost than their Mexican counterparts. On the contrary, richer municipalities may not see any advantage in associating with poorer ones. Wealthier Mexican metropolitan municipalities, however, have fewer constraints to decide engaging on IMC. Poorer municipalities may not enjoy such breadth of alternatives. To them, IMC is presented in the form of a *take-it-or-leave-it* negotiation, with, among other considerations, their lack of resources rendering them unable to freely establish this kind of interaction on their own.

Conclusion

Our findings allow us to conclude that subnational autonomy and a clearer metropolitan agenda—not a metropolitan government—are needed to support the resiliency of IMC arrangements within MRs. We analyzed the case of IMC in metropolitan regions in two federal countries in Latin America. Evidence suggests that previous explanations of IMC offered in the literature are a better explanation for what happens in Mexico's metropolitan municipalities, while IMC in Brazilian metropolitan regions is higher than in Mexico.

The federal context matters; a favorable context as exists in Brazil, with formal policy decentralization; a federal law supporting IMC; constitutionally mandated reelection of mayors since the year 2000; and state-level autonomy to create MRs all contribute to higher metropolitan governance quality and legal stability. At the same time, SLR-related rules can also reduce the likelihood of IMC. In both ways, federative institutions are relevant. These issues reduce the exclusive role of municipal factors and shed light on the explanatory relevance of federalist institutions and arrangements to explain the likelihood of IMC.

In Mexico, the incidence of IMC in metropolitan regions seems far more challenging. Mexico's federalism places subnational policy-making as a bargaining game, both between municipalities themselves and between these and other levels of government. Such a game increases uncertainty and, therefore, the transaction costs to engage in resilient local cooperation

arrangements. IMC in Mexican MRs seems far more sensitive to the municipalities' relative differences than what has been observed in Brazil (e.g., the smaller statistical effect of OSR found in Brazilian municipalities). Stronger local governments, according to Spink, Ward, and Wilson (2012), is a necessary condition to improve metropolitan governance, but the evidence reported in this paper highlights the importance of constitutional-level variables (Hulst and Van Montfort 2012; Tavares and Feiock 2018), in this case federalist features, as they affect the importance of local municipal factors to engage in IMC.

The underlying story is one of metropolitan regions lacking sufficient federal institutions to protect their own internal governance from external shocks or individual idiosyncrasy, and unable to contribute to higher political levels of trust and more stability between metropolitan municipalities.

We believe this is a promising research agenda. IMC has been extensively addressed in the literature. However, mid-level contexts (e.g., metropolitan regions) and macro-level contexts (e.g., constitutional and legal variables) affect how this phenomenon develops. In this case, the way municipalities address policy issues reflects on metropolitan governance (Lidström 2017; Savitch and Adhikari 2017), yet further research is needed to understand why and how.

Pairwise Correlations for Brazil and Mexico Variables.

	IMC	SLR	OSR	GPxC	Pov	Pop	Indigenous	PA	IM	BEDU	Population	Number of municipalities	Poverty	Gross product per capita	Literacy
Mexico															
IMC	1														
SLR	-.045 / .416	1													
OSR	.001 / .988	-.772 / .000	1												
GPxC	.052 / .332	-.254 / .000	.281 / .000	1											
Pov	-.056 / .299	.243 / .000	-.251 / .000	-.296 / .000	1										
Pop	.057 / .286	-.29 / .000	.269 / .000	.346 / .000	-.375 / .000	1									
Indigenous	.092 / .087	-.087 / .115	.118 / .033	.06 / .263	.044 / .415	.182 / .001	1,00								
PA	-.044 / .433	.241 / .000	-.309 / .000	-.028 / .611	.041 / .466	-.136 / .014	.03 / .54	1							
IM	-.073 / .19	.058 / .308	-.077 / .18	-.046 / .41	.041 / .458	-.117 / .035	-.02 / .75	.208 / .000	1						
BEDU	.062 / .25	-.343 / .000	.337 / .000	.209 / .000	-.044 / .414	.265 / .000	-.18 / .000	-.279 / .000	-.121 / .03	1					
Population	.032 / .55	-.399 / .000	.374 / .000	.242 / .000	-.293 / .000	.581 / .000	-.11 / .000	-.161 / .004	-.073 / .189	.298 / .000	1				
No. municipalities	.024 / .65	.083 / .134	-.153 / .006	-.223 / .000	.019 / .717	-.151 / .005	-.11 / .05	-.013 / .809	.091 / .1	-.151 / .005	-.029 / .584	1			
Poverty	-.045 / .4	.567 / .000	-.586 / .000	-.275 / .000	.57 / .000	-.344 / .000	.05 / .27	.283 / .000	.113 / .041	-.361 / .000	-.407 / .000	.071 / .188	1		
Gross product per capita	-.02 / .709	-.164 / .003	.201 / .000	.302 / .000	-.159 / .003	.061 / .252	-.06 / .25	-.098 / .077	.003 / .964	.022 / .683	.025 / .638	-.102 / .056	-.195 / .000	1	
Literacy	.055 / .305	-.293 / .000	.26 / .000	.173 / .001	-.417 / .000	.248 / .000	-.46 / .00	-.027 / .634	.022 / .694	.131 / .015	.231 / .000	.206 / .000	-.569 / .000	.114 / .033	1

(continued)

Appendix A. (continued)

	IMC	SLR	OSR	GPxC	Pov	Pop	Indigenous	PA	IM	BEDU	Population	Number of municipalities	Poverty	Gross product per capita	Literacy
Brazil															
IMC	1.00														
SLR	-.170	1.00													
	.000														
OSR	.155	-.915	1.00												
	.000	.000													
GPxC	.178	-.416	.425	1.00											
	.000	.000	.000												
Pov	-.244	.630	-.606	-.474	1.00										
	.000	.000	.000	.000											
Pop	.040	-.489	.459	.190	-.286	1.00									
	.176	.000	.000	.000	.000										
Black population	-.259	-.051	.086	-.184	.195	.262	1.00								
	.000	.083	.004	.000	.000	.000									
PA	.002	.003	-.006	.060	-.005	-.023	.021	1.00							
	.938	.923	.839	.041	.871	.439	.477								
IM	.042	-.061	.067	-.041	.012	.143	.160	.014	1.00						
	.155	.038	.024	.163	.681	.000	.000	.639							
BEDU	.087	.058	-.119	.015	.072	-.027	-.093	-.031	-.025	1.00					
	.003	.051	.000	.601	.014	.355	.002	.286	.390						
Population	.031	-.655	.633	.201	-.321	.633	.329	-.010	.182	-.139	1.00				
	.298	.000	.000	.000	.000	.000	.000	.724	.000	.000					
Number municipalities	.251	-.134	.148	.213	-.297	-.061	-.276	-.001	-.073	.053	-.225	1.00			
	.000	.000	.000	.000	.000	.039	.000	.984	.013	.072	.000				
Poverty	-.286	.752	-.734	-.545	.865	-.382	.158	-.017	-.018	.070	-.425	-.296	1.00		
	.000	.000	.000	.000	.000	.000	.000	.576	.542	.018	.000	.000			
Gross product per capita	.280	-.579	.595	.817	-.620	.219	-.243	.045	-.053	.014	.187	.371	-0,740	1.00	
	.000	.000	.000	.000	.000	.000	.000	.127	.073	.627	.000	.000	0.000		
Literacy	-.336	.602	-.570	-.504	.195	-.275	.298	.011	.046	.009	-.249	-.381	0,793	-0,690	1.00
	.000	.000	.000	.000	.000	.000	.000	.706	.115	.771	.000	.000	0.000	0.000	

Note. IMC = intermunicipal cooperation; SLR = supra-local resources; OSR = own-source revenue; GPxC = gross product per capita; Pov = poverty level; Pop = population level; IM = ideology of mayors; BEDU = bureaucracy education.

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Appendix B

Variance Inflator Factor Analysis for Brazil and Mexico.

Variable	VIF	I/VIF
Mexico		
SLR	2.66	0.376289
OSR	2.84	0.352489
2.GPxC	1.37	0.727981
2.PovR_	1.77	0.56432
2.Pop	1.87	0.53433
PA	1.36	0.734343
IM		
1	1.2	0.830065
3	1.16	0.859221
4	1.18	0.844068
BEDU	1.34	0.74884
Population	1.78	0.560307
Number mun	1.29	0.776422
Poverty	3.1	0.322673
Gross product per capita	1.14	0.877829
Literacy	1.91	0.523989
Mean VIF	1.73	

Variable	VIF	I/V
Brazil		
SLR	7.66	0.131
OSR	6.31	0.158
2.GPxC	1.78	0.561
2.PovR_	4.02	0.249
2.Pop	1.61	0.619
PA	1.01	0.986
IM		
1	1.22	0.821
3	1.26	0.797
4	1.03	0.968
BEDU	1.09	0.915
Population	1.24	0.805
Number mun	1.18	0.848
Poverty	6.75	0.148
Gross product per capita	1.51	0.661
Literacy	2.83	0.353
Mean VIF	2.61	

Note. VIF = variance inflation factor; SLR = supra-local resources; OSR = own-source revenue; GPxC = gross product per capita; Pov = poverty level; Pop = population level; IM = ideology of mayors; BEDU = bureaucracy education.

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Declaration of Conflicting Interests

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Notes

1. Estimation of the number of existing MRs was based on information from Brazil's 27 State Legislative Assemblies plus the Federal District because, in Brazil, data on the total number of existing MRs is highly inaccurate. The only data available are from national statistics office IBGE's Network of Influence of Cities, which is from 2008 and, therefore, outdated.
2. As regards health, social assistance, education, culture, housing and sanitation, the environment, heritage protection, poverty eradication, social integration of underprivileged sectors, and traffic (FC, Article 23).
3. Policy items in Mexico subject to IMC, according to the National Office of Statistics and Geography (INEGI), are water and sanitation, drainage, garbage collection, garbage disposal, transit, police, slaughterhouses, graveyards, parks and public gardens, street and road maintenance, public spaces and buildings, public markets, and others.
4. Policy items in Brazil, based on the information on IMC in MRs made available by the Brazilian Institute of Geography and Statistics for the year 2011, are education, health, social assistance and development, employment and labor, tourism, culture, housing, environment, public transport, urban development, and basic sanitation.
5. The National Council of Evaluation (CONEVAL) in Mexico estimates the cost of a basic basket of goods. When people cannot afford such a basket, they are said to be under the minimum line of well-being, which is similar to a poverty line. In the case of Brazil, this indicator is provided for each municipality by the United Nations Development Program (for the year 2010).
6. In the Brazilian case, if we went back more than four elections, we would be comparing two different electoral rules because mayoral reelections only became

possible for those mayors elected after the year 2000. Mayoral terms of office are four years.

7. National Action Party (PAN), Institutional Revolutionary Party (PRI), Party of the Democratic Revolution (PRD).

8. Left-wing parties (Communist Party of Brazil, Democratic Labor Party, Humanist Solidarity Party, National Municipalist Party, Socialist Popular Party, Brazilian Socialist Party, Workers' Party, Green Party); right-wing parties (Democrats, Brazilian Labor Party, Popular Party, Republican Party, Brazilian Labour Renewal Party, Christian Social Party), center parties (Brazilian Social Democratic Party and Brazilian Democratic Movement Party), smaller right-wing political parties (Progressive Republican Party, Brazilian Worker Renewal Party, Social Democratic Christian Party, Liberal Social Party, Labor Party of Brazil Worker, Christian Labor Party, and National Labor Party).

9. This information is not available for Brazilian municipalities.

Supplemental Material

Supplemental material for this article is available online.

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Author Biographies

Oliver D. Meza is a research-professor in the public administration division at the Center for Teaching and Research in Economics (CIDE) in Mexico. His research interests include local government's policy agendas, implementation of local policies, and institutional arrangements of local policy-making.

Eduardo José Grin is professor and researcher at the Getulio Vargas Foundation in Brazil. His main lines of research revolves around structure and transformation of the state, local power studies, federalism and intergovernmental relations, government policy and planning, and public policy.

Antônio Sérgio Fernandes is an associate professor and researcher at the Post-Graduation Program in Administration at the School of Administration of the Federal University of Bahia (NPGA/EA-UFBA). His area of work in research is public administration, with a theoretical-methodological focus in institutional analysis and comparative studies, metropolitan management, social capital, citizenship, local power, and municipal management.

Fernando Luiz Abrucio is a professor and head of department of public administration of Fundação Getúlio Vargas. His research topics are in the areas of political science, public administration, public policy, and comparative politics, with emphasis on issues related to education, intergovernmental relations, and federalism, as well as on state reform and public management.