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Assessing the intensity of cooperation: a study of joint delegation of municipal functions to inter-municipal associations

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ABSTRACT
Talking is cheap, at least in the short term; elected officials may profess their preferences for IMC and yet deny IMA organisations the necessary resources to fulfil their missions. Driven by a focus on revealed preferences for inter-municipal cooperation, the article aims to answer two questions: Why do some IMA exhibit a high level of commitment on the part of their local government members whereas others remain underutilised, reflecting a choice by local governments to retain these responsibilities themselves? How does this commitment to IMAs vary over time? We use data from 25 IMAs over a 10-year period (2008–2018) in Portugal to assess the intensity of cooperation among Portuguese local governments through stand-alone organisations. The panel analysis regression supports the hypotheses that a larger number of local governments involved in IMAs and higher levels of heterogeneity among them make cooperation more difficult. In contrast, longer interaction in IMAs reinforces the intensity of cooperation.

Introduction

Inter-municipal cooperation (IMC) is a widespread phenomenon that can take many different forms across countries. Several IMC arrangements have been employed to capture economies of scale and scope, promote regional competitiveness, and address externalities caused by traffic congestion, pollution, and sprawl created by excessive growth. The choice of IMC tools is the subject of a significant number of scholarly contributions, including research on inter-local service agreements (LeRoux and Carr 2007; Shrestha and Feiock 2009), inter-municipal associations (Silva and Pano Puey 2018; Silva, Teles, and Ferreira 2018), and inter-municipal companies (Tavares and Camões 2010; Eythórsson et al. 2018).

Supplemental data for this article can be accessed here.

This article focuses on a specific form of IMC – Inter-Municipal Associations (IMA) – identified in Feiock's Institutional Collective Action (ICA) framework as 'delegated authority' (Feiock 2013). IMAs involve the creation of a separate, stand-alone type of organisation purposely set up by two or more local governments on a voluntary basis to which they delegate the task of delivering specific services (Hulst and van Monfort 2007; Feiock 2013; Tavares and Feiock 2018).

The growing body of research investigating the adoption of IMC solutions provides urban and local government scholars with a clearer picture of the drivers of IMC, both in Europe (Hulst and van Monfort 2007; Wollmann 2010; Teles and Swianiewicz 2018) and in the United States (Feiock and Scholz 2010; Carr and Hawkins 2013). Our research departs from the studies that have focused on the factors influencing the adoption of interlocal agreements and other forms of IMC. Rather than investigating what drives the initial decision to cooperate, we are interested in what happens after membership in an IMA organisation is formalised. Talking is cheap, at least in the short term; elected officials may profess their preferences for IMC and yet deny IMA organisations the necessary resources to fulfil their missions. The main contribution of this study is therefore the focus on commitment levels to IMA organisations that secure sustained IMC over time. In doing so, the analysis extends prior work by relying on data about revealed preferences for IMC and not simply on stated preferences as many previous studies.

The article aims to fill this lacuna by providing answers to the following questions: 1) why do some Inter-Municipal Associations (IMAs) exhibit a high level of commitment on the part of their local government members whereas others reflect a choice by local governments to retain these responsibilities themselves? And 2) how does this commitment to IMAs vary over time? In order to answer these questions, we develop and test a theory of delegation to IMAs based on principal-agent theory. The article employs panel data from 25 IMAs in Portugal for the period 2008–2018 to assess the variation in the intensity of cooperation between Portuguese IMAs, measured in terms of commitment to expenditures, workforce, and public contracts.

The manuscript is organised as follows. After the introduction, the second and third sections develop a theory of delegation of authority to IMAs, distinguishing between the decision to set up stand-alone IMC organisations and the actual implementation of IMC revealed by the commitment of resources to these joint efforts. The fourth section discusses the hypotheses linking the factors affecting implementation to a battery of indicators of commitment. In order to support the hypotheses, we focus primarily on prior empirical studies investigating the commitment of local governments to stand-alone organisations for IMC. Fifth, we describe the research context, including the background, nature, resources, and main institutional features of Portuguese IMAs. The sixth section introduces the data and methods to be

employed in the analysis conducted in section seven. Section eighth presents and discusses the results and the last section concludes.

Commitment to cooperation in inter-municipal associations

Few studies have attempted to open the 'black box' of IMC by investigating the effective commitment of resources by local governments to IMAs. Hulst and van Montfort (2007a) investigated the levels of commitment to IMAs in The Netherlands, showing that their relative importance has grown over the years, as evidenced by the rise in joint spending from 0.5% in 1960 to 10.2% in 1995. The authors also suggest additional measures to assess the performance of cooperative arrangements, including the size of the workforce and the level of customer service, among others.

Recently, Swianiewicz and Teles (2018) proposed the use of an 'intensity index' expressed as a proportion of the overall municipal budget employed in IMC. Along these lines, Łukomska and Szmigiel-Rawska (2018) assessed the intensity of IMC by analysing the levels of financial transfers between municipalities. Other work has attempted to assess commitment to cooperation based on the count of policy tools employed to promote collaboration in a given policy area (Youm and Feiock 2019). While not specifically related to cooperation *per se*, Hawkins et al. (2016) employ indicators of financial resources and human capacity to assess commitment to sustainability by local governments.

In line with these seminal studies, we propose to investigate long-term commitment to cooperation. For the purpose of this research, we define commitment to cooperation as the willingness of local governments to provide time, financial resources, and human capacity to engage in planning and implementing service delivery through a joint organisation (i.e., an IMA).

Inter-municipal associations as a form of delegation to promote inter-municipal cooperation

Compared to other IMC arrangements, IMAs are less subjected to uncertainty and transaction costs. As more permanent solutions than inter-local contracts, they are able to secure political insulation and managerial competence that cannot be easily reversed by political changes due to electoral cycles (McCabe 2004). Since this type of IMC organisation is formalised, local governments are not required to undertake the consolidation of other services or governmental structures (Zeemering 2008).

Traditionally, empirical studies have been focussed on the motivations for the adoption of IMC arrangements, but choice alone does not entail commitment. In fact, stand-alone organisations for IMC have been described as

'empty shells' (West, 2007) due to the absence of functional attributes, budget, and/or staff. Moreover, adoption can be easily perceived as a form of rhetorical device (Haveri and Airaksinen 2007): it provides visibility to local executive(s) without incurring much of the cost. Here, we seek to unravel the causal mechanisms that make municipal executives move beyond IMC rhetoric to actual commitment as a sign of 'true' IMC.

In IMAs, emphasis is placed on the decision made by local governments to delegate authority to the inter-municipal organisation. This decision can generate collective benefits and costs to the community as well as selective benefits and costs to local officials and decision-makers. Potential benefits involve economies of scale and scope, resource pooling, specialisation, and mitigation of negative externalities. Costs are associated with the loss of democratic accountability, shared responsibilities, and blurred lines of authority inherent in stand-alone organisations for IMC due to the multiple principal problem (Voorn et al. 2019). Once the delegation of authority takes place, local officials relinquish at least part of their autonomy and control over the delivery of specific policies and services in favour of an organisation not subjected to electoral accountability. Based on the ICA framework, we argue that local government officials trade-off the benefits and costs of the decision to delegate when deciding the level of commitment to these IMC organisations (Tavares and Feiock 2018). Next, we expand on this theory of delegation.

The delegation decision

This section develops a principal agent theory of delegation of authority from local decision-makers to stand-alone organisations designed to provide services to a geographical area involving two or more municipalities. The key assumption is that each individual decision to commit resources to an IMA is the product of a unitary elected official (e.g., mayor or local council) subjected to bounded rationality (Simon 1997, 88) controlling the delegation decision to the IMA. This is likely to mirror decision-making processes present in both strong mayor systems and local council systems.

The creation of an inter-municipal association (IMA) follows a similar path across countries[1]: the municipal decision-maker votes favourably the decision to join an IMA. The IMA organisation (a single agent) acts on behalf of the municipalities (multiple principals, possibly with conflicting goals) to jointly provide specific services to their citizens. In most countries, the establishment of IMAs is voluntary, since municipalities choose the IMA they wish to join and the cooperating partners. Cross-country variation along the voluntary-mandated continuum is important to explain the choice of whether or not to join an IMA or why the choice of a particular IMA. However, this institutional variation is less relevant to explain differences in commitment across IMAs in the same country as they are all subjected to the same set of rules.

Each local decision-maker delegates the decision over a service task to the IMA, effectively relinquishing direct control over the quantity and quality of the service to be provided. Each individual delegator expects the delegatee (the IMA) to perform at an acceptable level. At the same time, the delegatee wants the delegators to commit the necessary resources to reach this acceptable level, but this requires them to give up a certain degree of control over service delivery (Whitford 2010). The level of commitment by the delegators, therefore, depends upon the degree of information asymmetry present in the delegation decision. What factors affect the degree of information asymmetry present in the delegation decision?

The decision to delegate authority over service responsibilities to IMAs faces two types of challenges: hidden information and hidden action (Moe 1984, 754–755). Hidden information, also known as adverse selection, stems from information asymmetries between the mayors (the principals) of all local governments participating in the IMA (the agent). To simplify our argument suppose there are two groups of local decision-makers. The first group is comprised of officials who view cooperation as a means to pursue their personal agendas and political careers. The second group includes officials who regard IMAs as an organisational tool for accomplishing collective goals. Each official ignores how others will behave once the IMA is in place. This requires some type of ex-ante screening mechanism to induce incentive compatibility between officials and ensure credible commitment to the common goal. Hidden action, also known as moral hazard, assumes that the presence of ex-post opportunism and actors' bounded rationality in cooperative agreements can lead to defection (Simon 1997; Williamson 1981; Feiock 2013). In the specific case of IMAs, the delegation outcome entails a 'double moral hazard' problem (Whitford 2010, 35): 1) between delegators, who attempt to free ride on one another by contributing less (lower commitment); and 2) between the delegators and the delegatee, who may fail to deliver the acceptable level due to shirking/opportunism.

The delegation of authority also generates costs associated with the loss of democratic accountability, shared responsibilities, and blurred lines of authority inherent in IMAs (Borraz and Le Galès 2005; Gendzwiłł and Lackowska 2018). First, once delegation occurs, officials relinquish part of their autonomy and control over the services being delegated in exchange for a single, stand-alone organisation focused on joint outcomes. Prior research suggests that IMAs are frequently hindered by the desire of local government officials and populations to secure local self-rule and political autonomy (Norris 2001). Second, collaboration using an autonomous organisation displaces policy conflicts to a secondary political arena (the governing body of the IMA), effectively removing the political discussion from the local to the supra-municipal level and creating difficulties for voters to identify and sanction elected officials at the ballot box (Bertelli 2012). Third, delegation to

an IMA may generate negative outcomes for society as a whole if those responsible for the organisation treat it as a common pool (Jordahl and Liang 2010). This is another manifestation of moral hazard problems and it may be particularly appealing if the debt incurred by the IMA is not consolidated with the total debt of each individual local government. However, because negative outcomes may revert the attribution of blame back to local officials, they have incentives to invest resources in monitoring the activities of the IMA.

In sum, the delegation decision is framed by upper-level rules and entails two types of asymmetries: 1) between the elected officials representing the municipalities engaged in IMAs, due to adverse selection (ex-ante) and moral hazard (ex-post); and 2) between elected officials and citizens, due to the loss of direct control over service delivery, the displacement of policy conflict to a secondary arena (the IMA), and the use of the IMA organisation as a common pool. The following section discusses the hypotheses operationalising the causal mechanisms identified the previous paragraphs.

Hypotheses

The previous section described the conditions faced by local officials when deciding whether to delegate service delivery to jointly owned inter-municipal organisations. The discussion of the theoretical mechanisms underlying this decision is not complete without the operationalisation of the concepts introduced above. The hypotheses presented in this section target both types of information asymmetries discussed above and are the most likely drivers of commitment to cooperate through IMAs.

Prior informal ties that are strengthened over time are likely to facilitate cooperation (Feiock 2013) because they operate as an ex-ante screening mechanism to induce incentive compatibility among officials and minimise adverse selection problems. Delegation to IMAs is facilitated when norms of cooperation, reciprocity, and reputation develop among local officials able to trust their counterparts in neighbouring jurisdictions. Furthermore, the choice of a stand-alone organisation for IMC has the advantage of institutionalising cooperation through formal means, minimising the credible commitment problems and possible opportunistic behaviours by all parties involved in the IMA (McCabe 2004). Along these lines, two aspects contribute to the expansion of involvement and the minimisation of commitment costs in IMAs.

First, repeated interactions among neighbours minimise uncertainty and protect against the adverse selection of partners for cooperation (Feiock, Steinacker, and Park 2009; Hawkins and Carr 2015). The longer the experience local governments have with any type of IMC, the more likely they are to

increase their commitment to IMAs. Lengthy membership in an IMA builds trust and reputation through repeated interactions. Since local governments entering IMAs share boundaries, it is likely that they resist the temptation to capture short-term gains in favour of long-term benefits (Dixit 1996). Thus,

H1: Commitment to IMAs is higher when local governments have a longer history of prior cooperation.

Second, the number of partners engaged in an IMA organisation is likely to influence the degree of commitment. However, this effect is uncertain due to two conflicting arguments. On one hand, a large number of partners is likely to reduce the likelihood of hidden action by increasing the amount of information available, thus helping to minimise information gathering costs to overcome collective action problems (Ostrom 2010). Like market competition, when the number of potential partners is high, the circulation of information also increases (Whitford 2010), leading to the mitigation of hidden information in the delegation of authority to IMAs. Local governments with more neighbours are in a better position to commit to IMAs because an increase in the number of partners increases the amount of information available and diffuses risk among partners (Carr and Hawkins 2013; Tavares and Feiock 2018).

On the other hand, a larger number of partners also increases potential free riding (Post 2004), so the net effect of the number of potential partners remains uncertain. The presence of a large number of actors creates a potential for free riding that allows ex-post opportunism to expand (Olson 1965; Whitford 2010). The larger number of partners is, the more likely it is some of them will treat the IMA as a common pool (Post 2004). These competing arguments lead to the following alternative hypotheses:

H2a (Information Hypothesis): Commitment to IMAs is higher when the IMA includes more local governments.

H2b (Free Riding Hypothesis): Commitment to IMAs is lower when the IMA includes more local governments.

Beyond the number of partners, the degree of similarity between partners is equally important to predict commitment to interaction in networks (McPherson, Smith-Lovin, and Cook 2001; Kossinets and Watts 2009; Atouba and Shumate 2015). Given that IMAs address policy issues spanning across multiple local governments, elected officials may face obstacles in agreeing over the allocation of services, benefits, and costs due to the diverse preferences of their constituencies. Because elected officials are involved in principal–agent relationships with their constituencies, if all officials face similar

types of preferences and demands from their constituencies they are more likely to commit resources to an IMA. In other words, homophily between jurisdictions reduces information asymmetries in the delegation to IMAs, because elected officials will face less diverse policy preferences from their constituencies (Lee, Feiock, and Lee 2012; Zeemering 2019). Moral hazard increases significantly when officials face internal pressures such as administrative resistance, interest group opposition, and racial diversity (Feiock, Steinacker, and Park 2009), essentially due to an increase in the number of potential veto-players (Tsebelis 2002). If these pressures vary significantly between jurisdictions within the same IMA, the level of commitment to IMC is likely to drop.

In addition, preference heterogeneity across jurisdictions in an IMA will also increase monitoring costs for the cooperating governments (Post 2004). Monitoring costs such as technical expertise, professional administration, and financial supervision are inherent to all externalisation decisions (Sedmihradska 2011; Łukomska and Szmigiel-Rawska 2018; Pano Puey, Magre Ferran, and Puiggròs Mussons 2018). Thus, IMAs are likely to entail two types of monitoring costs for officials delegating service delivery tasks to these organisations: local officials need to monitor both the performance of the IMA and the contributions of the other local governments participating in the IMA. Shared socio-economic attributes and political traits minimise these monitoring costs due to reduced information asymmetry between the participants (Lee, Feiock, and Lee 2012).

The degree of homophily between jurisdictions comprising an IMA has been assessed in many different ways (Lee, Feiock, and Lee 2012; Gerber, Henry, and Lubell 2013; Lee 2016). Prior studies show that physical homophily leads to shared policy goals between jurisdictions and, as a result, increases collaborative efforts (Lee 2016). Population sizes of the jurisdictions entering cooperative agreements has been the main indicator of physical homophily employed in the literature (Lee 2016).

Prior research also suggests that economic homophily is likely to increase interlocal agreements because local governments will have more incentives to cooperate in economic development initiatives (Krueger and McGuire 2005; Shrestha and Feiock 2011). In contrast, when potential partners have very diverse levels of revenues, the wealthier partner(s) may be less willing to engage in IMC, not only because they have less to gain with the increase in the scale of service provision, but also because potential efficiency gains and cost savings will be more uncertain than revenue losses resulting from the delegation decision (Sørensen 2006). Others have suggested that this power imbalance between actors in cooperative endeavours may result in lower levels of commitment due to defection risk by the larger government exploiting the smaller governments (Maser 1998; Kim et al. 2020; Terman, Feiock, and Youm 2020).

Prior attempts to capture the effects of political homophily have focussed primarily on the similarities of political institutions across jurisdictions (see Lee 2016). Equally important, common ideology and shared political ties across jurisdictions belonging to the same IMA are likely to generate similar goals in the policy-making process leading to an increase in the commitment to cooperation. Gerber, Henry, and Lubell (2013) found political homophily effects in regional planning networks in California. Song, Park, and Jung (2018) found strong support for the political homophily hypothesis in their analysis of interorganisational collaboration in emergency management situations in Seoul. The authors state that 'political similarities are important not only for enhancing a strong commitment but also for reducing the risks associated with interorganizational collaboration' (p.261).

From these theoretical and empirical arguments, we derive our third hypothesis:

H3: Commitment to IMAs is higher when municipalities comprising the IMA are more homogenous.

H3a: Commitment to IMAs is higher when the municipalities comprising the IMA have more homogenous population sizes (physical homophily).

H3b: Commitment to an IMA increases when the local governments comprising the IMA are economically homogeneous (economic homophily).

H3c: Commitment to an IMA increases when the local governments comprising the IMA are politically homogenous (political homophily).

This section presented a set of hypotheses derived from the theoretical arguments expanded above regarding the decision by local officials to commit municipal resources to IMAs to deliver services at the supra-municipal level. Next, we describe the research context before the empirical test of these hypotheses.

Research context: inter-municipal communities in Portugal

The focus of this article is placed on the commitment by two or more general-purpose local governments to IMC organisations as a form of delegated authority for joint service delivery (Tavares and Feiock 2018). Portuguese IMAs *(Comunidades Inter-municipais)* are an example of delegated cooperation, since the definition of the tasks to be performed and budgets to be allocated is the responsibility of their enacting governments, but policy implementation rests in the hands of the IMA organisation. Contrary to other inter-municipal voluntary arrangements, Portuguese IMAs do not

have flexible boundaries and are coterminous with the participating munici-palities. They are service delivery organisations with professional staff and financial autonomy, deriving revenues from user fees and transfers from the participating municipalities.

Geographically, all Portuguese IMA organisations follow the boundaries of the NUTSIII regions as defined by the Eurostat. Although local governments are not required to join IMAs respecting the boundaries of the NUTSIII, the presence of strong upper-level incentives, namely the ones associated with the management of EU structural funds render inevitable this geographical design, and – ultimately – the motivation to join the organisation. In addition, due to the limited incentives to exit such an organisation, their composition is highly stable.

Although formal ways of engaging in cooperative arrangements exist in Portuguese governance history since the beginning of the twentieth century, the last decades have been particularly rich in the number, diversity of forms, and scope of such inter-municipal associations (Teles 2016, 69–71). Being of a voluntary nature, these associations have enriched the governance land-scape of the country with a wide variety of flexible and up-scaled municipal functions, particularly in some service delivery activities benefiting from economies of scale, as is the case of water provision, transportation, and waste management. Incentive structures played a prominent role in inducing cooperative arrangements between local governments, particularly the EU funding process which occurred in parallel with a significant reduction of national funds and in a context of economic crisis (Raudla and Tavares 2018). The rhetoric of the reform suggested also that IMAs would facilitate decision-making processes through enhanced dialogue and negotiation opportu-nities, and would contribute to the efforts concerning the dissemination of information between municipalities to promote regional strategy and plan-ning (Teles 2016).

The IMAs were legally established in 2008 as public associations of muni-cipalities, under the national law that determines the role, competencies, and functioning of local authorities. These multipurpose organisations include the metropolitan areas (of Lisbon and Porto), 21 inter-municipal communities covering the 278 municipalities of continental Portugal and two associations of municipalities of the islands of Azores and Madeira. The metropolitan areas are established by legal mandate, and cannot be extinguished or abandoned, while municipalities belonging to the IMAs may decide to exit by a simple majority vote of their respective deliberative body. This has not yet occurred in any case, perhaps because the legislation is clear in stating that a municipality's withdrawal within three years following the date on which it entered, results in the loss of all financial and administrative benefits received by virtue of membership.

Given the fact that there are very few restrictions on IMAs taking on new responsibilities, many tasks are voluntarily taken on by these organisations in accordance to the local authorities' competencies and their member municipalities willingness to cooperate. This has an impact on the intensity and diversity of cooperation, which is likely to vary across the country's 25 inter-municipal entities (23 IMAs plus the Metropolitan Areas of Lisbon and Porto).

Data and methods

The intensity of the delegation of authority from local governments to IMA organisations is shaped by information asymmetries between the elected officials of the municipalities engaged in IMAs and between elected officials and their respective citizens. Table 1 displays the hypotheses stated above as well as the variables, indicators, and data sources employed to test them.

Data

In order to analyse the determinants of commitment to cooperation by Portuguese municipalities, we collected data on the resources of the 25 IMAs over the 2008–2018 period as well as the economic and demographic characteristics of their member municipalities.

Figure 1 presents some descriptive information that briefly characterises the aggregate resources allocated to the IMAs. This information covers the period under analysis and includes the financial transfers from the national government and from the municipal governments, as well as other transfers including European funds. These constitute the bulk of the IMAs financing, and their level of expenditures, including the cost of human resources. The trend clearly shows a peak associated with the recovery from the financial crisis after 2013. The Technical Appendix includes a figure with a breakdown of resource allocations for each IMA.

One focal question of this article is to what extent some local governments delegate tasks to their IMAs whereas others prefer to retain the responsibilities for themselves. Broadly speaking, this indicates the level of municipal commitment to participate in autonomous organisations for IMC. Here we measure this commitment in terms of available resources, in the sense that

Table 1. Summary of hypotheses, variables, indicators, and sources.

| Hypotheses	Variables	Indicators	Sources
History (H1)	History of IMA	Years elapsed since initial cooperation	IMA's websites
Information (H2a) Free-Riding (H2b)	Size of IMA	Number of municipalities	INE
Homophily (H3)	Population homogeneity	Herfindahl Index	DGAL
	Economic homogeneity	Herfindahl Index	INE
	Political homogeneity	Herfindahl Index	CNE
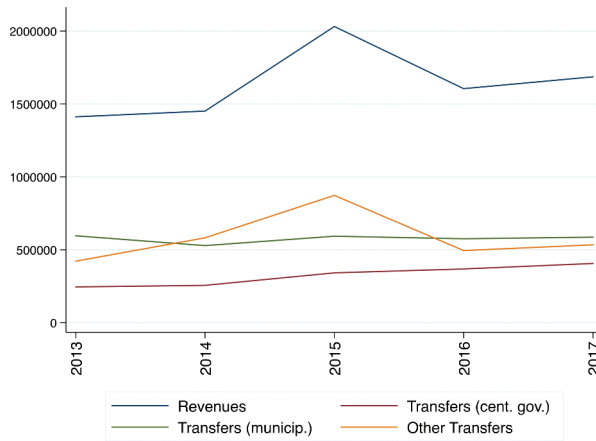
Figure 1. Resource allocations by IMAs.

local governments that choose to delegate tasks to their IMAs will most likely be very proactive in allocating resources in order to empower the capacity of IMAs to pursue their mission. Accordingly, the share of resources made available to each IMA vis-a-vis the resources of its member municipalities clearly signals their commitment to cooperate. The proxies used here are human and financial resources as well as expenditures to acquire goods and services (public contracts). In sum, we employ the following individual measures of commitment to cooperation:

(1) *Financial Commitment* – the share of expenditures of the IMA to the sum of the revenues of the member municipalities;
(2) *Commitment on Human Resources* – the share of workers of the IMA to the population of the member municipalities;
(3) *Commitment on Public* Contracts – the share of the contracts signed by the IMA to the contracts signed by the member municipalities.

Composite measure of commitment

In order to capture the underlying dimension of these individual measures, we also used a statistical technique for data reduction. This procedure produces a single and *composite measure of commitment* with the advantage of mitigating the specificities of each individual measure. It will also be used as a dependent variable in the panel regression analysis conducted in the following section. We performed factor analysis and, considering the computed eigenvalues, the results strongly supported the existence of one underlying factor. Figure 2 presents aggregate information on the municipal commitment to cooperate considering the four measures (three individual
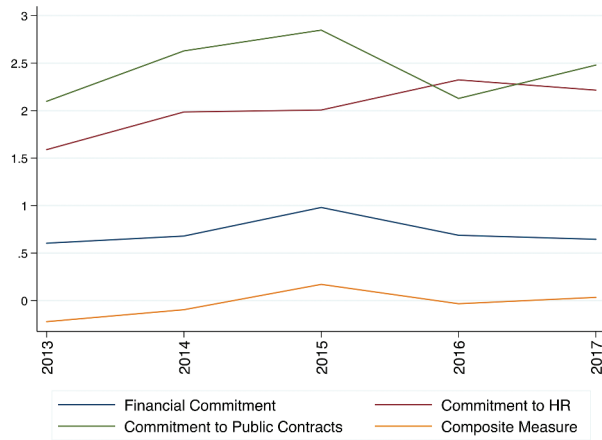
Figure 2. Evolution of commitment to cooperate.

and one composite). The evolution shows a consistent increase until 2015 followed by an inflection point. This trend is somewhat different in the case of the commitment to cooperate in terms of human resources, which shows a consistent increase until 2016.

The analysis includes five key independent variables. *History* is a count variable of the number of years elapsed since the IMA was enacted. *Size* is measured as the number of municipalities comprising the IMA. *Homophily* is assessed using three Herfindahl indexes for population, economic, and political homophily.[2] Details about the construction of these homophily measures are included in the Technical Appendix. Three control variables are included: GDP per capita of the IMA, financial dependency measured as the proportion of transfers in total revenues, and total population of the IMA. Table 2 presents the descriptive statistics for the data used in the analysis.

Table 2. Descriptive statistics.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Dependent Variables					
Commitment (composite measure)	197	−.0884	.6724	−1.520	2.978
Financial Commitment	104	.7200	.4760	.0540	2.952
Commitment on Human Resources	93	.6903	.7223	.0463	4.072
Commitment on Public Contracts	197	2.019	1.695	.0587	9.170
Independent Variables					
History	250	15.44	9.984	5	33
# Municipalities	250	12.32	4.220	5	19
Population Homophily	250	.1732	.0800	.0870	.4429
Economic Homophily (Fiscal Revenues)	250	.2214	.0999	.1163	.6187
Political Homophily	246	.4622	.1282	.2479	1
Population, log	250	12.51	.8086	11.31	11.32
Financial Dependency	250	.2043	.1057	.0666	.5491
GDP per capita, log	250	2.679	.1970	2.271	3.306

Inferential analysis

We estimate the panel data regression models for the 25 Portuguese IMAs covering the period of 2008 to 2018 in the conventional way. The small but heterogeneous number of units that characterise the present design recommend simplicity as the major criterion for the specification of the models. The statistical tests (Hausman and Breusch–Pagan Lagrangian multiplier) pointed to the choice of the fixed-effects estimator. That immediately raises the question of how to test the first (history) and the second hypotheses (size) as they are measured with time-invariant variables, which is not allowed by that estimator. The only solution is to rely on the random-effects estimators.[3]

Table 3 displays the panel regressions for the main results, including the composite and the individual measures of commitment to cooperation as the dependent variables and the independent variables shown in Table 1. Globally, the results provide statistical and substantive support for the three hypotheses presented in the previous sections. More importantly, these results also appear to be robust to different specifications, variables, and estimators.

The *history* hypothesis receives empirical support from the data with the exception of the regressions regarding commitment to human resources. All else equal, the number of years elapsed since the municipalities entered the IMA is positively associated with the commitment to cooperation. In other words, municipalities with a longer history of cooperation with each other are more likely to devote more resources to the IMA they belong. Although this is not a surprising result, the statistical significance adds information to this line of reasoning.

The results also appear to support hypothesis 2b – the *free-riding* hypothesis – signalling that the number of local government units (municipalities) that constitute the IMA is negatively related to commitment. This finding gives credit to the argument that more partners intensify collective action problems leading to potential free riding and lower levels of commitment.

As for the *homophily* hypothesis (H3), the statistical results of different specifications show that IMAs constituted by municipalities that are alike constitute a more fruitful ground for cooperation. On the contrary, heterogeneity is likely to increase information asymmetries between elected officials and their constituencies, decreasing the intensity of commitment. The statistical results are especially strong in the case of population (size) homophily, but also significant, albeit to a lesser extent, concerning economic homophily (fiscal revenues of municipalities).

Regarding the control variables, the results also suggest the intensity of cooperation increases in smaller (overall population), richer (GDP per capita), and less financially depend IMAs. The results with regard to size are important since they appear to be consistent with the second and the third hypotheses.

Table 3. Results for composite and individual measures of commitment.

	Composite Measure			Financial Commitment			Commitment to Human Resources			Commitment to Public Contracts		
History	0.013* (0.007)	0.016** (0.006)		0.013** (0.006)	0.015*** (0.006)	0.014** (0.006)	-0.004 (0.008)	-0.002 (0.008)	-0.003 (0.011)	0.042** (0.018)	0.046** (0.018)	0.043** (0.019)
# Municipalities	-0.067*** (0.018)	-0.038** (0.016)		-0.050** (0.020)	-0.037* (0.020)	-0.014 (0.019)	-0.065* (0.034)	-0.026 (0.017)	0.010 (0.021)	-0.150*** (0.072)	-0.088 (0.064)	-0.056 (0.066)
Population Homophily	-4.214*** (1.054)			-2.558*** (0.716)			-4.673** (1.979)			-6.538* (3.758)		
Econ. Homophily (Fisc Rev)		-2.202*** (0.677)			-1.678*** (0.593)			-2.127*** (0.518)			-2.272 (1.771)	
Political Homophily			-0.201 (0.527)			-0.280 (0.240)			0.503 (0.530)			-0.535 (0.786)
Population, log	-0.294*** (0.111)	-0.278*** (0.098)	-0.425*** (0.098)	-0.042 (0.135)	-0.013 (0.135)	-0.076 (0.136)	-0.278* (0.161)	-0.282** (0.144)	-0.394*** (0.137)	-0.290 (0.299)	-0.302 (0.291)	-0.415 (0.301)
GDP per capita, Log	1.004** (0.404)	0.985** (0.414)		0.759** (0.319)	0.808*** (0.293)	0.565 (0.365)	1.543* (0.835)	1.489** (0.714)	0.809* (0.476)	-0.020 (1.261)	-0.232 (1.235)	-0.450 (1.178)
Financial Dependency	-2.037 (1.256)	-1.955* (1.130)	-0.296 (1.300)	-3.280*** (1.129)	-3.344*** (1.058)	-2.683*** (1.141)	-2.672 (2.578)	-2.172 (2.188)	-0.521 (1.516)	-2.035 (2.699)	-1.373 (2.514)	-0.332 (2.485)
Year 2009	-0.358* (0.200)	-0.333* (0.187)	-0.332* (0.182)							-0.786** (0.367)	-0.746** (0.358)	-0.726** (0.354)
Year 2010	-0.395** (0.188)	-0.385** (0.187)	-0.349*** (0.172)							-0.665** (0.311)	-0.644** (0.299)	-0.539* (0.286)
Year 2011	-0.130 (0.203)	-0.118 (0.189)	-0.102 (0.172)							0.268 (0.343)	0.290 (0.329)	0.364 (0.324)
Year 2012	-0.096 (0.208)	-0.106 (0.193)	-0.141 (0.183)							0.441 (0.379)	0.432 (0.367)	0.359 (0.371)
Year 2013	-0.229	-0.268	-0.265							0.739**	0.697**	0.647*

(Continued)

Table 3. (Continued).

	Composite Measure			Financial Commitment			Commitment to Human Resources			Commitment to Public Contracts		
	(0.267)	(0.249)	(0.245)							(0.369)	(0.344)	(0.347)
Year 2014	−0.062	−0.096	−0.134	0.165**	0.170**	0.133*	0.147	0.148	0.149	1.409***	1.363***	1.347***
	(0.281)	(0.261)	(0.252)	(0.074)	(0.074)	(0.076)	(0.171)	(0.164)	(0.177)	(0.476)	(0.445)	(0.452)
Year 2015	0.156	0.120	0.102	0.435***	0.441***	0.410***	0.037	0.039	0.075	1.651***	1.611***	1.602***
	(0.301)	(0.281)	(0.279)	(0.077)	(0.080)	(0.079)	(0.095)	(0.091)	(0.114)	(0.516)	(0.495)	(0.507)
Year 2016	−0.080	−0.096	−0.121	0.113	0.126*	0.095	0.118	0.138	0.173	0.922**	0.907**	0.882**
	(0.277)	(0.257)	(0.254)	(0.073)	(0.072)	(0.080)	(0.190)	(0.190)	(0.213)	(0.449)	(0.428)	(0.443)
Year 2017	−0.054	−0.066	−0.079	0.066	0.084	0.063	0.139	0.158	0.212	1.279***	1.274***	1.252**
	(0.286)	(0.265)	(0.264)	(0.108)	(0.106)	(0.119)	(0.175)	(0.171)	(0.209)	(0.489)	(0.471)	(0.489)
Constant	2.795	1.981	3.995**	0.615	−0.146	0.686	2.138	1.339	3.075	7.680	6.811	7.984
	(1.908)	(1.890)	(1.986)	(2.097)	(2.007)	(2.046)	(3.061)	(3.069)	(2.518)	(4.808)	(4.942)	(5.091)
Model	RE	RE	RE	RE	RE	RE	RE	RE	RE	RE	RE	RE
Prob > chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	197	197	193	104	104	103	93	93	92	197	197	193
Number of IMAs	25	25	25	24	24	24	22	22	22	25	25	25

Robust standard errors in parentheses

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

Increased size brings complexity to cooperation, which seems to work in the same way as the number of municipalities.

Globally, these results appear to support the idea that complexity makes it more difficult for municipalities to commit to cooperation. The number of local governments involved and their heterogeneity as well as the size of the IMA in terms of population size and number of jurisdictions increases the levels of diversity among communities belonging to an IMA. This complexity introduces additional transaction costs to the relationships between mayors and between elected executives and their constituencies, thus diminishing the intensity of commitment to cooperation.

Conclusions and future research

The novelty of this research resides in the attempt to measure actual commitment to inter-municipal cooperation by local officials in formal IMC organisations rather than simply focusing on the factors leading to the creation of these organisations. In other words, the primary difference is the focus on revealed preferences for inter-municipal cooperation and not on stated preferences. Globally, the findings confirm, in substantive terms, that complexity has a detrimental effect on IMC and that this effect translates into less commitment of energy and resources to IMAs in Portugal. While this conclusion is not entirely new, the way this is shown using a longitudinal analysis of indicators of commitment is certainly a contribution to the empirical literature on IMC.

The article framed cooperation using inter-municipal associations as the product of a delegation decision and employed quantitative measures of the intensity of cooperation to assess the commitment to cooperation by local-elected officials. The empirical measures of commitment were based not only on financial expenditures by the municipalities in the IMAs, but also on other relevant resources necessary for the effective functioning of these associations, including human resources.

The panel analysis supports the hypotheses derived from the delegation theory expanded in this article. Commitment to cooperation through IMAs is more intense when the number of partners is smaller, have a longer history of cooperation, and are more homogenous in terms of both population and economic profile; in contrast, a larger number of local governments and heterogeneity among them reduce commitment. A larger number of members in IMAs increase the costs of collective action due to opportunities for free riding among local government partners. This finding is consistent with prior work by Hawkins (2010) and Shrestha and Feiock (2011) showing that regional fragmentation decreases the probability of inter-municipal cooperation. On the other hand, heterogeneity of preferences among constituencies generates additional information asymmetries between elected officials and

their citizens, thus decreasing the propensity to commit resources to IMAs. This result confirms prior research in the American context indicating that heterogeneity is one of the major obstacles to IMC (Shrestha and Feiock 2011; Lee, Feiock, and Lee 2012; Zeemering 2019). These obstacles pave a hard road to cooperation, but they can be mitigated by longer experiences of cooperation. When municipalities have an extensive history of prior cooperation, which deepens trust, reciprocity, and mutual adjustments, officials are more prone to invest resources to increase the intensity of cooperation. This result is not new, but it reinforces the argument that the tools of IMC are frequently complementary to one another (Kwon, Feiock, and Bae 2012). Thus, our result aligns with the idea that the scope of pre-existing IMC arrangements can influence the adoption and success of new arrangements (Tavares and Feiock 2018).

This work is not without its limitations. First, our study employs all the indicators of commitment available for the last decade of IMC endeavours in Portugal. There might be other, more appropriate measures of commitment, but they are currently unavailable. Second, and most important, the conclusions drawn for the Portuguese case may not carry over to other contexts. The Portuguese local government system can be characterised as a strong mayor-type executive. The municipal executive, and the mayor in particular, clearly dominate the local political scene and the oversight function of the municipal council is limited. In practice, this suggests that the findings reported here might be generalisable to other countries with similar local systems (e.g., Greece, Spain, Poland, among others). In contrast, in countries where the city council dominates the local sphere (e.g. Finland, UK, among others), the decision-making process may be substantially different and the results less likely to follow the same pattern. Either way, additional empirical analyses should be conducted in other countries using similar measures in order to get a consistent picture of the factors associated with the commitment to IMC.

Future work should engage in additional research on the quantitative measurement of the intensity of cooperation. This is the first step to advance this goal, and the measures presented here need to be validated both theoretically and empirically. Another step is to extend this type of analysis to different institutional settings of cooperation, possibly conducting comparative studies between different countries or groups of countries.

Notes

1. The article uses the acronym IMA to describe all stand-alone organisations formally set up by a group of municipalities. IMAs are known by different names around the world: *comunidades inter-municipais* in Portugal, *municipal unions* in Italy, *intercommunalités* in France, and *mancomunidades* in Spain, Bolivia, Equador, and Chile.

2. The Herfindahl index is primarily used as a measure of the size of firms in relation to the industry. In our case, the population Herfindahl index measures the size of the population of the municipalities in relation to the total population of the IMA. A low value (near 0) indicates that all municipalities have about the same population size (physical homophily). A negative coefficient is expected. The economic Herfindahl index measures the proportion of fiscal revenues of the municipalities in relation to the total amount of fiscal revenues of IMA. A low value (near 0) indicates that all municipalities raise about the same amount of fiscal revenues (economic homophily). A negative coefficient is also expected. The political Herfindahl index measures the proportion of municipalities of the IMA that are governed by the same political party. A high value (near 1) indicates that one or few political parties govern in a large number of municipalities (homophily). A positive coefficient is expected. Note that due to the different nature of the variables, the Herfindahl Index of political homophily has the exact opposite interpretation of the population and economic indexes.
3. In order to be cautious about the results reported here, we also estimated ordinary least squares and instrumental variable regressions, using several variables as instruments, but the results remained substantively the same. See the Technical Appendix for a detailed description of all the results included in this article.

Acknowledgments

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

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