

Does the decentralisation theorem apply to the French local governments? An empirical test on intermunicipal competences

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Abstract – As a key component of territorial governance in Europe, intermunicipality offers municipalities the opportunity to exercise and collectively fund some local public goods or services. In accordance with the decentralisation theorem, the choice made by municipalities to transfer some competences to the intermunicipal level ought to be based on a trade-off between economies of size and the cost of spatial heterogeneity of citizens' preferences. In order to empirically test this assertion, a *probit* model is estimated focusing on those French intermunicipalities with own fiscal powers, looking specifically at 10 various competences. Four main results are highlighted: (i) the heterogeneity of citizens' preferences is holding back the transfer of competences from municipalities to the intermunicipal level; (ii) economies of size and the need to coordinate local public choices predetermine certain competences to be exercised at intermunicipal level; (iii) intermunicipalities made up of small municipalities are more likely to be entrusted with certain competences; (iv) the decision to transfer competences to the intermunicipal level is influenced by the decisions made by neighbouring intermunicipalities.

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Reminder:

The opinions and analyses in this article are those of the author(s) and do not necessarily reflect their institution's or Insee's views.

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In the early 1980s, Act I of Decentralisation marks the beginning of a period of profound reorganisation within the French public sector. Powers are transferred from the central government to municipalities, *départements* and regions, which consequently became the third level of territorial authority. One of the challenges of drawing governors closer to the governed is getting public policies to take better account of the spatial heterogeneity of citizens' preferences (Tiebout, 1956). This idea hinges on Tocqueville's analysis (1836, p. 265), who already observed that "in larger centralised nations, the legislature is bound to give laws a uniform character which disregards the diversity of places and mores."

Furthermore, following the failure of policies encouraging the merging of municipalities (the law of 16 July 1971 on municipality mergers and consolidations), the government promotes intermunicipal cooperation (laws of 6 February 1992 and 12 July 1999; certain provisions of the law of 13 August 2004). Far from being a step backwards, intermunicipal cooperation appears to be complementary to decentralisation. It offers municipalities the opportunity to exercise and collectively fund some local public goods or services (called hereafter "competences"), whose range has been extended through decentralisation. Today, intermunicipality is a key level of territorial governance in France and most European countries, where decentralisation and intermunicipal cooperation have been developed in tandem (Frère & Paty, 2014). Also, as Hulst and Van Montfort attest (2007, p. 8): "[...] intergovernmental cooperation involving municipalities is a phenomenon that is present in all Western European countries. In some countries it has a long history, in others it is a relatively recent development; it varies in terms of its extent, significance and form, but is never completely absent". The most widespread model of cooperation in Europe is a form of intermunicipality that combines public and private bodies working together to exercise and fund numerous local competences. This is what is known as multi-purpose, associative intermunicipality (CDLR, 2007). Its creation respects municipalities' volunteerism, even though it remains more or less regulated by the central government. This is the case in Italy, where municipalities in mountainous regions must cooperate within a *comunità montana*. Likewise, while certain competences must be entrusted to these associative intermunicipal

bodies¹, it is generally left to the member municipalities to make a collective decision as to which competence(s) they wish to transfer to such bodies.

In France, the country's intense municipal fragmentation (36,700 municipalities in 2012², half of which with populations of 500 inhabitants or fewer) has seen a specific and highly integrated form of cooperation emerge —namely "federative" intermunicipality— a system in which intermunicipalities have their own fiscal powers. These include the *Communautés de communes*, *Communautés d'agglomération*, *Communautés urbaines*, *Métropoles* and *Syndicats d'agglomération nouvelle*. The consolidation of such public entities for intermunicipality cooperation (*Établissements publics de coopération intercommunale*, EPCIs) with their own fiscal powers was made mandatory by the Territorial Authorities Reform Act (RCT law) of 16 December 2010, such that currently in 2017 nearly 100% of French municipalities³ fall under an EPCI with its own fiscal powers. Conversely, municipalities still benefit from a great deal of leeway in terms of which competences they wish to transfer to their intermunicipality, despite the new obligations laid down by the Law on the New Territorial Organisation of the Republic (NOTRe) of 7 August 2015⁴. As such, the flexibility inherent to intermunicipal cooperation enables the principle of bottom-up subsidiarity to be applied on a case-by-case basis.

Intermunicipal cooperation translates into a local, limited-scope movement⁵ that centralises decision-making at the local level. Consequently, according to the optimal decentralisation theorem proposed by Oates (1972), and in accordance with the logic of the Tiebout model (1956), municipalities' decision to

1. For example, Swiss cantons can legally force municipalities to cooperate in a specific jurisdictional area (CDLR, 2007).

2. More precisely, 36,680 from 2000 to 2011 to the nearest one or two, followed by 36,700 in 2012 as a result of Mayotte's integration into the overseas departments.

3. With the exception of four single-municipality islands (*île d'Yeu*, *île de Bréhat*, *île de Sein* and *île d'Ouessant*).

4. The NOTRe Act provides for additional compulsory transfers of powers from member municipalities to *Communautés de communes* and *Communautés d'agglomération*, including powers over economic development, tourism promotion, urban planning (development of local planning plans), planning, maintenance and management of traveller halting sites (in 2017), management of aquatic areas and flood prevention (in 2018), water and sanitation (in 2020) and household waste collection and treatment (in 2020).

5. Unlike municipalities, intermunicipalities do not have a general purpose. Instead, they have a remit that is exclusively limited to those powers which are transferred to them (functional speciality principle), exercised only within the area designated by their perimeters (principle of territorial speciality).

cooperate for a given competence ought to be based on a trade-off between economies of size and the cost of the spatial heterogeneity of citizens' preferences.

By studying the cooperation choices of municipalities with respect to specific competences, this article offers an original empirical test of the decentralisation theorem. Indeed, while some analyses of specific intermunicipalities have identified the logic and strategies applied by local public actors⁶, few studies have sought to establish global statistical relationships between measurable municipalities' and intermunicipalities' characteristics and the competences transferred. Frinault and Le Saout (2011) emphasised that some rural territories –consisting of small municipalities– are, for budgetary reasons, more inclined than others to engage in policies involving the sharing or transferring of social welfare competences to the intermunicipality. Frère *et al.* (2011) demonstrated the presence of a zoo effect of sorts within EPCIs with own fiscal powers in France. The zoo effect, initially observed by Schmandt and Stephens (1960) in the municipalities of Milwaukee County and later modelled by Oates (1988), is based on the idea that there are significant indivisibilities in respect of many local public goods (such as zoos), leading that the community must reach a certain minimum size in order to be able to provide them. Local public goods therefore increase with the size of local authorities, in both quantity and diversity. Applied to French intermunicipalities, the zoo effect provides an explanation as to why EPCIs with larger populations tend to exercise more competences. This article is not interested in the total number of transferred competences: rather it considers each competence taken individually. It is then the decision of municipalities to transfer certain competences (and not others) to the EPCI that is being studied and not the extent of the intermunicipalities' competences.

With regard to competences falling within the scope of public works, LeRoux and Carr (2007) also demonstrate through a similar approach that the decision of the Michigan municipalities to cooperate or not was based on a number of factors, in addition to the cost characteristics of the competence and the resulting economies of scale. They included the economic and fiscal resources available to the municipalities, the level and distribution of their populations, as well as their surface area. However, the context of the Michigan municipalities seems far removed from that of French municipalities. In

the case of France, Emond (2015) examines the optional competences of social welfare⁷ exercised at the intermunicipal level. These competences exhibit two specific features: economies of size are negligible and they benefit a minority of the population, which does not fund them through local taxes. Hence, by estimating a spatial probit model on the French EPCIs data, the decision to transfer this type of competences to the intermunicipal level appears to be driven by key strategic interactions exhibiting mimetic behaviour: the decision to transfer voluntary social competences to an EPCI is not based solely on the characteristics of its constituent municipalities, but also on whether or not these competences have been adopted by neighbouring EPCIs.

By way of contrast, this study draws on the decentralisation theorem to explain municipalities' cooperation choices. Following a presentation of the theoretical arguments relating to such choices in the literature, particular attention is paid to the extent of intra-municipal heterogeneity of citizens' preferences. A spatial *probit* model is then constructed on the basis of the propositions identified in the first section, then estimated with a view to identifying the determinants of municipalities' cooperation choices for 10 various competences. This work is based on 2012's data, which is the most recent year before the full impact of the Territorial Authorities Reform Act (RCT, enacted 16 December 2010) began to produce its effects. Indeed, the RCT's key feature is its strengthening of the role of prefect by potentially modifying the cooperative behaviour of municipalities. Finally, we suggest avenues for future research.

The decentralisation theorem applied to intermunicipal cooperation

By cooperating, municipalities transfer some of their powers to the intermunicipal level, thus

6. For example, Frinault and Le Saout (2011) argue that it is politically more costly for a mayor to transfer powers connected with citizens' associations (sport, social welfare) — which would see his or her direct interaction with the electorate reduced — than it is to transfer purely technical skills (waste management). Desage (2012) presents examples in which officially transferred skills have remained de facto the function of mayors. Gallez (2014) emphasises the importance of personal commitment with respect to elected representatives, as well as that of political leadership games whether between various local players or between them and the central powers.

7. The study focused especially on the following powers: Voluntary Social Assistance, the Intermunicipal Centre for Social Welfare, Urban and Local Development and Economic and Social Inclusion, as well as Healthcare Activities (medical or social and cultural)

creating a centralisation movement of public decision-making. Following the optimal decentralisation theorem (Oates, 1972), then, any decision by municipalities to cooperate indicates a trade-off between the cost of the spatial heterogeneity of citizens' preferences and the benefits of economies of size. On one hand, when a given competence is entrusted to the municipalities, they each benefit from a significant degree of discretionary power in exercising it. Thus, each municipality can determine every characteristic of the various local public goods in line with the preferences of its citizens. On the other hand, when decision-making is centralised at the intermunicipal level, the subsequent collective decision cannot respond quite as well to the heterogeneity of preferences across the different member municipalities' citizens (see Box 1). Citizens see their preferences less well-represented in the intermunicipal collective decision, which incurs a significant social cost. Generally speaking, the cost of the spatial heterogeneity of citizens' preferences constitutes a key element

in the formation of social groups (Alesina & Spolaore, 1997; 2005) and social enclaving is therefore rational behaviour in this context.

Municipalities would then have an interest in cooperating in priority with neighbouring communities that have populations with preferences similar to their own, thus minimising the cost of collective decision-making. As a result, this intermunicipal heterogeneity of citizens' preferences may also affect upon the level of integration within the intermunicipality. Essentially, the more an intermunicipality includes municipalities consisting of citizens with heterogeneous preferences, the higher the cost of collective decision-making and member municipalities will therefore be less inclined to transfer their competences to the intermunicipal level, *ceteris paribus*.

Proposition 1. *Intermunicipal heterogeneity of citizens' preferences is slowing down the transfer of competences to the intermunicipal level.*

Box 1 – Intermunicipal cooperation and cost of spatial heterogeneity of citizens' preferences

Let us consider three municipalities (A, B and C) which, for a given local public good g , must choose a characteristic between option x and option y (expressed respectively as g_x and g_y). In making its decision, each municipality relies on the preferences of its citizens and respects the choice of the majority.

Thus, for municipality i (for $i = A, B, C$), we have:

$$g^i = \begin{cases} g_x & \text{if } n_x^i > n_y^i \\ g_y & \text{otherwise} \end{cases} \quad (1)$$

where n_x^i and n_y^i designate, respectively, the number of citizens N^i of municipality i , in favour of option x and option y of the local public good g , such that $n_x^i + n_y^i = N^i$. Let us examine the following two cases:

Case 1

In municipality A, as in B, all citizens are in favour of option x , while all citizens of municipality C are in favour of the option y . As such, municipalities A and B will opt for option x ($g^A = g_x$ and $g^B = g_x$) whereas C will opt for option y ($g^C = g_y$). In this case, the public decision takes full account of citizens' preferences: all citizens see their preferences fulfilled.

However, if the three municipalities decide to cooperate and transfer local public good g to the EPCI, the situation will be different. Depending on the population of each municipality—as well as the internal functioning of the EPCI and the negotiating powers of each municipality within the community council—the public good provided by the EPCI g^{A+B+C} may adopt characteristic x as easily as it might characteristic y . But in both cases, part of the

population will not be in line with the collective choice of the EPCI (n^C if $g^{A+B+C} = g_x$, or $n^A + n^B$ if $g^{A+B+C} = g_y$). Thus, by centralising decision-making, the EPCI is less able to take into account the spatial heterogeneity of citizens' preferences.

Case 2

In each municipality, some citizens are in favour of option x , while others are in favour of option y . Consequently, each municipality opts for the characteristic that satisfies the majority of its citizens (equation 1). Let us posit $n_x^i > n_y^i$ for $i = A, B, C$. According to equation 1, each municipality will opt for option x and the population $n_y^A + n_y^B + n_y^C$ will not be in line with the choice of their respective municipality.

If the three municipalities decide to cooperate and transfer local public good g to the EPCI, then the situation will be the same. In fact, where each municipality opts separately for option x , the EPCI will uphold this choice. Public good g will be provided with characteristic x and the population $n_y^A + n_y^B + n_y^C$ will not be in line with the EPCI's choice, as was already the case without cooperation.

These two examples illustrate that it is only intermunicipal heterogeneity of citizen preferences—as opposed to intra-municipal heterogeneity—that constitutes a source of democratic inefficiency of the intermunicipality in comparison to the municipality.

On the other hand, centralisation also has certain advantages of its own, the most attractive of which being the potential for generating economies of scale. Indeed, in the presence of significant fixed production costs and low variable costs, it is possible to reduce the average production cost of a local public good by increasing its production scale. It was with this in mind that the first intermunicipal associations were created in France. While the duties entrusted to EPCIs are now much broader, controlling public spending and optimising government policy-making remain major objectives.

However, in the context of intermunicipal cooperation, it would be more appropriate to talk about economies of size instead of economies of scale. Indeed, cooperation has two distinct effects on the average production cost of a local public good: (i) by increasing the production scale, the average cost varies downwards in the case of economies of scale, or upwards in the case of diseconomies of scale; (ii) by sharing numerous costs (fixed generation costs, organisational or administrative costs, decision-making costs, etc.), which are then no longer shouldered by each municipality individually but by the whole, cooperation makes it possible to reduce the total production cost – and thus the average cost – of the good. Intermunicipal cooperation can thus make it possible to achieve

economies of size, even in the presence of diseconomies of scale (see Box 2).

Thus it is understood that the greater the economies of size, depending on a public good's cost structure (see Box 2), the greater the extent to which cooperation can reduce its average cost of generation and the bigger the incentive for municipalities to cooperate with one another, *ceteris paribus*.

Proposition 2. *By determining the full extent of the economies of size that can be achieved through cooperation, the cost structure for supplying a given local public good or service plays a key role in deciding whether or not to transfer its production to the intermunicipal level.*

Furthermore, economies of scale have an indirect effect on demand for local public goods: the zoo effect (Oates, 1988). Some indivisible and weakly rival goods – such as stadia, theatres or zoos – may be too expensive for citizens living in smaller municipalities: the amount that everyone should pay to fund their construction exceeds their *willingness to pay*. Intermunicipal cooperation may provide them a solution: since the total production cost of the good is borne by a larger population, the per capita cost decreases and citizens' demand can thus be met. We know that the larger the population consolidated within

Box 2 – Intermunicipal cooperation and economies of size

Consider two municipalities (A and B) that must fund the production of a given local public good. The total cost of generating the public good (TC) consists of a positive fixed cost of production (FC) and a variable cost (VC), which is positive and increases commensurately with the population N_i of the municipality i ($i = A, B$).

Thus, without cooperation, each municipality i bears the total cost of production:

$$TC(N_i) = FC + VC(N_i) \quad (2)$$

And if the two municipalities cooperate, they will subsequently bear the total production cost collectively:

$$TC(N_A + N_B) = FC + VC(N_A + N_B) \quad (3)$$

Deducing therefrom, intermunicipal cooperation will enable them to generate economies of size if and only if:

$$TC(N_A) + TC(N_B) > TC(N_A + N_B) \quad (4)$$

$$\Leftrightarrow FC + VC(N_A) + VC(N_B) - VC(N_A + N_B) > 0 \quad (5)$$

By definition, however, economies of scale appear in the production of the public good if and only if:

$$VC(N_A) + VC(N_B) - VC(N_A + N_B) > 0 \quad (6)$$

On the contrary, if this condition is not respected, diseconomies of scale appear in the production of the public good.

Yet if Equation 6 holds, then it means Equation 5 also holds since, in theory, the fixed cost of production is positive. In other words, if economies of scale are at work, this will necessarily translate into significant savings and thus cooperation will reduce the overall production cost of the public good. More generally, however, Equation 5 holds as soon as FC is greater than $VC(N_A + N_B) - VC(N_A) - VC(N_B)$, even where Equation 6 does not hold. In other words, intermunicipal cooperation can generate economies of size – even in the presence of diseconomies of scale – provided that this excess cost is offset by the fixed costs that are shared.

Finally, one can deduce from Equation 5 that the economies of size achieved by way of cooperation are all the more significant given that: (i) the fixed costs of production are high, (ii) the second derivative of variable costs is low.

the intermunicipality, the greater the economies of size and the greater the incentive for the municipalities to cooperate, *ceteris paribus*.

Proposition 3. In the presence of economies of size, the larger the population of the intermunicipality, the more member municipalities are willing to transfer their competences to the intermunicipal level.

Moreover, this zoo effect may have the following indirect consequence. The smaller a municipality, the less able it is to fund a large number of highly indivisible public goods on its own. It then has no alternative but to cooperate with its neighbours to fund their production collectively. Consequently, the greater the number of small municipalities consolidated within a given intermunicipality, the more likely they are to transfer their competences to the intermunicipal level, *ceteris paribus*.

Proposition 4. As an indirect consequence of the zoo effect, intermunicipalities are more readily entrusted with competences when they consist of smaller municipalities.

Finally, let us keep in mind that cooperation has other non-negligible advantages (Frère & Paty, 2014). Indeed, intermunicipal cooperation also helps to improve the quality of local public goods and services, to promote horizontal equalisation and to internalise various external effects. For instance, where the provision of a public good is entrusted to municipalities, spill-over effects (or other externalities) may begin to show and local public policies, which are highly interdependent, may suffer from a lack of coordination. Yet these various external effects can prevent the local public sector from functioning properly, both in terms of the level of public expenditure and the tax rates adopted.

Thus if we apply the decentralisation theorem to intermunicipal cooperation, municipalities' decision to cooperate and transfer competences to the intermunicipal level appears to be the result of a delicate trade-off between advantages and disadvantages, at the core of which is the cost of the spatial heterogeneity of citizens' preferences and the benefits of economies of size. In the rest of the article, an empirical approach is implemented in order to test these various propositions in the case of France. We must first measure the heterogeneity of citizens' preferences, a focal point of the decentralisation theorem but difficult to address empirically.

Measuring territorial heterogeneity

The heterogeneity of citizens' preferences is thus likely to play a key role in municipalities' choice of cooperation. However, since there is no empirical measurement for these preferences, (a) proxy variable(s) based on the economic and social composition of the populations studied is(are) commonly used. The implicit assumption is as follows: citizens have different preferences depending on their income, socioprofessional category, education level, employment/unemployment status, age or even gender (Bergstrom & Goodman, 1973). By calculating a heterogeneity index for each of these variables, the heterogeneity of citizens' preferences is thus measured indirectly. However, since these variables are closely correlated with one other, typically only a limited number of them are used in empirical studies. Moreover, as we have seen before, the spatial heterogeneity of citizens' preferences may express itself in relation to any one characteristic of local public goods. It can therefore seem reductionist to approximate this multidimensional heterogeneity using two or three sociodemographic variables, supposedly encompassing the full diversity of citizens' preferences (Gross, 1995). In order to avoid this shortcoming, we propose the use of a principal component analysis (PCA) to construct a composite indicator of preferences heterogeneity on the basis of 15 sociodemographic variables. This approach has three stages.

First, observable variables must be constructed allowing for an approximation of the citizens' preferences for each French municipality. To this end, we use Insee data on the population census of 2012 (see Box 3). 15 variables were eventually selected; they characterise each municipality in terms of population structure (proportion of the population aged under 15, 15-29, 75 and over; the percentage of the total population who are men, as well as the number of people per household), socioprofessional composition (proportion of the working population who are agricultural workers, craftsmen, associate professionals, managers), and standard of living (median income, unemployment rate).

Second, heterogeneity indices are calculated using these 15 variables. More precisely, these are indices of intra-community heterogeneity, i.e. the heterogeneity between municipalities within the same intermunicipality. For each variable, a Gini index was calculated at the intermunicipal level. Its value tends towards 0 in a situation of perfect equity (e.g. the

unemployment rate is identical in all member municipalities), and towards 1 in a situation of maximum inequity (e.g. all the unemployed are located in a single member municipality).

Third, a PCA is conducted over these 15 Gini indices in order to construct a composite indicator of preference heterogeneity derived from the principal components of the analysis (Hosseini & Kaneko, 2011). The first two components of this PCA explain 60.2% of the total sample variance. According to the correlations circle (Figure I), most variables are correlated with the first component: it explains 49.1% of the sample variance, compared with 11.1% for the second component. By way of contrast, the second component is closely correlated to the Gini indices calculated on the basis of household size, median income and the proportion of agricultural workers in the active population. Lastly, the Gini index calculated for the share of the population over 75 years of age is located far from the circle and is not aligned with any of the axes: it is poorly explained by these two components.

In order to improve the quality of our synthetic indicators, we might consider two solutions. The first would consist of adding another principal component, which would automatically increase the explained variance. However, the percentage of the variance explained by the third component is low and its eigenvalue is less than one. A second solution is preferred: it consists of conducting two PCAs in parallel,

distinguishing between demographic variables on the one hand and socioeconomic variables related to employment (education level, socio-professional category (SPC) and standard of living) on the other hand (see appendix, Figures AI and AII for the correlation circles). The percentage of the variance explained by for the first two components is improved, reaching 72.2% for the demographic variables and 67.9% for the employment variables.

Having now these two sets of synthetic indicators that indirectly measure intermunicipal heterogeneity of citizens' preferences, we construct an econometric model in order to identify the major empirical trends influencing municipalities' cooperation choices.

The econometric model

On the basis of the decentralisation theorem as applied to intermunicipal cooperation and the resulting set of propositions, we define three variables of interest on which any collective decision to transfer competences to the intermunicipal level depends: the heterogeneity of citizens' preferences h_x , the intermunicipality's total population n_x as well as the average population of its member municipalities \bar{n}_x .

This decision can be calculated using a *probit* model, with D_x^g equal to 1 when there is a decision to transfer competences g to the intermunicipal level, such as:

Box 3 – Data

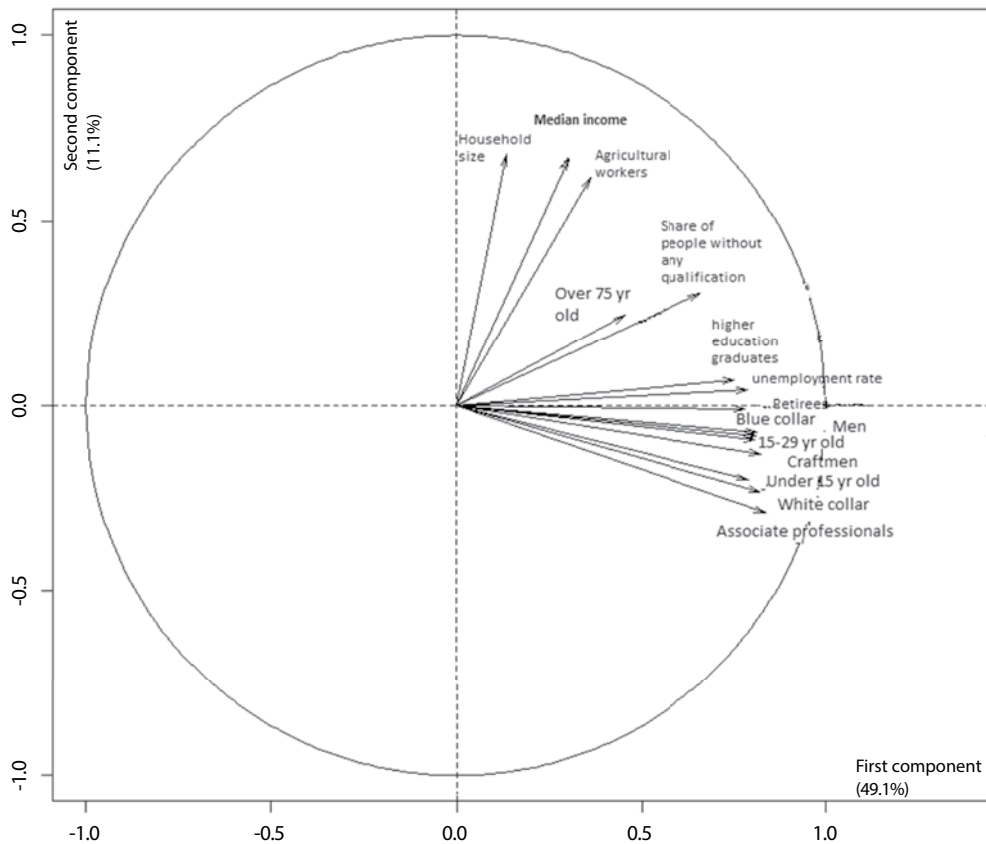
The data used at the municipal level are drawn mainly from the Insee population census of 1 January 2012, with the exception of per capita financial wealth potential, which was provided by the DGCL, and the per capita median income, which was taken from *FiLoSoFi* data (social and fiscal localized incomes) provided by the DGFIP and Insee. However, because of the lack of data available for 2012, we have used 2013's financial wealth potential information.

We chose to work on the basis of 2012's data, which is the most recent year before the full force of the Territorial Authorities Reform Act (enacted 16 December 2010) began to operate. Indeed, this Reform Act marks a major turning point in the development of intermunicipalities with individual fiscal powers in France. The role of prefect is considerably reinforced, with the aim to streamline the intermunicipal map, thereby reducing the decision-making power of individual municipalities' cooperation choices.

These municipal variables are then calculated at the intermunicipal level on the basis of the perimeters of intermunicipalities with their own fiscal powers as of 1 January 2012 published by the DGCL. They consolidate all of the *Communautés de communes*, *Communautés d'agglomération*, *Communautés urbaines* and *Syndicats d'agglomération nouvelle* (*Métropoles* being more recent). However, in the perspective of the spatial approach of the model, geographically isolated intermunicipalities have been excluded from the scope of the study. This includes intermunicipalities in overseas departments and regions, as well as those in Corsica. Our data sample therefore comprises 2,543 intermunicipalities with their own fiscal powers.

Finally, the position of intermunicipalities on the urban-rural gradient was determined based on Insee-Datar's Urban Area Zoning data (ZAU 2010). The list of powers exercised by each intermunicipality is based on the DGCL's national intermunicipality database (*Banatic*).

Figure 1
Circle of correlations for all Gini indices relating to the various different sociodemographic variables – Principal Components Analysis



Reading note: associated with a point of contact (0.72; 0) in the first factorial plan, the Gini index for the portion of the intermunicipality's population who are retired has a correlation of 0.72 with the first main component and a zero correlation with the second main component. In other words, 0.72% of its variance is captured by the first component, with the second capturing nothing.
 Scope: 2543 EPCs with own taxation powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).
 Sources: Insee, *Census 2012*; authors' calculations.

$$P_X^g = P(D_X^g = 1 | h_X, n_X, \bar{n}_X, z_X) = \Phi(\beta_0^g + \beta_1^g h_X + \beta_2^g n_X + \beta_3^g \bar{n}_X + \beta_4^g z_X) \quad (7)$$

where $\Phi(\cdot)$ corresponds to the distribution function of the standard normal distribution law, z_X is the vector of control variables and β^g specify the parameters to be estimated for competence g .

More specifically, h_X is the column vector composed of the principal components constructed in the previous section, i.e. alternatively the first two principal components of the PCA conducted for the 15 variables ($CP1_X^{tot}$ et $CP2_X^{tot}$); or the first two principal components of the two PCAs conducted in parallel, one for the demographic variables ($CP1_X^{demo}$ and $CP2_X^{demo}$) and the other for the employment variables ($CP1_X^{emp}$ and $CP2_X^{emp}$).

According to Proposition 1, these variables are expected to have a negative impact on P_X^g – the greater the intermunicipal heterogeneity of citizens' preferences, the higher the cost of collective decision-making and the lower the likelihood of municipalities transferring their competences to the intermunicipal level (Tiebout, 1956). Conversely, Proposition 3 suggests that, in the presence of economies of size, the population of intermunicipality n_X has a positive impact on P_X^g , i.e. the larger the population of the intermunicipality, the lower the average production cost and the greater the financial incentive for municipalities to cooperate. Finally, in accordance with Proposition 4, the average population of the member municipalities of intermunicipality \bar{n}_X would have a negative impact on P_X^g , i.e. the smaller the municipality, the less able it is to produce public good g using its own resources and the more

dependent it is on the intermunicipality to which it must transfer the relevant competence in order to ensure that g is provided to its citizens. This is what is known as the indirect zoo effect.

In addition, vector z_X is composed of nine control variables aimed to define context variability between the different EPCIs in our sample. The sole purpose of introducing these variables into the model is to set some characteristics of the intermunicipalities likely to affect the relationship between each of our variables of interest (spatial heterogeneity of preferences, size of the intermunicipality and average size of the municipalities comprising the intermunicipality) and the transfer of competences. The expected sign of the relationship between the transfer of competences and these variables is a priori unknown.

A Herfindahl-Hirschman index measures the municipal concentration of per capita financial wealth potential within the intermunicipality. It is calculated on the basis of the per capita financial wealth potential of the member municipalities and such that:

$$HHI_X^{pc_fi_wealth_pot} = \sum_{x \in X} \left(\frac{pc_fi_wealth_pot_x}{\sum_{x \in X} pc_fi_wealth_pot_x} \right)^2 \quad (8)$$

Where $pc_fi_wealth_pot_x$ corresponds to municipality x of intermunicipality X 's per capita financial wealth potential, or its fiscal potential⁸ plus the fixed portion of the DGF subsidy⁹.

Thus, the value of $HHI_X^{pc_fi_wealth_pot}$ varies between $1/n_X$, i.e. when each member municipality has the same financial wealth potential per inhabitant, and 1 when a single member municipality holds all the financial wealth potential in the intermunicipality. The sign of the associated coefficient is expected to be negative: a higher concentration of financial wealth potential per capita reduces the likelihood that public good g will be transferred to the intermunicipal level. In fact, a high index $HHI_X^{pc_fi_wealth_pot}$ illustrates an asymmetric situation in the level of per capita financial wealth potential of the various member municipalities. Relatively rich municipalities (per capita) may then fear that they will become net funding providers for intermunicipality activities and will tend to hold back the transfer of cost-intensive competences. However, the presence of a small number of dominant municipalities can also facilitate collective decision-making, thus facilitating the transfer of competences. In such cases, the sign of the associated coefficient would be positive.

Unemployment rate of the intermunicipality ($Unemployment_rate_X$). The expected sign for this variable is undetermined. Actually, since intermunicipal cooperation is perceived as a potential solution to certain local imbalances in the labour market, then municipalities would tend to entrust key competences to the intermunicipal level when the unemployment rate is high. However, municipalities may also prefer to retain their decision-making power in respect of such electorally significant competences and thus maintain a direct relationship with their citizens.

Median income of the intermunicipality's citizens ($Median_income_X$). Standard of living is an important factor when it comes to understanding the diversity of citizens' preferences with respect to public goods. Assuming that local public goods are normal goods, their demand should grow with citizens' incomes. Therefore, if the intermunicipality is better able to respond to this new demand, the transfer of competences should be more pronounced. If that is not the case, the result would be the opposite.

Percentage of the intermunicipality's population aged below 15 years (Pct_b15_X) and over 75 years (Pct_o75_X). Once again, the expected sign for these two variables remains unknown a priori. On the one hand, if a community has a large share of young and old people in its population, it can then be assumed that the member municipalities will tend to transfer specific competences in order to satisfy their high demand for local public goods. Thus, they would benefit from the potential advantages of cooperation. On the other hand, however, the member municipalities might also prefer to retain the exercise of these competences for electoral concerns.

Surface area of the intermunicipality in square kilometres ($Surface_area_X$). By determining the full extent of economies of size, production costs play a decisive role in municipalities' cooperation choices (Proposition 2). Yet many competences are, by their very nature, sensitive to network effects. These include the maintenance of roads, water treatment and distribution and energy production and distribution. Thus, the larger the area of a given intermunicipality,

8. Fiscal potential corresponds to the amount of tax revenues that a municipality would receive if its four gross local tax bases (territorial economic contribution (contribution économique territoriale), housing tax (taxe d'habitation), property tax on built and non-built land (taxes sur le foncier bâti et non bâti)) were levied at the average national rates calculated for all French municipalities.

9. The DGF (dotation globale de fonctionnement) is the main subsidy paid by the central government to local to municipalities.

the more costly it will be to introduce a collective sanitation system (assuming similar population sizes). With regard to such competences, cooperation would therefore become less attractive for municipalities as the surface area of the intermunicipality increases. We expect communities' $Surface_area_X$ to have a negative impact on P_X^g , particularly with regard to competences that are sensitive to network effects.

Intermunicipality's legal status (CU_CA_X), a dummy variable that takes the value 1 for *Communautés urbaines* or *Communautés d'agglomération*, and the value 0 otherwise. These legal statuses produce significant variations between intermunicipalities, both in terms of minimum population thresholds to be achieved as well as mandatory, voluntary or optional competences. In fact, depending on an intermunicipality's legal status, it is required to exercise a minimum amount of competences belonging to specific jurisdictions¹⁰. Thus, these are mandatory jurisdictions as opposed to specifically-defined competences, otherwise they would have to be exercised by 100% of intermunicipalities (see Box 4, Figure A).

Type of area on which the intermunicipality is established. The typology of Insee-Datar's Urban Area Zoning (ZAU 2010) partitions the territory into three main types of spaces from which we draw three dummy variables: large urban areas ($Large_area_X$), other areas ($Small_average_area_X$), other multipolarised municipalities and isolated municipalities ($Rural_isolated_X$). Since this typology is determined at the municipal level, a given intermunicipality is designated by the type of area that corresponds to that of the majority of its member municipalities. Our model including a constant, $Large_area_X$ is excluded from the estimations.

The quality of model 7's estimation is assessed by two statistics: the percentage of correct

predictions and the log-likelihood that takes an increasingly higher value as the model's explanatory power grows. We also test for spatial autocorrelation by comparing, with a likelihood ratio test, the non-spatial model and the autoregressive spatial model (SAR). The model to be estimated then becomes:

$$P_X^g = \Phi\left(\beta_0^g + \beta_1^g h_X + \beta_2^g n_X + \beta_3^g \bar{n}_X + \beta_4^g z_X + \rho^g \sum_{Y \neq X} w_{XY} P_Y^g\right) \quad (9)$$

with w_{XY} the element of the spatial weighting matrix (W) describing the neighbourhood relationship between intermunicipalities X and Y . The definition of neighbourhood here is contiguity: two intermunicipalities are considered to be neighbours if they have a common border. Finally, the elements of the spatial weighting matrix (W) are row standardised¹¹. This SAR model is estimated using the maximum likelihood method proposed by McMillen (1992).

Results

First of all, the estimations of models (7) and (9) show that the results are unaffected by the specification adopted with regard to the heterogeneity of preferences. Thus, only those results obtained using the two principal components of the two PCAs conducted in parallel ($CP1_X^{demo}$, $CP2_X^{demo}$, $CP1_X^{emp}$ and $CP2_X^{emp}$) are presented here¹². The results of the estimations of model 7 are displayed in Tables 1, 2 and 3. Four main results emerge:

10. For example, a Communauté d'agglomération must exercise at least one competence connected to urban governance, which is not the case for a Communauté de communes.

11. If an EPCI has n contiguous neighbours, the weighting assigned to each will be $1/n$. By standardising the spatial weighting matrix (W), the neighbourhood impact is not artificially affected by the administrative breakdown that determines the number of contiguous neighbours for each EPCI.

12. The results of estimates obtained using the two main components of the PCAs conducted for all Gini indices ($CP1_X^{tot}$ and $CP2_X^{tot}$) are available on request.

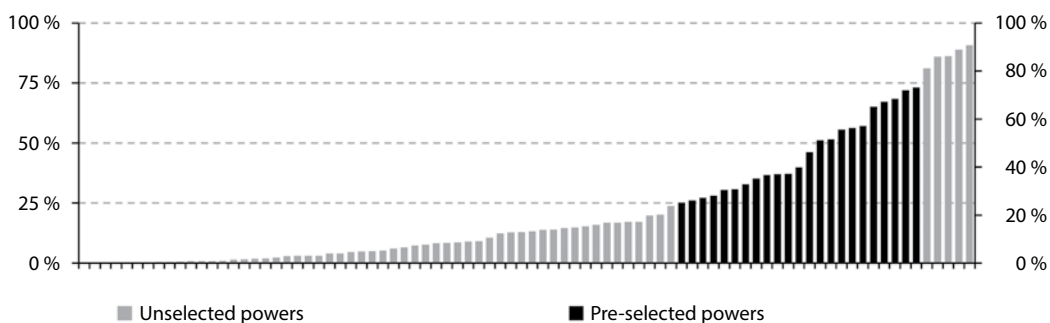
Box 4 – Choice of competences studied

The DGCL's national intermunicipality database (*Banatic*) lists the competences exercised by each intermunicipality out of a selection of 84 potential intermunicipal competences. Of these 84 competences, we have preselected 23. In fact, some competences are very rarely exercised. One such example is 'Record-keeping', which is exercised by just one intermunicipality of the 2,543 in our sample. Conversely, other competences are almost always exercised. These include the competence

'Creation, planning, maintenance and management of zones of industrial, commercial, service-based, artisanal or tourist activity', which is exercised by 90.7% of intermunicipalities in the sample. Yet with such low variability, it is difficult to take anything away from this as regards any decision to transfer such competences to the intermunicipal level. For this reason, only those 23 powers that are exercised by 25 to 75% of the sample intermunicipalities were preselected. →

Box 4 (contd.)

Figure A
Percentage of intermunicipalities studied exercising every one of the 84 intermunicipal powers



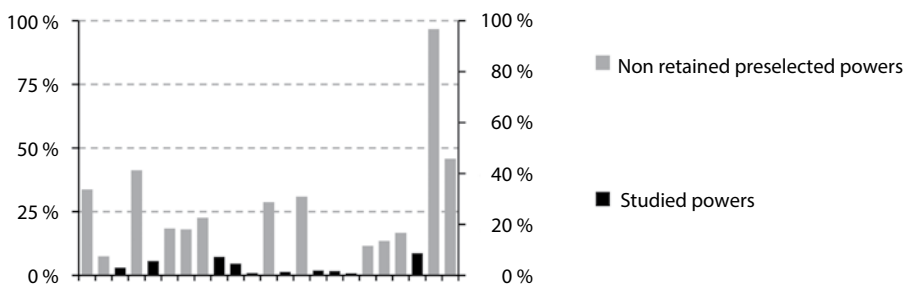
Scope: 2,543 EPCIs with own fiscal powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).
 Sources: DGCL, *Banatic* 2012.

EPCIs with their own fiscal powers constitute a form of intermunicipal cooperation in France, as do EPCIs with no fiscal power that consolidate various different types of associations (Single-purpose Intermunicipal Associations (SIVU) or Multi-purpose Intermunicipal Associations (SIVOM), Closed Joint Intermunicipal Associations (SMF) or Open Joint Intermunicipal Associations (SMO)). Municipalities have the choice either to transfer a given competence to the intermunicipal level or retain it for themselves, and are likewise able to choose the form of intermunicipal cooperation. Estimation results could therefore be biased in cases where they relate to competences commonly entrusted to intermunicipal associations. However, due to the

superposition and entanglement of the perimeters of intermunicipal associations, it is difficult to integrate them into any econometric analysis.

Furthermore, out of the 23 preselected powers, the 10 least frequently entrusted to these EPCIs with no fiscal powers were eventually selected for this study. These are, namely: 'Local Housing Programme (PLH)'; 'Planned Housing Improvement Operation (OPAH)'; 'Social Housing Policy'; 'Land-banking'; 'Territorial consistency scheme (SCOT)'; 'Sector Scheme'; 'Creation of Joint Development Zones (ZAC)'. The influence of intermunicipal associations on the choice of competences entrusted to the EPCIs with own fiscal powers is similarly limited.

Figure B
Percentage of municipalities that have transferred one of the 23 preselected powers to an EPCI without own fiscal power



Scope: 2,543 EPCIs with own fiscal powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).
 Sources: DGCL, *Banatic* 2012.

Result 1a – *The heterogeneity of citizens' preferences is holding back the transfer of competences from municipalities to the intermunicipal level.*

We can see that $CP1_X^{emp}$ and/or $CP2_X^{emp}$ have a significant and negative impact with respect to most of the competences studied, especially 'housing' and 'urban planning'¹³ (see Tables 1 and 2). In other words, the more heterogenous the population of a given intermunicipality's member municipalities –in terms of education level,

CSP and standard of living– the less inclined it is to transfer competences to the intermunicipal level. Proposition 1 therefore holds and the argument of Tiebout (1956), which stipulates that centralisation generates a significant social cost in view of its inferior consideration of the spatial heterogeneity of citizens' preferences, is reflected in French intermunicipalities with their

13. This is the case for powers over the local housing programmes, social housing policy, sports activities, SCOT, sector schemes and SPA creation.

own fiscal powers. These results complement those of Di Porto *et al.* (2016), who show that a municipality's decision to integrate into an EPCI is all the more complicated as its member municipalities' socioeconomic characteristics differ. In other words, territorial heterogeneity is holding back both the construction of intermunicipalities, and the transfer of competences to them.

Comparatively speaking, $CP1_X^{demo}$ et $CP2_X^{demo}$ play a more secondary role here. Only $CP1_X^{demo}$

has a significant (and negative) effect on 'social housing policy' and 'creation and maintenance of sports' (columns 1.3 and 3.3). When spatial autocorrelation is taken into account, $CP1_X^{demo}$ no longer has any significant impact on the 'creation and maintenance of sports facilities' (see column A3.3 in the appendix). Thus, the various sources of heterogeneity do not have the same impact on municipalities' decisions to transfer competences to the intermunicipal level: only the heterogeneity of municipal populations

Table 1
Probit estimates in the area of competence Housing

	1.1	1.2	1.3
	Local housing programme	OPAH ^a	Social housing policy
$CP1_X^{emp}$	0.038 (0.033)	0.016 (0.031)	-0.088* (0.036)
$CP2_X^{emp}$	-0.115* (0.057)	-0.015 (0.053)	-0.039 (0.061)
$CP1_X^{demo}$	-0.031 (0.029)	0.036 (0.027)	-0.087** (0.032)
$CP2_X^{demo}$	0.016 (0.044)	-0.048 (0.041)	0.034 (0.047)
$\log(n_X)$	0.672** (0.165)	0.235 (0.156)	0.119 (0.195)
$\log(\bar{n}_X)$	0.040 (0.167)	-0.144 (0.156)	0.510** (0.195)
$IHH_X^{pot_fi_hab}$	-0.465 (1.064)	-1.352 (1.017)	-4.254** (1.361)
Unemployment_rate _x	0.024 (0.019)	-0.016 (0.018)	-0.049* (0.021)
Median_income _x	-0.00002 (0.00003)	-0.00001 (0.00003)	-0.0001 (0.00003)
Pct_b15	0.083** (0.028)	0.113** (0.027)	0.112** (0.030)
Pct_o75	0.036 (0.031)	0.111** (0.029)	0.146** (0.033)
Surface_area _x	-0.00000 (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
CU_CA _x	1.674** (0.379)	-0.172 (0.213)	1.514** (0.266)
Small_average_area _x	0.143 (0.138)	0.544** (0.135)	0.352* (0.142)
Rural_isolated _x	0.250 (0.128)	0.223 (0.124)	0.213 (0.138)
Constant	-7.871** (1.385)	-3.939** (1.282)	-6.933** (1.500)
Observations	2,543	2,543	2,543
Log likelihood	-1,570.651	-1,710.083	-1,462.396
Correct predictions (%)	63.04	58.67	71.14
LR test ($H_0: \rho = 0$)	95.514**	52.073**	141.749**

a: Planned housing improvement operation (OPAH).

Note: * p<0.1; * p<0.05; ** p<0.01; standard deviations in brackets.

Reading note: $CP1_X^{emp}$ does not significantly affect (critical probability greater than 10%) the probability of *local housing programme* and *OPAH* competences being transferred, but does negatively affect the probability of *social housing policy* competence being transferred (significant at the 10% threshold).

Scope: 2,543 EPCIs with own fiscal powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).

Sources: Insee, *Census* 2012, Insee-DGFIP-Cnaf-Cnav-CCMSA, fichier localisé social et fiscal (*Filosofi*) 2012; DGCL, *Banatic* 2012; Insee-Datar, *ZAU* 2010; authors' calculations.

measured in terms of education level, SPC and standard of living holds back the transfer of competences to the intermunicipal level.

Result 1b – *Although heterogeneity relating to socio-professional category, standard of living and citizens' education level is holding back the transfer of competences from municipalities to the intermunicipal level, heterogeneity in terms of age and household size plays a more secondary role here.*

We also observe that the coefficient associated with the intermunicipality's population n_x is either insignificant, or significant and positive. In other words, the probability of these competences being transferred increases commensurately with the size of the intermunicipality, indicating the presence of the economies of size effect that ought to foster cooperation among municipalities (Proposition 3). This is especially true in the case of 'creation and maintenance of sports facilities' (column 3.3), where

Table 2
Probit estimates in the area of competences Urban planning

	(2.1)	(2.2)	(2.3)	(2.4)
	Land-banking	SCOT ^a	Sector schemes	Creation of ZAC ^b
$CP1_x^{emp}$	-0.054 (0.033)	-0.092** (0.036)	-0.067** (0.033)	-0.068** (0.034)
$CP2_x^{emp}$	0.009 (0.056)	-0.124* (0.063)	-0.059 (0.056)	-0.056 (0.059)
$CP1_x^{demo}$	-0.027 (0.029)	-0.032 (0.032)	-0.002 (0.029)	-0.016 (0.030)
$CP2_x^{demo}$	0.016 (0.044)	0.053 (0.049)	0.007 (0.043)	0.069 (0.045)
$\log(n_x)$	0.168 (0.171)	0.999*** (0.182)	0.182 (0.170)	0.735*** (0.175)
$\log(\bar{n}_x)$	-0.056 (0.172)	-0.206 (0.186)	0.325* (0.170)	0.018 (0.178)
$IHH_x^{pot_fi_hab}$	-1.723 (1.138)	-0.436 (1.113)	-2.088* (1.123)	-1.396 (1.144)
Unemployment_rate _x	0.004 (0.020)	-0.102*** (0.021)	-0.020 (0.019)	-0.015 (0.020)
Median_income _x	0.0001*** (0.00003)	-0.0001*** (0.00003)	-0.00003 (0.00003)	0.00002 (0.00003)
Pct_b15	0.031 (0.028)	0.041 (0.031)	0.035 (0.028)	0.058** (0.029)
Pct_o75	0.101*** (0.031)	-0.062* (0.033)	0.044 (0.030)	0.065** (0.032)
Surface_area _x	-0.00000 (0.00000)	-0.00002*** (0.00000)	0.00000 (0.00000)	-0.00000 (0.00000)
CU_CA _x	1.363*** (0.231)	0.059 (0.354)	0.807*** (0.250)	1.733*** (0.450)
Small_average_area _x	0.263* (0.138)	-0.547*** (0.153)	-0.171 (0.135)	0.140 (0.141)
Rural_isolated _x	0.155 (0.131)	-0.507*** (0.139)	-0.167 (0.128)	0.158 (0.130)
Constant	-5.481*** (1.388)	-3.039** (1.481)	-4.065*** (1.357)	-8.503*** (1.455)
Observations	2,543	2,543	2,543	2,543
Log likelihood	-1,590.865	-1,306.621	-1,625.750	-1,514.084
Correct predictions (%)	66.18	74.75	63.66	66.30
LR test ($H_0: \rho = 0$)	138.106***	273.668***	216.640***	139.508***

a: Territorial consistency scheme; b: Joint development zones.

Note: * p<0.1; ** p<0.05; *** p<0.01; standard deviations in brackets.

Reading note: $CP1_x^{emp}$ does not significantly affect the probability of land-banking competence being transferred, but does negatively affect the probability of SCOT, sector scheme and SPA competences being transferred (significant at the 5% threshold).

Scope: 2,543 EPCIs with own fiscal powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).

Sources: Insee, *Census* 2012, Insee-DGFIP-Cnaf-Cnav-CCMSA, fichier localisé social et fiscal (*Filosofi*) 2012; DGCL, *Banatic* 2012; Insee-Datar, *ZAU* 2010; authors' calculations.

the sharing of fixed generation costs expected and the subsequent economies of size are significant. By contrast and despite the similar cost structure (Proposition 2), this result is not observed for ‘sports activities’ and ‘creation and maintenance of (socio-)cultural facilities’ (see Table 3, columns 3.1 and 3.2).

However, the presence of economies of size alone cannot explain the significant positive impact that can also be seen for the following competences: ‘local housing programmes’, ‘territorial coherence schemes’ and ‘creation of Special Planning Areas’ (see Tables 1 and 2, columns 1.1, 2.2 and 2.4). In this case, the

need for coordination with respect to local public choices would come into play: in intermunicipalities with larger populations the need for coordination is greater and these competences tend more often to be entrusted to the intermunicipal level.

Result 2 – Economies of size and the need to coordinate local public choices predetermine that some competences will be exercised at the intermunicipal level.

When it is significant, the estimated coefficient of the member municipalities’ average

Table 3
Probit estimates in the area of competences *Spatial planning*

	3.1	3.2	3.3
	Sports activity	Creation/maintenance of (socio-) cultural facilities	Creation/maintenance of sports facilities
$CP1_x^{emp}$	-0.092*** (0.033)	0.007 (0.035)	-0.017 (0.036)
$CP2_x^{emp}$	0.007 (0.056)	-0.062 (0.059)	-0.025 (0.059)
$CP1_x^{demo}$	0.001 (0.029)	-0.013 (0.031)	-0.062** (0.031)
$CP2_x^{demo}$	0.044 (0.043)	-0.025 (0.046)	0.048 (0.046)
$\log(n_x)$	0.254 (0.164)	0.202 (0.177)	0.685*** (0.172)
$\log(\bar{n}_x)$	-0.220 (0.164)	-0.104 (0.177)	-0.397** (0.172)
$IHH_x^{pot_fi_hab}$	-1.154 (1.065)	-1.103 (1.174)	-0.294 (1.113)
Unemployment_rate _x	-0.051*** (0.019)	0.066*** (0.020)	0.020 (0.020)
Median_income _x	-0.0001* (0.00003)	0.0001** (0.00003)	0.00002 (0.00003)
Pct_b15	0.056** (0.028)	0.027 (0.030)	0.024 (0.030)
Pct_o75	0.013 (0.031)	0.043 (0.033)	0.017 (0.033)
Surface_area _x	-0.00000 (0.00000)	-0.00000 (0.00000)	-0.00001*** (0.00000)
CU_CA _x	-0.102 (0.221)	0.552** (0.225)	-0.020 (0.222)
Small_average_area _x	0.165 (0.137)	0.045 (0.148)	0.185 (0.143)
Rural_isolated _x	0.237* (0.128)	-0.065 (0.140)	0.245* (0.136)
Constant	-0.872 (1.347)	-4.809*** (1.437)	-5.547*** (1.421)
Observations	2,543	2,543	2,543
Log likelihood	-1,645.320	-1,460.486	-1,515.450
Correct predictions (%)	63.15	72.63	68.82
LR test ($H_0 : \rho = 0$)	90.404***	149.667***	193.644***

Note: * p<0.1; * p<0.05; ** p<0.01; standard deviations in brackets.

Reading note: $CP1_x^{emp}$ negatively impacts the probability of *sports activities* competence being transferred (significant at the 1% threshold), but does not significantly affect the probability of *Creation/maintenance of (socio-)cultural facilities* and *Creation/maintenance of sports facilities* competences being transferred.

Scope: 2,543 EPCIs with own fiscal powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).

Sources: Insee, *Census* 2012, Insee-DGFIP-Cnaf-Cnav-CCMSA, fichier localisé social et fiscal (*Filosofi*) 2012; DGCL, *Banatic* 2012; Insee-Datar, *ZAU* 2010; authors' calculations.

population \bar{n}_x can be negative as predicted by Proposition 4 (see Table 3, column 3.3), but also to the opposite sign (see Tables 1 and 2, columns 1.3 and 2.3). However, contrary to previous results, it is sensitive to the presence of spatial autocorrelation (not taken into account in the results presented in Tables 1 to 3). Once this spatial autocorrelation is treated (appendix, Tables A1, A2 and A3), the estimated coefficient for \bar{n}_x becomes negative when it is significant (columns A2.2, A2.1 and A3.3), whereas positive coefficients consequently lose their significance (columns A1.3 and A2.3). This result, which is an indirect consequence of the zoo effect, confirms Proposition 3: the smaller a municipality, the less able it is to fund many public goods on its own and the more it tends to turn to the intermunicipality.

Result 3 – An indirect consequence of the zoo effect is that intermunicipalities made up of small municipalities have a higher probability of being entrusted with some competences.

Furthermore, the control variables show different effects depending on the competence in question, thus demonstrating the complexity of local cooperation choices. We shall observe the net effect of the legal statuses of *Communautés d'agglomération* and *Communautés urbaine* on the most of the studied competences. Compared to *Communautés de communes* and *Syndicats d'agglomération nouvelle*, *Communautés d'agglomération* and *Communautés urbaines* would consequently be more readily entrusted with competences by their member municipalities. This result is consistent with the guidelines set out in the Law of 12 July 1999 on the strengthening and simplification of intermunicipal cooperation, and further bolstered by the RCT and NOTRe laws, which were intended to promote greater intermunicipal integration, especially with regard to *Communautés d'agglomération* and *Communautés urbaines*.

Lastly, the likelihood ratio tests systematically show the presence of spatial autocorrelation. Tables A1, A2 and A3 in the appendix present the results of the autoregressive spatial model's estimates (Equation 9), obtained using the maximum likelihood method proposed by McMillen (1992). Above all, it can be seen that the results shown until this point are robust to the treatment of this spatial autocorrelation, and even strengthened in the case of Result 3. Moreover, the estimator of the autoregressive term is always significant and positive: the probability

that the intermunicipality exercises a particular competence is all the higher if the bordering intermunicipalities also exercise this competence, and vice versa. These results are consistent with those obtained by Emond (2015), who identified the same local mimicking behaviour among French intermunicipalities for competences of social assistance.

Result 4 – The choice to transfer competences to the intermunicipal level greatly depends on the choice of neighbouring intermunicipalities, indicating a mimicking behaviour among contiguous intermunicipalities.

* *
*

By studying the competences exercised by French intermunicipalities, this article shows that the choice of municipalities to transfer some of their competences to the intermunicipal level indicates an arbitrage of sorts between economies of size and the cost of the heterogeneity of citizens' preferences. Oates's decentralisation theorem (1972) is therefore fully illustrated within the framework of intermunicipal cooperation.

On the one hand, the estimations show that the economies of size expected from cooperation provide an incentive for municipalities to cooperate. Depending on the competences in question, this result can be explained by two mechanisms. The first is the potential for improved coordination of local public choices — as is the case with competences over 'local housing programmes', 'territorial coherence schemes' or 'creation of joint development zones'. The second is the opportunity for collective funding of local public goods that are difficult to fund individually — as it is the case for the competence 'creation and maintenance of sports facilities'.

In addition, intermunicipalities made up of small municipalities have a higher probability of being entrusted with specific competences, *ceteris paribus*. This result appears to be an indirect consequence of the zoo effect: the smaller a municipality, the less able it is to fund many public goods on its own and the more it tends to turn to the intermunicipality. In the literature, this original result indicates a mechanism specific to voluntary intermunicipal cooperation, where economies of scale and size are at work simultaneously but in opposite directions on

municipalities' cooperation choices. Economies of size realised through cooperation provide an incentive for municipalities to transfer their competences, whereas the potential economies of scale from which they could benefit individually without the need to cooperate, make cooperation less critical and hold back the transfer of competences by municipalities.

On the other hand, the estimations show that the more heterogeneous intermunicipalities tend less frequently to transfer their competences to the intermunicipal level. In accordance with the Tiebout's argument (1956), the centralisation brought about by the transfer of competences to the intermunicipal level and the resulting cost of the spatial heterogeneity of citizens' preferences are influencing municipalities' cooperation choices. These results complement those of Di Porto *et al.* (2016), who show that a municipality's decision to integrate into an EPCI is all the more complicated as its member municipalities' socioeconomic characteristics differ. In other words, territorial heterogeneity is holding back both the construction of intermunicipalities, and the transfer of competences to them.

According to Estèbe (2008), this territorial heterogeneity has in some cases led to the formation of defensive intermunicipalities. In order to avoid being absorbed by the central municipal structure, peripheral intermunicipalities have emerged with the purpose of consolidating more homogenous municipalities. This type of strategic behaviour is only possible in light of the

large room for manoeuvre which municipalities are afforded when it comes to their cooperation choices. However, the effort to streamline intermunicipalities by enhancing the role of prefect—which was a product of the RCT and NOTRe laws—intends to combat precisely this kind of practices. There would therefore be an element of friction between the spontaneous and non-cooperative behaviour of municipalities that make their cooperation choices on the primary basis of defending the interests of their own citizens, and the cooperative objectives of their intermunicipality as supported by legislation, where community interests would take precedence over the individual interests of member municipalities¹⁴.

As we embark upon this new phase in the development of intermunicipality in France, a choice must be made: are we moving towards a type of intermunicipality whose sole objective is to optimise local public spending, or are we trying to create a genuine level of territorial governance that is capable of responding to the territories' heterogeneity? In particular, the prefects' interventions regarding the delimitations of intermunicipal perimeters, as well as on the definition of which competences should be transferred to the intermunicipal level, are a natural experiment that may provide the first part of the answer. □

14. Indeed, Epstein (2009, p.7) observed that "many [communautés] were formed over small areas, amalgamating socially homogenous communities, whereas the legislation was intended to consolidate heterogeneous municipalities."

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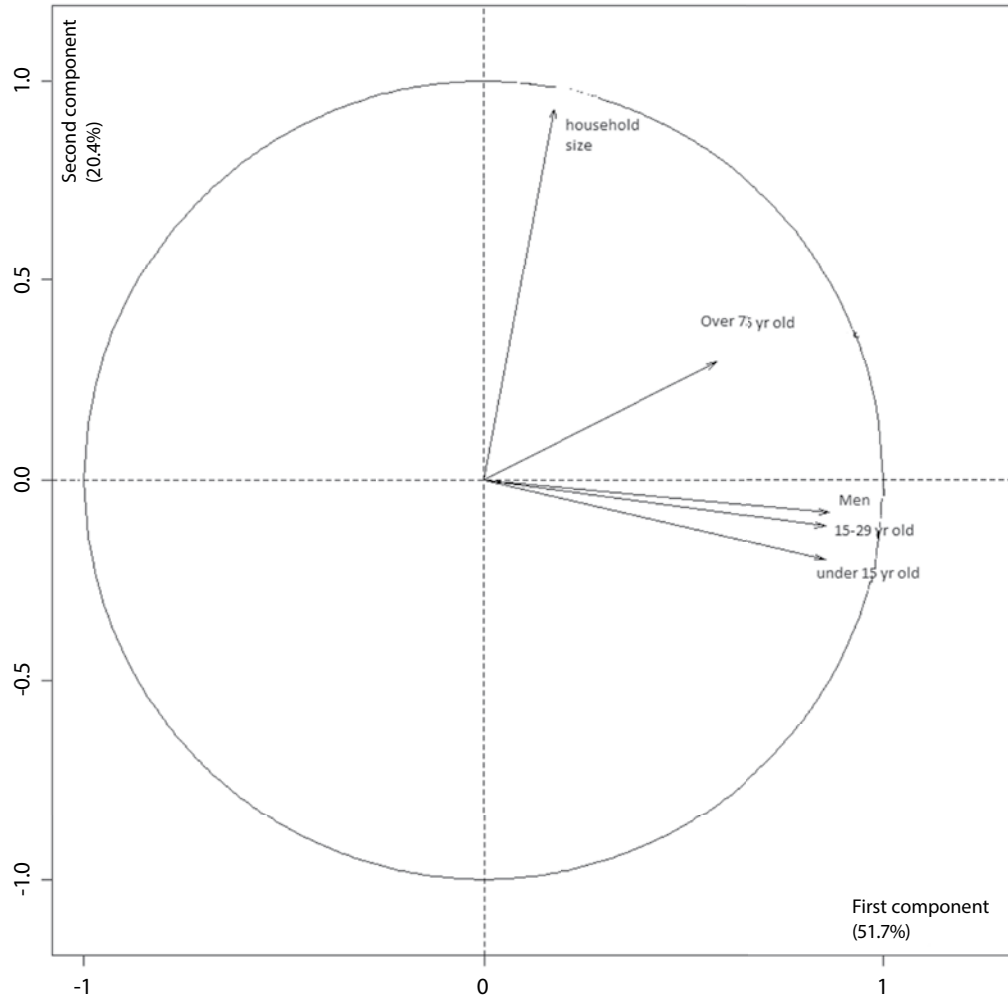
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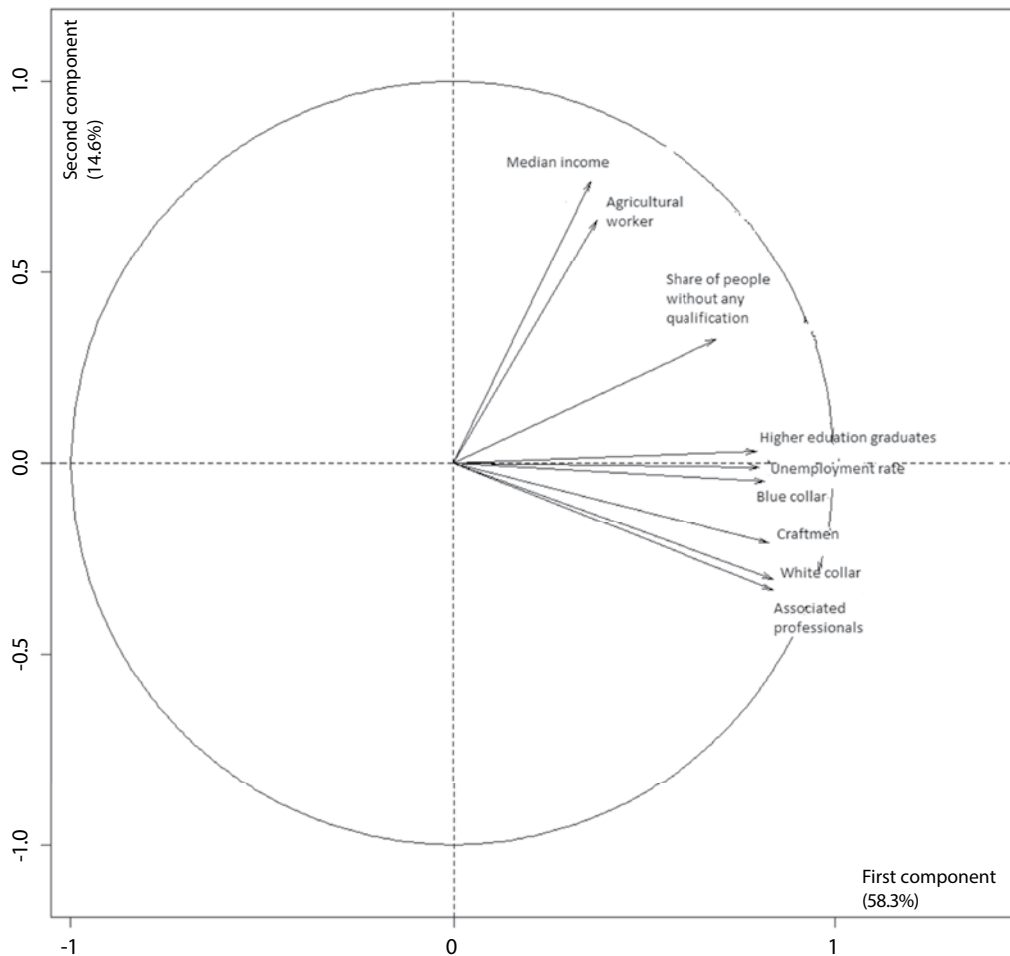
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Figure A1
Circle of correlations of Gini indices relating to demographic variables – Principal Component Analysis



Reading note: Being associated with a point of contact (0.80; -0.10) in the first factorial plan, the Gini index relating to the portion of the intermunicipality's population who are men has a correlation of 0.80 with the first main component and a correlation of -0.10 with the second main component. Scope: 2543 EPCs with own taxation powers (as of 1 January 2012) in Metropolitan France (Corsica excepted). Source: Insee, *Census 2012*; authors' calculations.

Figure A11
Circle of correlations of Gini indices relating to employment variables – Principal Component Analysis



Lecture: Being associated with a point of contact (0.74; -0.08) in the first factorial plan, the Gini index relating to the share of blue collars in the intermunicipality has a correlation of 0.74 with the first main component and a correlation of -0.08 with the second main component.
 Scope: 2,543 EPCs with own taxation powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).
 Sources: Insee, *Census 2012*; Insee-DGFIP-Cnaf-Cnav-CCMSA, fichier localisé social et fiscal (*Filosofi*) 2012; authors' calculations.

Table A1
Probit estimates in the area of competences Housing

	A1.1.	A1.2.	A1.3.
	Local housing programme	OPAH ^a	Social housing policy
$CP1_x^{emp}$	0.007 (0.005)	0.002 (0.004)	-0.010* (0.006)
$CP2_x^{emp}$	-0.020* (0.012)	-0.002 (0.006)	-0.004 (0.010)
$CP1_x^{demo}$	-0.004 (0.008)	0.008 (0.006)	-0.012** (0.006)
$CP2_x^{demo}$	0.004 (0.007)	-0.012 (0.010)	0.007 (0.009)
$\log(n_x)$	0.141*** (0.009)	0.061 (0.039)	0.043 (0.032)
$\log(\bar{n}_x)$	-0.012 (0.018)	-0.039 (0.039)	0.052 (0.032)
$IHH_x^{pot_fi_hab}$	-0.039 (0.060)	-0.288 (0.270)	-0.495** (0.198)
Unemployment_rate _x	0.003 (0.003)	-0.003 (0.005)	-0.007* (0.004)
Median_income _x	-0.00001 (0.00001)	-0.00000 (0.00001)	-0.00001* (0.00001)
Pct_b15	0.012* (0.006)	0.023*** (0.006)	0.014** (0.006)
Pct_o75	0.006 (0.007)	0.023*** (0.007)	0.020*** (0.006)
Surface_area _x	-0.00000 (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
CU_CA _x	0.151*** (0.046)	-0.048 (0.049)	0.322*** (0.045)
Small_average_area _x	0.036 (0.029)	0.116*** (0.032)	0.085*** (0.028)
Rural_isolated _x	0.040 (0.028)	0.047 (0.029)	0.044* (0.026)
Constant	-1.037*** (0.248)	-0.468 (0.330)	-0.719*** (0.266)
ρ	0.269*** (0.026)	0.217*** (0.028)	0.328*** (0.025)
Observations	2,543	2,543	2,543
Log likelihood	-1,521.069	-1,687.143	-1,459.489

a: Planned housing improvement operation.

Note: * p<0.1; * p<0.05; ** p<0.01; standard deviations in brackets.

Reading note: $CP1_x^{emp}$ does not significantly affect the probability of *local habitat programme* and *OPAH* competences being transferred (critical probability greater than 10%), but does negatively affect the probability of *social housing policy* competence being transferred.

Scope: 2,543 EPCs with own fiscal powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).

Sources: Insee, *Census* 2012, Insee-DGFIP-Cnaf-Cnav-CCMSA, fichier localisé social et fiscal (*Filosofi*) 2012; DGCL, *Banatic* 2012; Insee-Datar, *ZAU* 2010; authors' calculations.

Table A2
Spatial *Probit* estimates in the area of competences *Urban planning*

	A2.1.	A2.2.	A2.3.	A2.4.
	Land-banking	SCOT ^a	Sector schemes	Creation of ZAC ^b
$CP1_x^{emp}$	-0.008 (0.006)	-0.016*** (0.004)	-0.020*** (0.008)	-0.012* (0.006)
$CP2_x^{emp}$	0.0003 (0.001)	-0.010 (0.009)	-0.004 (0.014)	-0.013 (0.011)
$CP1_x^{demo}$	-0.005 (0.006)	-0.004 (0.005)	0.001 (0.005)	-0.001 (0.080)
$CP2_x^{demo}$	0.003 (0.004)	0.010 (0.008)	0.003 (0.003)	0.017 (0.011)
$\log(n_x)$	0.049 (0.031)	0.137* (0.068)	0.050* (0.026)	0.155*** (0.024)
$\log(\bar{n}_x)$	-0.031** (0.012)	-0.045** (0.020)	0.027 (0.031)	-0.024 (0.030)
$IHH_x^{pot_fi_hab}$	-0.251 (0.198)	-0.070 (0.128)	-0.311 (0.219)	-0.190 (0.157)
Unemployment_rate _x	0.001 (0.001)	-0.014*** (0.003)	-0.004 (0.004)	-0.003 (0.004)
Median_income _x	0.00002*** (0.00000)	-0.00002 (0.00002)	-0.00001** (0.00000)	0.00000 (0.00000)
Pct_b15	0.002 (0.001)	0.00001 (0.001)	0.004 (0.007)	0.005 (0.006)
Pct_o75	0.013*** (0.004)	-0.010*** (0.003)	0.008* (0.005)	0.010 (0.007)
Surface_area _x	-0.00000 (0.00000)	-0.00000*** (0.00000)	0.00000 (0.00000)	-0.00000 (0.00000)
CU_CA _x	0.318*** (0.046)	-0.042 (0.030)	0.184*** (0.045)	0.108** (0.046)
Small_average_area _x	0.061** (0.029)	-0.044* (0.025)	-0.011 (0.039)	0.050* (0.029)
Rural_isolated _x	0.035 (0.027)	-0.087*** (0.023)	-0.027*** (0.006)	0.023 (0.029)
Constant	-0.453** (0.179)	0.100*** (0.000)	-0.305 (0.302)	-1.051*** (0.273)
ρ	0.323*** (0.026)	0.419*** (0.023)	0.383*** (0.025)	0.319*** (0.025)
Observations	2,543	2,543	2,543	2,543
Log likelihood	-1,599.803	-1,232.085	-1,502.375	-1,529.299

a: Territorial consistency schemes; b: Joint development zones.

Note: * p<0.1; ** p<0.05; *** p<0.01; standard deviations between brackets.

Reading note: $CP1_x^{emp}$ does not significantly affect the probability of *land-banking* competence being transferred, but does negatively affect the probability of *SCOT*, *sector scheme* (significant at the 1% threshold) and *SAP* (significant at the 10% threshold) competences being transferred.

Scope: 2,543 EPCs with own fiscal powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).

Sources: Insee, *Census* 2012, Insee-DGFIP-Cnaf-Cnav-CCMSA, fichier localisé social et fiscal (*Filosofi*) 2012; DGCL, *Banatic* 2012; Insee-Datar, *ZAU* 2010; authors' calculations.

Tableau A3
Spatial *probit* estimates in the area of competences *Spatial planning*

	A3.1.	A3.2.	A3.3.
	Sports activities	Creation/maintenance of (socio-) cultural facilities	Creation/maintenance of sports facilities
$CP1_x^{emp}$	-0.014** (0.007)	0.001 (0.003)	-0.002 (0.008)
$CP2_x^{emp}$	-0.001 (0.005)	-0.008 (0.010)	-0.001 (0.005)
$CP1_x^{demo}$	0.001 (0.007)	-0.001 (0.001)	-0.007 (0.006)
$CP2_x^{demo}$	0.009 (0.021)	-0.005 (0.007)	0.005 (0.008)
$\log(n_x)$	0.042 (0.048)	0.032 (0.022)	0.112*** (0.020)
$\log(\bar{n}_x)$	-0.033 (0.038)	-0.018 (0.022)	-0.063*** (0.014)
$IHH_x^{pot_fi_hab}$	-0.241 (0.211)	-0.158 (0.136)	-0.058 (0.289)
Unemployment_rate _x	-0.009* (0.005)	0.007* (0.004)	0.001 (0.007)
Median_income _x	-0.00001 (0.00001)	0.00001 (0.00000)	0.00000 (0.00000)
Pct_b15	0.009** (0.004)	0.002 (0.002)	0.00004 (0.001)
Pct_o75	0.001 (0.002)	0.004 (0.004)	0.0003 (0.0002)
Surface_area _x	-0.00000 (0.00000)	-0.00000 (0.00000)	-0.00000** (0.00000)
CU_CA _x	-0.019 (0.077)	0.133*** (0.043)	0.024 (0.026)
Small_average_area _x	0.026 (0.034)	0.016 (0.024)	0.041 (0.028)
Rural_isolated _x	0.039 (0.047)	-0.008 (0.014)	0.043* (0.025)
Constant	0.251 (0.360)	-0.239* (0.127)	-0.409*** (0.103)
ρ	0.269*** (0.027)	0.334*** (0.026)	0.367*** (0.026)
Observations	2,543	2,543	2,543
Log likelihood	-1,681.399	-1,445.584	-1,491.182

Note: * p<0.1; * p<0.05; ** p<0.01; standard deviations in brackets.

Reading note: $CP1_x^{emp}$ negatively impacts the probability of *sports activities* competence being transferred (significant at the 5% threshold), but does not significantly affect the probability of *land-banking, creation/ maintenance of (socio-)cultural facilities* and *creation/maintenance of sports facilities* competences being transferred.

Scope: 2,543 EPCs with own fiscal powers (as of 1 January 2012) in Metropolitan France (Corsica excepted).

Sources: Insee, *Census* 2012, Insee-DGFIP-Cnaf-Cnav-CCMSA, fichier localisé social et fiscal (*Filosofi*) 2012; DGCL, *Banatic* 2012; Insee-Datar, ZAU 2010; authors' calculations.