

Inter-municipal cooperation and costs: Expectations and evidence

* Germà Bel & ** Mildred E. Warner

(*Universitat de Barcelona; **Cornell University)

Forthcoming in *Public Administration*, 2015

Abstract:

Austerity and fiscal crisis make the search for cost saving reforms in local government more critical. While cost savings from privatization have frequently proven ephemeral, inter-municipal cooperation has been a relatively understudied reform. We analyze the literature on cost savings under cooperation and find savings are dependent on (1) the cost structure of public services, particularly those related to scale and density economies and externalities, (2) the structure of local government (size, metropolitan location, powers granted by the nation or regional state), and 3) the governance framework at the local/regional scale where cooperation varies from informal to formal. European studies give more emphasis to cost savings, while US studies focus on coordination concerns arising from the higher degree of devolution in the US local government system.

Keywords: Local government reform, inter-municipal cooperation, international comparative analysis

JEL CODES: H70, H73, R58

Inter-municipal cooperation and costs: Expectations and evidence

1. Introduction

Many developed economies have been hit hard by the economic crisis that began in 2008. This crisis has caused serious tensions in government finances, which have affected the countries of southern Europe and Ireland in the Eurozone. While deficit orientations are important at the country level, following Maastricht criteria for public finance stability, these constraints have strong impacts at the local level, because many central governments have mandated strict deficit objectives to local governments, which face a more limited tax base and stronger fiscal competition. European Commission requirements regarding competition in services of general economic interest have had an impact on local government especially as a result of austerity (Warner and Clifton, 2014). Thus, the fiscal crisis intensifies the need for local governments to rethink service delivery in order to increase the efficiency of locally provided services.

A policy traditionally proposed to reduce costs is the consolidation of municipalities. Although it can be either compulsory or voluntary, in practice most experience worldwide has had a compulsory character, given the usual reluctance of municipalities to merge. However, results on cost reduction from amalgamation have not met expectations; cost savings are the exception and many times costs grow as a result of consolidation, as most case studies reviewed in Bish (2001), Dollery and Johnson (2005), Fox and Gurley (2006) and Holzer and Fry (2011) show. No cost savings is the usual result found by the most robust empirical studies conducted for different countries around the world (Allers and Geertsema 2012).

Another policy assumed to address problems of scale is privatization of service delivery. Here again, results on cost savings are mixed (Boyne 1998, Hodge 2000, Bel, Fageda and Warner 2010) and attributed to lack of competition, early exhaustion of any scale economies, and inadequate before and after accounting of costs. Most studies find less frequent contracting in small and rural municipalities,

although in the US contracting rates have increased in rural municipalities in 2007 (Hefetz, Warner and Vigoda-Gadot, 2012). Rural areas appear to be more reluctant to contract because transaction costs do not compensate potential efficiency gains of small scale (Bel and Miralles 2003), and because fewer private providers are available in small and rural areas (Warner and Hefetz, 2002b; Warner 2006; Bel and Fageda, 2011; Hefetz and Warner, 2012; Johnston and Girth, 2012). In this context, it is interesting and timely to analyze the potential that inter-municipal/ inter-local cooperation offers to municipalities to improve efficiency and effectiveness of public service delivery. Cooperation has received far less attention than privatization, and the literature is still scarce with respect to cost evaluation.

The potential of sharing services as an alternative metropolitan regional governance reform was envisaged half a century ago by Ostrom, Tiebout and Warren (1961, p. 836), when they suggested that small municipalities could make use of special arrangements to act jointly to provide services when the municipal boundary is suboptimal. Furthermore, this can help small municipalities confront limited managerial and technical capabilities (Deller and Rudnicki, 1992), and also help municipalities to confront problems of fiscal stress (Zafra-Gómez et al, forthcoming). Shared services delivery is a widespread phenomenon, and is particularly intense in small municipalities (Warner and Hefetz, 2003, Bel and Costas, 2006; Carr, LeRoux, and Shrestha, 2009; Warner, 2011). However, systematic evidence on the relationship between inter-municipal cooperation and costs is scant and contradictory, and evidence on its role in promoting regional coordination is equally limited.

The objective of our paper is to provide a rationale for the existence of diverging empirical results on inter-municipal cooperation and costs. First we analyze the theoretical background relevant for the economic and governance effects of inter-municipal cooperation. We pay special attention to (1) the cost structure of public services, particularly those related to scale and density economies, and externalities, and (2) the structure of local government (size, metropolitan location, powers granted by the nation or regional state), and 3) the transactions costs of the governance arrangement. Transaction costs result from service characteristics, city characteristics, institutional design and organizational

arrangements and these last two are of particular interest in public administration (Frederickson and Smith 2003, Feiock 2007 & 2013, Hefetz and Warner 2012). After establishing our theoretical framework, we review the existing multivariate empirical evidence. We are able to identify the characteristics of cost structure and service delivery governance that should be considered under cooperation and the importance of differing national structures of local government systems on the scope of cooperation reforms. We conclude with a discussion of what cooperation can and cannot achieve and directions for future research.

2. What is cooperation?

Cooperation in service delivery is a concept that encompasses a variety of forms, which widen as we adopt an international comparative approach. Useful characterizations for shared service arrangements are found in the public administration literature. Agranoff and McGuire (2003, pp. 43-44) and McGuire and Agranoff (2011) model shared services as the intersection of two dimensions, the intensity of collaborative activity by a city and the extent to which this activity is strategic. Feiock and Scholz (2010, 16) emphasize autonomy, understood as the ease of entry and exit from a collaborative agreement, as a key dimension to delimit different types of cooperative arrangements. Feiock (2009) adds the number of actors involved as an additional dimension to categorize the arrangements (bi-lateral, multi-lateral).

In Europe these types of cooperation can take the form of joint corporations or administrative organizations where the different municipalities involved shared ownership and production, as happens in Norway (Sørensen 2007), Finland (Haveri and Airaksinen, 2007), Spain (Warner and Bel, 2008), The Netherlands (Bel, Dijkgraaf, Fageda and Gradus, 2010; Gradus, Dijkgraaf and Wassenar, 2014), and Italy (Garrone, Grilli and Rousseau, 2013). The collaborative may jointly produce a service or several services, contract it to one of the members, or contract to an outside party – either for profit or non-profit. Interestingly, interlocal contracting is very scarce in Europe. For instance, it is virtually non-

existent in Spain (Warner and Bel, 2008); in other cases, its relevance is very small, as in the Netherlands, where only 4% of municipalities contract solid waste collection to neighboring municipalities, whereas 15% of municipalities use intermunicipal cooperation by means of joint delivery (Bel *et al*, 2010; Gradus, Dijkgraaf and Wassenaar, 2014). By contrast, in the US interlocal contracting is more common than joint production (Warner and Hebdon, 2001). Because our paper deals with the European experience, interlocal contracting will receive less attention hereafter.

Cooperation is often implemented by higher tier local governments, such as counties in the US, or *comarcas* in Spain and *communauté de communes* in France. Spanish *comarcas* are financed with regional and (voluntary) municipal transfers, different from the French *communauté de communes*, which enjoy direct taxing power (Guengant and Leprince, 2006). In both Spain and France, governing bodies of the joint authority are formed with representatives of the local councils, and these last retain authority regarding the local shared service. Thus, they can exit the cooperation without important transaction costs or time constraints (Bel, Fageda and Mur 2014). In the US, exit is also an option and the ability to maintain shared service arrangements over time is challenged by shifting interests of constituent partners. To address this concern some countries have created entities that provide coordination and technical assistance to partner municipalities such as regional organization councils in Australia, regional districts in British Columbia and boards of cooperative educational services in New York (Holzer and Fry 2011, Sancton 2005).

Several key distinctions can be made regarding the most important characteristics of the different types of cooperative arrangements. Regarding the degree of institutionalization, cooperation ranges from informal to formal arrangements. Among the formal ones, we can distinguish between standing bureaucratic organizations and contractual agreements. Regarding the type of tasks performed, cooperative arrangements can be operational in nature (directly engaging in service delivery) or coordinative in nature (such as Councils of Government). Regarding the quantity of functions performed, they can be single-purpose or multi-purpose. Governance of cooperative arrangements can

be a single entity or multi-governmental. Finally, the governing boards can be formed with elected representatives or with appointed managers.

Interestingly, informal cooperation is much less frequent in Europe than in the US (Hulst and van Montfort, 2007; Warner, 2011). Informal cooperation is frequent in areas (such as fire, roads and police) where power in the US is municipal, whereas power in most EU countries is either regional or central. Therefore, informal cooperation is a more important issue in the US. This helps us understand why European scholars do not usually pay attention to informal cooperation,¹ and why public policy debates and research on interlocal/inter-municipal cooperation in Europe do not address concerns related to equity and regionalism (see Hulst and van Montfort 2007 for Western European countries, and Swianiewicz 2011 for Central and Eastern European countries), which figures importantly in US research (Foster 1997, Lowery 2000, Warner and Hefetz 2002a, Warner 2006, Feiock 2007).

Even if higher tier governments provide incentives or a legal framework for cooperation, cooperation among local governments is voluntary (Feiock, 2008). The possibility of exit is an important feature of cooperation and ease of exit varies across types of cooperative agreements. Exit is easiest in contractual arrangements and in *communautés de communes* and *comarcas* (where municipalities can exit the cooperation for a specific service, but remain members of the institution); and has more constraints in standing bureaucratic organizations (joint production and ownership) and in joint purchase (if no huge investment in sunk capital is involved). In practice the most difficult cooperative agreements to exit are districts and authorities, where separate governments have been created with the specific purpose of governing the cooperation.

In Europe governments have competences, which have been established compulsorily by either national or regional laws. Local governments can deliver services beyond their legal obligations, but they cannot avoid providing basic services. In contrast, distribution of powers in the US differs by state

¹ Some exceptions exist, of course, such as that of regional conferences (*Regionalkonferenzen*) networks and forums in Germany (Heinz, 2007), and county councils in Romania (Stănuș, 2011), which have similarities with the more widespread Councils of Governments in the US.

and many local services are optional. Joint production by municipalities is much less frequent in the US and less likely to be enforced than in some European countries. This explains why equity and externality concerns, which drive much US interest in cooperation, are not central concerns in the European literature. Bennet (1993) has made a distinction between local governments as community-based organizations that articulate political participation and local governments as agents close to consumers for the delivery of services. Local governments are community-based in southern European countries, whereas Nordic countries are more characterized by the service delivery type of local government (Hulst and van Montfort 2007, Wollmann 2010). As a result, national regulations impose more limits and constraints to cooperative agreements in Northern than in Southern European countries.

3. Theoretical issues

In this section we analyze the theoretical background relevant for the effects of inter-municipal cooperation.

3.1 Economic Theory: Costs and scale

Many government-provided services are subject to returns to scale and problems of sub-optimal jurisdiction size may arise (Lago-Peñas and Martínez-Vázquez, 2013). The optimal size for service provision has formed an essential part of the literature on local government (Hirsch 1959, Oates 1972, and Dixit 1973). The optimal geographic scale crucially depends on three dimensions: volume of service, size of population, and dispersion of population (Deller 1992, Ladd 1992). These have different implications for returns to scale.

Economies of scale exist when average cost decreases as production increases. For example, a small municipality might not make full use of the load capacity of a truck, or have too small a demand for fuel to command a competitive price in the market place. When the average cost reduction is due to the fixed cost being spread across a larger number of users, *economies of density* exist. For example, increasing

population density allows an increase in the number of consumers connected to the urban water network. *Economies of scope* exist when the average cost decreases as the number of services produced by the same infrastructure increases, or because several phases in the production process are integrated, for example waste collection, recycling and methane digesting. Returns to scale enable a single entity to produce all services at a lower cost than would be incurred by two or more entities. The existence of these different types of returns to scale requires one pay attention to the economic characteristics of the service, because different services will exhibit different conditions of delivery in order to exploit returns to scale.

Inter-municipal cooperation can be used as a formula to exploit returns to scale, as it allows an increase in service output and the population using a service or an infrastructure. As suggested in the seminal work by Ostrom, Tiebout and Warren (1961, p. 837), voluntary cooperation among municipalities is one of the different formulae (together with reconstitution of boundaries and turning services to other levels of government) that can be used when looking for an appropriate match between the interests affecting and affected by public transactions. This is illustrated by figure 1 for economies of scale, for a service where cost depends on the level of output (decreasing Average Cost as shown by the line labeled AC). The vertical axis shows prices (P) and the horizontal axis displays service quantities (Q, output). Under delivery provided by a Single Municipality (demand DSM), the minimum price will be P_1 (assuming price equals average cost and the service is self financed), corresponding to the average cost at DSM level. If that municipality engages in cooperation, the aggregation of the demand by multiple municipalities (demand DMM) allows a lower average cost (AC at DMM level) to be achieved, and thus a minimum price equal to P_2 . The shaded area in figure 1 represents the potential welfare gains obtained by the cooperating municipality.

(Insert Figure 1: Scale economies and cooperation, about here)

The analysis above has paid attention to returns to scale that focus on the production function of the service and the volume of service provided. This is the most important efficiency motivation for inter-municipal cooperation. Other sources of inefficiencies, such as density economies and externalities might be addressed by cooperation as well. Some services might be characterized by economies of density because networks are important in the delivery of that service. These networks frequently go beyond the municipal jurisdiction in the areas such as metropolitan transportation, watershed management, urban water distribution (in contiguous cities), etc. Therefore, inter-municipal cooperation might allow the cooperating jurisdictions to benefit from economies of density. Note this can imply more service provided and higher overall costs, although average cost decreases.

Municipalities can also benefit from cooperation to address externalities that result from uncoordinated actions of local jurisdictions. In areas such as storm water management, road maintenance or control of pollution, decisions taken by one municipality can positively or negatively affect residents in a neighboring municipality. In such cases, cooperation can allow a more efficient delivery of the service because it might be a means to internalize externalities. Its effects on costs are ambiguous, because it can also have the consequence of increasing costs as the overall cross-jurisdictional efficacy of delivery rises. Issues related to inter-municipal networks and externalities are related to space and organization of local government, and now we turn to this topic.

3.2 Structure of Local Government

The US and several European countries (notably Spain, Italy and France) face a local government structure with many very small municipalities. Fragmented local government systems face the challenge of providing services efficiently and addressing problems of service spillovers and tax exporting (Lago-Peñas and Martínez-Vázquez, 2013). In the US many scholars argue that when regional governance is voluntary and lacks sanctioning authority or taxation power, the ability to promote cooperation is undermined -especially in services where there is heterogeneity in need and

resources across the region (Foster 1997, Frug 2002, Warner and Hefetz 2002a). The European experience, suggests that broader government structure and institutional design can affect cooperation. A key difference between Europe and the US is the higher level of fiscal autonomy and service responsibilities in the US and the lower importance of higher tier government grants. Another difference is that counties are locally elected bodies in the US whereas in southern Europe (i.e. Spain, France) they are appointed from municipal councils in a second-degree election which may promote inter-local cooperation. Third, in continental Europe basic local services (solid waste, water, etc.) are compulsory for all municipalities so service levels are more homogeneous, facilitating cooperation.

Inter-municipal cooperation can be an important reform to address challenges of suboptimal government size. Geographically, in the US, rates of cooperation are highest among suburbs and rural areas and this has been a consistent trend for the last 15 years (Hefetz, Warner and Vigoda-Gadot, 2012). Inter-municipal cooperation for most services is geographically bounded to municipalities in the nearby region. Suburbs represent a market of similar sized municipalities in close proximity where cooperation affords suburbs the opportunity to enjoy economies of scale (Warner and Hefetz, 2002a; Hefetz, Warner and Vigoda-Gadot, 2012). For rural municipalities inter-municipal cooperation is an important alternative to private contracting as low density and high costs limit private competition for rural service delivery (Warner, 2006; Mohr et al, 2010; Bel and Fageda, 2011; Hefetz and Warner, 2012). In Europe the critical role of scale, externalities and spillovers and local government size is less important because many services are handled by higher tiers of government. Thus the European research on inter-municipal cooperation is not as concerned with equity and geographic challenges of voluntary coordination that so preoccupies the US literature.

Feiock (2007) has warned that stability of inter-local agreements is undermined by heterogeneity among local governments' partners – but if inter-municipal cooperation is to be a reform that addresses scale and equity issues, it will need to develop governance forms that help overcome differences among partners. Feiock's (2007) theory of institutional collective action builds from

Ostrom's (1990) support for polycentrism based on trust, reciprocity and collective benefits, and delves into political institutions and the structure of policy networks. Transactions costs matter, but they extend beyond the service to the nature of the local governments in the cooperating region (Hefetz and Warner, 2012). Proximity and homogeneity in interests, needs and resources facilitate cooperation as does institutional homogeneity in budget rules and service requirements. Longer tenure and more professional management also facilitate cooperation as this gives time for reciprocal relationships to build both weak and strong ties in regional policy networks.

Cooperation is a form of network governance and the public administration literature is replete with examples of the challenges posed by networks where hierarchical control is replaced by horizontal collaboration, and command and sanctioning authority is replaced by negotiation and persuasion (Milward and Provan, 2000; Salamon, 2002; Goldsmith and Eggers, 2004). Inter-local networks that bridge fragmented local government systems are complex (Savitch and Vogel, 2006). Feiock (2007) has postulated a theory of institutional collective action that builds from rational choice to explore the elements of cooperation. This involves not only the inter-personal relations between network actors but regional coordination structures that facilitate collective action (Thurmaier and Wood, 2002). On the relational side, trust and norms of reciprocity are important (Frederickson and Smith, 2003; Ostrom, 1990) but so too are the reality of differences in wealth, need and preferences within the region (Feiock, 2007; Warner and Hefetz, 2002a; 2002b).

Intermediary governance bodies of local character, such as counties and regional governments, exist in many countries. In the US metropolitan planning organizations and regional councils of government have emerged to help address coordination issues. An intermediary governance body can reduce the transactions costs of negotiating and maintaining cooperative agreements by providing an ongoing network for information exchange, and a framework for sharing that builds trust and norms of reciprocity that help maintain cooperation over time. Rules or trust can be the basis for coordination. While trust breaks down with an increase in the number of actors, formal rules reduce transaction costs

and allow a wider number of actors to cooperate. Transactions costs, shared values and norms, and social networks, along with geographic and service characteristics are all important factors explaining inter-municipal cooperation.

3.3 Governance Arrangement: Coordination and Transactions Costs

Transaction costs are important in the selection of service delivery arrangement and can be applied to government decisions regarding the delivery of public services where institutional arrangements to establish and enforce contracts tend to be quite complex (Williamson, 1999) and factors such as monitoring and control become central. What matters is not just to minimize production costs, but the sum of production and transaction costs. Transaction costs have been applied widely in the analysis of cooperation (Brown and Potoski, 2003; Lamothe, Lamothe and Feiock, 2008; Carr, LeRoux, and Shrestha, 2009; Levin and Tadelis, 2010; Shrestha and Feiock, 2011; Hefetz and Warner, 2012). Inter-municipal cooperation may be subject to lower transaction costs than privatization because cooperating governments share similar objectives (Brown, 2008; Hefetz, Warner and Vigoda-Gadot, 2014).

However, transaction costs from cooperation involve information, negotiation, monitoring and agency costs that can be quite substantial (Feiock, 2007). Empirical research has shown that inter-municipal contracting is preferred to for profit contracting when services have higher transactions costs due to asset specificity and lack of competition (Girth et al., 2012; Hefetz and Warner, 2012; Levin and Tadelis, 2010). However research has shown principal-agent problems arise with inter-municipal cooperation due to weak sanctioning power among municipal partners (Marvel and Marvel, 2007), and boundary crossing and coordination problems due to differences in wealth, demographic makeup, geographic location and ideology of participating communities (Lowery, 2000; Feiock, 2007).

Furthermore, attention has to be paid to the existence of political transaction costs (Rodrigues, Tavares and Araújo, 2012), because political interaction is always costly (Tavares and Camões, 2007).

Typical principal-agent problems arise with inter-municipal cooperation, because local governments act as agents for residents, who are the main stakeholders of service delivery. With cooperation, new governance bodies often assume functions to govern the collaboration, be they multi-government bodies, separate governments, or boards of managers. The distance between principal and agent increases, because a second order principal-agent relationship emerges: the principal is now the municipal government (who is in turn the residents' agent) and the agent is the manager of the cooperative agreement. Several factors can work as control mechanisms to improve the alignment between the principal and agent. Risk due to problems of credibility and commitment between the cooperating partners can increase the need for monitoring and coordination, increasing transaction costs and making cooperation more expensive.

Low transaction costs are a prerequisite for cooperation to be a useful tool in service delivery. This involves both the upfront transaction costs municipalities must incur through study, design and the transition to the new collaborative form of service delivery, as well as the ongoing transaction costs of contract management and monitoring. The transition to cooperative service delivery entails having available expertise, background research, capacity, and a potentially complex political process.

4. Empirical evidence on cooperation and costs

While robust empirical evidence abounds on the effects of local privatization on costs (see Bel and Warner, 2008; Bel, Fageda and Warner, 2010), robust statistical evidence on the effects of inter-municipal cooperation on costs is much more scarce, as pointed out by (Holzer and Fry, 2011: 81) when discussing the relationship between shared delivery and efficiency: "The literature was disappointingly skimpy on estimating costs savings for different service delivery options." For the US, anecdotal information on savings in a few cases surveyed was provided by Honadle (1984) and Ruggini (2006), in the UK, accounting information is provided by the Department for Communities and Local

Government, and case studies for Australia do not show cost savings (see Dollery, Akimov and Byrnes, 2009: 216-218) .

Eight multivariate empirical works have appeared in the last few years, which provide a systematic analysis of the effect of cooperation on costs by means of cost functions of linear type. We are aware that we only have available a small number of works to conduct our analysis. Furthermore, most of these works, seven, are studies on solid waste collection, because this is one of the services that has been the subject of more studies on cost, and because it is a service where cooperation is relatively frequent. That said, we believe that this evidence, even if limited in quantity, allows us to identify the main characteristics of cost structure and service delivery governance that should be taken into account under cooperation. Likewise, this facilitates a better understanding of the importance of differing national structures of local government systems on the scope of cooperation reforms, as four different countries are covered in this set of studies (Spain, Italy, Norway and the Netherlands).

Table 1 displays the most important characteristics of the studies, including sample year and size, country, service, estimation technique, operationalization of variables related to costs and to cooperation, type of institutional arrangement, and results. Most of these works (Bel and Costas, 2006; Bel and Mur, 2009; Dijkgraaf and Gradus, 2013; Zafra-Gómez et. al, 2013; Bel, Fageda and Mur, 2014; and Dijkgraaf and Gradus, forthcoming) use Cobb-Douglas cost functions, solidly established in the literature that analyzes the relationship between privatization of local services and costs. This type of cost function analyzes the relationship between the institutional form of service delivery and costs controlling for other non-institutional determinants of cost such as population or volume of service, density of population, dispersion, frequency of service, etc. Besides these works, two empirical papers study the effect of *Communautes* on total expenditures of French communes, thus trying to analyze the degree of substitution between municipal and inter-communal expenses. Guengant and Leprince (2006) find that inter-communal expenses do not reduce overall municipal expenditure, but the opposite result is found in Frère, Leprince and Paty (forthcoming). These two papers do not specifically analyze the

effect of cooperation on the costs of the service(s) subject to shared delivery, thus are not comparable to those in table 1.

(Insert table 1 around here)

Most of the papers from Spain use a regional data base (Catalonia or Aragon), which allows them to include many small municipalities in the sample. However, Zafra-Gómez et al. (2013) use a much wider national sample, which is more representative of Spain as a whole. Likewise, Dijkgraaf and Gradus (2013; forthcoming) use wide national samples of the Netherlands, which are also highly representative. Bel, Fageda and Mur (2014) analyze costs from cooperation controlling for production form, which works in environments where cooperative provision can be combined with private production. Cooperation and privatization are not incompatible in Spain. The county or the provincial council decides what form of production is to be used to deliver the service. Recall that municipalities are free to retain municipal provision or to engage in inter-municipal cooperation, as this remains a municipal responsibility (Bel et al, 2010). Municipalities can cooperate to achieve a better scale of operation and thus be more attractive to private producers. Cooperation allows small municipalities to reduce transaction costs from contracting out and increase their bargaining power with private producers.

Cooperation is associated with public production in countries like Norway and the Netherlands. Sørensen's (2007) model for Norway is built from the literature on corporate governance, and is basically formed of institutional variables, such as competition, concentration, number of municipal owners, etc. Garrone, Grilli and Rousseau (2013) estimate cost functions for multi-utility firms in Italy (electricity, gas, water and waste). This is the only work that looks beyond the solid waste sector. Most works find cooperation is significantly associated with lower costs (Bel and Costas, 2006; Bel and Mur, 2009; Dijkgraaf and Gradus, 2013; Zafra-Gómez et. al, 2013; and Bel, Fageda and Mur, 2014). However, Sørensen (2007) and Garrone, Grilli and Rousseau (2013) find cooperation associated with

higher costs, and Dijkgraaf and Gradus (forthcoming) find the difference is not statistically significant. Thus, divergence is an interesting result, and several factors could help to explain it.

First, a limited number of local services are characterized by scale economies. In these cases, aggregating the service will reduce the average cost of delivery, as shown in figure 1 above. This is the case in solid waste services, which is the focus of most studies reviewed. As observed in recent reviews on empirical works on local services privatization and costs (Bel and Warner, 2008; Bel, Fageda and Warner, 2010) solid waste and urban water services are the two most important sources of studies, and they are usually organized at the local level. These services are often organized via for profit or cooperative delivery and paid for via user fees, which leads government accounting bodies to maintain data on wide samples of municipalities, a prerequisite to robust multivariate empirical analysis. Cooperation is frequent in solid waste in Europe, but this is not the case with water. This explains why empirical evidence on costs is most frequently based on the solid waste service.

Second, economies of scale exist for small municipalities, but not for larger ones. Because of this, small municipalities will benefit more than larger ones from cooperation, as the former ones will more likely achieve a reduction of the average cost of service delivery. Average municipal size in Spain is below 6,000 inhabitants, whereas in Norway it is almost 12,000 inhabitants, double that of Spain. This would help explain why studies for Spain tend to result more frequently in cost savings from cooperation, compared to those in Norway. In Italy average population is around 7,500. However, as noted by Garrone, Grilli and Rousseau (2013) small municipalities are heavily underrepresented in their sample of 27 multi-utility firms in Italy, thus there may be limited potential for cost savings from cooperation among the larger communities in their sample. Furthermore, in Italy inter-municipal multi-utilities jointly provide several services, and some of them (gas, electricity, and water) might be characterized by economies of density rather than scale economies and scope economies. Contiguity of urban areas is more important in economies of density than aggregating output of discontinuous urban areas and this might affect the ability of Italian multi-service firms to exploit scale economies. In short,

the economic characteristics of services such as gas, electricity and water might help explain why intermunicipal cooperation does not result in cost savings in Italy.

Third, governance of the cooperative arrangement has important differences in these countries. In Norway and Italy cooperation has a multi-government character managed by a board of directors, whereas cooperation in Spain is typically governed by a single separate government to which municipalities have delegated the production of the service(s). Political transaction costs (Tavares and Camões, 2007; Rodrigues, Tavares and Araújo, 2012), tend to be higher with multi-government ownership and boards of directors than with single governments. Garrone, Grilli and Rousseau (2013) give special attention to concentration of ownership. Cooperation walks a fine line between competition and monopoly. What about the nature of the cooperative arrangement, or the structure of local government, will ensure that the benefits of cooperation result in cost savings as opposed to cost increases? A recent study comparing cooperation in Spain and the Netherlands pointed to the importance of local government size, and level of competition in the market in determining whether inter-municipal cooperation results in lower costs (Bel et al. 2010).

Finally, Dijkgraaf and Gradus (forthcoming) include the pricing system used for solid waste delivery in each municipality in the Netherlands. They find that unit based pricing is associated with lower costs, and that differences in costs between the different institutional forms of delivery tend to disappear after controlling for the pricing system. This would explain why significantly lower costs with cooperation were found in Dijkgraaf and Gradus (2013), but lower costs under cooperation were not significant in Dijkgraaf and Gradus (forthcoming).

5) Discussion and Agenda for Future Research

Review of the evidence in the previous section offers a first unanticipated and interesting insight.

Papers that conduct a multivariate empirical analysis on the effects of cooperation on costs are all done for European countries, with no exception. In our view, this contrast reflects the different nature of the

policy and scholarly debate on inter-municipal cooperation in the US and Europe. In the US several services with strong asset specificity, externalities over contiguous areas, and stressful demands (i.e. fire departments and roads), and others of high impact on social cohesion (such as education and social services) are provided by the municipalities, whereas they are more frequently provided by more centralized levels of government (either regional or national) in the EU countries.

Because of this, the scholarly analysis on inter-municipal cooperation in the US is more closely connected to debates on equity, externalities and the need for regional coordination in service delivery. The US literature pays more attention to the question of why municipalities engage in cooperation, what its objectives are, what drives it and what limitations affect it. By contrast, the scholarly analysis in EU countries is focused on outcomes, specifically the economic results of cooperation, rather than empirically analyzing why it is undertaken. This may be due to differences in local government structure in Europe, e.g. the higher level of centralization of core services, the lower fiscal autonomy of local governments and the greater homogeneity of service delivery given compulsory rules regarding local government competencies. In the case of the US, however, differences in autonomy, authority and services provided make collaboration both more important and more difficult. Heterogeneity in service delivery raises the transaction costs of voluntary cooperation for US local governments. In addition, there is a lack of systematic cost data for U.S. cities in part because cost savings are not the primary objective.

As discussed in the theory section, several factors are crucial to obtaining costs savings from cooperation. Among them, the type of service, the size of output/population, and the transaction costs imposed by the institutional design of the cooperative governance arrangement. All these factors are at play in explaining the different results in the existing literature: solid waste is more prone to scale economies, small municipalities are more likely to benefit from exploiting scale economies, and single separated governments are likely to incur lower transaction costs than multi-government bodies with external boards of directors. This likely explains why studies on solid waste for Spain consistently yield

better results for cooperation than those for Norway and Italy. Of course, the limited evidence available prevents us from making more robust claims and generalizations. Still these results offer useful insights for policymakers and scholars on where policy implementation and academic research should lead.

Additional research is needed on the impact of cooperation on costs, especially now as fiscal stress is encouraging governments to look to cooperation as a potential solution. The empirical techniques and variables to use in the analysis of cost of local services are well known. We believe the analysis of the European experiences offers useful guidance for empirical analysis in the US and other contexts, provided some differences in the use of concepts are taken into account. Available literature already shows that techniques and variables are similar in related areas of study such as privatization and costs (see Bel and Warner, 2008; Bel, Fageda and Warner, 2010). Indeed, the main problem is the availability of data. In Europe, data on more diverse sectors than solid waste is needed. In the case of the US, empirical outcome data on any sector will be extremely useful. Given the heterogeneity of governance structure and accounting systems across the states, studies on cost outcomes might best be focused at the state rather than the national level. Another challenge for the US is to differentiate between more or less formal forms of cooperation and between interlocal contracting and intermunicipal joint production, as differences in governance structures between these institutional forms might be associated with cost differences. Indeed, such differentiation is important in Europe as we have noted that single, separated governments have lower transaction costs than multi-governmental bodies.

Eventually, having more empirical papers available in the literature would make possible a metaregression analysis of studies on cooperation and costs. This would permit a rigorous comparison of costs between the economic effects of cooperation and consolidation. This is critically important given current debates in metropolitan service delivery, and more particularly given the fact that quite often consolidation and cooperation are seen as alternative tools for confronting similar problems.

Acknowledgements: Most of this research was done while Germà Bel was visiting Scholar at Cornell University (2012-2013). We thank the Spanish Government (ECO2012-38004) and the Government of Catalonia (SGR2009-1066) for their financial support. Germà Bel also thanks ICREA-Academia. Professor Warner acknowledges the support of USDA Hatch and Smith Lever grants administered by the NYS Agricultural Experiment Station and USDA National Institute for Food and Agriculture grant # 2011-68006-30793.

References

- Agranoff, Robert and Michael McGuire. 2003. *Collaborative Public Management. New Strategies for Local Governments*. Washington DC: Georgetown University Press.
- Allers, Maarten A. and J. Bieuwe Geertsema 2012. *Do municipal amalgamations affect local government spending and taxation? Evidence from the Netherlands*. Paper presented at the 2012 Conference of the Public Choice Society.
http://www.pubchoicesoc.org/papers_2012/Allers_Geertsema.pdf (accessed August 30, 2012)
- Bel, Germà and Antón Costas. 2006. Do public sector reforms get rusty?: Local privatization in Spain. *Journal of Policy Reform* 9(1): 1-24.
- Bel, Germà, Elbert Dijkgraaf, Xavier Fageda and Raymond Gradus. 2010. Similar problems, different solutions: Comparing refuse collection in the Netherlands and Spain. *Public Administration* 88(2): 479-495.
- Bel, Germà and Xavier Fageda. 2011. Big Guys Eat Big Cakes: Firm Size and Contracting In Urban and Rural Areas. *International Public Management Journal* 14(1): 4-26.
- Bel, Germà, Xavier Fageda and Melania Mur. 2014. Does Cooperation Reduce Service Delivery Costs? Evidence from Residential Solid Waste Services. *Journal of Public Administration Research and Theory* 24 (1), 85-107.
- Bel, Germà, Xavier Fageda and Mildred Warner. 2010. Is Private Production of Public Services Cheaper than Public Production? A meta-regression analysis of solid waste and water services. *Journal of Policy Analysis and Management* 29(3): 553-577.
- Bel, Germà and Antonio Miralles. 2003. Factors influencing the privatisation of urban solid waste collection in Spain. *Urban Studies* 40(7): 1323-1334
- Bel, Germà and Melania Mur. 2009. Inter-municipal cooperation, privatization and waste management costs: Evidence from rural municipalities. *Waste Management* 29(10): 2772-2778.
- Bel, Germà and Mildred Warner. 2008. Does privatization of solid waste and water services reduce costs? A review of empirical studies. *Resources, Conservation & Recycling* 52(12): 1337-1348.
- Bennet, Robert J. 1993. Local governments in Europe: Common directions of change. In Robert J. Bennet, ed., *Local Governments in the New Europe*, pp. 1-27. Belhaven: London.
- Bingham, Lisa B. and Rosemary O'Leary, eds., 2008. *Big Ideas in Collaborative Public Management*. New York: M.E. Sharpe.
- Bish, Robert L. 2001. *Local Government Amalgamations. Discredited Nineteenth-Century Ideals Alive in the Twenty-First*. Toronto (Ontario): C. D. Howe Institute, Urban Papers n. 150.
- Boyne, George A. 1998. Bureaucratic theory meets reality: Public choice and service contracting in US local government. *Public Administration Review* 58(6): 474-484.
- Brown, Trevor L. 2008. The Dynamics of Government-to-Government Contracts. *Public Performance Management Review* 31(3): 364-386.
- Brown, Trevor L. and Matthew Potoski. 2003. Transaction costs and institutional explanations for government service production decisions. *Journal of Public Administration Research and Theory* 13(4): 441-468.
- Carr, Jered B., Kelly Leroux and Manoj K. Shrestha. 2009. Institutional Ties, Transaction Costs, and External Service Production. *Urban Affairs Review* 44(3): 403-27.
- Christensen, Tom and Per Lægreid, eds. 2010. *Ashgate research companion to the new public management*. Aldershot: Ashgate.

- Deller, Steven C. 1992. Production efficiency in local government: a parametric approach. *Public Finance* 47(1): 32-44.
- Deller, Steven C. and Edward Rudnicki. 1992. Managerial efficiency in local government: Implications on jurisdictional consolidation. *Public Choice* 74(2): 221-231.
- Dijkgraaf., E., and R.H.J.M. Gradus. 2013. Cost advantage cooperations larger than private waste factors. *Applied Economics Letters* 20(7): 702-705.
- Dijkgraaf., E., and Raymond Gradus. Forthcoming. Waste Management in the Netherlands. In Thomas Kinnaman and Kenji Takeuchi, eds., *Handbook on Waste Management*, Cheltenham: Edward Elgar Publishers, forthcoming.
- Dixit, Avinash 1973. The optimum factory town. *Bell Journal of Economics and Management Science* 4(2): 637-651.
- Dollery, Brian, Alexandr Akimov, Joel Byrnes. 2009. Shared Services in Australian Local Government: Rationale, Alternative Models and Empirical Evidence. *Australian Journal of Public Administration* 68(2): 208-219.
- Dollery, Bryan and Andrew Johnson. 2005. Enhancing Efficiency in Australian Local Government: An Evaluation of Alternative Models of Municipal Governance. *Urban Policy and Research* 23(1): 73-86.
- Feiock, Richard C. 2007. Rational Choice and Regional Governance, *Journal of Urban Affairs* 29(1): 47-63.
- Feiock, Richard C. 2008. Institutional Collective Action and Local Government Collaboration. In Lisa B. Bingham and Rosemary O'Leary, eds., *Big Ideas in Collaborative Public Management*, pp. 195-210. New York: M.E. Sharpe.
- Feiock, Richard C. 2009. Metropolitan Governance and Institutional Collective Action. *Urban Affairs Review*, 44(3): 356-377.
- Feiock, Richard C. 2013. The institutional collective action framework. *Policy Studies Journal* 41(3): 397-425.
- Feiock, Richard C. and John T. Scholz. 2010, Self-Organizing Governance of Institutional Collective Actions Dilemmas: An Overview. In Richard Feiock C. and John T. Scholz *Self-organizing federalism: Collaborative mechanisms to mitigate institutional collective action*. Pp. 3-32. Cambridge: Cambridge University Press.
- Feiock, Richard C. and John T. Scholz. eds. 2010, *Self-organizing federalism: Collaborative mechanisms to mitigate institutional collective action*. Cambridge, Cambridge University Press.
- Foster, Kathryn A. 1997. *The political economy of special-purpose government*. Washington, D.C.: Georgetown University Press.
- Fox, William F. and Tami Gurley. 2006. *Will consolidation improve sub-national governments?* World Bank Policy Research Working Paper 3913.
<http://elibrary.worldbank.org/content/workingpaper/10.1596/1813-9450-3913> (accessed August 30, 2012)
- Frederickson, H. George and Kevin B. Smith. 2003. *The Public Administration Theory Primer*. Boulder (CO): Westview.
- Frère, Quentin, Matthieu Leprince and Sonia Paty. Forthcoming. The impact of inter-municipal cooperation on local public spending. *Urban Studies*, forthcoming.
- Frug, Gerald E. 2002. Beyond Regional Government. *Harvard Law Review* 117(7): 1766-1836.

- Garrone, Paola, Luca Grilli and Xavier Rousseau. 2013. Management Discretion and Political Interference in Municipal Enterprises. Evidence from Italian Utilities. *Local Government Studies* 39(4): 514-540.
- Girth, Amanda, Amir Hefetz, Jocelyn Johnston and Mildred E. Warner 2012. Outsourcing Public Service Delivery: Management Responses in Noncompetitive Markets, *Public Administration Review*, 72(6): 889-900.
- Goldsmith, Stephen and William Eggers. 2004. *Governing by network: The new shape of the public sector*. Washington, DC: Brookings Institution Press.
- Gradus, Raymond, Elbert Dijkgraaf and Mattheus Wassenaar. 2014. Understanding mixed forms of refuse collection, privatization and its reverse in the Netherlands. *International Public Management Journal* 17(2), forthcoming
- Guengant, Alain and Matthieu Leprince. 2006. Évaluation des effets des régimes de coopération intercommunale sur les dépenses publiques locales. *Économie et Prévision* 2006/4-5(175): 79-99.
- Haveri, Arto and Jenni Airaksinen. 2007. Inter-Municipal Cooperation in Finland: Old Traditions and New Promises. In Rudi Hulst and André van Montfort, eds. *Inter-Municipal Cooperation in Europe*, pp. 39-65. Dordrecht: Springer.
- Hefetz, Amir and Mildred E. Warner. 2012. Contracting or Public Delivery? The importance of service, market and management characteristics. *Journal of Public Administration Research and Theory* 22(2): 289-317.
- Hefetz, Amir, Mildred E. Warner and Eran Vigoda-Gadot. 2012. Privatization and inter-municipal contracting: The US local government experience 1992-2007. *Environment and Planning C: Government and Policy* 30(4): 675-692.
- Hefetz, A., M. E. Warner and E. Vigoda-Gadot. 2014. Concurrent sourcing in the public sector: A strategy to manage contracting risk, *International Public Management Journal* (17)2, forthcoming
- Heinz, Werner. 2007. Inter-Municipal Cooperation in Germany: The mismatch between existing necessities and suboptimal solutions. In Rudi Hulst and André van Montfort, eds. *Inter-Municipal Cooperation in Europe*, pp. 91-115. Dordrecht: Springer.
- Hirsch, Werner Z. 1959. Expenditure Implications of Metropolitan Growth and Consolidation. *Review of Economics and Statistics* 41(3): 232-241.
- Hodge, Graeme. 2000. *Privatization: An international review of performance*. Boulder, CO: Westview Press.
- Holzer, Marc and John Fry. 2011. *Shared services and municipal consolidation. A critical analysis*. Alexandria (VA): Public Technology Institute.
- Honadle, Beth Walter. 1984. Alternative Service Delivery Strategies and Improvement of Local Government Productivity. *Public Productivity Review* 8(4): 301-313.
- Hulst, Rudie and André van Montfort, eds. 2007. *Inter-Municipal Cooperation in Europe*. Dordrecht: Springer.
- Johnston, Jocelyn M. and Amanda M. Girth. 2012. Government Contracts and “Managing the Market.” The Implications of Strategic Management Responses to Weak Vendor Competition. *Administration & Society* 44(1): 3-29.
- Ladd, Helen F. 1992. Population Growth, Density and the Costs of Providing Public Services. *Urban Studies* 29(2): 273-295.

- Lago-Peñas, Santiago and Jorge Martinez-Vazquez, eds. 2013. *The Challenge of Local Government Size. Theoretical Perspectives, International Experience, and Policy Reform*. Cheltenham: Edward Elgar.
- Lamothe, Scott, Meeyoung Lamothe and Richard C. Feiock. 2008. Examining Local Government Service Delivery Arrangements Over Time. *Urban Affairs Review* 44(1): 27-56.
- Levin, Jonathan, and Steven Tadelis. 2010. Contracting for government services: Theory and evidence from U.S. cities. *The Journal of Industrial Economics* 58(3): 507-41.
- Lowery, David. 2000. A Transactions Costs Model of Metropolitan Governance: Allocation Versus Redistribution in Urban America. *Journal of Public Administration Research and Theory* 10(1): 49-78.
- Marvel, Mary K. and Howard P. Marvel. 2007. Outsourcing Oversight: A Comparison for In-House and Contracted Services. *Public Administration Review* 67(3): 521-30.
- McGuire, Michael and Robert Agranoff. 2011. The limitations of public management networks. *Public Administration* 89 (2): 265-284.
- Milward, H. B., and Keith G. Provan. 2000. Governing the hollow state. *Journal of Public Administration Research and Theory* 10(2): 359-79.
- Mohr, Robert, Steven C. Deller and John M. Halstead 2010. Alternative Methods of Service Delivery in Small and Rural Municipalities. *Public Administration Review* 70(6): 894-905.
- Oates, Wallace, 1972. *Fiscal federalism*. New York: Harcourt Brace Jovanovich.
- Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.
- Ostrom, Vincent, Charles M. Tiebout, and Robert Warren 1961. The organization of government in metropolitan areas: A theoretical inquiry. *American Political Science Review* 55(4): 831-842.
- Rodrigues, Miguel, Antonio F. Tavares, and Joaquim Filipe Araújo. 2012. Municipal Service Delivery: The Role of Transaction Costs in the Choice between Alternative Governance Mechanisms. *Local Government Studies* 38(5): 615–38.
- Ruggini, John. 2006. Making local government more workable through shared services. *Government Finance Review*, February 2006: 31-35
- Salamon, Lester. 2002. The new governance and the tools of public action: An introduction. In Lester Salamon, ed. *The tools of government: A guide to the new governance*. Oxford: Oxford University Press.
- Sancton, Andrew. 2005. The Governance of Metropolitan Areas in Canada. *Public Administration and Development* 25(4): 317-327.
- Savitch, H.V. and Ronald K. Vogel 2000. Paths to New Regionalism. *State and Local Government Review* 32(3): 158-68.
- Shrestha, Manoj. K. and Richard C. Feiock. 2011. Transaction Cost, Exchange Embeddedness, and Interlocal Cooperation in Local Public Goods. *Political Research Quarterly* 64 (3): 573-587.
- Sørensen, Rune J. 2007. Does Dispersed Public Ownership Impair Efficiency? The Case of Refuse Collection in Norway. *Public Administration* 85(4): 1045–58.
- Stănuș, Cristina. 2011. Patterns of Inter-Municipal Cooperation and Local Governments Characteristics in Romania. *Southeastern Europe* 35(2): 191-208.
- Swianiewicz, Pawel, eds. 2011. *Working Together. Inter-municipal Cooperation in Five Central European Countries*. Budapest: Open Society Institute.

- Tavares, António F., and Pedro J. Camões. 2007. Local Service Delivery Choices in Portugal: A Political Transaction Costs Framework. *Local Government Studies* 33(4): 535–53.
- Thurmaier, Kurt and Curtis Wood 2002. Interlocal Agreements as Social Networks: Picket Fence Regionalism in Metropolitan Kansas City. *Public Administration Review* 62(5): 585-96.
- Warner, Mildred E. 2006. Market-based governance and the challenge for rural governments: US trends. *Social Policy & Administration* 40(6): 612-631.
- Warner, Mildred E. 2011. Competition or Cooperation in Urban Service Delivery? *Annals of Public and Cooperative Economics*, 82(4): 421-435.
- Warner, Mildred E. and Germà Bel. 2008. Competition or monopoly? Comparing privatization of local public services in the US and Spain. *Public Administration* 86 (3): 723-735.
- Warner, Mildred E. and Judith Clifton. 2014. Marketization, Public Services and the City: The Potential for Polanyian Counter Movements, *Cambridge Journal of Regions, Economy and Society*, 7(1): 45-61.
- Warner, Mildred E. and Robert Hebdon. 2001. Local Government Restructuring: Privatization and Its Alternatives, *Journal of Policy Analysis and Management* 20(2): 315-336.
- Warner, Mildred E. and Amir Hefetz. 2002a. Applying Market Solutions to Public Services: An Assessment of Efficiency, Equity and Voice. *Urban Affairs Review* 38(1):70-89.
- Warner, Mildred E. and Amir Hefetz. 2002b. The Uneven Distribution of Market Solutions for Public Goods, *Journal of Urban Affairs*, 24(4): 445-459.
- Warner, Mildred E. and Amir Hefetz. 2003. Rural-urban differences in privatization: limits to the competitive state. *Environment and Planning C: Government and Policy* 21(5): 703-718.
- Williamson, Oliver E. 1999. Public and private bureaucracies: A transaction cost economics perspectives. *Journal of Law, Economics, and Organization* 15(1): 306–342
- Wollmann, Hellmut. 2010. Comparing Two Logics of Interlocal Cooperation: The Cases of France and Germany. *Urban Affairs Review* 46(2): 263-292.
- Zafra Gómez, José Luis, Luis Enrique Pedagua Sánchez, Ana María Plata-Díaz, and Antonio Manuel López-Hernández. Forthcoming. Do local authorities use NPM-delivery forms to overcome problems of fiscal stress? *Revista Española de Financiación y Contabilidad-Spanish Journal of Finance and Accounting*. Forthcoming
- Zafra-Gómez, Jose Luis, Diego Prior, Ana Maria Plata-Díaz and Antonio M. López-Hernández. 2013. Reducing costs in times of crisis: Delivery forms in small and medium sized local governments' waste management services. *Public Administration*, 91(1), 51-68.

Table 1: Basic characteristics of the multivariate empirical works on cooperation and costs

Study	Sample size	Year data collection	Country	Regression method	Service	Dependent variable	Operationalization of cooperation	Institutional form	Result
Bel & Costas (2006)	186	2000	Spain-Catalonia	Log-linear regression	Solid waste	Total cost for municipality	Dummy 1-0	<i>Comarcas</i> (counties)	Cooperation saves cost
Sørensen (2007)	211 / 311	2005	Norway	Linear regression	Solid waste	Costs per capita / Fees per household	Dummy 1-0	Inter-municipal corporations	Cooperation increases costs
Bel and Mur (2009)	56	2003	Spain-Aragón	Log-linear regression	Solid waste	Total costs for municipality	Dummy 1-0	<i>Comarcas</i> (counties)	Cooperation saves cost
Dijkgraaf and Gradus (2013)	431 / 548	1998-2010	The Netherlands	Log-linear regression	Solid waste	Total cost for municipality	Dummy 1-0	Interlocal contracts & intermunicipal-corporations	Cooperation saves cost
Zafra-Gómez, et al. (2013)	923	2002-2008	Spain	Pooled OLS and Panel Data	Solid waste	Total cost for municipality	Dummy 5-1	Mancomunidades, consortia & provinces	Cooperation saves cost
Garrone, Grilli and Rousseau (2013)	27	1997-2006	Italy	Translogarithmic function (GLS)	Water, electricity, gas, waste	Firm's Total Costs	Concentration of ownership (HHI= 1 municipality)	Multi-utility firms	Cooperation increases cost
Bel, Fageda & Mur (2014)	85	2008	Spain-Aragon	Linear regression (2SLS)	Solid waste	Total costs for municipality	Dummy 1-0 and Interaction Coop&(public and private delivery)	<i>Comarcas</i> (counties)	Cooperation saves cost
Dijkgraaf and Gradus (forthcoming)	500	1998-2010	The Netherlands	Log-linear regression	Solid waste	Total cost for municipality	Dummy 1-0	Intermunicipal-corporations	Cooperation saves cost, but difference is not statistically significant.

Note: All works in the table are multivariate econometric studies.

Source: Authors'.

Figure 1: Scale economies and cooperation

