

“Partial privatization in local services delivery: An empirical analysis on the choice of mixed firms”

Germà Bel and Xavier Fageda

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Abstract: Mixed public-private firms are increasingly used in several European countries. This paper makes use of survey data from Spanish municipalities to examine the motivations of local governments for engaging in partial privatization of local service delivery of water distribution and solid waste collection. The empirical analysis indicates that mixed firms emerge as a pragmatic middle way between pure public and pure private production. Indeed, local governments make use of mixed firms when cost considerations, financial constraints and private interests exert contradictory pressures. Political and ideological factors play no significant role in that decision.

1. Introduction

A large amount of research, theoretical as well as empirical, has analyzed why local governments choose to privatize public services or, instead, stick with public delivery [Bel and Fageda (2007) offer a recent and wide review of this literature]. The standard framework of analysis has focused on the choice between public production and privatization/contracting out. However, Warner and Hebdon (2001) emphasize that privatization is not the sole available option for the reform of local services, and Hefetz and Warner (2007) argue that analysis must move beyond the either/or dichotomy of public versus private production. Hence, more attention must be paid to the fact that local government contracting is a complex management process, which combines transactions costs, managerial concerns, and social choice issues.

There is an increasing interest in analyzing reforms other than strict privatization and contracting out. Thus, Warner and Hefetz (2008) show significant growth in mixed delivery modes in the US since 1997. Mixed delivery in the US implies that a municipality is divided in several service districts, and pure public delivery is used in one or more districts while pure private production is used in other district(s) within the same municipality.¹ Another interesting study of reform outside the 'public or private decision' is that by Tavares and Camões (2007).

These authors ask why Portuguese municipalities decide to reform bureaucratic delivery by creating municipal corporations, single function entities that have independent corporate status. Even though delivery remains purely public, municipal corporations enjoy more discretion in employment and financial operations and have the right to own property. Because of this, they enjoy more flexibility in organizing the delivery of services.

In this paper we examine yet another strategy. Instead of focusing on pure delivery forms (public or private), we analyze the motivations that influence partial privatization of local services by means of mixed public-private firms. Mixed public-private firms are organizational forms that escape the pure public/pure private dichotomy. Their ownership is divided between the government and the private sector, and they operate exclusively under private commercial law. We want to make clear that our study does not consider other production forms that move beyond the public/private dichotomy, such as non-for-profit organizations, which are widely discussed as emerging hybrid organizational forms in countries like the US. Not-for-profit organizations are never used in Spain for delivery of local services such as solid waste collection or water distribution.²

In Spain, the private partners tend to be large firms with an established reputation for delivery of the particular local service. The government retains some degree of control in the firm, while day-to-day operations are usually conducted by the private partner. This allows less costly monitoring, thus reducing transaction costs. In many cases, the local government holds a majority of the shares. Mixed public-private firms play a significant role in the delivery of local services in Spain (Bel 2006, Warner and Bel 2008) and other European countries. Bognetti and Robotti (2007) explain the legal status of mixed firms in Italy³, discuss the pros and cons of mixed firms regarding efficiency and performance, and find that 14% of local public utilities in Italy are mixed public-private firms.

Mixed public-private firms in Italy are organizationally similar to those we study in Spain, but other types of mixed firms are not. For instance, in Italy Bognetti and Robotti (2007) include

public-public mixed enterprises, where there are several owners and all of them are public entities. Such mixed public-public firms represent 13% of public utilities in Italy. This type of multi-government firm is not a partial privatisation, and is, therefore, outside our main object of study. Multi-government firms exist in other countries and have been studied in The Netherlands (Dijkgraaf and Gradus, 2008a, 2008b) and Norway (Sørensen, 2007). Indeed, in these works multi-government firms are usually considered a type of public firm. In the same way, it is important to recall that mixed public-private arrangements in the US usually have both pure private firms and pure public units delivering the service within one jurisdiction.⁴ Hence, it is not a form of partial privatization comparable to the partially privatized firms we find in Spain.

The empirical literature on partial privatization of firms providing local services is extremely scant. With this paper we intend to contribute to the literature by providing an empirical multivariate analysis of the factors that explain partial privatization: that is, the decision to choose to use a mixed public-private firm to deliver the service, instead of choosing pure production forms--either public or private. From our analysis we find that partial privatization appears to be more frequent when the factors leading to privatization (such as cost structure considerations, financial restrictions or private interests, among others) exert contradictory pressures. In this way, partial privatization seems to emerge as a pragmatic choice between pure public and pure private production choices. In addition to this, mixed public-private firms are positively related to intermunicipal cooperation, which suggests that the desire to take advantage of scale economies can be another factor leading to partial privatization.

The rest of the paper is organized as follows. In section 2 we review the theoretical literature seeking to explain local government choices concerning the form of service delivery, since this is the framework most useful to the analysis of partial privatization. In section 3 we characterize the organization of the markets for solid waste and water distribution in Spain, since these provide the fields within which we conduct our empirical analysis. In section 4 we explain our empirical

strategy, and in section 5 we discuss the results obtained from our estimations. Finally, we draw the main conclusions from our analysis.

2. Factors explaining local governments' delivery choices: Theoretical background

Under partial privatization, municipal or supra-municipal governments enter into long term contracts with private firms through jointly owned firms. Mixed firms strongly differ from long-term contracts with totally private firms in several important aspects. Key among those differences is the fact that governments can exert control through property rights (in addition to regulatory tools) over the mixed firms. Even if these firms are managed independently of government, the latter maintains a voice in deciding the objectives to be pursued by the firm. Furthermore, government participation on the governing boards of the mixed firms help to reduce the problems resulting from long-term incomplete contracts.

Based on the theoretical literature on partial privatization and on the relationship between partial private ownership and managers' choices (e.g. Matsumura 1998; Matsumura and Kanda 2005), managers of mixed firms under effective control of local government are expected to give more weight to the objectives of local government and give less weight to profit maximization. In a similar fashion, Schmitz (2000) shows that partial privatization may result in an optimal combination of incentives for reducing costs and improving quality in comparison to pure production forms (either public or private).

Several theoretical approaches have been developed in relation to the choice of the production form of local services. Public Choice was the first to comprehensively analyze delivery choices within the domain of public services, and according to this theory, overproduction and inefficiency will be the outcome when politicians and bureaucrats monopolize public services delivery (Niskanen, 1971). Two basic hypotheses that emerge from this approach are that contracting out by local governments improves technical efficiency in the production of the service and also provides lower costs in the service delivery.

The influence of cost considerations in the delivery choices of governments has been too the central issue in another group of privatization theories that focuses on transaction costs. When deciding whether to make or buy a service, administrative costs and costs from incomplete contracts are important (Williamson 1979, 1999), and a core role is played by factors such as monitoring and control (Sappington and Stiglitz, 1987). From these theoretical approaches, a core hypothesis emerges: whenever transaction costs involved are huge, privatization will be unlikely to deliver cost savings and improved performance. Hence, conditions like asset specificity or difficulty of performance monitoring are central in determining when a local service can be successfully privatized (Brown and Potoski, 2003) because such conditions can make transaction costs prohibitive.

Property rights theory⁵ provides another important approach. The theory of incomplete contracts (Grossman & Hart, 1986; Hart & Moore, 1990) offers a useful analytical framework in situations where contracting is a complex operation. Hart, Shleifer & Vishny (1997) the manager of a private firm producing public services has incentives to reduce costs, but he/she has no concern for quality erosion. Hence, a trade-off between costs savings and service quality is likely to emerge. Privatization will likely reduce costs, but it can also result in lower quality of service. In this theoretical setting, Schmitz (2000) shows that partial privatization may imply better incentives to reduce costs in comparison to pure public production while also bring better incentives to improve quality in comparison to pure private production.

Based on these theoretical approaches, several hypotheses have been raised in the literature concerning the factors that influence local privatization. These hypotheses can be grouped into two economic and two political families (Bel and Fageda 2007). On the economic side, governments may be inspired by some combination of fiscal restrictions and anticipated lower costs. Since the 1980s, fiscal motivations have been fed by two major restrictions on local finance working simultaneously. On the one hand, local political environments have reduced the ability to raise revenues; on the other, supra-local restrictions have limited transfers from other

governments. Because of this, most studies of privatization include fiscal variables designed to measure the effects of such restrictions, the usual hypothesis proposing a positive relation between fiscal constraints and privatization.

Still on the economic side, but now looking at costs, emphasis has been put on the fact that contracting out introduces competition where there is a public monopoly (Savas, 1987) and, by breaking that monopoly, should result in lower costs. A different approach emphasizes that cost savings from privatization can be achieved by exploiting economies of scale when the public service has been delivered over a suboptimal jurisdiction (Donahue, 1989).

On the political side, policy makers can be moved by the desire to win the support of key interest groups, or by loyalty to an ideology. Within a democratic environment, two main motivations guide politicians in their decisions. On one side, politicians seek to win elections and control government. On the other, according to their ideological leanings, politicians have preferences for some policies over others. This dual dimension of politicians within a democratic environment has been named the *citizen-candidate* approach, following theoretical works by Osborne and Slivinski (1996), and Besley and Coate (1997). Within the domain of political interests, the decision to privatize is dependent on the existence of pressure groups (such as industrial interests or trade unions) having a particular interest in the rents resulting from a given form of service delivery. Ideology may also influence privatization: progressive parties have been linked to more pro-public values (hence, more public production), whereas conservative parties are associated with more a pro-private business orientation (hence, more privatization).

All in all, the hypotheses more commonly analyzed in the literature examining the motivations behind the privatization of local services can be summarized as follows (Bel and Fageda 2007): a) Fiscal constraints should be positively associated with privatization. b) Private production can be encouraged by the desire to reduce costs, either through competition or by exploiting scale economies. c) The relative strength of different interest groups, such as unions or industrial business, should influence local government privatization decisions. d) Progressive

governments will be more reluctant to privatize local services, while Conservative governments will be more prone to privatization.

Our main hypothesis is that partial privatization will be more frequent when those factors leading to privatization (such as cost structure considerations, financial restrictions or private interests, among others) exert contradictory pressures. In this way, partial privatization might emerge as a pragmatically based ‘middle way’ between pure public and pure private production choices.

3. The organization of refuse collection and water distribution in Spain

Spanish municipalities have a legal obligation to provide services for solid waste collection and for water distribution, as established in the Law 781/1986 of Basis for the Local Regime. With regard to the effective delivery of these services, local governments are free to choose between different organizational forms available within the Spanish legal framework. As a result, pure public and pure private production, as well as mixed organizational forms are all in evidence (Warner and Bel, 2008).

Pure public production exists when a public bureaucracy (a governmental department) or a public agency (a public unit working under public administrative law) produces the service in-house. In both cases, the bureaucracy or the public agency operates under the rules of public administrative law. Still within the framework of public production are public firms, a more sophisticated organizational form also found in Spain [as well as in some other European Union countries, such as Italy (Bognetti and Robotti, 2007), Netherlands (Dijkgraaf and Gradus 2007, 2008b), Norway (Sørensen 2007), Portugal (Tavares and Camões 2007), or Sweden (Ohlsson 2003)]. These government-owned firms are managed and organized under private commercial law rules. In this way, even if public firms are similar to public bureaucracies and agencies in the sense that the government has ultimate control, the managers of a public firm enjoy much greater autonomy: resulting in much more flexibility regarding inputs purchasing, labor organization, etc. Interestingly, public firms in Spain do not usually compete for contracts outside their own

jurisdiction (contrary to what happens in other European countries such as The Netherlands - Dijkgraaf and Gradus, 2007- and Norway -OECD 2000).

On the other extreme along the public-private continuum, there is pure private production, which implies that a privately owned firm produces the service. A contract defines the relationship between the public administration and the private firm, and management and organization within the private firm are governed by rules of private commercial law.⁶ Consequently, private firms have much more flexibility than public bureaucracies concerning such key issues in local services as work force organization, managers' remuneration, etc.

Besides pure public production (including here public firms as a form of pure public, since it is under complete government control) and pure private production, a different type of organizational form is relevant in Spain: mixed public-private firms (mixed firms henceforth). Ownership of mixed firms is divided between the government and the private sector while operations are carried out under private commercial law. Under partial privatization, municipal or supra-municipal governments engage in long-term contracts with private firms through joint ventures (Bel 2006, Warner and Bel 2008). Spanish mixed firms do not compete for contracts outside their own jurisdictions, as is common in Italy (Bognetti and Robotti, 2007).

In many cases the government retains a controlling stake in the firm, and the private partner tends to be a firm with an established position in the market for private delivery of local services. In such cases, however, day-to-day operations are usually conducted by the private partner, with the government retaining some degree of control over strategic decisions. In some cases, local governments hold a small fraction of shares in the mixed firm. Here the private partner has more control over all decisions regarding the service, and the local government benefits from easier access to information about the service and the firm. This allows reduced monitoring costs, thus reducing overall transaction costs.

Data for the organization of the solid waste and water distribution services in Spain has been obtained by means of the *II Survey on Production of Local Services*, run by the research unit 'Public

Policies and Economic Regulation', at Universitat de Barcelona. Detailed information on the survey methodology and the data gathered from it is available in Bel (2006).

With regard to solid waste collection, in 2003 56% of the municipalities with a population of over 2,000 had contracted out to private firms, which implies that two-thirds of the Spanish population is being served by a private firm (see Table 1), since the average population of those municipalities with private production is higher than that of the municipalities with public production. Public production (bureaucracy + public firm) exists in 37% of the municipalities, but only a little more than one-fourth of the population is served by public delivery. Finally, 7% of municipalities (6% of the population) are served by mixed firms.

Insert table 1 around here

Concerning water distribution, 42% of the municipalities with a population over 2,000 had contracted out solid waste collection to private firms in 2003, which implies that 40% of the Spanish population is being served by a private firm, since the average population of municipalities with private production is close to the mean. Public production (bureaucracy + public firm) exists in more than 50% of the municipalities, but only 48% of population is served by public delivery. Finally, a little more than 6% of the municipalities are served by mixed firms, but this represents 12% of the population.⁷

All in all, mixed firms have a small, but by no means negligible, share of service delivery in solid waste and water distribution. In the case of solid waste, mixed firms are used in some large cities such as Málaga, the fifth largest city in Spain, and Las Palmas de Gran Canaria. In both cities, the local government owns 50% of the firm, while the private partner, owning the other half, is Fomento de Construcciones y Contratas (FCC), the largest private provider of solid waste services in Spain. However, mixed firms are particularly important among smaller municipalities, and the percentage of served population is slightly smaller than percentage of municipalities (7%).

The opposite happens with water distribution: while the percentage of municipalities served by mixed firms is similar to that in solid waste collection, the percentage of population served is

much larger (12%), since mixed firms (like public firms) are relatively frequent in large municipalities (for instance, 16% of municipalities over 100,000 inhabitants are served by mixed firms).⁸ These large municipalities served by mixed firms include Valencia, the third most populated city in Spain, as well as several cities with population between 200,000 and 500,000 (Alacant, Elx, Granada, Murcia, and Las Palmas de Gran Canaria). In most cases, the private partner is Aguas de Barcelona (AGBAR), the leading private provider of urban water services in Spain.

To sum up, many municipalities in Spain opt for partially privatized delivery of solid waste and water distribution. In this way, they engage in joint ventures with private partners in order to organize the delivery of solid waste and water distribution. In doing so, they accept higher coordination costs that would follow from pure public organizations. However, compared to pure private production, these municipalities retain more control and information, even as they give an important role to private partners, thus reducing transaction costs. They relinquish some control on the organization of the service, but they can enjoy whatever benefits the private partners can provide (managerial know how, scale economies, up-dated technology, incentives and so on.). Next, we analyze what factors lead governments in Spain to partially privatize local services, thus choosing mixed firms instead of a pure organizational form (either public or private).

4. The Empirical Strategy

The data used in the empirical analysis refers to municipalities larger than 2,000 inhabitants in Spain that filled out the survey mentioned above. Information was obtained from 539 municipalities for solid waste collection and 546 municipalities for water distribution.⁹ Note that the equation to estimate considers observations for both local services, so that each municipality of the sample may be part of one or two observations. Information contained in the survey is for 2003 and includes the form of delivery (i.e. pure public production, pure private production,

partially privatized production)¹⁰, the level (local or supralocal) at which the service is produced and, if applicable, the year when the service was contracted for the first time.

Data for the population of municipalities in 2003 has been obtained from the Spanish Statistics Institute, while details about the local fiscal burden come from the Ministry of Treasury.¹¹ The web site of the Spanish Ministry of Domestic Affairs provides information for electoral results at the city/town level. Finally, data concerning the strength of industrial interests is available in the 2004 Spanish Economic Yearbook published by La Caixa, a Spanish savings bank.

The empirical model reflects the literature on factors explaining local government's delivery choices. Following to the theoretical framework stated in section 2, our empirical model includes several variables that capture economic aspects; the demand for local services at the municipal level, fiscal stress, industrial interests and transaction costs. Additionally, the model includes variables that account for political and ideological factors. The equation to estimate takes the following form:

$$Y_i = a + \beta_1 pop_i + \beta_2 pop_i^2 + \beta_3 coop_i + \beta_4 transaction_costs + \beta_5 fiscal_burden_i + \beta_6 industrial_interests_i + \beta_7 mayor_i + \beta_8 ideology_i + \varepsilon_i \quad (1)$$

where Y_i is a dummy variable that takes a value of 1 when a mixed firm produces the service and 0 when a pure organizational form (either public or private) is in charge of the delivery of the service.

We include the following explanatory variables in equation (1). Variables for population and the square of population of municipalities are considered, pop and pop^2 . Population is usually used as a proxy for the demand of local services. We expect the relationship between the demand size and the decision to partially privatize to have an inverse-U shape (Bel & Miralles, 2003). Dealing with private partners imposes high transaction costs on small towns while large cities do not benefit from scale economies or better managerial capacities, since large cities already operate at the optimal scale and enjoy highly skilled managerial capabilities.

Furthermore, we include a dummy variable that account for the use of intermunicipal cooperation to deliver the service, *coop*. This variable takes value of 1 when the service is produced at the supramunicipal level, while it is 0 when production is municipal. Cooperation may bring several of the benefits of private operations (scale economies, managerial capacities and so on) while affording low transaction costs and a favorable position in the bargaining process.¹²

Recall that the decision to use mixed firms may result in higher transaction costs in comparison to pure public production but lower transaction costs in comparison to pure private production. Keeping this in mind, each service is associated with different transaction costs depending on the characteristics of the production process (asset specificity, ease of performance measurement). In this regard, we measure the role of transaction costs through a dummy variable for the considered service, *transaction_costs*. This variable takes a value of 1 when the service is water distribution and 0 for solid waste collection.

The transaction costs of contracting out should be higher for water distribution than for solid waste since the former service has strong network features. Recall that the percentage of municipalities that use mixed firms is similar for water and solid waste, so that the multivariate analysis will allow us to capture the role of transaction costs given the attributes of municipalities.

Building indicators ranging from 1 (low specificity, or easy measurement) and 5 (high specificity, and difficult measurement), Brown and Potoski (2005) find water distribution to have an asset specificity of 3.94 and an ease of measurement of 2.44. For residential solid waste they find an asset specificity of 3.00 and ease of measurement 2.06, while the numbers for commercial waste are 3.06 and 1.97 respectively. In the same fashion, Bel (2006) provides evidence that contract terms are longer in water than in solid waste. In this regard, note that competition for the market should be more feasible for solid waste while natural monopoly features are clearly present in water distribution. Given attributes of municipalities, using mixed firms as a sort of

partial privatization policy may be appropriate when dealing with services characterized by high transaction costs and no room for competition.

Equation (1) also includes fiscal burden as an explanatory variable, *fiscal_burden*. According to legal specifications in the Spanish budgetary process, we construct this variable as the sum of the financial expenditures (chapters 3—interests—and 9—amortization—of the expenditures budget) over the sum of ordinary revenues of the local government (chapters 1 through 5 of the revenues budget).¹³ As we mentioned above, some form of private production in delivering services is more likely when local governments face fiscal constraints. The use of private production may imply either contracting out to private firms or engaging in joint ventures with private partners

We also take into account the influence of industrial interests on privatization, *industrial_interests*. This variable reflects industrial activity by measuring the dimension of industrial activity in the city relative to the level of the whole country. It is based on an index that measures the city's tax revenues over those of the whole country. Here tax revenues refer to local taxes for industrial activities. The expected sign of the coefficient for this variable is not clear. The higher the strength of industrial interests is, the higher the pressures are to fully privatize the delivery of the service. Hence, the use of pure private (public) production is more (less) likely when the strength of industrial interests increases, but the effect on the use of mixed firms is ambiguous.

The effects of political and ideological influences are captured by using two distinct variables. Indeed, we first consider the political affiliation of the mayor, *mayor*. We construct this variable as a dummy variable that takes a value of 1 when the mayor belongs to a conservative party and 0 when the mayor belongs to a progressive party.¹⁴ Local elections in Spain are based on party lists. The members of the municipal council are elected on a proportional basis. The election of the mayor is indirect: after being elected, municipal council members elect the mayor. An absolute majority of votes from the municipal council members is required to be elected as mayor in the first round. If no candidate obtains such a majority, then the first member of the list that obtained the largest amount of votes in the local election becomes mayor.

Second, we consider the ideological position of the constituency in national elections, *ideology*. We construct this variable by measuring the mean percentage of votes obtained by conservative parties in the national elections of 2000 and 2004. In our view, the ideology of the constituency is reflected in its stance in national elections. This is so especially if we remember that Spain has a parliamentary system, and the prime minister is elected by the national parliament. Hence, national elections are the most ideologically motivated elections in Spain.

Note that the political affiliation of the mayor may differ from the ideology the constituency shows in national elections.¹⁵ In fact, a mayor's affiliation might also depend on the relative strength of interest groups (industrial unions, trade unions, and coalitions at the local level, etc). Although these variables are correlated, they may be capturing different aspects of the decision since they are clearly not identical.¹⁶

Table 2 summarizes how we construct each of the variables used in the empirical model, while table 3 indicates the basic statistics of these variables.

Insert table 2 around here

Insert table 3 around here

5. Results

Table 4 shows the results of the estimates of the two specifications of equation (1) for both water and waste removal. Note that our sample has a severe imbalance between the number of ones and zeros. Complementary log-log models are frequently used to estimate binary models with unbalanced samples. Unlike logit, the complementary log-log regression is based on a skewed distribution function. Results of estimates in table 2 are presented using both logit and complementary log-log models. It can be seen that both techniques yield very similar outcomes.

The equation is significant at 1% level, and the pseudo- R^2 is in within the usual range for the empirical literature on local privatization. We find that all variables capturing economic factors are statistically significant while political and ideological factors do not play any significant role.

Thus, we find clear evidence that the use of mixed firms by local governments is based on a very pragmatic approach.

Insert table 4 about here

Coefficients (sign as well as statistical significance) suggest that governments are more prone to enter into mixed firms when transaction costs of the service are high (+ sign, which should prevent privatization), when financial burden of the local government is high (+ sign, which should promote privatization), and when local industrial interests are weaker (- sign, which should prevent privatization). Hence, mixed firms appear more frequently when cost considerations, financial restrictions and private interests exert contradictory pressures.

Indeed, high transaction costs and weak industrial interests prevent the choice of pure private production. Pulling in the opposite direction, financial constraints prevent the choice of pure public production. Mixed firms seem to emerge as a type of pragmatically based ‘middle way’ between pure public and pure private production.

The sign of the coefficients (and its statistical significance) of variables for population show the expected inverse-U shape relationship between municipality size and the decision to partially privatize service delivery. Hence, medium-sized municipalities seem to use mixed firms more commonly. The use of mixed firms allows such municipalities to obtain more benefits than does the associated transaction costs of dealing with private partners.

Mixed firms are also positively related to intermunicipal cooperation. Engaging in a public-private partnership with an industrial partner requires bargaining power on the part of the government. Large cities engage with private partners to create mixed firms by themselves. On the other hand, the joint power of an authority set up for intermunicipal cooperation increases the bargaining power of small municipalities. Hence, mixed firms are more frequently used by small municipalities engaged in cooperation than among small municipalities that do not cooperate. In this regard, the mean population of municipalities that use mixed firms is much lower when the service delivery is undertaken at the supramunicipal level, as table 5 shows.

Insert table 5 around here

An alternative approach to modeling local government's choices between pure or mixed organizational forms is to estimate equation (1) with a dependent variable that considers the three different organizational forms. This dependent variable takes value 0 when a pure public production form is chosen, it takes value 1 when a mixed firm is used, and it takes value 2 when private firms are in charge of the service delivery. Given the multivariate but discrete nature of the dependent variable, this equation must be estimated using a multinomial logit model.

Results of the estimates of the multinomial logit model are presented in table 6. The sign of coefficients in specification 1 must be interpreted as the influence (positive or negative) of the associated variable on the likelihood of choosing pure public production over mixed firms, and those signs in specification 2 as the influence of the corresponding variables in the likelihood of choosing pure private production over mixed firms.

Results from table 6 indicate that the choices faced by local governments concerning mixed firms move beyond the dilemma between pure public and pure private production. It seems that those choices are more related with the dilemma between pure or mixed organizational forms. Most coefficients of the explanatory variables have the same sign when one considers public or private production in relation to mixed firms.

Insert table 6 around here

As in the bivariate model, the main finding is that variables capturing economic factors tend to be statistically significant while political and ideological factors are not influential. Mixed firms are chosen more frequently when municipalities cooperate (- sign for public production as well as for private production).

When fiscal constraints are tighter, mixed production is preferred over both public production (- sign for public production) and private production (- sign for private production). In the latter, however, the significance of the coefficient is much lower. Note that fiscal stress

does not appear to be an influential factor for local privatization in countries from the European Union, contrary to the US experience (see Bel and Fageda, 2007).

In any case, fiscal constraints seem to promote the use of mixed firms. In relation to public production, local governments may be pushed to partial privatization for pragmatic reasons. As for private production, local governments may avoid financial problems by using a mixed model that allows them to retain some control of the firms in charge of service delivery.

Regarding industrial interests, we find that stronger industrial interests increase the likelihood of choosing a private firm over a mixed firm (+ sign for private production). Contrary to what we could expect, stronger industrial interests also make the choice of public production preferable to that of mixed firms (+ sign for public production). However, it is worth noting that the statistical significance of the latter coefficient is modest. Thus, this result is less robust than that relating weak industrial interests to the choice between mixed firms and private firms. Indeed, we need to be cautious in interpreting these results. All in all, private investors may prefer having full control of the firm to engaging in a joint venture with local governments. On the other side, the absence of a strong industrial interest may leave the government with little opportunity to reject public production in favor of either partial or full privatization

Additionally we find that larger municipalities choose public production less often than mixed firms, while population does not condition the decision of local governments between private and mixed firms.

Transaction costs do not seem to influence the decision between public production and mixed firms, while high transaction costs prevent the use of private production. Indeed, where transaction costs are high (and there is no room for competition) many municipalities may use partial privatization as an alternative to complete privatization.

The increasing relevance of mixed firms in Spain –as well as other European countries--could help explain why public services delivery reform is more stable in Europe than in the US (Warner and Bel, 2008), where oscillation between public delivery and private delivery is much more

frequent (Hefetz and Warner, 2004, 2007). It may well be that mixed firms increase flexibility for local governments seeking to implement reform. On the one hand, those seeking to escape from pure public production but unwilling (or unable) to go to pure private production can use mixed firms. On the other, local governments that have experienced a private contract failure might use mixed firms to avoid a return to pure public production.

6. Concluding remarks

The use of mixed public-private firms has a significant and increasing role in several European countries. While the empirical literature concerning local government delivery choices has thus far focused attention on the public versus private dilemma, the various theories have provided empirical tests of cost considerations, fiscal constraints and political and ideological factors. This paper builds on that work to examine the attributes of municipalities that influence decisions to develop mixed firms, rather than using pure production forms (either public or private). The paper then takes the analysis a step further by taking into account the role that intermunicipal cooperation and transaction costs may have on that decision.

The data used comes from a survey of municipalities about their delivery of two important local services: solid waste and water distribution. From this survey, we know that mixed firms deliver these services in a significant proportion of municipalities. In Spain, the use of mixed firms can be considered a partial privatization in which municipal or supra-municipal governments engage in long term contracts with private firms through joint ownership of the firm. Under this mixed organizational form, local governments can take advantage of scale economies, better managerial capacities and incentives, and so on. At the same time, such arrangements may come with lower transaction costs than would follow from contracting out to a private firm.

Results from the empirical analysis show that the decision to use mixed firms is fundamentally pragmatic. Indeed, mixed firms seem to emerge as non-ideological ‘middle way’ between pure public and pure private production.

We find an inverse-U shape relationship between municipality size and the decision to partially privatize a service. Furthermore, municipalities that cooperate regionally are more likely to use mixed firms. Both the size of the municipality and its use of cooperation influence access to scale economies and the level of transaction costs. In turn, these cost considerations condition the decision on the use of mixed firms.

Along the same lines, we present evidence that local governments are more prone to use mixed firms when the specific transaction costs of the service are high and industrial interests are weaker. High costs and weak local private interests make a choice of pure private production unlikely. The use of mixed firms is also more likely when the fiscal burden on the local government is high, because financial constraints prevent the choice of pure public production.

Hence, local governments make use of mixed firms when cost considerations, financial restrictions and private interests exert contradictory pressures. Political and ideological factors have no influence on a local government's decision to use mixed firms.

Our research raises several interesting questions. It remains unclear whether mixed firms are most likely to replace pure public or pure private production (in other words, whether there is any significant difference between these two potential origins). In the same way, knowing the precise percentage of government ownership in mixed firms would likely provide interesting additional insights. Obtaining such information and, therefore, being able to better analyze the dynamics of partial privatization is on our agenda for future research.

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TABLES

Table 1 Solid Waste Collection and Water Distribution (percentage of concessions and percentage of population), Spain 2003

	Public		Private	Hybrid
	Public bureaucracy	Public firm	Private production (contracts)	Mixed firm
	Percentage of municipalities			
Solid Waste Collection (adjusted total)	24.2	12.4	56.3	7.0
Water Distribution (adjusted total)	27.7	23.9	41.8	6.4
	Percentage of population served			
Solid Waste Collection (adjusted total)	14.8	12.4	67.0	5.6
Water Distribution (adjusted total)	13.8	34.1	40.2	11.7

Notes: Municipalities over 2,000 population.

n=540 (for solid waste collection), and n=548 (for water distribution).

Percentages do not add up to 100% because one municipality in solid waste collection and two municipalities in water have public and private production coexisting in the same jurisdiction. This represents 0.1% of municipalities and 0.2% of population served, for both services.

Source: Based on Universitat of Barcelona survey (Bel 2006).

Table 2. Description of variables

Variable	Description
Bivariate dependent variable	Dummy variable (0 = pure production form, 1 = mixed firm)
Multivariate dependent variable	Discrete variable (0 = pure public production, 1 = mixed firm, 2 = pure private production)
pop	Local population
pop ²	Square of local population
Coop	Dummy variable (1 = service produced at the supra-municipal level, 0 at the municipal level)
transaction_costs	Dummy variable (1 = water distribution, 0 = solid waste collection)
fiscal_burden	Sum of financial expenditures over sum of ordinary revenues of the local government
industrial_interests	Relative share of industrial activity in the city/town (index based on the tax revenues share of the city over the whole country. Tax revenues refer to local taxes for industrial activities)
mayor	Dummy variable (1 = mayor belongs to a conservative party, 0 = mayor belongs to a progressive party)
ideology	Percentage of votes obtained by right wing parties in the national elections

Table 3. Basic statistics of variables

Variable	Mean	Standard deviation	Minimum value	Maximum value
pop	44,713.24	118,757.1	2,033	3,092,759
Coop	0.27	0.44	0	1
transaction_costs	0.50	0.50	0	1
fiscal_burden	0.08	0.06	0	0.82
industrial_interests	0.0025	0.0028	0.00020	0.030
mayor	0.45	0.49	0	1
ideology	0.49	0.10	0.18	0.80

Table 4. Estimates of the equation of factors explaining the use of mixed firms (binary model)

	Specification (1): logit	Specification (2): Complementary log-log
Pop	5.31e-06 (1.42e-06)***	4.69e-06 (1.18e-06)***
Pop ²	-2.04-12 (5.26e-13)***	-1.80e-12 (4.50e-13)***
Coop	1.28 (0.26)***	1.16 (0.23)***
transaction_costs	0.66 (0.27)**	0.60 (0.25)**
Fiscal_burden	2.99 (1.23)**	2.70 (1.01)***
industrial_interests	-153.63 (78.00)**	-148.39 (72.94)**
Mayor	0.39 (0.29)	0.35 (0.26)
Ideology	0.05 (1.22)	0.07 (1.13)
Intercept	-3.75 (0.64)***	-3.67 (0.58)***
N	886	886
Pseudo R ²	0.10	-
χ^2 (joint sig.)	41.19***	48.17***
Log pseudolikelihood	-219.01	-219.44

Note 1: Standard errors in parentheses (robust to heteroskedasticity)

Note 2: Significance at the 1% (***), 5% (**)

Table 5. Distribution of population for municipalities that use mixed firms

	Water distribution			Solid waste		
	Municipalities (cooperate)	Municipalities (no cooperate)	T-statistic (Average differences)	Municipalities (cooperate)	Municipalities (no cooperate)	T-statistic (Average differences)
Number municipalities	20	28		16	9	
Population (Average)	22,458	125,461.1	2.74***	15,003.69	134,397.9	2.51**
Population (Standard deviation)	18,006.99	166,578.5		15,315.46	191,857.5	

Note 1: Significance at the 1% (***), 5% (**)

Table 6. Estimates of the equation of factors explaining the use of mixed firms (multivariate logit)

Base outcome = mixed firm	Dependent variable: 0 = pure public production, 1 = mixed firm, 2 = pure private production	
	Specification (1): Pure public production	Specification (2): Pure private production
Pop	-3.14e-06 (1.37e-06)**	-1.15e-06 (3.30e-06)
Pop ²	1.45e-12 (5.95e-12)**	-2.10e-11 (1.13e-11)
Coop	-0.64 (0.27)**	-1.90 (0.26)***
transaction_costs	-0.31 (0.28)	-1.02 (0.28)***
Fiscal_burden	-3.95 (1.54)***	-2.22 (1.30)
industrial_interests	145.88 (79.99)	163.63 (78.39)**
Mayor	-0.47 (0.30)	-0.28 (0.30)
Ideology	-0.65 (1.28)	0.53 (1.28)
Intercept	2.78 (0.68)***	3.07 (0.66)***
N	886	
Pseudo R ²	0.09	
χ^2 (joint sig.)	127.02***	
Log pseudolikelihood	-721.54	

Note 1: Significance at the 1% (***), 5% (**)

End Notes

¹ Warner and Bel (2008) provide a detailed analysis of the organization of service delivery in the US.

² Although some cases of non-for-profit organizations can be found in other areas such as social services. In the same direction, it is worth noting that public debate in Spain on local services focuses on the results (quality and cost) provided by the service producer, much more than on the process through which the service is delivered. In this sense, problems related to democratic control are not a primary concern in Spain. This can be explained by the fact that no purely private provision (market provision) exists in Spain, and local governments always retain control (as mandated by national law) on the basic characteristics of the delivery of the services we focus on (such as price and quality standards), regardless they are provided by a public unit, a private firm or a mixed public-private firm.

³ Boggetti and Robotti (2003) analyze the implications of the 2002 Financial Law in terms of the promotion of market mechanisms in local services delivery in Italy, including the use of different types of public-private mixed firms.

⁴ Other types of mixed exist in the US as well: benchmarking for service redundancy, segmenting the market, or dividing the service into component parts or work sharing (Warner and Hefetz, 2008).

⁵ Based on seminal works by Alchian (1967), and Alchian and Demsetz (1972).

⁶ Most contracts to external suppliers are awarded through competitive tendering; but not all of them, since competitive tendering is not compulsory in Spain. As a matter of fact, only private firms participate in bids for contracts, and –as mentioned- public firms and mixed firms do not usually bid for contracts outside their own jurisdiction. Because of this, contracting out is –in practice- equivalent to private production in water distribution and, especially, in solid waste collection.

⁷ In our sample one city in solid waste collection (Parla) and two in water (Calvià and Marratxí) have public and private production coexisting within their jurisdiction. This represents 0.1% of municipalities and 0.2% of population served, for both services. Indeed, mixed public-private market delivery (in the U.S. sense, which means that public and private production coexists in the same jurisdiction) is only exceptional in Spain for solid waste and water distribution services. In fact, among European countries, Sweden is the only one in which it is relatively common to find this mixed market delivery (OECD 2000).

⁸ Note that percentages in table 1 are adjusted for differences in city size regarding the frequency of response to the survey. Hence, the adjusted percentage of mixed firms is similar for water distribution and solid waste, although the absolute numbers of municipalities with mixed firms differ between both services. This is due to the fact that mixed water distribution firms are more frequent in large municipalities.

⁹ Recall that, initially, data on production form was obtained for 540 municipalities in solid waste and 548 in water. However, Parla –in solid waste- and Calvià and Marratxí –in water distribution- have coexisting pure public and pure private production within their municipalities (that is to say, mixed delivery *a la* US). Hence, we have not been able to include these three observations in our empirical analysis.

¹⁰ Our sample does not provide detailed information on the percentage of shares retained by the government in the case of mixed firms.

¹¹ Data for this variable refer to 2002 since it is the fiscal burden a year prior to a decision that should influence local government choices.

¹² It is worth noting that intermunicipal cooperation in Spain –as well as in other European countries- is compatible with any organizational form (Bel and Fageda, 2007). However, in the Netherlands intermunicipal cooperation is not compatible with private production (Dijkgraaf and Gradus, 2007, 2008).

¹³ Data on fiscal burden are not available for nine municipalities so that 18 observations have been excluded from the sample. Data for other nine municipalities are available only for 2001.

¹⁴ We must exclude from the estimation those municipalities whose mayors do not belong to a standard political party (parliamentary representation either at national or regional -state- level), since we cannot precisely infer where such mayors lie on the conservative/progressive continuum.

¹⁵ Recall that divergence between the mayor's political affiliation and the ideological leanings of the majority is not that uncommon out of Spain either. For instance, the city of New York is solid Democrat in the US Presidential elections. Nonetheless, both the former mayor, Rudolph Giuliani, and the current mayor, Michael Bloomberg, have Republican affiliation.

¹⁶ The joint inclusion of these variables in the estimation could imply a multicollineality problem. However, results do not change if we estimate separately these two variables.