

# Make or Buy Urban Public Transport Services: A Rational Choice?

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## Abstract

In this article, our aim is to study the determinants of the trade-off between in-house and outsourced utilities provision. More precisely, we focus on the French urban public transport sector. With regard to the issue we are interested in, this case is a particularly rich domain since, in France, the local authorities in charge of regulating the procurement of urban public transport services can choose between direct provision and outsourcing. In this latter case, they even have an additional option since they can contract out the operation of service either to semi-public companies or to fully private firms.

Using an original database covering 154 different French urban transport networks (out of 210), we estimate the impact on organisational choices of network complexity and of various interest groups' pressure.

Our results allow shedding light on the economic rationale behind the choice of a mode of governance. Indeed, although most of the interpretations of the organizational decisions made by local governments in utilities sectors concentrate on political factors, we show that there are rooms for economic explanations.

**JEL Codes:** H44, L24, L33, L92

**Keywords:** Public and private provision; Contracting out; Urban public transport.

# 1 Introduction

Since the seminal article by Coase (1937), a large body of the literature in industrial organization has tried to analyze the rationale behind the organizational choices made by firms. The so-called make-or-buy decision has been the subject of many theoretical developments and empirical works, especially in transaction cost economics and incomplete contract theory<sup>1</sup>. The basic arguments are that the main drivers of vertical integration are the need to secure relationship-specific investments in a context of environmental uncertainty (Williamson1985) and the existence of verifiability problems (Grossman and Hart 1986; Hart and Moore 1988). These propositions have originally been made to explain the behaviour of private firms operating in competitive markets. But, they can also be applied to the public sector, and more particularly to utilities (Crocker and Masten 1996). The make-or-buy decision then becomes a trade-off between in-house public provision (*via* a public bureau for instance) and delegation to a private operator (*via* a franchise agreement or a PPP contract). The two most common ways that governments can use to provide services are indeed in-house provision using salaried city employees and performance requirements contracts with private sector firms.

With the waves of privatization experienced in utilities industries since the 1980's and the extensive use of Public-Private contractual agreements, a huge number of theoretical developments have been made in an incomplete contracting perspective to explain the make-or-buy decision in the context of utilities<sup>2</sup>. In this account, the choice between public and private provision of services is dictated by efficiency considerations and depends on the level of contracting difficulties arising when it is hard to foresee and contract about the uncertain future. But although the question of when public or private provision of public services is optimal has been extensively dealt with theoretically, few empirical tests have been done so that the ratio empirical tests/models is very low. A first objective of the paper is to fill this gap by proposing a test of the determinants of local governments' organizational choices in the French urban public transport sector.

A second objective is to introduce political economy considerations in the analysis. Indeed, it is usually assumed that agents have a strong incentive to choose the most efficient mode of governance. Although this assumption is quite reasonable when we study actors operating in highly competitive markets, it can be seriously challenged, however, in an analysis of the decisions made by local governments for utilities that

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<sup>1</sup>See Garrouste and Saussier (2005), Gibbons (2005) and Lafontaine and Slade (2007) for recent surveys.

<sup>2</sup>Examples of the more recent theoretical developments are the works by Grout (1997); Hart, Shleifer, and Vishny (1997); Bennett and Iossa (2002); Hart (2003) or Levin and Tadelis (2009).

are largely protected from competition. In these circumstances, it is likely that factors other than economic efficiency, like support of key political constituencies or political orientation, will play an important role. For example, local governments may choose a form that will allow them to influence local employment, a much easier task with a public bureau than with a private operator whose autonomy of decision is larger. A second objective of our paper is then to take into account such non-economic aspects. In the present French context, where several major cities have recently and sometimes suddenly decided to contract back in house public services like water distribution (as in Paris or Grenoble) or urban transport services (as in Toulouse, Belfort or Douai), disentangling the economic motives from the political economy determinants of organizational choices is of particular interest.

To tackle these issues, we focus on the French urban public transport sector at the local (city) level. This case is a particularly rich domain since, in France, the local governments in charge of regulating the procurement of urban public transport services can choose between direct provision and outsourcing. In this latter case, they even have an additional option since they can contract out the operation of service either to a semi-public company or to a fully private firm. Furthermore, our study deals with organizational choices made at the level of city government, which is a useful level at which to study such decisions for several reasons. First, we are able to observe many cities making decisions about service provision in parallel. In this sense cities are a useful laboratory for making statistical comparisons. Second, cities differ in a variety of interesting aspects -by size, location, form of government and political orientation. At last, urban transport service provision at the city level is important from both economic and public policy standpoints as local government spending in the recent years equaled about 2 billion euros per year (GART 2007).

These characteristics of the French local urban public transport sector thus allow us to answer the questions that are at the core of our study: What are the determinants of the organizational choices made by local governments to provide public services? Are their decisions mainly driven by economic efficiency considerations or by political constraints?

To address these issues, we use an original database covering 154 different French urban transport networks<sup>3</sup> and we estimate the impact of network complexity and political pressures on organizational choices. The results of our estimates indicate that local governments tend to choose in house provision when the service is complex and contracting difficulties are expected. In that sense, local governments' deci-

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<sup>3</sup>Our sample thus covers 73% of the entire population since there are 210 urban public transport networks in France.

sions regarding the organization of public services provision are driven by efficiency considerations. But at the same time our results also indicate that political and institutional determinants play a major role in their decisions. Indeed although the political orientation of local governments does not appear as a significant determinant of organizational choices, variables such as the provision choices made by surrounding cities appear as significant explanatory variables of the trade-off between semi-public and private contractor. Our study therefore suggests that organizational decisions proceed in two steps. First, the decision to make or buy is dictated by economic motives. Then, if the decision is to outsource, the choice between semi-public and private contracting depends largely on non monetary-dimensions, and more particularly on interest groups' pressure.

The paper is organized as follows. Section 2 presents our theoretical background and the testable propositions we can derive. Section 3 gives an overview of the French local urban public transport sector. Section 4 describes our data and variables. Section 5 provides the results of our estimations and section 6 offers concluding remarks.

## **2 Contracting for local public services: theory**

The determinants of utilities privatisation at the local level have been studied from several perspectives that can be classified into two main categories. A first set of approaches highlights the economic rationale that drives the decisions made by local governments and insists on the role played by cost efficiency considerations broadly defined, that is including technological costs of production as well as transaction costs. A second body of works stresses the incidence of non-monetary factors like political interests, ideological biases and institutional constraints.

### **2.1 Economic determinants of privatisation**

In the incomplete contract theory's perspective, the trade-off between public and private provision of public services depends on the costs of contracting with an external provider, that is with the transaction costs level derived from authority delegation under asymmetric information and uncertainty.

Ignoring external contracting costs, that is the costs of writing, monitoring and adjusting delegation contracts, production would be organized and carried out more efficiently in a privatized firm than in a public firm for at least two main reasons. Firstly, because the objectives of a private firm are clearer and less diffuse and secondly because better incentives can be given to the managers and workers (Hart et al. 1997; Dixit 2002). Furthermore, at the local level, contracting out with a private

entity allows benefiting from economies of scale and scope as private firms are able to service multiple localities and sometimes to deliver different kind of public services (David and Chiang 2009). At last, as in the case of the French urban transport sector, private participation is often associated with *ex ante* competition since delegation contracts are short term contracts (seven years in average) awarded through a tendering process, while direct public administration is not subject to such competitive pressures. In other words, competition issues reinforce the expectation that public service provision tends to be less efficient than private service provision in terms of productive efficiency. Such prediction is confirmed in the case of the French urban public transport sector by several empirical studies (Gagnepain and Ivaldi 2002; Roy and Yvrande-Billon 2007).

However, accounting for contracting costs implies that outsourcing imposes additional costs that are not incurred if in-house provision is chosen (*e.g.* cost of the competitive tendering process, cost of contract renegotiation). The optimal provision mode will then weigh the added contractual costs of using delegation contracts against the added benefits of the increased productive efficiency. In other words, in-house public production might be more efficient than outsourcing when the costs of managing contracting out and monitoring contractor compliance overwhelm savings that might otherwise accrue from contracting out. Hence public authorities are expected to be less likely to outsource the provision of public services when external contracting difficulties increase, that is when it is harder to specify, enforce and adjust delegation contracts.

In comparison with the number of papers comparing the production costs of public and private firms, there is little empirical literature on the question of why governments do or do not privatize local services. However, the evidence they provide confirm that a key determinant in the make-or-buy decision of cities is contracting difficulties. For instance, Ferris and Graddy (1994) in a study of health services in the US, or Nelson (1997) in an analysis of the service delivery practices for sixty-three municipal services in US municipalities, come to the conclusion that not only production costs but also monitoring costs are taken into account by local government decision-makers in their organizational choices. In the same vein, Levin and Tadelis (2009) relying on a dataset of service provision choices by U.S. cities in a range of domains (*e.g.* public works, transportation, safety, health and human services) show that services for which it is harder to write and administer delegation contracts are less likely to be outsourced.

What this series of works highlights is the economic rationale behind the choices made by public authorities. In this account, outsourcing to private firms is dictated by ef-

efficiency considerations. It is however likely that considerations other than economic efficiency, *e.g.*, support of key political constituencies, play an important role.

## 2.2 Non-monetary determinants of privatization

An alternative view argues that the choice of production modes by (local) governments mainly depends on non-monetary constraints such as political interests or ideological preferences (Boycko, Shleifer, and Vishny 1996; Savas 2000). This approach holds that politicians' decisions may emanate from personal utility maximization (*e.g.* career concerns), and respond to external pressure such as citizen discontent or tax burden. Accordingly, the decision to privatize utilities provision is expected to depend on the relative strength of various interest groups, which may not necessarily be consistent with economic efficiency considerations.

Thus, in a city plagued by unemployment, local governments may choose a provision mode allowing them to influence local employment, a much easier task with a public bureau than with a private operator whose autonomy of decision is protected by a contract and who is usually expected to increase labour productivity (such as delivered services per employee) through retrenchment in excess employees. For similar reasons, the degree of unionization of public employees is commonly assumed to impact negatively on privatization as public employees and unions have a greater preference for internal production (Warner and Hebdon 2001).

It is also argued that in cities with a high level of local taxation, taxpayers' discontent may lead local decision makers to choose outsourcing even though in-house provision of utilities may be the most efficient organizational mode. Thus, for instance, Dijkgraaf, Gradus, and Melenberg (2003), in a study on refuse collection, find that fiscal stress positively impacts on privatization decisions at the local level.

Industrial groups can form an influential interest group as well and be strong promoters of privatization. The studies by Chong, Huet, and Saussier (2006) and Plunket, Huet, and Saussier (2008) on the French water sector show for instance that local authorities are deeply influenced by the organizational choices made by neighboring cities: *ceteris paribus*, cities surrounded by local governments having opted for privatization are more likely to adopt this provision mode. Reciprocally, in house provision is much more chosen when neighboring cities have already chosen this organizational mode. Furthermore, as shown by Gence-Creux (2001), inside a city, provision choices regarding a particular utility also depend on choices made in the past for other public services. In other words, these works suggest that the geographical repartition of the various modes of provision is not random; it depends on the pressure exerted by

industrial groups.

At last, partisan affiliation may also be a determinant, as well as the form of governance of local governments which may influence the autonomy of decision at the local level (Lopez de Silanes, Shleifer, and Vishny 1997). More precisely, right-wing orientated governments are expected to be more prone to privatization. Dubin and Navarro (1988) for instance show that ideology impacts on the decisions to privatize. Another interesting result is obtained by Levin and Tadelis (2009) who find that US cities run by an appointed manager rather than an elected mayor are more likely to contract for service provision.

In a nutshell, while make-or-buy decisions in the private sector are assumed to be driven by efficiency considerations, in utilities industries, political stakes and institutional constraints may interfere with economic efficiency motives so that the question of whether public authorities' organizational choices are rational remain a crucial and open one.

### **3 Urban transport service provision: an overview**

To address the positive question of what determines public authorities' organizational choices in practice, we focus on the French urban public transport sector at the local (city) level. It is a particularly relevant case to deal with the issue we are interested in, because the regulation of urban public transport services is under the entire responsibility of local governments (cities or groups of cities) who can choose between several modes of procurement. Indeed, since the 1982 decentralization law, each local government is in charge of the regulation of its own urban public transport system, which encompasses setting the characteristics of the services to be procured (route structure, quality, fares, timetable) and selecting a mode of organization for the provision of such services. As regard organizational choices, there are three methods to provide urban public transport services. Local authorities can either operate the service directly *via* a public bureau ("*régie*") or delegate the responsibility for providing the service to a transport operator within the framework of a contractual agreement. In the latter case, the operator can be a private or a semi-public company ("*Société d'Economie Mixte*" (SEM)) and is selected *via* a competitive tendering process. It is to be noted that regulatory rules prevent the coexistence of several operators in the same urban network. In each urban area, public transport activities are therefore supplied by a single operator. Figures 1 and 2 below provide a snapshot of how urban public transport services are delivered: of the 154 cities in our sample, nearly 15% provide the service using only city employees, that is *via* a public bureau, almost 17% use contracts with semi-public firms and 68% delegate the provision of the service to

private firms *via* contracts. That outsourcing to private companies is the dominant organizational mode is a distinguished feature of France compared to most other OECD countries<sup>4</sup>.

As in most European countries, subsidies are an important characteristic in this sector. Revenues from fares were estimated to cover only 32% of the operating costs in average, which corresponds to an operating deficit of more than €2 billions. The main additional sources of financing can come from the budget of the local authorities (€2,026m in 2006), from selective state subsidies (€93m in 2006) or from a special tax (“*le versement transport*”) (€2,422m in 2006)<sup>5</sup>.

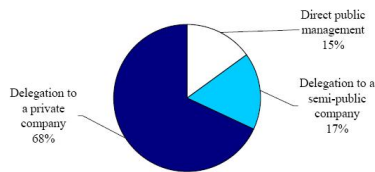


Figure 1: **Distribution of our sample’s networks according to the mode of organization prevailing in 2006** (Source: CERTU 2006 - 154 networks)

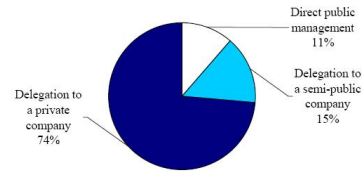


Figure 2: **Distribution of all networks according to the mode of organization prevailing in 2006** (Source: CERTU 2006 - 210 networks)

## 4 Urban public transport service provision by French cities: our data

The main source of data we used to construct an original database on this sector is the annual survey conducted by the French Ministry of Transportation (*Enquête “Cahiers Verts”* 1995-2006) which provides a range of information on the organizational and technical characteristics of the French urban transport systems at the local level. We complemented this database with data on the cities’ economic situation provided by the National Institute for Statistics and Economic Studies. We also collected from the Ministry of Environment information on the provision modes of other public services (water distribution and water sanitation). At last, data on the political orientation of city mayors come from the Ministry of Internal Affairs. In the end, our dataset covers 154 urban public transport networks (out of 210). The unit of observation is a local authority (a city or a group of cities) in 2006.

Our dependent variable (*Organization<sub>i</sub>*) is the organizational mode of urban transport

<sup>4</sup>The majority of the transport operators are members of the three largest groups dominating the market. In 2006, these three groups, namely Keolis, Transdev and Veolia Transport, controlled about 66% of all urban public transport systems (Source : GART 2007).

<sup>5</sup>Source : GART (2007)



services in city  $i$  in 2006. The alternative modes of urban transport service provision are: in-house provision, outsourcing to a semi-public company and outsourcing to a private company. Consequently, the variable  $Organization_i$  takes the value 1 if in 2006 the local government provided the service in house; it takes the value 2 if in 2006 the urban public transport service was provided by a semi-public company; at last, it takes the value 3 if in 2006 the provision of the service was outsourced to a private firm.

To test whether our predictions are corroborated in the French urban public transport sector, we need to relate our predictions to the data. As our propositions stress the importance of contracting difficulties on the one hand and non monetary determinants on the other hand, we need to identify variables that impact on these aspects. The set of variables we introduce in the right-hand side are the following<sup>6</sup>.

#### 4.1 Economic determinants

**Complexity.** Our first set of variables accounts for the complexity of the service performed by the operator. These variables proxy not only for the complexity of the service, but also for the level of (human) specific investments needed to operate the service, a key variable from an incomplete contract perspective. Indeed, the more complex the definition of a service and the higher the level of human assets specificity required to deliver it, the more costly it is to write and administer a contract with an external provider, and consequently the lower the likelihood to outsource the provision of the service.

Numerous theoretical and empirical studies have highlighted that urban public transit planning is a difficult task, requiring highly specific human skills<sup>7</sup> (see Guihaire and Hao (2008) for a recent survey). More precisely, the difficulty to design and operate an urban transit network is shown to depend on the number of bus stops and on the population density, as these two dimensions strongly influence frequency settings, timetable development but also buses and drivers scheduling. Consequently, our proxy for the level of service complexity associated with a particular network is the variable  $Complexity_i$ , which corresponds to the ratio of the number of bus stops over the pop-

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<sup>6</sup>As we aim at explaining organizational decisions that prevailed in 2006 but were sometimes taken several years before, we chose to retain as a reference period for the vectors of explanatory variables the year preceding the expiration of the contract for those networks operated by external contractors (whether semi-public or private companies). As for the publicly managed networks, we took the last year at our disposal (2006) because we consider that this provision mode is challenged every year

<sup>7</sup>Results of a recent empirical study by Brown and Potoski (2005) support this view. They asked a sample of public managers to rank 64 local services in the US along two contracting dimensions : asset specificity and ease of measurement. They found urban transport services to display high asset specificity and modest ease of measurement. In particular, they found that urban transit raises higher contracting difficulties than solid waste collection and disposal. Also, their results indicate that water management (distribution and treatment) displays higher asset specificity but lower measurement difficulties than urban public transport

ulation density. Our intuition is the following: for a given level of population density, increasing the number of bus stops makes the design of the service more complex as the network becomes finer-meshed. Similarly, for a given number of bus stops, a decrease in the population density increases the complexity of service definition problems. Indeed, to compensate for the resulting reduction in network accessibility, the regulator faces, at least, two conflicting objectives: on the one hand, providing better quality (*e.g.* improving trip directness, reducing waiting and transfer times) so as to maintain urban public transit as a satisfying substitute to private car; on the other hand, avoiding wasting money in running empty buses. Besides, with the decrease in population density, it is likely that for some lines, timetabling becomes less relevant. For such lines, urban transport may be provided through demand responsive services or taxis, which deserve a specific treatment. At last, in low density areas, demand for transport tends to be very time and direction-dependent, thus increasing the frequency setting problem (Guihaire and Hao 2008). We thus conjecture that *Complexity<sub>i</sub>* has a negative impact on the probability to delegate.

We also proxy the level of contracting difficulties with the variable *Cities<sub>i</sub>* which measures the number of cities covered by the local government *i*. Our intuition is that the more cities served by public transport in the area monitored by the local government *i*, the more complex the organisation of the competitive tendering process if delegation is the selected mode of organization. We also conjecture that the more cities in the area the more difficult the specification of the contract with an external provider. Hence our proposition is that *Cities<sub>i</sub>* might have a negative impact on the degree of delegation.

**Uncertainty.** The level of contracting difficulties incurred when outsourcing is the chosen organizational mode is also likely to be correlated with the degree of uncertainty characterizing the provision of service because uncertainty impacts on contracting difficulties. For instance, the more uncertain the demand for transport, the higher the probability of contract renegotiation, hence the more costly the outsourcing solution and the higher the probability to provide the service in house.

To assess the impact of uncertainty on the degree of delegation, we include in the right-hand side the variable *Uncertainty<sub>i</sub>* that captures the variance of hazards impacting on revenues and costs. *Uncertainty<sub>i</sub>* corresponds to the volatility of annual demand measured as the standard deviation of journeys (passengers) between 1995 and the reference year. In line with Caillaud and Quinet (1993), we expect that the more volatile the demand, the more integrated the organizational mode.

**Economies of scale.** In addition to transaction costs considerations, the potential for production cost reduction may also impact on the make-or-buy decision. Contracting out may indeed be associated with production costs savings through economies of scale and/or competitive effects. For this reason, we introduce the variable  $Size_i$ , which corresponds to the length of the network in kilometres. Our intuition is the following: on the one hand, small networks may not enjoy sufficient economies of scale to efficiently produce the service inhouse. Benefits of contracting out may thus be higher for small networks. On the other hand, small networks are likely to attract few private operators as the potential profits do not justify investing resources in preparing and submitting bids, which suggests that those cities might be constrained to provide transport services directly (Prager 1994). Thus, depending on the relative importance of this two counteracting effects, the impact of the network size on the probability to delegate might be positive or negative.

## 4.2 Non-monetary determinants

### 4.2.1 Citizens' discontent

**Unemployment and inequality.** As shown by Estache, Guasch, Iimi, and Trujillo (2008), socio-economic circumstances such as inequality and unemployment may play a role in the decisions taken by public authorities. This view holds that local governments may derive political benefits from direct provision when they experienced social tensions. To confront this prediction to data, we use two variables: the unemployment rate at the city level ( $Unemployment_i$ ) and the level of inequality as measured by the interdecile earnings ratio ( $Inequality_i$ ).

**Tax burden.** Consistently with the literature on privatization<sup>8</sup>, we expect cities' financial conditions to matter for their contracting decisions. More specifically, we expect local governments that have tight budgets to be more likely to outsource to private operators to save costs. To test this proposition we use the variable  $Taxes_i$  which corresponds to the average level of taxes dedicated to the financing of the transport sector<sup>9</sup> that city  $i$  collects each year, divided by the number of inhabitants. As indicated in section 2, the subsidies given to the transport sector come from this special tax and from the budget of the local authorities. Therefore an increase in the level of special taxes allows alleviating the level of funds allocated to the transport sector that comes from the city's budget and is associated with a reduction of the budget constraint. Hence  $Taxes_i$  is expected to impact negatively on the probability to delegate: the higher the level of special taxes dedicated to the transport sector paid

<sup>8</sup>For a survey see for instance Megginson and Netter (2001).

<sup>9</sup>This special tax is called "versement transport" and is paid by any local firm with more than 9 workers.

by local firms, the less local authorities have to draw on their budget to finance the sector and the lower the probability of outsourcing.

#### 4.2.2 Industrial groups

We also intend to assess the incidence of the organizational choices made by surrounding cities on the decision taken by a particular city. In accordance with some recent works in spatial economics (Chong et al. 2006, Plunket et al. 2008), we expect local authorities to be influenced by their neighbours' choices. To test this proposition, we introduce a variable *Regional choices<sub>i</sub>* which measures the proportion of networks managed by private operators in the same region (city *i* excluded). We expect this variable to have a positive impact on the degree of delegation. The intuition behind this proposition is the following: to choose a mode of provision similar to the one selected by neighbouring cities can be a way to benefit from their capabilities as regards, for instance, the organization of competitive tendering if delegation is the selected mode, or as regards the management of a direct public administration. Besides, service delivery choices may also depend on the existence of interest groups trying to protect and increase the rents derived from delegated management of urban public transport activities. Thus, we assume that the variable *Regional choices<sub>i</sub>* is also a proxy for the strength of industrials' pressure. Figure 3 shows the geographical repartition of organizational modes in 2006. The darker the colour the less integrated the organizational mode. Thus, the white areas refer to local authorities that chose direct administration for their transport services. The dark blue areas refer to local authorities that delegate the provision of services. As this figure clearly indicates, some regions are very rich in public management (*e.g.* Provence-Alpes-Côte d'Azur, the South East region), whereas, in some others, delegated management predominates (*e.g.* Bourgogne, the Center region). This supports the intuition according to which the organisational choice made by a particular city is correlated with the choices made by its neighbours.

We also incorporate in our model a variable *Water contracts<sub>i</sub>*, which measures the number of water services that city *i* delegated at the reference year<sup>10</sup>. Indeed, one might expect the contracting experience of a city regarding other public services to impact on the mode of provision of urban transport services it selects. If, as argued by Gence-Creux (2001), Fraquelli, Piacenza, and Vannoni (2004) or Levin and Tadelis (2009), there is a potential for economies of scope in private sector contracting, then cities that have experienced outsourcing the provision of some services may be more likely to use the private sector for other services. However, the potential for

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<sup>10</sup>As water services encompasses four different activities (production, distribution, collection and treatment), this variable ranges from 0 to 4.

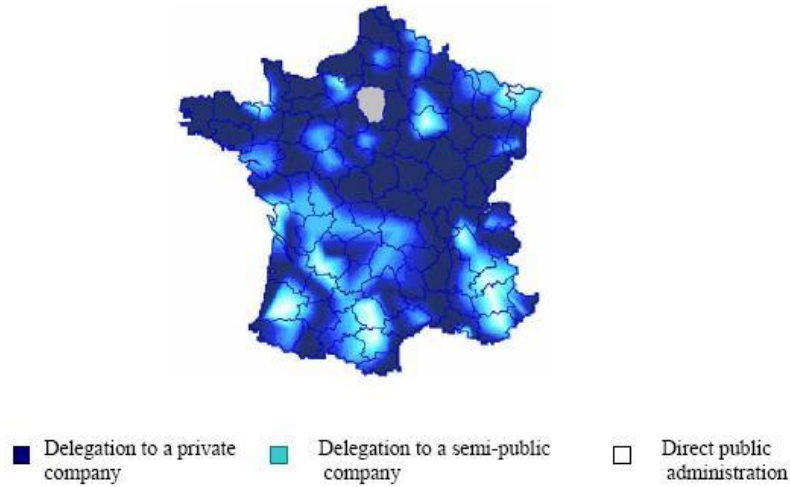


Figure 3: **Geographical repartition of organizational modes in 2006**

economies of scope resulting from the joint operation by a private contractor of water and transport services may be very limited as only one company operates in both sectors in France (Veolia Environnement). Secondly, the argument that local authorities that experienced competitive tendering for their water services might benefit from this experience to reduce the costs associated with the organization of auctions in the transport sector is disputable because contracts in the water sector are often long term contracts. Hence, the administrative staff in charge of organizing competitive tendering for water in the past is likely to have been replaced at the time a bidding process is organized in the transport sector. For these reasons, we assume that this variable may rather capture the influence of industrial pressure groups, interested in promoting delegated management of local public services (not only urban public transport) at the city level. Thus, our conjecture is that  $Water\ contracts_i$  might impact positively on our dependent variable ( $Organization_i$ ).

#### 4.2.3 Partisan affiliation

To assess whether differences in political ideology impacts on organizational choices at the city level, we use a qualitative variable ( $Politics_i$ ) that takes values 1 if, at the reference year, the mayor of city  $i$  belonged to a right-wing orientated party and 0 if she belonged to a left-wing orientated political party. This variable is supposed to impact positively on the probability to outsource the provision of urban transport services as right-wing orientated decision makers are traditionally considered as more prone to privatization.

#### 4.2.4 Legal status of local authorities

The various decentralization laws implemented in France since the 1970's have contributed to give local authorities more and more powers. To endorse their new and growing responsibilities, many municipalities have chosen to gather and jointly provide services. To go further in the analysis of the institutional determinants of organizational choices, we distinguish between the various types of inter-cities arrangements. Indeed, we know that some inter-cities arrangements (SIVU, *Syndicats mixtes*) are *ad hoc*, that is were created especially to ensure the operation of urban public transport services. On the other hand, other institutional arrangements (such as *communautés de communes* or *communautés d'agglomérations*) were originally created for other reasons than being able to finance and provide urban transport services and have therefore no specific competencies as regard transport. Hence we created a variable *Ad hoc inter-cities arrangement<sub>i</sub>* that takes the value 1 if, at the reference year, local government *i* was part of an inter-cities arrangement specifically designed to manage urban public transport service and 0 otherwise. We expect this variable to have a negative impact on the degree of delegation. The intuition behind this proposition is that local governments that are part of an inter-cities arrangement created specifically to coordinate urban public transport services are more likely to have a pro-active policy regarding transport, hence to provide the service in house.

Table 1 provides definitions of all variables used in the empirical model along with descriptive statistics. Table 2 presents mean comparisons for each of the governance modes.

Table 1: Checklist of our variables

Variable	Definition	Obs.	Mean	Std.	Min.	Max.
$Organization_i$	Mode of organisation (1 if in house provision, 2 if semi-public contracting, 3 if private contracting)	154	2.55	0.73	1	3
$Complexity_i$	Number of stops by density (inhabitants per square kilometres)	154	0.67	0.69	0.04	4.75
$Cities_i$	Number of cities governed by the local authority $i$	154	13.77	15.09	1	86
$Uncertainty_i$	Standard deviation of journeys between 1995 and the reference year	154	703.71	2321.88	1.11	24105.05
$Size_i$	Length of the network $i$ in kilometres	154	203.93	225.43	12	1207
$Unemployment_i$	Unemployment rate (year 1999)	154	15.01	3.41	7.7	23.2
$Inequality_i$	Interdecile earnings ratio (year 1999)	154	6.09	1.75	3.80	15.2
$Taxes_i$	Average level of transport specific taxes per inhabitant	154	0.05	0.03	0.01	0.20
$Regional\ choices_i$	Proportion of networks managed by private operators in the same region (city $i$ excluded)	154	0.58	0.22	0	0.89
$Water\ contracts_i$	Number of water services outsourced by the local authority $i$	154	2.33	1.75	0	4
$Politics_i$	Dummy taking the value 1 when the city mayor is right-wing orientated	154	0.56	0.50	0	1
$Ad\ hoc\ inter-cities\ arrangement_i$	Dummy taking the value 1 when the inter-cities arrangement is <i>ad hoc</i>	154	0.26	0.44	0	1

Table 2: Mean comparisons between cities using direct management, delegation to a semi-public company or delegation to a private firm

	Direct provision	Semi-public contracting	Private contracting
<b>Contracting difficulty, economies of scale</b>			
<i>Complexity<sub>i</sub></i>	1.031 (1.074)	0.758 (0.449)	0.580 (0.620)
<i>Cities<sub>i</sub></i>	15.409 (19.417)	20.269 (15.021)	11.840 (13.718)
<i>Uncertainty<sub>i</sub></i>	409.850 (1180.993)	1046.434 (1993.921)	680.643 (2565.194)
<i>Size<sub>i</sub></i>	180.341 (259.988)	278.861 (150.802)	190.451 (231.180)
<b>Non-monetary factors</b>			
<i>Unemployment<sub>i</sub></i>	15.409 (3.665)	14.25 (3.330)	15.120 (3.377)
<i>Inequality<sub>i</sub></i>	6.577 (2.762)	6.207 (1.681)	5.968 (1.481)
<i>Taxes<sub>i</sub></i>	0.057 (0.041)	0.069 (0.036)	0.048 (0.027)
<i>Organization<sub>i</sub></i>	0.523 (0.153)	0.475 (0.245)	0.622 (0.207)
<i>Water contracts<sub>i</sub></i>	2.363 (1.840)	1.884 (1.728)	2.434 (1.735)
<i>Politics</i>	0.636 (0.492)	0.423 (0.504)	0.585 (0.495)
<i>Ad hoc inter-cities arrangement<sub>i</sub></i>	0.136 (0.351)	0.423 (0.504)	0.245 (0.432)

Note : standard errors in parentheses

## 5 Economic and political economy determinants of governance choices: specification and results

To empirically assess the determinants of alternative forms of service provision, we first estimated an ordered probit model. As we mention in section 4, the dependent variable (*Organization<sub>i</sub>*) takes the values 1 to 3 according to the mode of provision chosen by the local authority *i* in 2006. The linear probability model we estimate is the following :

$$Organization_i = \beta X_i + \epsilon_i, \quad (1)$$

where  $X_i$  is a set of variables capturing the economic and non-monetary determinants of organizational choices. Assuming that the disturbance terms are logistically



distributed, the probabilities associated with each provision mode is given by:

$$\begin{aligned} Pr \{Organization_i = j\} &= Pr \left\{ k_{i-1} < \sum_{l=1}^3 (X_i \beta_l + \epsilon_i) \leq k_i \right\} \\ &= \frac{1}{1 + \exp(-k_i + \sum_{l=1}^3 X_i \beta_l)} - \frac{1}{1 + \exp(-k_{i-1} + \sum_{l=1}^3 X_i \beta_l)}, \quad j = 1, 2, 3. \end{aligned} \quad (2)$$

Columns 1 and 3 of table 3 report results from this first specification.

**Impact of economic determinants.** First, our results show a clear impact of service complexity. Models 1 and 3 indicate that cities whose urban public transport network is complex are less likely to outsource the provision of transport services as the coefficient associated to the variable *Complexity<sub>i</sub>* is negative and significantly different from zero. This is consistent with our prediction: an increase in network complexity, hence in contracting difficulties, reduces the likelihood of outsourcing.

Second, we find a significant negative correlation between the probability to outsource and the number of cities covered by a transport network (model 3). This supports the view that local governments monitoring several cities might face more contracting difficulties if they decide to delegate the provision of the service.

Third, our tests indicate that our proxy for demand uncertainty (*Uncertainty<sub>i</sub>*) is a significant determinant of organizational choices. However, as opposed to our conjecture, the yearly fluctuations of the demand for transport appear to impact positively on the decision to outsource the provision of the service. One possible explanation is that in the presence of a high level of demand uncertainty, local governments might prefer to transfer commercial risks to private companies operating on several different networks and hence able to mutualize these risks. However, this interpretation has to be qualified as delegation contracts do not necessarily imply the transfer of commercial risks on operators. As reported by Roy and Yvrande-Billon (2007), in approximately 50% of the delegation contracts risks on revenues are borne by local authorities<sup>11</sup>, suggesting that the incidence of demand uncertainty on the likelihood of outsourcing depends on the type of contract chosen to govern service provision. And indeed, when we classify the various contracts according to the degree of commercial risk borne by the external provider and then estimate the impact of demand uncertainty on contractual choices, we find that the more volatile the demand for transport, the lower the likelihood to choose a net cost contract<sup>12</sup>. In other words, networks characterized

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<sup>11</sup>About 50% of the contracts in the urban public transport sector are indeed cost plus contracts or gross cost contracts. Hence only half of the contracts are net cost contracts.

<sup>12</sup>To look at the impact of demand uncertainty on contractual choices, we constructed a dummy variable (*Commercial risk<sub>i</sub>*) taking the value 1 when the external contractor bears commercial

by a high degree of demand uncertainty are more likely to be operated by external providers but who do not bear commercial risks. The contractual difficulties associated with outsourcing in the presence of uncertainty<sup>13</sup> are mitigated by the type of contracts chosen to govern service provision as the preferred contractual options when demand is uncertain are cost plus and gross cost contracts.

At last, we find that the length of the network ( $Size_i$ ) impacts positively on the likelihood of contracting out, consistently with the results obtained by Levin and Tadelis (2009). This suggests that cities with large networks, although enjoying sufficient economies of scale to produce the service in-house, prefer to benefit from their better access to private suppliers. Conversely, while small networks may lack the scale for in-house provision, their operation is substantially less likely to be privatized because of their low attractiveness to private operators.

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risks and 0 otherwise. Then we regressed this variable on  $Uncertainty_i$ . Results of our estimates are available on request; a particularly interesting result is the following:  $Commercial\ risk = -0.001 * Uncertainty + 2.055^{***} Politics - 0.176$  (Pseudo  $R^2 = 0.18$ ).

<sup>13</sup>In particular, the risks of contract renegotiation.

Table 3: Determinants of organizational choices

	Ordered Logit (1)		Multinomial Logit (2)		Ordered Logit (3)		Multinomial Logit (4)	
	Direct provision	Semi-public contracting	Direct provision	Semi-public contracting	Direct provision	Semi-public contracting	Direct provision	Semi-public contracting
<b>Contracting difficulties &amp; economies of scale</b>								
<i>Complexity<sub>i</sub></i>	-1.059 (0.338)***	1.236 (0.449)***	0.727 (0.540)	-0.972 (0.335)***	1.133 (0.453)**	0.692 (0.547)	1.133 (0.453)**	0.692 (0.547)
<i>Cities<sub>i</sub></i>				-0.030 (0.018)*	0.034 (0.026)	0.033 (0.024)	0.034 (0.026)	0.033 (0.024)
<i>Uncertainty<sub>i</sub></i>	0.0003 (0.0001)*	-0.0007 (0.449)**	-0.0002 (0.0002)	0.0003 (0.0002)*	-0.0007 (0.0003)**	-0.0002 (0.0002)	-0.0007 (0.0003)**	-0.0002 (0.0002)
<i>Size<sub>i</sub></i>	0.002 (0.001)*	-0.005 (0.449)***	-0.0004 (0.002)	0.003 (0.001)**	-0.005 (0.002)**	-0.002 (0.002)	-0.005 (0.002)**	-0.002 (0.002)
<b>Non-monetary factors</b>								
<i>Unemployment<sub>i</sub></i>	0.091 (0.084)	0.001 (0.114)	-0.250 (0.123)**	0.102 (0.085)	0.002 (0.117)	-0.267 (0.127)**	0.002 (0.117)	-0.267 (0.127)**
<i>Inequality<sub>i</sub></i>	-0.315 (0.149)**	0.297 (0.195) <sup>+</sup>	0.385 (0.211)*	-0.336 (0.152)**	0.310 (0.199) <sup>+</sup>	0.411 (0.216)*	0.310 (0.199) <sup>+</sup>	0.411 (0.216)*
<i>Taxes<sub>i</sub></i>	-31.149 (10.301)***	52.329 (16.853)***	30.861 (13.265)**	-29.018 (10.392)***	49.028 (17.159)***	28.947 (13.631)**	49.028 (17.159)***	28.947 (13.631)**
<i>Regional choices<sub>i</sub></i>	2.000 (0.867)**	-1.912 (1.312) <sup>+</sup>	-3.338 (1.197)***	2.142 (0.876)**	-2.084 (1.331) <sup>+</sup>	-3.443 (1.210)***	-2.084 (1.331) <sup>+</sup>	-3.443 (1.210)***
<i>Water contracts<sub>i</sub></i>	0.163 (0.112) <sup>+</sup>	-0.108 (0.161)	-0.311 (0.158)**	0.142 (0.113)	-0.099 (0.161)	-0.249 (0.160)*	-0.099 (0.161)	-0.249 (0.160)*
<i>Politics<sub>i</sub></i>	-0.067 (0.410)	0.306 (0.593)	-0.610 (0.551)	-0.086 (0.412)	0.312 (0.594)	-0.510 (0.556)	0.312 (0.594)	-0.510 (0.556)
<i>Ad hoc inter-cities arrangements<sub>i</sub></i>	-0.068 (0.421)	-0.829 (0.772)	1.020 (0.558)*	0.087 (0.439)	-1.001 (0.813)	0.878 (0.579) <sup>+</sup>	-1.001 (0.813)	0.878 (0.579) <sup>+</sup>
<i>Trend</i>	0.016 (0.079)	0.168 (0.121)	-0.224 (0.110)**	0.033 (0.081)	0.158 (0.123)	-0.249 (0.116)**	0.158 (0.123)	-0.249 (0.116)**
<i>Constant</i>		-340.972 (242.779)	448.822 (221.170)**		-321.203 (246.700)	497.978 (233.937)**	-321.203 (246.700)	497.978 (233.937)**
<i>Log - L</i>	-111.590	-98.037	-110.206					
<i>LRχ<sup>2</sup>(K - 1)</i>	34.13	61.23	36.89					
<i>Pseudo R<sup>2</sup></i>	0.1326	0.2380	0.1434					
<i>Prob &gt; χ<sup>2</sup></i>	0.0003	0.0000	0.0002					
<i>N</i>	154	154	154					

Note : standard errors in parentheses; <sup>+</sup>  $p < 0.15$ ; \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

Considering the quality of the data available and the variety of provision modes, we decided to go a step further in the analysis of the determinants of organisational choices and we proceeded to an estimation assuming that the variable *Organization<sub>i</sub>* is a qualitative variable, not an ordered one. The ordered logit specification includes indeed several restrictions<sup>14</sup>. One important is that the unobserved factors ( $\epsilon_i$ ) that tend to shift organizational choices from direct provision to semi-public contracting also influence the shift from semi-public contracting toward private contracting. This is not the case in a multinomial logit model where unobserved factors are assumed to be uncorrelated. In this model, the probability that the local authority  $i$  provides the service through mode  $j$  is given by :

$$Pr \{Organization_i = j\} = \frac{\exp(X_i\beta_j)}{\sum_{l=1}^3 \exp(X_i\beta_l)}, \quad j = 1, 2, 3. \quad (3)$$

where  $X_i$  is a vector of economic and non-monetary determinants of service provision choices. The results based on this specification are provided in columns 2 and 4 of table 3. Not only do these results confirm our central propositions regarding the economic motives of organisational choices but they also provide more precision on the effect of each variable on the choice of arrangements open to local authorities. Indeed, models 2 and 4 indicate that an increase in service complexity is associated with a shift away from private contracting toward in-house provision but not toward semi-public contracting. Similarly, *Uncertainty<sub>i</sub>* and *Size<sub>i</sub>* appear as explanatory variables of the trade-off between in-house provision and private outsourcing but do not intervene in the trade-off between semi-public outsourcing and private outsourcing. At last, *Cities<sub>i</sub>* is found to be a significant determinant in model 3 but not in model 4, which suggests that the number of cities covered by a network is only a determinant of the shift away from semi-public contracting to in-house provision.

In the end, what these estimates reveal is that the trade-off between in-house provision and private outsourcing is dictated by economic factors such as the level of complexity of the service, the degree of demand uncertainty and the potential for competition. But these variables do not explain the choice of semi-public contracting.

**Impact of non-monetary determinants.** Results of our estimates indicate that the rate of unemployment of a city is not a significant determinant of the organizational choices made by its local government regarding urban transport. A possible explanation is that legislation for utilities industries does not give private operators a large room of leeway as regards their number of employees. Therefore, private outsourcing may not be considered as threatening the level of employment in the transport

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<sup>14</sup>The error in applying an ordered model to a non-ordered variable is much higher than the converse (Maddala 1983).

industry and is very unlikely to affect the rate of unemployment at the city level.

Consistently with our expectations, we obtain a negative and statistically significant relationship between the level of income inequalities and the likelihood to outsource, suggesting that local governments might use organizational choices in utilities industries as means to influence the economic situation of their area. More precisely, results from the multinomial logit models (models 2 and 4) reveal that wages inequalities have a clear positive impact on the probability to choose semi-public contracting over private outsourcing but influence less significantly the trade-off between in-house provision and private contracting. These results are consistent with the wages practices observed in the transport sector. As indicated in appendix A, wages in the urban public transport industry are much higher in semi-public companies than in private and even public ones.

At last, among the variables capturing citizens' pressure,  $Taxes_i$  appears as a statistically significant determinant of organizational choices. This supports our proposition: the likelihood of outsourcing is negatively correlated with the level of taxes collected from local firms to finance the transport sector. The higher the level of special taxes dedicated to the transport sector paid by local firms, the smoother the budget constraint of local authorities and the lower the probability to use external suppliers, whether private or semi-public, for urban transport services.

Regarding industrial groups' pressure, in line with our proposition, local governments surrounded by cities where urban transport services were previously privatized are more inclined to contract out, as indicated by estimates of  $Regional\ choices_i$  in models 1 and 3. Moreover, once again, it is the trade-off between semi-public and private outsourcing that is better explained by this variable. The shift away from in-house production toward private contracting does not indeed significantly depends on the proportion of neighboring networks already privatized, as shown by estimates of models 2 and 4. This result might illustrate that local governments adopt mimetic behaviors, modeling their organizational choices on those of their neighbors. It might also reveal that industrial groups are quite influential. Both interpretations suggest that organizational choices at the local level are partly driven by considerations that do not directly rely on a cost-minimizing logic. However, some economic arguments can justify the mimetic behavior of local authorities and their sensitivity to the influence of industrial groups. Indeed, one can imagine that local governments that choose to delegate like their neighbors take this decision to benefit from their experience as regard for instance the organization of tenders or the monitoring of contracts.

In the same vein, we show that the organizational choices made by local authorities for the provision of water services impact on their choices in the transport sector. The more privatized water services in a city, the higher the probability that transport services are privatized as well. However, the variable *Water contracts<sub>i</sub>* is significant at the 15% level only in models 1 and 3, and in the multinomial logit models (models 2 and 4), it only explains the trade-off between semi-public and private outsourcing. Since the privatization of both services is unlikely to generate large positive externalities (*e.g.* economies of scope), we interpret this finding as an illustration of the strength of industrial groups' pressure on local governments.

The prediction that partisan affiliation impacts on privatization decisions is not borne out in the data. Right-wing orientated local governments are not more inclined to outsource to the private sector than left-wing orientated authorities, as the variable *Politics<sub>i</sub>* is not significant. This result suggests that despite increased ideological support for privatization at the state level, it is difficult to predict how this support will manifest itself at the local level of government where pragmatism is a guiding principle (Warner and Hebdon 2001).

At last, the variable *Ad hoc inter-cities arrangement<sub>i</sub>*, that was introduced to capture the impact of the form of governance of local authorities, is not a significant determinant of the likelihood of outsourcing. Local governments that are part of an inter-cities arrangement specifically created to coordinate urban public transport services are not more likely to provide the service in house. This institutional dimension however plays a role in the trade-off between semi-public and private outsourcing. Estimates of models 2 and 4 indeed show that authorities belonging to *ad hoc* inter-cities arrangements prefer semi-public contracting over private outsourcing.

To summarize, our results show that the choice of a mode of governance is not random. They also suggest that organisational decisions proceed in two steps. The decision to outsource or not depends centrally on the level of service complexity and on the financial constraint. If the decision is to outsource, then the choice between semi-public and private contracting depends largely on non-monetary dimensions such as the level of income inequalities or the organisational choices made by neighbouring cities as regard transport services but also other utilities. In other words, the decision to use external providers rather than internal production is rather dictated by economic motives while the choice between a semi-public provider and a private operator is more based on political economy determinants. These findings may help explaining the results obtained by Roy and Yvrande-Billon (2007) who show that semi-public operators are less efficient than public providers.

## 6 Conclusions

Our objective in this paper was to explore a question that is central in industrial organization: what determines the choice of a specific mode of organization of public services provision? Although this issue has generated many theoretical developments especially in an incomplete contract perspective, few empirical studies have analyzed the trade-off among different governance modes in provision of public utilities. Additionally, to our knowledge, this issue has never been addressed for the urban public transport sector.

To explore what drives the decision to make or buy public services, we concentrated on the French local urban public transport sector and used a detailed set of data covering 154 cities. Our econometric results are very encouraging. Indeed in a sector in which most interpretations of the organizational decisions made by local governments rely heavily on political factors, we show that there are rooms for economic explanations. Our estimates clearly indicate that when deciding whether to provide the service in house or to contract out local authorities take into account economic efficiency considerations. More precisely, we provide evidence that cities where outsourcing is likely to induce high contracting costs (*e.g.* because the service is hard to specify) tend to provide the service directly that is through a public bureau. Political considerations are however not absent from local governments' decisions but our estimates reveal that they are mostly involved in the trade-off between semi-public and private providers. In particular, we show that the organizational modes chosen by neighbouring cities are key determinants of the decision to privatize. In other words, the central make-or-buy decision is driven by economic motives and interest groups' pressure only impacts on the choice of the external provider; a relatively good news for those who would doubt the rationality of local politicians.

Although instructive, this study is only a first step in the analysis of the organization of utilities. Future work should be done to investigate the impact of organizational choices on performances. Our ambition is indeed to assess the costs and benefits of governance structures assuming that organizational choices are endogenous, that is to say, taking into account the determinants of these decisions.

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## Appendix A : Average annual wages in euros (1,000) and modes of organization

	All sample	Direct management	Semi-public contracting	Private contracting
<i>Mean</i>	29.76	29.92	30.76	29.33
<i>Standard deviation</i>	5.07	4.89	4.08	5.38

## Appendix B : Correlation matrix

	Org.	Com.	Unc.	Siz.	Cit.	Une.	Ine.	Tax.	Adh.	pol.	Reg.	Wat.
<i>Organization</i>	1.00											
<i>Complexity</i>	-0.23	1.00										
<i>Uncertainty</i>	0.01	0.10	1.00									
<i>Size</i>	-0.04	0.38	0.60	1.00								
<i>Cities</i>	-0.14	0.38	0.43	0.73	1.00							
<i>Unemployment</i>	0.01	0.01	-0.05	0.08	0.06	1.00						
<i>Inequality</i>	-0.12	-0.00	0.10	0.17	0.10	0.65	1.00					
<i>Taxes</i>	-0.16	0.15	0.64	0.68	0.55	-0.04	0.12	1.00				
<i>Ad hoc intercities arrangement</i>	0.02	-0.07	0.15	0.18	0.25	0.12	0.07	0.15	1.00			
<i>Politics</i>	0.01	-0.08	-0.12	-0.07	-0.10	0.03	0.10	-0.14	-0.02	1.00		
<i>Regional choices</i>	0.23	0.02	0.05	0.05	0.06	0.12	-0.01	-0.07	-0.01	-0.13	1.00	
<i>Water contracts</i>	0.05	0.11	0.114	0.13	0.09	-0.04	-0.04	0.16	-0.06	0.14	0.01	1.00