Competitive Tendering and Optimal Size in the Regional Bus Transportation Industry

Carlo CAMBINI, Massimo FILIPPINI

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Real Collegio Carlo Alberto
Via Real Collegio, 30
10024 Moncalieri (To)
011 640 27 13 - 642 39 70
info@hermesricerche.it
http://www.hermesricerche.it

Competitive Tendering and Optimal Size in the Regional Bus Transportation Industry♣

Carlo Cambini
DSPEA - Politecnico di Torino and HERMES, Italy
and
Massimo Filippini
Department of Economics, University of Lugano and Swiss Federal Institute of Technology, Switzerland

Abstract

When defining how to implement tendering procedures for the regional bus transportation industry, one of the main problems local authorities have to face is setting the area size to be assigned as franchised monopoly.

This paper's aim is to analyze the topic by combining some empirical results and evidence from recent experience [developments] in the Italian regional bus industry. The empirical results show that the bus transportation sector is characterized by the presence of economies of density and scale These results imply that the best strategy for introducing competition in the bus industry is a competitive tendering approach for an area of given dimension and not necessarily a route-by-route tendering. However, it seems that the criterion applied by local authorities in Italy is much more related to political issues – such as jurisdictional boundaries of a municipal or provincial area – than a desire to promote the exploitation of economies of scale and density.

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1. Introduction

In recent years many EU-member countries have decided to introduce a competitive tendering procedure in the assignment of franchised monopolies in the regional and local transportation industry, including bus, underground and local trains. This process has been generated by the obligation of the member countries to implement the European Directive 1191/69/EU (modified by 1893/91/EU). Over the past 15 years, a number of nations have already introduced competition "for the market" in the provision of local public transport services, especially bus services. These experiences have produced some positive effects both on productivity and cost savings.[1]

Competitive tendering is the main mechanism to create competitive pressure in a market in which open competition between different transport operators is not possible or uneconomic. Thus, if *competition in the market* is limited for technical reasons, the only way to enhance the efficiency is to introduce *competition for the market* (Demsetz, 1968; Laffont and Tirole, 1993; Klemperer, 1999). However, the implementation of tendering procedures is not so simple; local authorities have to correctly define the structure of a competitive tendering procedure in order to avoid negative effects for the whole local transport market and consequently for customers. [2]

In particular, local authorities have the faculty to define different sizes of the service areas to be assigned as franchised monopoly in the regional bus transportation industry. They can open a competitive tendering process for a single bus line, or they can decide to open a tendering process for a system of bus lines, for instance for a whole regional bus network. The different choice of the size of the service area has extremely important impacts on the organization of the local transport market (i.e. the presence of only one firm for an entire network or several firms operating in different parts of a network) and on the way the transport actors, firms and local governments, could plan and re-design the provision of final services (i.e. frequencies of buses, choice of the number of bus lines, and so on).

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[1] For a presentation of these experiences and their effects see Cox and De Velde (1998) and Cox and Duthion (2001). For a detailed analysis of the competitive tendering procedure held in London, see White and Though (1995), Matthews *et al.* (2001) and London Transport Buses (2002). For the Swedish case, see SPTA (2002).

[2] For a presentation of the potential problems in the implementation of competitive tendering process, see Toner (2001) and Boitani and Cambini (2002a).

A correct definition of the optimal size of a service area in the bus transportation industry is, therefore, extremely important and, like any other network industry such as telecommunications, gas, energy, and water, it is hardly linked to the dimension of economies of scale. Therefore, in order to implement the tendering processes, it is necessary for the regulator or local governments to have information on the optimal size of the service territory.

The purpose of this study is to make a contribution to the debate on the introduction of competitive tendering procedures in the local bus transportation sector. In the first part of the paper, we analyse the main elements that a local authority must define in implementing a competitive tendering procedure in local public transport industry. In the second part, we present a review of some recent empirical studies on the issue of economies of scale in the regional bus transportation industry. In particular, a recent study on the cost structure of a sample of Italian bus companies is discussed.

Finally, in the third part of the paper we focus on the tendering process held in Italy in the last two years. The Italian case is particularly interesting since, in order to enhance efficiency and competitive pressure, non-tendered concessions will be banned as of January 2004; by that date all subsidised local transport services must be tendered off, either route by route or by a bunching of routes. Up to now many Italian regions have already defined a tendering procedure and some of them have completed the process and declared the franchised firms. However, in many cases the choice of the size of the network seems to be far from being optimal, at least from an economic point of view.

The policy implications and the conclusions are examined in the last part of the paper.

2. Properties of a competitive tendering procedure in local public transport

The organization and implementation of a competitive tendering process in the bus industry is complex because many aspects must be taken into account and clarified.[3] For the purpose of this paper we identified six main aspects.[4]

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[3] Notice that, since transport services are basically unprofitable, the price that comes out of a competitive tendering normally consists of the remuneration that the winning bidder *requires* to run the services and not a price to *pay* to get the rights to run the services.

[4] For a discussion on this issue see also Isotope (1997), Toner (2001) and Boitani and Cambini (2002a). Note that, in general, an efficient outcome of an award procedure depends on several factors, in particular

First, the local authority has to define the contractual form to offer to the winning bidders. In this regard, it is important to define the two types of on-going risks that a supplier of transport services has to face: the *production risk*, associated with the production cost of the services' provision; and the r*evenue (or commercial) risk*, associated with the sale of transport services. The different allocation of these risks defines a set of different types of contracts that could be tendered (Isotope, 1997):

- *Gross Cost Contract*: the transport firm bears only the production risk while the revenue risk is born by the tendering authority. The firm receives a price related to an anticipated level of production cost. Revenues accrue only to the tendering authority.

- *Net Cost Contract*: both risks are born by the transport firm. It receives a price determined in the tendering process, consisting of the difference between anticipated total costs and traffic revenues.[5]

In addition, there are other kind of incentive contracts between local authorities and the transport firm[6], in which the revenue risk is split between actors. The different types of contract raise different incentives to minimize costs and/or to control revenues, and these contracts must be specified ex ante in the design of the tendering procedure.

The second relevant aspect to consider in the implementation of a competitive tendering process is the dimension of the service area to be tendered. The local authority could organise a:

Route-by-route tendering: this assures an efficient production of services, since the level of potential bidders is high and thus competition is more intense; however, it could increase the total cost of service planning, since the local authority has to integrate the entire range of services provided by the different operators. This tendering procedure could successfully be used to assign inter-city routes that in general are more profitable than urban services and are usually supplied by transport operators in order to cross-subsidize urban services.[7]

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the number of participants, the inexistence of barriers to entry and the presence of perfect knowledge on technologies to be used among operators (Klemperer, 1999).

[5] Another type of contract which was employed in France is the *Management Contract*. In this case both production and revenue risks are born by the tendering authority instead of the transport firm. The manager of the company receives remuneration regardless of the level of costs or revenues achieved.

[6] These are gross cost contracts with revenue incentive, or net cost contracts with shared revenue risk.

[7] A competitive tendering for these services should define a price the company should *pay* to the local authority to manage the service and not a price the company should *receive* to provide the service, which is usually the case for urban services.

Network tendering: consists of a competitive tendering regarding the assignment to the best bidder of transport services in a whole urban or regional area. Even if this method maintains the integrity of the network, it presents some disadvantages. Firstly, the complexity of the services to provide increases the organizational costs of the tendering procedure. Moreover, if we apply this procedure to allocate transport services in a big town or a metropolitan area, the potential number of bidders would be relatively low, since it is difficult for a small operator to provide services in a big city. Therefore, the potential benefits from competition for the market would be lower.

Sub-basin tendering: the tendered area is divided in sub-basins in which the winning bidders have to provide a bunching of routes. Reducing the area to serve increases the number of potential bidders and thus enhances the competitive pressure in the tendering process. In addition, the possibility of tendering small units, without loss of integration, permits the local authority to compare operators' performance simultaneously (yardstick competition). The main problem is defining the single units to award and their size in order to exploit the economies of scale or density and to coordinate and correctly plan the services in the whole area.

In conclusion, we can say that there is a trade-off in the definition of the size of the bus service area to be assigned through a competitive tendering process. On one hand, the definition of a small service area to be assigned, for instance a bus line, can guarantee a high level of competition because many operators will be able to participate in the tendering process. On the other hand, a small service area cannot guarantee an optimal exploitation of the economies of scale.

Finally there are four other aspects extremely relevant in designing a tendering procedure, such as:

- *Service design in the assigned area*: the franchised firm could either provide a contractually pre-defined services or re-design the services in terms of fares, frequencies of buses, bus routes, etc.
- *Service quality*: local authorities must define ex ante the minimum service quality they want the transport operator to provide to citizens in terms of frequencies of buses, security and so on. With regard to this, local authorities usually set penalties in case of unjustified reduction in quality provision.

- *Award criteria*: the selection criteria must take into account both the economic and technical issues of service provision. While the economic elements are easily quantified, problems of evaluation emerge from operative issues that are difficult to verify and quantify. The possibility of assigning arbitrary weights to different elements of the bid could alter the final result of the award process.
- *Infrastructure ownership*: the ownership of buses, depots and other equipment represent a consistent barrier to entry that could prevent new operators from entering the market. If the tendering authority owns the infrastructure, then these barriers can be eliminated. Otherwise, the tendering authority must oblige the incumbent to transfer the entire infrastructure to the potential new operator, but it has to define how to evaluate the financial value of these capital goods. This last task is extremely complex due to the information asymmetry existing between the incumbent and the local authority.

Competitive tendering does not end the regulatory process. All the above aspects must be clearly signed in a contract between the winning bidder and the local authority; the latter must ex post verify and control that the franchised operator follows the rules contractually defined.[8]

3. Empirical results on the economies of scale and density in the bus industry

From the economic point of view, as we have seen in the previous section, the implementation of tendering processes requires information on the optimal size of a service area in the bus industry. Of course, the correct definition of the optimal size in the bus transportation industry, a typical network industry, is linked to the dimension of economies of scale and density.

Traditionally, the level of output has been utilized as an indicator of the company size in cost model specifications. Recently, however, some authors have begun to distinguish between firm size and level of output. This distinction seems particularly important for industries in which services are produced over a network of spatially distributed points such as the railways and the bus industries.[9] In these cases it is

[8] See McAfee e McMillan (1988).
[9] See Caves *et al.* (1984), Filippini *et al* (1993) and Filippini and Prioni (1994) for applications of this approach in measuring the size of a network industry.

possible to view the output of a bus or railway system as having several dimensions. Differences between the cost per unit of output among companies may be also due to the nature and shape of the network they serve. For instance, one might expect a higher level of unit costs if a given level of output is provided over a network of 50 km with bifurcations or in a simple linear network of 20 km.

The majority of the most recent cost models used to analyze the cost structure of bus companies include as explanatory variables an output indicator as well as a network indicator. The output of a bus system can be measured in different ways. Many studies on cost structure in the bus industry use the number of passengers or the passenger-kilometers as indicators of output.[10] Other studies employ bus-kilometers or seat-kilometers as indicators of output.[11] We believe that the use of the number of passenger or passenger-kilometers as output indicators is not completely correct, because demand-side effects affect these indicators. It is not evident why cost should depend on the number of passengers on a bus. Generally, running an empty bus is not cheaper than running a full-one. For this reason, the utilization of seat-kilometers or bus-kilometers, which are pure supply indicators, seems to be more appropriate. Moreover, in the majority of EU-member states, the regulation of the bus sector obliges bus companies to provide services on a regular base regardless of the quantity demanded.

Several researchers have used the number of route-kilometers or the number of stops as a measure of network size in studies of the bus industry. [12] For the regional bus industry, these two indicators are generally highly correlated and seem to be the single most important indicators of the size of a bus system. Of course, bus system networks can be described according to many attributes. However, from the econometric point of view, due to multicollinearity and degree of freedom problems, it is important to select one representative indicator.

The inclusion of an indicator of the size of the network of a bus company along with output allows us to distinguish between economies of scale and economies of density.

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[10] See for example Windle (1988) and Levaggi (1994).

[11] See for example Berechman (1987), Filippini *et al.* (1992), Fazioli *et al.* (1993), Filippini and Prioni (1994).

[12] See for instance Windle (1988) or Filippini and Prioni (1994).

Economies of density, whose definition is close to the traditional definition of economies of scale, are defined as the proportional increase in total cost resulting from a proportional increase in output (*Y*), holding the network size (*N*) of the company fixed, for instance the length of the bus lines.[13] This is equivalent to the inverse of the elasticities of total cost with respect to output,

$$\boldsymbol{ED}_{\boldsymbol{TC}} = \frac{1}{\dfrac{\partial \ln \boldsymbol{TC}}{\partial \ln \boldsymbol{Y}}} \qquad (1)$$

We will talk of economies of output density if *ED* is greater than 1, and accordingly, diseconomies of output density if *ED* is below 1. In the case of *ED* = 1, no economies or diseconomies of output density exist. Economies of density exist if the average costs of a bus company decrease as output increases through higher frequency of bus services on the existing route. This measure is relevant for deciding whether side-by-side competition or local monopoly is the most efficient form in the local bus industry.

Economies of scale are defined as the proportional increase in total cost brought about by a proportional increase in output (*Y*) and the size of the network (*N*).[14] Economies of scale (*ES*) can thus be defined as:

$$\boldsymbol{ES}_{\boldsymbol{TC}} = \frac{1}{\dfrac{\partial \ln \boldsymbol{TC}}{\partial \ln \boldsymbol{Y}} + \dfrac{\partial \ln \boldsymbol{TC}}{\partial \ln \boldsymbol{N}}} \qquad (2)$$

We will talk of economies of scale if *ES* is greater than 1, and accordingly, we identify diseconomies of scale if *ES* is below 1. In the case of *ES* = 1, no economies or diseconomies of scale exist.

Economies of scale are absent if average costs remain constant when a bus company increases the length of the network without changing the traffic intensity on its network. This measure is very important for defining the optimal size of a service area in the regional bus industry to be assigned as a franchised monopoly through a competitive tendering process. Further, this measure is relevant for analysing the impact on cost of merging two adjacent regional bus companies.

[13] See Caves *et al.* (1984).
[14] See Caves *et al.* (1984).

From the empirical point of view, the most relevant studies introducing the difference between economies of scale and density are those by Windle (1988), Fazioli *et. al.* (1993), Filippini and Prioni (1994), Fazioli *et al.* (2002) and Karlaftis and McCarthy (2002).[15] In table 1 we briefly present some information on these studies.

Tab. 1: Previous studies on economies of scale and density

Author(s)	**Database**	**Type of function**	**Measure of output and network size**	**Economies of scale**	**Economies of density**
Windle (1988)	91 US Urban Mass Transit companies operating in 1978-79	Total cost and variable cost	passenger miles; number of route miles	Nearly constant	Increasing
Fazioli, Filippini, Prioni (1993)	40 Italian regional and urban bus companies (Emilia Romagna) 1986-1990	Total cost	vehicle kilometers; number of route kilometers	Increasing	Increasing
Filippini, Prioni (1994)	93 Swiss regional and urban bus companies 1993	Total cost	vehicle kilometers; number of stops	Increasing	Increasing
Fazioli, Filippini, Künzle (2002)	58 Italian regional and urban bus companies 1991-1997	Total cost	vehicle kilometers; number of route kilometers	Increasing	Increasing
Karlaftis and McCartthy (2002)	256 US regional and urban bus companies 1986-1994	Variable cost	vehicle miles; number of route miles	Increasing	Increasing

[15] Another interesting and relevant empirical study is Fraquelli *et al.* (2001). We do not report it in table 1, since it makes no distinction between economies of scale and density that are the topics of our analysis. However, the results in Fraquelli *et al.* (2001) confirm the main results of Fazioli et al. (2002) here described.

Generally, the empirical results show that the regional bus transportation sector is characterized by the presence of economies of density and scale. [16]

In the following sections we present in more detail the study performed by Fazioli *et al.* (2002). In particular, we are interested in knowing if the Italian regional bus industry is characterized by the presence of economies of scale and density. This result will be utilized in the next section for the discussion on the tendering processes performed in Italy during recent years.

The cost model specification used by Fazioli *et al.* (2002) is

$$TC = AC\,(Y, N, PL, PC, T)$$

where TC represents total annually cost, Y is the output represented by the total number of bus kilometers, and N is the network indicator described by the length of the bus lines in kilometers. PL and PC are the prices of labour and capital, respectively. T is a time variable that captures the shift in technology representing a change in technical efficiency.

Fazioli *et al.* (2002) used a panel of 58 Italian bus companies to estimate this model. Of these 58 companies, 17 companies were operating in urban areas, 11 were operating in rural area and 30 companies were operating in urban as well in rural areas. For the econometric estimation of the cost function a translog functional form and a fixed effects approach were utilized. The authors found, as expected using a fixed effects approach, (1) a high explanatory power of the model and (2) a majority of the explanatory variables that were statistically significant and with the expected sign.

The empirical evidence reported in Fazioli *et al.* (2002) supports the hypothesis of density and scale economies in the bus industry. Table 2 presents the estimates of economies of density and economies of scale calculated for four types of companies: a medium-sized bus companies and three large companies included in the sample operating in different service areas. We note that the indicators for economies of scale and economies of density are all greater than 1, which means that the majority of the Italian bus companies of our sample operate at an inappropriately low scale and density

[16] It has to be noted that the empirical results by Windle (1988) confirm the presence of short run economies of scale and density in the bus industry. Therefore, an increase in the output and the network length reduces average variable costs.

level. Of course, it has to be pointed out that the values of economies of scale and density reported in the study by Fazioli *et al.* (2002) are estimated using a sample of small and medium-sized companies. The largest bus companies operating in Italy, for instance the big urban companies operating in cities like Milan or Rome, are not included in the sample. Therefore, the conclusion of the study by Fazioli *et al.* (2002) cannot be generalized to the very large urban bus companies.

Table 2: Economies of scale and density for different types of bus companies

	Medium-sized companies Y = 6650360 bus km N= 899 km	**Companies operating in urban as well as in regional areas** Y = 32407000 bus km N= 1670 km	**Companies operating in a regional area** Y = 25934000 bus km N= 9131 km	**Companies operating in an urban area** Y = 24563000 bus km N= 930 km
Economies of density	2.56	1.42	1.38	1.568
Economies of scale	1.54	1.17	1.21	1.294

The estimated indicators of economies of density can clarify the efficiency of side-by-side competition on a given bus line. The finding shows that the cost of serving a market of size *Y* over a bus line with one company is lower than the cost of serving the same market with *N* competitive companies which operate parallel on the same line. Therefore, side-by-side competition is less cost-efficient than the monopolistic provision of bus services on a given line. This result reinforces the idea that the only strategy to introduce competition in the bus industry is through a competitive tendering approach and not through a deregulation process, i.e. through a side-by-side competition as in the UK.

The results on economies of scale can help to clarify the issue of optimal service territory size for the monopolistic provision of bus services. The results show that the small and medium-sized bus companies operate at an inappropriately low scale. The service territory area of most of these companies appears too small. Therefore, mergers between two small bus companies whose service territories are adjacent would improve the scale efficiency of these companies. Opening a competition just for a very small bus transportation network or just for a bus line does not seem to be efficient. Local authorities should take this result into account in the definition of the size of the bus service network to be assigned as a franchised monopoly through a competitive tendering process. Moreover, opening a competition for single bus lines could favor the appearance of cream skimming behaviors, i.e. bus companies could be interested in participating only in competitive tendering procedures for bus lines interesting from an economic and financial point of view.

4. Optimal size of the service area and competitive tendering processes in Italy

Regional and local transport services in Italy has been long provided by public firms - owned by national and especially local governments - enjoying monopoly protection by means of non-tendered concessions.

The economic and financial performance of local public transport firms has dramatically deteriorated in the last thirty years. The Italian local public transport sector has been characterized in the last two decades by increasing costs, sky-rocketing deficits and a declining market share. Especially labor costs, which represent 2/3 of the total operating costs, have increased over years, while traffic revenues have remained stationary due to a combination of low fares for distributive concerns and a consistent shift from public to private transport. From 1992 traffic revenues have started to increase, growing from about 940 million Euros in 1992 to about 1330 million Euros in 1998 (+40%). Despite this jump, at the end of the nineties traffic revenues covered on average only 30% of total operating costs while the remaining costs was covered by public (national and local) subsidies.

In order to improve the allocative and productive efficiency of the market, the Italian government introduced a new reform (D.lgs. 422/97 and 400/99) whose main purpose was to create a more market-oriented industry, enhance competition and reduce the huge subsidies to the unprofitable (local and national) transport firms. In particular, it stated that non-tendered concessions to be banned as of January 2004. By that date all subsidised local transport services (rail services included) must be tendered off, either route by route or by a bunching of routes. Thus, the actual regime in place in Italy is a so-called *limited competition regime* based on tendering procedures.

The competitive tendering processes have been in planning in many Italian regions, and in some of them they are already concluded. Table 3 shows the Italian regions that, as of July 2002, had designed a competitive tendering to allocate transport services, pointing out the main elements of the tendering procedures. In particular, Table 3 contains information on the contractual form, duration of the contracts, the size of the service area (provincial basins, municipal basins or local basins) and the yearly level of the output. This table does not contain information on competitive tendering processes organized in large Italian cities such as Rome and Genoa[17], since they are out of our sample.

Generally, we can observe that a homogeneous criterion to define the size of the bus service area does not exist. In particular, it seems that the regional authorities normally choose the size of the service area using the province or municipal jurisdictional boundaries. The size of the service area and the level of the outputs contained in Table 3 indicate that local authorities do not seem to be interested in promoting the exploitation of economies of scale and density. In fact, the empirical results by Fazioli *et al.* (2002) indicate that bus companies with an annual production of 25,000,000 million Bus*Km are still characterized by the presence of economies of scale and density. Moreover, the small size of the service areas did not encourage a high number of competitors to participate to the tendering process. Therefore, it seems that political criteria are more relevant than economic criteria in the definition of the size of the service area. The design of the Italian competitive tendering processes seems not to give incentives to lead the transport operators to merge.

In general the tendering procedure in Italy regards a whole network. In many cases, especially for the small and medium-sized Italian provinces, urban and inter-city routes are tendered in bundle. Perhaps, a local authority prefers to tender jointly these two kinds of transport services in order to let the firm cross-subsidise the unprofitable urban services with the more profitable intercity services and thus reduce the price (or subsidy) to pay to the winning bidder to run services.[18]

In all the above-mentioned experiences, local governments maintain the ownership of the infrastructures and buses. At the moment, these capital goods are given for free to

[17] The competitive tendering procedure organized in Rome was limited only to some additional transport services consisting in new lines for the Jubilee 2000 and in other 15 million bus*km divided in two set (8 and 7,5 million bus*km, respectively). These new routes integrate the 120 million bus*km provided, with a non-tendered concession, by the incumbent operator, Metrobus s.p.a. In the tendering process in Rome a new operator entered the market, a joint venture between Sita (belonging to the National railways firm, Ferrovie dello Stato), some local operators (Arpa - Chieti, Apm – Perugia) and the French Transdev. It obtains both the routes "J" and the two sets of additional services.

the winning bidder. However, in the near future, when the Italian reform for all local public utility services (art. 35, L. 448/01) will be in effect, infrastructure and buses should be rented at a predefined price to the winning bidder.[19] Finally, almost everywhere the incumbent operators, in joint venture with other local transport operators, won the competitive tendering with a reduction on average of 5% and 7% of the reserve price, respectively.

[18] The winner of the competitive tendering procedure is the company ready to offer predefined transport services for the least amount of public subsidies.

[19] It has to be noted that generally the exploitation of the economies of scale and density should allow lowering the rental prices for the infrastructure and the buses.

Region	Contractual form	Dimension	Area details	Contract's duration
Friuli Venezia Giulia	Net-cost contract	Provincial basins	*Whole region divided in 4 sub-basins corresponding to single Provinces:* Trieste (12.772.000 bus *Km)	10 years
			Pordenone (7.467.000 bus *Km)	10 years
			Udine (15.903.000 bus *Km)	10 years
			Gorizia (5.454.000 bus *Km)	10 years
Valle d'Aosta	Net-cost contract	Sub-basins	*Whole region (6 mln bus*Km) dividend in 6 sub basins* • Fondo Valle ("valley floor") and route "Aosta-Turin Airport": 995.000 bus *Km	6 years (+ 3)
			• Alta Valle ("upper valley"): 1 mln bus *Km	6 years (+ 3)
			• Centro Valle ("central valley"): 1 mln bus *Km	6 years (+ 3)
			• Aosta e cintura (Aosta and surroundings): 1,5 mln bus *Km	6 years (+ 3)
			• Bassa Valle ("lower valley"): 1.1 mln bus *Km	6 years (+ 3)
			• Media Valle ("mid valley"): 0.5 mln bus *Km	6 years (+ 3)
Liguria	Net-cost contract	Provincial or municipal basins	La Spezia (provincial area) 9 mln bus *Km	6 years (+ 3)
			Savona (provincial area) 5.8 mln bus *Km	6 years (+ 3)
			Imperia (provincial area) 6.8 mln bus *Km	5 years (+ 3)
			Genova (municipal area) 33 mln bus *Km	6 years

Table 3: The competitive tendering procedures started in the Italian bus industry as of July 2002

Region	**Contractual form**	**Dimension of the service area**	**Area details**	**Contract's duration**
Basilicata	Net-cost contract	Provincial basins	*2 provincial basins (25 mln bus*Km) + regional routes:* Matera (8 mln bus *Km)	1 years
			Potenza (15.5 mln bus *Km)	1 years
			Regional routes (2 mln bus *Km)	1 years
Lombardia	Net-cost contract (with or without incentives)	Provincial or municipal basins	Cremona (municipal area) 1.6 mln bus*Km divided in: - urban services: 1.584.000 bus *Km - suburban services: 55.675 bus *Km	7 years
			Como (provincial area) 10.56 mln bus *Km	7 years
			Lecco (provincial area) 5 mln bus *Km	7 years
			Sondrio (provincial area) divided in 3 sub-basins: - Alta Valle ("upper valley") (1 mln bus *Km) - Media Valle ("mid valley") (1 mln bus *Km) - Bassa Valle ("lower valley") (1 mln bus *Km)	7 years

Table 3: The competitive tendering procedures started in the Italian bus industry as of July 2002

5. Conclusions

The purpose of this paper is to analyze one of the main aspects which characterized the definition of a competitive tendering processes in the bus industry, the optimal choice of the area size.

Generally, the empirical results show that the bus transportation sector is characterized by the presence of economies of density and scale. These results imply that the only strategy for introducing competition in the bus industry is through a competitive tendering approach and not through a deregulation process, i.e. through a side-by-side competition as in the UK. Moreover, it seems not to be efficient to open a competitive tendering procedure just for a very small bus transportation network. Local authorities should take this into account in the definition of the size of the bus service network to be assigned.

It is important to point out that, as far as the Italian analysis is concerned, the data regard only transport firms operating in small- to medium-sized towns and not in big cities or metropolitan areas like Rome, Milan, Genoa, Turin, Naples, Catania, Bari, and Florence. Thus, our empirical results cannot be extended to the analysis of the transport system of these cities.

The Italian government opened the bus industry to competition mandating that non-tendered concessions would be banned by January 2004. Up to now many, but not all, Italian regions have defined competitive tendering procedures. However, it seems that the criterion applied by local authorities to define the area dimension to be assigned is much more related to political issues, such as jurisdictional boundaries of a municipal or provincial area, rather than a real desire to promote the exploitation of economies of scale and density. Therefore, the responsibility of the opening of competitive tendering procedures should be generally assigned to the regional governments and not to municipalities. Finally, the design of the Italian competitive tendering processes does not seem to give incentives to lead the transport operators to merge, contrary to what happens in many European countries like the United Kingdom, France, Sweden and Finland.

Up to now, the Italian experience has not been so thrilling: incumbent operators always win and no new operators (with the exception of the case of Rome) have entered the market. The main effect of competitive tendering has been a reduction in subsidies that local governments has to pay, even if these reductions have not been so large.

Is competitive tendering the best way to increase efficiency in local transport services? The answer is not so simple; local authorities must be aware that the implementation of competitive tendering is very complex. In general, in order to be effective, the award process must have some relevant properties, i.e. presence of a reasonable number of participants, no barriers to entry, symmetric information among participants (Klemperer, 1999). However, when these conditions are not satisfied, due to the peculiar characteristics of the market (i.e. existence of sunk costs and asymmetric information between the incumbent and new potential entrants) or the impact of external factor that could influence the award process (i.e. political pressure), competitive tendering alone could be ineffective. Perhaps combining competitive tendering with the use of an incentive regulatory mechanism (Laffont and Tirole, 1993), i.e. a cap on subsidies in order to harden the firm's budget constraint (Boitani and Cambini, 2002b), could lead to a more efficient result.

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