

Governance and regulation of urban bus transportation: Using partial privatization to achieve the better of two worlds

Daniel Albalade

Universitat de Barcelona and GiM-IREA, Barcelona, Spain

Germà Bel

Universitat de Barcelona and GiM-IREA, Barcelona, Spain

Barcelona Graduate School of Economics, Barcelona, Spain

Joan Calzada

Universitat de Barcelona and GiM-IREA, Barcelona, Spain

Abstract

Mixed delivery of public services is gaining increasing attention as a way for public managers to avoid deciding between a purely public and purely private delivery system. The unusual coexistence of public and private operators in the urban bus market in Barcelona provides an interesting context in which to analyze the challenges and opportunities posed by this system. Competition for concessions among private operators and the regulation of concessionaires generate incentives to improve efficiency and quality. Furthermore, partial privatization increases the efficiency and feasibility of public operators. In fact, competitive bidding is effective in disciplining private operators and increasing the regulators' bargaining power over both public and private firms. The reform implemented in Barcelona offers an interesting insight into all metropolitan areas that are in a position to create a number of separate concessions large enough to benefit from economies of density.

Keywords: Barcelona, governance, mixed public–private, privatization, transportation.

1. Introduction

In recent years, there has been growing interest in improving the efficiency of public services. There is a commonly held perception that public firms are inefficient and should be replaced by private operators. However, it has been argued that the entry of private operators implies a high regulatory burden, especially when contracts are incomplete and reversal of the decision to privatize is difficult. The main objective of this paper is to analyze whether a public–private system adequately addresses some of the governance problems encountered in urban services such as bus transportation. In the first part, we examine the advantages and difficulties of this system and discuss some of the problems involved in the tendering processes and the regulation of concessions. In the second part,

Correspondence: Germà Bel, Dep. Política Econòmica – Universitat de Barcelona, Facultat Econòmiques, Torre 6, Planta 3, Avd. Diagonal 690, 08034 Barcelona, Spain. Email: gbel@ub.edu
Accepted for publication 20 October 2011.

we examine Barcelona's mixed public–private system, which is a relatively unusual case in the European Union. We outline Barcelona's regulatory model and show the results obtained so far.

The first contribution of this work is to show that a mixed system where public and private firms coexist may help regulators achieve the better of two worlds. First, regulators can compare firms' production processes and costs, while still retaining direct involvement in service delivery (Miranda & Lerner 1995). The presence of a public operator gives the regulator information about costs and demands that is useful for overseeing private operators and protecting passengers' interests. Second, mixed systems facilitate public–private cooperation in service provision when public firms are responsible for some parts of the service and private firms take care of other aspects (Warner & Hefetz 2008). Third, private firms are useful for identifying the inefficiencies of public firms and moderating the demands of public employees. Public-firm managers and labor unions may feel threatened by the possibility of privatization and this can increase efficiency and reduce labor conflicts (Hatry 1999). Finally, the presence of public firms allows local authorities to reverse the privatization policy if necessary, and this increases their bargaining power over private concessionaires.

The second contribution of the paper is methodological, as we present an integrated analysis of the methods for regulating the bus industry. We explain how a competitive tendering process and the regulation of concessionaires can be designed to improve the performance of operators in a mixed system. While previous literature has used a non-integrated approach to analyze these aspects, we believe that it is essential to consider them together to successfully regulate the sector. Thus, for example, the presence of private operators in a tender helps moderate the wages of public firms and monitor their performance. We emphasize the need to remove barriers to entry in the tendering process to increase competition for the concessions and to use incentive mechanisms to improve concessionaires' performance.

Finally, the third contribution of the paper is to explain the merits of Barcelona's regulatory model of bus transportation, which has successfully given rise to an integrated public–private regulatory system. Barcelona is one of the few metropolitan areas in the European Union where public and private operators coexist within a jurisdiction. In fact, most European metropolitan areas and large cities make a choice between purely public and purely private forms of delivery. Urban bus services are private in almost all cities in England¹ and most cities in France (Savage 1993; Amaral *et al.* 2009). On the other hand, the service in most cities in Germany, Italy, and Spain is provided by public firms. However, competition between public and private suppliers within cities has made some headway in Scandinavia, which is generally inclined to introducing competition in product and services markets. Mixed public–private systems are also uncommon in bus services in the US, although they have been implemented for the provision of other local services such as residential solid-waste collection and water distribution (Warner & Bel 2008; Warner & Hefetz 2008).

Until now, literature has not analyzed the governance and regulatory reform of Barcelona's transportation system. Local bus transportation in the Barcelona area consists of one public and several private firms that operate the service through different concessions. Transports Metropolitans de Barcelona (henceforth known as TMB) is a firm that is fully owned by the local government and operates daily urban routes in downtown Barcelona and the immediate surroundings, representing around 60 percent

of the route length in the metropolitan area. In addition, a group of private concessionaires connect the suburban areas with the city center and operate night services. A local transport authority, the Entitat Metropolitana del Transport (henceforth known as the EMT) is responsible for awarding and regulating concessions, as well as providing facilities. Our paper analyzes the management strategy developed in recent years by the EMT to regulate the operators, taking into account this market structure. We analyze the coexistence of public and private firms, the competitive tendering process implemented by the EMT, and the incentive regulation applied to concessionaires.

The remainder of the paper is organized as follows: section 2 provides a theoretical discussion on how partial privatization, competition, and regulation can be introduced in urban bus transportation; section 3 presents the case of Barcelona, which is an example of how a number of these theoretical recommendations can be implemented in a market; finally, the last section presents our conclusions.

2. Theoretical background

This section analyzes three key regulatory aspects that determine the performance of operators in bus transportation. First, we discuss the merits of a mixed public–private system. Next, we explain how competitive tendering forces concessionaires to reveal truthful information about their costs and enhances market regulation. Finally, we suggest some regulatory instruments that can be used to increase the efficiency of concessionaires and reduce the subsidies granted to them.

2.1. Public–private systems

The provision of many utilities like telecommunications, electricity, water, and transportation involves large economies of scale and density, and therefore it is efficient to give a single firm the exclusive rights to operate the service. Economies of scale exist when the average cost decreases as production increases. Economies of density exist when the average cost decreases if the fixed cost can be spread across a larger number of consumers. From a productive perspective, it is more efficient in both cases to use a monopolist to provide the service to all consumers. However, in order to maintain social welfare this monopoly must be regulated.

In the case of local bus transportation, however, the literature demonstrates that economies of scale in production are not significant. Is it therefore appropriate to divide the metropolitan area into separate routes or regions and to award them to different concessionaires? Should concessions be granted to private firms? Does the joint presence of public and private firms lead to the use of benchmarking techniques? We will now deal with each of these questions in turn.

A classic dilemma in the provision of public services is the difficulty of simultaneously reaching both productive and allocative efficiency when there are increasing returns of scale in production. Bearing this in mind, a key consideration when organizing bus transportation is whether economies of scale and density are sufficiently important to prevent the fragmentation of the market into different concessions.

A number of empirical papers in the field of urban bus transportation have shown that, on average, returns to scale are constant, and that some large firms in the sector even exhibit decreasing returns to scale (Matas & Raymond 1998; Filippini & Prioni 2003; Farsi *et al.* 2007). These results are very important because they imply that no scale benefits are

lost when creating several concessions in a large metropolitan area.² Therefore, several operators can efficiently participate in the provision of the service, as is the case in Barcelona.

Once we accept the potential advantages of creating several concessions for operating the bus service in a city, the next question to consider is whether it is preferable to provide the service through public or private firms. Several papers have shown the benefits of privatizing bus services. De Rus and Nombela (1997) found that public firms in Spain use 30 percent more employees than private firms to serve the same vehicle-km and pay wages that are 18 percent higher. This is a remarkable finding when we consider that labor costs account for a substantial part of bus operator costs. Savage (1993) and White (1997) reported significant cost reductions after the privatization of local bus operators in the UK, mainly due to wage reductions. Public firms usually have higher personnel costs than private firms because of stronger unions and softer budget restrictions. In Switzerland, Filippini and Prioni (2003) found that private operators are more efficient in providing regional services, and Lee and Rivasplata (2001) also reached this conclusion with regard to New Zealand and Chile. The downside is the difficulty in obtaining reliable information to regulate private firms. Therefore, politicians should only contemplate privatization when they are sure that the costs and quality gains obtained offset the regulatory burden created by the asymmetries of information between the operators and the regulator.

Since the 1980s, many European countries have implemented significant changes in the organization of bus services under the auspices of the European Commission (European Commission 2007). The UK, France, and Spain have all liberalized the market in an attempt to reap the benefits of privatization. However, in addition to purely public or private markets, other hybrid structures are gaining importance, for example mixed companies, where the public and private sectors share ownership of the firm, or mixed public–private systems, where public and private firms coexist in the same territorial jurisdiction. What are the potential advantages of these alternative models?

A mixed company is one way to avoid the classic public/private service delivery dilemma. Ownership is divided between the local government and the private sector, and the firm operates entirely within the framework of private commercial law. Usually, the private partner manages the day-to-day operations of the firm, while the government retains control of the longer-term planning activities (Bel & Fageda 2010). Under this organizational model, local (or supra-local) governments engage in long-term contracts with private firms through joint ventures (Bel 2006).

In the US, the term “mixed public–private system” has a very different meaning. It is understood as a system in which several public and private firms provide the service within the same local jurisdiction: local governments combine delivery at the level of the market by using both private contracts and public production for the same service (Warner & Bel 2008, p. 728). This arrangement does not affect the ownership of firms but it implies the partial privatization of the provision of the service. This is the system that has been implemented in Barcelona’s metropolitan area. We will now analyze its main properties.

Mixed public–private provision allows governments to pursue different types of objectives. First, it helps to reduce regulatory costs. The government can compare firms’ production processes and costs, while still retaining direct involvement in service delivery (Miranda & Lerner 1995).³ The most efficient companies achieve better conditions and inefficient ones are penalized (Armstrong & Sappington 2006). Second, mixed provision fosters competition. The use of competitive tendering increases the number of potential

providers in the jurisdiction (Warner & Hefetz 2008). Third, it facilitates public–private cooperation. A public firm can be responsible for some parts of the service provision and private firms can take care of other aspects (Warner & Hefetz 2008). For example, in bus transportation a public firm can serve city-center routes while private firms can serve routes between the city center and suburban areas, as is the case in Barcelona. Fourth, it allows reversing the privatization policy if necessary. In a mixed system, the local government can opt either to outsource further or to revert to public delivery, increasing the regulator's bargaining power over the concessionaires (Hefetz & Warner 2007). Finally, a mixed delivery model disciplines public firms' employees. Public firm managers and labor unions may feel threatened by the possibility of privatization; this can lead to increased concern for efficiency and reduce the likelihood of strikes (Hatry 1999). The threat of privatization is especially important in countries like Spain where the inefficiency gap between private and public bus companies is associated with personnel management.⁴

To summarize, mixed systems can increase competition in the local market, provide information on costs (thus reducing information asymmetries and transaction costs), and ensure that governments can guarantee a failsafe service or reverse its privatization decision in case of contract failure. In the second part of the paper we analyze whether the potential advantages of mixed systems have been realized in Barcelona and we describe the main difficulties encountered by regulators.

2.2. Competition under partial privatization

In the bus industry, economies of density make it efficient to grant the concession of each route to a single firm. Public authorities may tender the concession of different groups of routes and award them to the firms that request the lowest subsidy or those that score highly when several aspects such as price, coverage, and quality are taken into consideration.

The appeal of tender systems is that bidders have the incentive to reveal their true costs, which enables the regulator to select the best offer. When this occurs, tenders replicate the results of competitive markets, provided that the information available is good and enough firms enter the bid. Of course, competitive bidding is less effective in determining the most efficient operator when the regulator is also concerned with the quantitative and qualitative attributes of the service rather than the price alone. Moreover, when the definition of the service is not sufficiently clear, competitive bidding may favor the opportunistic firms that are able to exploit contractual gaps (Bajari *et al.* 2003; Yvrande-Billon 2006; Calzada & Miralles 2009).

According to Estache and Gómez-Lobo (2005), there are several ways of tendering a route: contracts may be tendered based on a set of selection criteria, which include the price offered by firms as well as quality variables,⁵ or they may be awarded to the firm that requests the lowest subsidy. In this case, the regulator sets the prices and the subsidy that receives the firm covers the shortfall between the estimated revenue and the costs. Firms may or may not retain revenue from prices and this determines their subsidy. Therefore, the type of contract determines the incentives of the firms. For example, if the subsidies are not dependent on revenues, it will not be in their interest to attract customers (Gautier & Yvrande-Billon 2011).

Many studies have shown the difficulties involved in competitive bidding (Williamson 1976; Littlechild 2002). Auctions become less attractive when few firms participate in the process or when there is the possibility of collusion: the smaller the number of firms

in the auction, the higher the declared costs and, consequently, the larger the subsidy to be paid. The case of London corroborates this result: Amaral *et al.* (2009) found a high negative correlation between the number of bidders and the cost of service during the years of public–private coexistence. Yvrande-Billon (2006) also reported that in the period 1996–1999 some French bus companies tried to divide up the market.

When few firms participate in the tendering process, regulators might be interested in reducing entry barriers in order to increase participation and to offer fewer subsidies. According to Baumol (1982), in contestable markets, the threat of entry forces incumbents to reduce their prices and obtain normal returns. In urban bus transportation regulators can apply several strategies to increase the contestability of the market. For example, in Barcelona and many French cities, local authorities maintain ownership of the infrastructure and only outsource the provision of the service. Regulators offer concessionaires essential equipment such as garages and buses in order to reduce their initial investment. However, incumbents and potential entrants never have exactly the same opportunities since the former are better informed regarding assets, quality, and demand than their rivals. Another strategy for increasing participation is to use a route-by-route tender instead of tendering a whole district. This option, however, implies much higher coordination costs (Boitani & Cambini 2006).

Another significant limitation of tenders is the fact that contracts may be incomplete if there is uncertainty about the future development of the sector. In this regard, one of the biggest shortcomings of auctions is “Williamson’s transformation.” Williamson (1976) noted that after the concessionaire has overcome the competitors and made sunk investments, its relationship with the government becomes a bilateral monopoly and some of the achievements gained through the competitive process may be lost.

Several strategies have been proposed to mitigate Williamson’s transformation. For example, regulators can award short-term contracts to prevent opportunistic behavior by concessionaires. Short contracts reduce market risks and allow the regulator to adjust them to changes in technology and demand. However, when operators need to incur major sunk costs, longer time horizons may be required to ensure dynamic efficiency.

Finally, several authors have highlighted the consequences of competitive tendering for the market structure. Nash (2005) showed that the use of auctions in the UK has favored the consolidation of companies and the dominance of the industry by three large groups. Similar results have been identified by Alexandersson *et al.* (1998) with regards to Sweden and by Mathisen and Solvoll (2008) with regards to Norway. These studies show that the uncertainty about competitive tendering may increase cross-ownership and reduce the number of bus firms.

A question that remains unanswered by the economic literature is whether in a mixed system the competition between public and private firms can improve the results of the tender process and reduce the subsidies awarded to the winners. For example, in a mixed system private firms may behave less opportunistically when they bargain for incomplete contracts.

Finally, it is worth mentioning that the literature reports ambiguous results regarding the relationship between competitive tendering and cost efficiency. Isotope (1998) estimated that the use of competitive bidding in Europe can reduce costs by 35 percent with market fragmentation – breaking up public monopoly – and privatization. Preston (2005) considered that tenders typically give unit costs that are around 20 percent lower than in the case of an unchallenged public monopoly operator. Analyzing the tendering process in

London that was initiated in 1985, Kennedy (1996) reported that the estimated cost savings from tendering were 18 percent from 1987 to 1992. Considerable cost savings were achieved through reductions in labor costs due to improved working practices. In spite of this, Hensher and Wallis (2005) showed that contract prices in London in the five years up to 2000/01 increased at an average rate of around 10 percent per annum, while in the rest of Great Britain the rate of increase was somewhat higher. Factors that contributed to this increase were higher standards (such as low-floor buses) and input prices.

In analyzing the use of competitive bidding in France from 1993, Yvrande-Billon (2006) concluded that it did not lead to better performance, due to the lack of transparency in the attribution processes (after the tender, local authorities negotiate the contract terms with pre-qualified firms) and the limited monitoring capabilities of the authorities. However, when analyzing the period 1995–2002, Roy and Yvrande-Billon (2007) showed that private operators outperform public ones in terms of technical efficiency.

The results of the use of tendering processes in Italy have been poor. Boitani and Cambini (2006) assessed the results of the tenders implemented since 1998 and they reported that there were few participants and that incumbents managed to win the franchise almost everywhere. More importantly, subsidy savings were negligible in many cases.

In summary, the privatization of bus transportation may involve initial cost reductions, but the costs may increase over time (Bel *et al.* 2010), as is the case in other sectors.

2.3. Concession design

The regulatory instruments used in bus-service concessions do not differ greatly from the regulations used in other monopolistic markets. Contracts may stipulate how the subsidies are calculated, who sets the fares, guidelines on the coverage and quality of the service, and what technologies may be used. Moreover, regulators ensure that the conditions of the concessions are observed. The contract design is essential for attracting participants to the tender: firms want a clear, stable regulatory regime that allows them to estimate the costs and revenues of concessions.

An important aspect of contracts is the degree of risk sharing. Roy and Yvrande-Billon (2007) explained that there are essentially two types of risk in the bus sector: the first is “the production risk,” which is associated with the costs of producing a fixed level of service, independent of the volume of passengers. This may reflect, for example, unexpected changes in the price of petrol or in the environmental regulations that affect operators’ costs. The second is the “revenue risk,” which is associated with the sale of transport services. Thus, for example, the demand for bus services may decrease after a period of strikes if consumers believe that the service is no longer reliable. In France, the recognition of these two types of risks has given rise to three different contracts: net-cost contracts, gross-cost contracts, and management contracts (Table 1). Each of these contracts involves distributing the responsibility for the risks between the transport companies and the regulators differently. While net-cost contracts and gross-cost contracts can be considered variants of fixed-price contracts, management contracts can be interpreted as cost-plus contracts.

Roy and Yvrande-Billon (2007) reported a downward trend in the presence of management contracts in France in recent years. The authors show that private operators regulated with gross-cost contracts have the highest efficiency scores. But they emphasized that the performance differentials between the various regulatory schemes are slight. Therefore, only marginal efficiency gains are to be expected from regulatory changes.

Table 1 Types of contract in urban bus services in France

	Type of contract		
	Net-cost contract	Gross-cost contract	Management contract
Risk burden	Both product and revenue risks are borne by the transport company	The production risk is taken by the transport company while the revenue risk is borne by the local authority	Both production and revenue risks are borne by the local authority instead of the transport company
Payment	The operator only receives a subsidy equal to the difference between the anticipated total operating costs and revenues	The operator receives an agreed subsidy for the production of a fixed amount of services	The private operator receives a remuneration that is independent of its performance

Source: Based on information provided in Roy and Yvrande-Billon (2007).

More generally, one advantage of having several concessions in the same municipality is that regulators can complement the use of incentive mechanisms in the contracts with benchmarking techniques that make it possible to compare the performance of all firms.

Another key element of concessions is their duration. A short contract reduces market risks and allows the regulator to adjust the contracts to changes in technology and demand. Moreover, consumers benefit more immediately from the productivity gains generated by operators. However, longer contracts increase incentives for investing in cost-reducing activities. In summary, longer time horizons may enhance dynamic efficiency but do not allow for reductions in the subsidies granted to firms. In order to avoid this problem, Engel *et al.* (2001) suggested using an auction where the regulator fixes the prices and firms bid for the least present value of revenues. In this context, the duration of the concessions is adjusted according to the operator's revenues. This solution may be appropriate when there is a high level of uncertainty about the demand for the service.

3. Barcelona's regulatory model

This section analyzes the mixed public–private system used in the metropolitan area of Barcelona and the regulations designed to monitor the concessionaires. Our analysis highlights the achievements of the Entitat Metropolitana del Transport (EMT) in increasing efficiency in accordance with the theoretical prescriptions described above, and also identifies areas in which there is room for improvement in the system's management.

3.1. Entitat Metropolitana del Transport (EMT)

The EMT was created in 1987 to regulate the provision of bus transportation in 18 municipalities in Barcelona's metropolitan area, an urban continuum of 331.5 square kilometers with a population of 2.8 million. In Barcelona, metro and bus fares are integrated and subsidized to ensure affordability. The EMT is responsible for the management, planning, and coordination of mass public surface transportation services. It also regulates the metro network, which is operated by the public firm Ferrocarril Met-

ropolità de Barcelona S.A. (Barcelona Metropolitan Railways).⁶ Public transportation services in the metropolitan area of Barcelona are funded via a range of mechanisms:

- (i) A management contract with bus and metro operators;
- (ii) A transportation tax; and
- (iii) Transfers from other local institutions.

The EMT's governing body consists of 31 representatives from the 18 municipalities covered by the service. Representatives are appointed by municipal councils. The city of Barcelona appoints 11 representatives, municipalities with more than 100,000 inhabitants appoint three, and municipalities with populations below 100,000 appoint one. In this way, the provision of urban bus transportation in the metropolitan area can be considered a case of intermunicipal cooperation, in which different municipalities provide the service through a joint-governance body, that is, the EMT.

In the Barcelona area there is a long tradition of private delivery of public services, despite the fact that all of the municipalities served by the EMT have had left-wing mayors and city councils since 1979 (local democracy was re-established in Spain in 1979). This situation is not likely to change after the recent local elections in May 2011, when center-right mayors and governments were elected in four municipalities. At present, all but two municipalities in the EMT area (Gavà and Sant Boi) have private delivery of solid-waste services, and all but one (Prat de Llobregat) have private delivery of urban water services. Therefore, using private delivery for bus transportation is consistent with local practices in other public services.⁷

One of the missions of the EMT is to regulate public and private bus operators. The EMT coordinates and finances the services provided by the publicly owned firm Transports Metropolitans de Barcelona (TMB). In spite of this, TMB enjoys considerable freedom to design and plan its services and is not subject to a concession contract because of its traditional status as public operator. As a consequence, the EMT cannot use incentive mechanisms to minimize TMB's costs and enhance its quality.

This lack of effective control over TMB is one of the main shortcomings of Barcelona's model and the most difficult issue to address due to the political interference from the boards of both the EMT and TMB. There is more political interference in the TMB management, which might explain the difficulties in applying to TMB the same regulatory instruments that are applied to the other operators. In the case of the EMT, the managers have considerable independence in the regulation of private concessions. However, the main strategic decisions are taken by the EMT council, which is made up of politicians representing the municipalities of the metropolitan area.

Private operators have far less management autonomy than TMB. The EMT organizes the tendering process, determines the subsidies received, and implements incentives to improve efficiency and quality. The next section analyzes these regulatory instruments.

3.2. Mixed public–private delivery

Surface transportation in Barcelona is organized as a mixed system. TMB operates urban daytime routes in the city of Barcelona and the surrounding area. TMB carries 75 percent of passengers and is responsible for 55 percent of the metropolitan routes, 48 percent of the bus stops, 62 kilometers of service, and 70 percent of the vehicles. The area not covered by TMB is operated by small private firms. Generally they connect the suburbs

and the downtown area, and also operate urban services at night. Routes are grouped into districts and exploited monopolistically for short periods defined in the concessions.⁸

In recent years, the relevance of private operators has increased. Between 2003 and 2009 the number of passengers transported by private firms grew by almost 30 percent, while those transported by TMB decreased by 3.8 percent. Moreover, in this period the market share of private management increased at the expense of TMB from 21.7 percent to around 27.2 percent.⁹

Furthermore, both the operational kilometers served and the numbers of routes managed by private firms grew significantly between 2003 and 2009. This reflects the EMT's strategy to contract out new lines to private operators instead of extending TMB's network outside Barcelona city center. In fact, the number of kilometers operated by private firms has increased 72 percent and the number of lines 37 percent in the period analyzed. By contrast, the number of routes and operational kilometers controlled by TMB has increased by just 3.8 percent and 11 percent, respectively.

The coexistence of public and private operators in the same jurisdiction is not common in Europe, except in Scandinavian countries. As explained in section 2.2, one of the advantages of this situation is the possibility of using benchmarking techniques to regulate operators. In Barcelona, this technique is not explicitly used, but we can analyze the economic efficiency of the private and public operators by comparing their costs.¹⁰ In 2006, TMB's cost per kilometer driven was 4.94 euros, while the average cost per kilometer driven on the routes covered by private operators was 3.27 euros (the cost per kilometer ranged from 2.06 euros to 4.12 euros). The main factor behind this difference was labor costs, since private operators pay lower hourly salaries than TMB. This situation has encouraged transportation authorities to use some informal benchmarking during negotiations on labor conditions with TMB employees.

3.3. Competitive tendering

Concessions in Barcelona include routes grouped into districts, which allow concessionaires to cross-subsidize unprofitable routes. The EMT manages three different types of concessions: first, concessions with public service obligations; second, concessions exempt from public service obligations; and third, profitable concessions that must pay a fee to the EMT.

The first type of concession is the most common. It implies that bus operators must satisfy some public service obligations in exchange for a subsidy. The EMT regulates several relevant aspects of concessions, such as the fare (which is the same for the whole Barcelona metropolitan area), route extensions, the number of stops, and the frequency of the service. However, both production and revenue risks are borne by operators. In fact, they are subject to a net cost contract similar to the one described in section 2.3.

When operators bid for a concession they make a financial offer based on their expectations about the evolution of costs, and if later on there are deviations they don't receive any compensation. Similarly, bids include an agreement to transport a certain number of paying passengers, and if operators don't reach this objective they have to compensate the EMT for the revenues that are lost. By contrast, if operators are able to transport more passengers they receive a percentage of the extraordinary revenues that are generated.

The second group of concessions was tendered before the 1970s and was not originally subject to public service obligations. For this reason, this type of concessionaires is

not subsidized by the EMT. Many of these concessions are about to expire and will be replaced by the first type of contract. In recent years, the EMT has negotiated the extension of some routes of these concessions and an increase in the frequency. In these cases, the EMT offers a subsidy to the concessionaire that is determined according to the same incentive mechanisms described above.

Finally, the third group of concessions is designed for routes that are clearly profitable. Operators subject to this contract type pay an annual fee to the EMT based on its declared revenues. An example of this is the concession on the route that connects downtown Barcelona and the airport. Also, an operator called TOMBUS used this type of contract to compete with TMB for high-traffic routes in downtown Barcelona, but it gave up the concession in 2008.

Each time a concession expires, the EMT puts it out to tender again. Participants in the process are usually operators based in Barcelona and other Spanish cities. The EMT considers five aspects in its assessment of the offers:

- 1 Financial proposal (operating costs per kilometer and expected rate of return): note that this is an essential element in the assessment of bids, since the financial proposal determines the revenues of the operators. Moreover, the difference between the costs of the service and the regulated tariff determines the subsidy given to the users.
- 2 Expected demand: as children, the elderly and the disabled do not pay for urban transportation, the EMT is primarily interested in the firm's expected demand from paying passengers. The number of passengers specified in the bids constitutes an objective for the winners of the concessions.
- 3 Staff and equipment used in the area of the concession: this information is useful for assessing efficiency.
- 4 Experience in the sector and ability to exploit the service.
- 5 Description of the coaches used to provide the service.

The EMT assesses all the technical and financial aspects of the bids and assigns a score to each of them. Finally, it chooses the concessionaire with the highest score.

New private concessions are usually awarded for a five-year period, which is short enough to ensure recurring competition for the market. In addition, contracts can usually be extended for two or more years, dependent on the operator's performance, which is measured based on quality objectives, realization of marketing campaigns, and acceptance of new objectives. Therefore, the EMT uses contract duration to incentivize efficiency: it initially establishes short contracts and then extends them if the operators prove efficient.

As discussed above, the success of tenders depends on the number of participants. In Barcelona, the EMT tries to encourage participation by making the market more contestable. When a firm wins a tender it can employ its own management processes, but it must use its predecessor's staff and equipment to operate the service. This strategy reduces barriers to entry and makes the market more contestable.

As is the case in France and Italy, the regulator owns or heavily finances the bus fleets. Furthermore, the EMT owns two bus garages and is currently building new ones. Therefore, the most important acquisitions required to run the service, namely the vehicles and garages, are owned by EMT, which offers them to the winning concessionaires. In addition, the contracts drawn up by EMT and the Spanish labor authorities stipulate that when a new firm wins a concession it must maintain the staff and working conditions of

its predecessor. Entrants can negotiate with unions in order to accommodate new workers in the firm and alleviate possible discriminatory conditions between new and existing employees, and therefore labor conditions may change, resulting in labor cost savings.

The EMT's strategy has been quite successful in making the market contestable and challenging some of Williamson's criticisms regarding incomplete contracts. However, all of the measures created to make the market more contestable also make it difficult for entrants to offer better bids than the incumbents.

The use of competitive tendering has not implied the entry of new concessionaires. In fact, in recent years, the concessions have always been awarded to incumbents.¹¹ One possible reason for this is a cartelized market. However, since 1990, 11 firms have participated in the tenders and an average of four firms has bid in each process. Most of the bidders hold a concession in the Barcelona area, but five of them are from outside the EMT domain and want to acquire the concessions from the incumbents. Taking this into account, greater variation among firms in the Barcelona area should be observed in the future.

Another explanation for the lack of variation in the firms holding concessions is that the scoring system used by the EMT may benefit incumbents, even when they do not make the best financial offers. This may be because bids are valued based on the firm's reputation and previous experience. Direct inspection of the past tenders reveals that entrants have made a lower (i.e. better) financial offer than the incumbent in two out of nine tender processes. However, as mentioned above, three aspects are assessed by the EMT in addition to the financial proposal and experience. Clearly, more research is needed to understand the entry patterns in this sector.

In conclusion, it seems that the EMT successfully uses competitive pressure to discipline private incumbents. The presence of several firms providing bus services in Barcelona's metropolitan area and the reduction of barriers to entry have made the market more contestable, and this situation is exploited by the EMT even if incumbent concessionaires are not replaced.

3.4. Concession design

The EMT defines the characteristics of the service offered by the concessionaires, establishes network routes, sets fares and quality levels, and organizes the tenders.

Concessionaires are given incentives to improve on efficiency and quality. The first contracts designed by the EMT only included a subsidy equal to the difference between the firm's estimated operating costs and the estimated revenues. More recently, however, several incentives have been included in the contracts to improve concessionaires' performance.

The subsidy offered to concessionaires with public service obligations, S , is calculated based on the estimated cost of the service, C , and a set of variables, G , which reflect their efficiency:¹²

$$S = C + G = (C_o + C_f) - I + G_t + G_e + G_o + G_s.$$

The cost of the service reflects the operating costs, C_o , plus the financial cost of the equipment not supplied by the EMT, C_f . The firm's operating costs cover the wages of drivers and other employees, petrol, energy and other expenses. These costs are updated depending on variations in wages, oil prices, and the retail price index.

G comprises a variety of instruments designed to improve the conduct of regulated firms. First, G_r reflects the number of paying passengers served by the firm who do not benefit from social tariffs. If the concessionaire carries out marketing campaigns and other activities that increase the number of passengers paying the regular price, it receives a percentage of the additional revenues generated.¹³ Second, G_e shows the extraordinary revenues attracted by the firm, for example through advertisements or the sale of old vehicles.¹⁴ The concessionaire obtains one third of the total revenues generated in this way.

Finally, G_o reflects the quality of the service measured by objective instruments and G_s shows users' impressions of service quality, measured by direct interviews. One of the main problems generated by privatization is that private concessionaires may lower the quality of the service in order to reduce costs (Hart *et al.* 1997). To prevent this, the EMT incorporates several quality indicators in the compensation mechanism offered to the firm.¹⁵ The index called "on-vehicle quality" (G_o) is the result of an internal assessment made by the EMT's inspectors, and it is therefore considered an objective measure of quality. It measures punctuality, frequency, interior cleanliness of vehicles, information to users, customer services, and driving quality. The index called "service quality" (G_s) reflects the quality perceived subjectively by users. It is built through interviews with users that pose questions about timetable coordination, transfers, customer services, punctuality, driving quality, comfort of vehicles, adequacy of stops, cleanliness of vehicles, and information received in case of timetable or route modifications.

Concessions not subject to public service obligations were initially not regulated using these incentive mechanisms. In recent years, however, some concessions have been modified in order to extend the routes and increase frequency. In these cases, operators are rewarded in accordance with the above incentive scheme.

Finally, in the case of profitable routes (the route from downtown Barcelona to the airport), the EMT receives a fixed percentage of the firm's total revenues. In this particular case, the firm is responsible for providing all employees and material equipment.

Interviews with EMT officials have shown that concessions are designed to enhance efficiency, reduce public subsidies, and improve the service offered to users. As stated by the Executive Manager, the EMT has modified the contracts in order to internalize cost risks, but also to introduce incentives and penalties associated with the achievement of commercial and quality objectives (Martínez 2002). Incentive mechanisms have led to changes in the relationship between the EMT and the concessionaires, and have created a useful tool for developing the transportation policy.

But do these incentives work? Table 2 compares concessions with and without incentive contracts in the period 1995–2006. If we focus on one of the concessions that has always been operated by the same firm over time, we can compare their main performance before and after the introduction of incentive schemes. The result is that on average these concessionaires obtained a larger increase in paying passengers and in extraordinary revenues after the introduction of incentives. While in the period 1995–2002 the number of paying passengers was reduced by a yearly mean of 1.6 percent, in the period 2002–2006 it increased by 7 percent. Similarly, in the period 1995–2002 extraordinary revenues increased by 30 percent, and in the period 2002–2006 it achieved an increase of 155 percent. It is important to clarify that an exhaustive analysis of the effectiveness of the EMT's incentive scheme would require an in-depth multivariate analysis, which we cannot undertake due to a lack of adequate information.

Table 2 Comparison between contracts with and without incentives

	Without incentives	With incentives
Same concession, same operator	1995–2002	2002–2006
Annual average increase of passengers	1.7%	7.0%
Annual average increase of paying passengers	–1.6%	7.0%
Annual average increase of extraordinary revenues	30%	155%
Same operator, different concession	1998–2006	1998–2006
	(Esplugues)	(St. Feliu)
Annual average increase of passengers	46%	110%
Annual average increase of payment passengers	59%	86%
Annual average increase of extraordinary revenues	33%	65%
Increase of subjective quality indicator	–3%	2%

Note: Recall that extraordinary revenues are not linked to passenger revenues. They come from advertisement and sales of old vehicles.

Source: Based on information provided by EMT.

Finally, an examination of the performance of different concessions operated by the same firm also provides interesting insights into the role played by the contract design. For instance, when comparing the concessions of Esplugues and Sant Feliu (both operated by the same company), we find that in Esplugues, where the firm has a contract without incentives, it obtained an increase in paying passengers (59 percent) and extraordinary revenues (33 percent), but the quality index of the service judged by users decreased by 3 percent. By contrast, in Sant Feliu the firm is regulated by an incentive contract and in the same period it achieved better results in terms of increasing the number of paying passengers (86 percent) and extraordinary revenue (65 percent), and it improved its subjective quality indicator (2 percent).¹⁶

4. Conclusion

The unusual mixed public–private structure of Barcelona’s transport system provides an interesting context in which to analyze the management challenges and opportunities of partial privatization. As regards metropolitan-transportation governance, the presence of a large number of sub-areas in the metropolitan area of Barcelona has made it possible to outsource the service in certain municipalities. However, transportation authorities have chosen to retain delivery of the service in downtown Barcelona. They probably lack the political will to privatize the service completely. Moreover, retaining a public system can be seen as a way to ensure failsafe delivery of the service. The main shortcoming of this model is that TMB retains a great deal of autonomy from the EMT, and this makes it difficult to regulate the public firm.

One of the key features of the regulatory model implemented by the EMT has been the establishment of short-term concessions and the removal of barriers to entry by maintaining public ownership of bus fleets and garages. These measures help increase competition for the market and prevent opportunistic behavior by incumbents. Other essential aspects are the incentive and penalization instruments used to increase efficiency. These measures have led to lower costs per kilometer driven among private concessionaires compared to TMB: an average of 3.3 euros versus 4.9 euros. Similarly, incentives in private concessions have been effective in attracting paying passengers and increasing extraordi-

nary revenues and service quality. It would be useful to analyze in more detail the factors behind these differences in efficiency, but unfortunately we do not have enough information to be able perform a statistical multivariate analysis on the regulatory reform.

An important aspect of the Barcelona mixed model is the growth in the share of routes managed by private firms. This change may positively affect the performance of TMB, because the threat of privatization of existing or new routes is more credible when private firms already have a presence in the area. A credible threat of privatization may well encourage performance improvements by public managers of TMB (Bel 2006; Bel *et al.* 2010). For example, there is evidence that the local government used this tool to tackle the strike by TMB workers in late 2007 and early 2008.

The EMT's efforts in eliminating the barriers to entry in the tendering process have made the market more competitive. In recent years, no substantial variation has been observed in the operation of concessions. However, the EMT uses competitive pressure to force private operators to fulfill certain efficiency and quality objectives. In fact, the regulator is using its bargaining power to negotiate aspects that are not included in the contracts but are important for the management of the service. In other words, it seems that the EMT is using this bargaining power to complement formal and relational contracting (Poppo & Zenger 2002; Brown *et al.* 2007). The advantages of using this strategy in the delivery of bus services have been stressed by van de Velde (2007). Further research on the use of relational contracting is likely to provide valuable new insights for the management of the service.

In conclusion, the case of governance reform in Barcelona's urban bus service illustrates how partial privatization and competitive pressure can be used to increase the efficiency and feasibility of public operators. In turn, reinforcing competitive pressure in the bidding process is an effective way of disciplining private operators and increasing the regulator's bargaining power. The reform introduced in Barcelona could be relevant for all metropolitan areas that are in a position to create a number of separated concessions large enough to benefit from economies of density.

Acknowledgments

This study has received financial support from the Spanish Ministry of Education (ECO 2009-06946ECO) and from the Autonomous Government of Catalonia (SGR2009-1066). Germà Bel acknowledges support from ICREA-Academia. Joan Calzada acknowledges the support of the Barcelona Graduate School of Barcelona. Comments and suggestions received when the paper was presented at the I International Workshop Barcelona–Lisbon on PPPs have been very helpful. We are particularly indebted to the Entitat Metropolitana del Transport, and particularly to Joan Maria Bigas, Maria Teresa Carrillo, Pelayo Martínez, and Eduard Unzeta for the valuable information provided. We are also grateful for helpful comments and suggestions from Xavier Fageda, the other members of the research group Governments and Markets at Universitat de Barcelona, the editors, and three anonymous referees.

Notes

- 1 Between 1985 and 1994, public and private bus companies coexisted in the metropolitan area of London. Unlike the Barcelona system, public operators participated in competitive biddings.

- 2 Fraquelli *et al.* (2004) found that economies of scope are associated with urban-intercity diversification, which suggests that merging neighboring firms could improve local networks. Hensher (2003) showed that larger areas can lead to a reduction in participation in competitive bidding, but economies of scale can be obtained for small firms.
- 3 Dalen and Gómez-Lobo (2003) analyzed the use of yardstick competition in the Norwegian bus market. They compared individually bargained contracts and contracts based on a yardstick model. They showed that the latter significantly reduce operating costs.
- 4 During the TMB workers' strike in late 2007 and early 2008, local authorities threatened workers with awarding new routes in downtown Barcelona to private companies. This was a credible threat due to the presence of several private firms in the city's metropolitan area.
- 5 This does not eradicate all problems. An incumbent operator might oversupply in terms of frequency so as not to leave gaps for rivals.
- 6 EMT also regulates the taxi service through the Metropolitan Taxi Institute.
- 7 No other mixed public-private systems exists in the area. Barcelona has fragmented delivery of solid waste in four districts, but in all of them the delivery is contracted to private firms (Bel & Warner 2009).
- 8 Barter (2008) proposed the following classification: (i) public monopoly; (ii) proactive planning with service contracts; (iii) franchises; (iv) passive franchises; (v) deregulation. Barcelona's model falls between the classic public monopoly and the model of service contracts with private firms. This hybrid option could be denoted as proactive planning with mixed-ownership delivery.
- 9 Data obtained from the EMT and TMB yearly reports.
- 10 We do not have the information to calculate the cost per vehicle-km or passenger-km, the most commonly used ratios in transport economics.
- 11 Boitani and Cambini (2006) and Yvrande-Billon (2006) reported similar results for Italy and France. Yvrande-Billon (2006) explained that in France between 1995 and 2002, 123 out of 165 tenders led to the renewal of the incumbent; these firms usually propose better bids than their competitors.
- 12 This implies that the net loss of the service for the EMT, L , is equal to the subsidy, S , minus the ordinary and extraordinary revenues obtained by the firm, I .
- 13 For the first 4 percent of additional passengers they obtain 30 percent of the revenues. This percentage decreases for larger deviations in the number of paying passengers. Also recall that if concessionaires don't reach the number of passengers specified in the contracts, they must compensate the EMT.
- 14 These sales can come from old vehicles owned by private contractors. New vehicles are purchased by the EMT in order to eliminate barriers to entry, and they are used by concessionaires.
- 15 These incentives may increase or reduce the operators' revenues by 4 percent.
- 16 This result is in line with the improvement of the quality indicators of the EMT routes in recent years. On-vehicle quality increased 5.6 percent in the period 2003–2007. The increase in the service quality indicator was modest, although it exceeded 3 percent.

References

- Alexandersson G, Hulten S, Fölster S (1998) The Effect of Competition in Swedish Local Bus Services. *Journal of Transport Economics and Policy* 32, 203–219.
- Amaral M, Saussier S, Yvrande-Billon A (2009) Auction Procedures and Competition in Public Services: The Case of Urban Public Transport in France and London. *Utilities Policy* 17, 166–175.
- Armstrong M, Sappington D (2006) Regulation, Competition and Liberalization. *Journal of Economic Literature* 44, 325–366.

- Bajari P, McMillan R, Tadelis S (2003) Auctions versus Negotiations in Procurement: An Empirical Analysis. *Journal of Law, Economics and Organization* 25, 372–399.
- Barter PA (2008) Public Planning with Business Delivery of Excellent Urban Public Transport. *Policy and Society* 27, 103–114.
- Baumol W (1982) Contestable Markets: An Uprising in the Theory of Industry Structure. *American Economic Review* 72(1), 1–15.
- Bel G (2006) *Economía y política de la privatización local*. Marcial Pons, Madrid.
- Bel G, Fageda X (2010) Partial Privatization in Local Services Delivery: An Empirical Analysis on the Choice of Mixed Firms. *Local Government Studies* 36(1), 129–149.
- Bel G, Warner M (2009) Managing Competition in City Services: The Case of Barcelona. *Journal of Urban Affairs* 31, 521–535.
- Bel G, Fageda X, Warner M (2010) Is Private Production of Public Services Cheaper than Public Production? A Meta-Regression Analysis of Solid Waste and Water Services. *Journal of Policy Analysis and Management* 29, 553–577.
- Boitani A, Cambini C (2006) To Bid or Not to Bid, This Is the Question: The Italian Experience in Competitive Tendering for Local Bus Services. *European Transport* 33, 41–53.
- Brown T, Potoski M, Van Slyke D (2007) Trust and Contract Completeness in the Public Sector. *Local Government Studies* 33, 607–623.
- Calzada J, Miralles A (2009) Subastas para los subsidios del servicio universal. In: Calzada J, Costas A, Jordana J (eds) *Más allá del mercado: las políticas de servicio universal en América Latina*. Fundación CIDOB, Barcelona, pp. 99–141.
- Dalen DM, Gómez-Lobo A (2003) Yardsticks on the Road: Regulatory Contracts and Cost Efficiency in the Norwegian Bus Industry. *Transportation* 30, 371–386.
- De Rus G, Nombela G (1997) Privatization of Urban Bus Services in Spain. *Journal of Transport Economics and Policy* 31, 115–129.
- Engel E, Fischer R, Galetovic A (2001) Least-Present-Value-of-Revenue Auctions and Highway Franchising. *Journal of Political Economy* 109, 993–1020.
- Estache A, Gómez-Lobo A (2005) Limits to Competition in Urban Bus Services in Developing Countries. *Transport Reviews* 25, 139–158.
- European Commission (2007) *Regulation of the European Parliament and of the Council on Public Passenger Transport Services by Rail and by Road*. COM (2007) 1370, Official Journal of the European Communities, Brussels.
- Farsi M, Fetz A, Filippini M (2007) Economies of Scale and Scope in Local Public Transportation. *Journal of Transport Economics and Policy* 41, 345–361.
- Filippini M, Prioni P (2003) The Influence of Ownership on the Cost of Bus Service Provision in Switzerland – An Empirical Illustration. *Applied Economics* 35, 683–690.
- Fraquelli G, Piacenza M, Abrate G (2004) Regulating Public Transport Networks: How Do Urban-Intercity Diversification and Speed-up Measures Affect Firms' Cost Performance? *Annals of Public and Cooperative Economics* 75, 193–225.
- Gautier A, Yvrande-Billon A (2011) Contract Renewal as an Incentive Device: An Application to the French Urban Public Transport Sector. Mimeo.
- Hart OD, Shleifer A, Vishny RW (1997) The Proper Scope of Government: Theory and an Application to Prisons. *Quarterly Journal of Economics* 112, 1127–1161.
- Hatry HP (1999) *Privatization: The Provision of Public Services by the Private Sector*. McFarland & Company Inc., Jefferson, NC.
- Hefetz A, Warner M (2007) Beyond the Market vs. Planning Dichotomy: Understanding Privatization and Its Reverse in US Cities. *Local Government Studies* 33, 555–572.
- Hensher D (2003) Contract Areas and Service Quality Issues in Public Transit Provision: Some Thoughts on the European and Australian Context. *Journal of Public Transportation* 6, 15–42.

- Hensher D, Wallis IP (2005) Competitive Tendering as a Contracting Mechanism for Subsidising Transport: The Bus Experience. *Journal of Transport Economics and Policy* 39, 295–321.
- Isotope (1998) *Improved Structure and Organization for Urban Transport Operations of Passengers in Europe*. European Commission (4th RTD Framework Programme): Urban Transport, European Communities, Luxembourg.
- Kennedy D (1996) London Bus Tendering: A Welfare Balance. *Transport Policy* 2, 243–249.
- Lee RW, Rivasplata CR (2001) Metropolitan Transportation Planning in the 1990s: Comparisons and Contracts in New Zealand, Chile and California. *Transport Policy* 8, 47–61.
- Littlechild S (2002) Competitive Bidding for a Long-Term Electricity Distribution Contract. *Review of Network Economics* 1, 1–38.
- Martínez P (2002) Un procés dinàmic, ple de reptes i oportunitats de futur. *Present i Futur del Transport Metropolità* 2, 48–58.
- Matas A, Raymond JL (1998) Technical Characteristics and Efficiency of Urban Bus Companies: The Case of Spain. *Transportation* 25, 243–263.
- Mathisen TA, Solvoll G (2008) Competitive Tendering and Structural Changes: An Example from the Bus Industry. *Transport Policy* 15, 1–11.
- Miranda R, Lerner A (1995) Bureaucracy, Organizational Redundancy, and the Privatization of Public Services. *Public Administration Review* 55, 193–200.
- Nash CA (2005) Privatization in Transport. In: Button KJ, Hensher DA (eds) *Handbook of Transport Strategy, Policy and Institutions*, Vol. 6. Elsevier, Amsterdam, pp. 97–113.
- Poppo L, Zenger T (2002) Do Formal Contracts and Relational Governance Function as Substitutes or Complements? *Strategic Management Journal* 23, 707–725.
- Preston J (2005) Tendering of Services. In: Button KJ, Hensher DA (eds) *Handbook of Transport Strategy, Policy and Institutions*, Vol. 6. Elsevier, Amsterdam, pp. 65–80.
- Roy W, Yvrande-Billon A (2007) Ownership, Contractual Practices and Technical Efficiency: The Case of Urban Public Transport in France. *Journal of Transport Economics and Policy* 41, 257–282.
- Savage I (1993) Deregulation and Privatization of Britain's Local Bus Industry. *Journal of Regulatory Economics* 5, 143–158.
- van de Velde D (2007) A New Regulation for the European Public Transport. Paper presented at the 10th Conference on Competition and Ownership in Land Passenger Transport (Thredbo 10), 12–17 August 2007, Hamilton Island, Australia.
- Warner M, Bel G (2008) Competition or Monopoly? Comparing Privatization of Local Public Services in the US and Spain. *Public Administration* 86, 723–735.
- Warner M, Hefetz A (2008) Managing Markets for Public Service: The Role of Mixed Public–Private Delivery of City Services. *Public Administration Review* 68, 155–166.
- White PR (1997) What Conclusions Can Be Drawn about Bus Deregulation in Britain? *Transport Reviews* 17, 1–16.
- Williamson O (1976) Franchise Bidding for Natural Monopolies – in General and with Respect to CATV. *The Bell Journal of Economics* 7, 73–104.
- Yvrande-Billon A (2006) The Attribution Process of Delegation Contracts in the French Urban Public Transport Sector: Why Competitive Tendering Is a Myth. *Annals of Public and Cooperative Economics* 77, 453–478.