



Competition effects of intercity bus tendering reforms in Spain[☆]

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ABSTRACT

Spain operates a 'competition for the market' system to award regulated monopoly rights for the provision of intercity bus services. We assess the impact of changes in the tendering system since 2007 on outcomes such as participation, bidded prices and frequencies, as well as prices and frequencies offered to consumers. Our results show that the design of the tender terms can significantly affect the conditions under which intercity bus services are operated. In particular, a ten percentage point increase in the weight given to price in the score function results in a fare decrease of 1.03 € cent per kilometre.

1. Introduction

An increasing number of countries are opting to liberalise their long-distance (intercity) coach (bus) markets. Following the example of the United Kingdom in the 1980s (White, 1995; White & Robbins, 2012), Norway and Sweden opened their markets in the late 1990s, followed in this century by Germany, France, Italy, Portugal, and Finland. More recently, Croatia, Bulgaria, and Romania have also adopted a model of 'competition in the market' in this sector.

The alternative approach of 'competition for the market', whereby operators are granted exclusive rights to provide the service through a tendering process, is not completely dismissed. It remains the norm in countries such as Spain and is frequently used to award the operation of subsidised local or regional services under Public Service Obligations (PSO) schemes (Ponti, 2011). Some countries, such as Belgium or Greece, continue to reserve intercity bus services for publicly operated or controlled monopolies; while others, such as Israel, have shifted towards competitive tendering (Ida & Talit, 2018).

The variety of regulatory settings applied to bus and coach services across countries, ranging from monopolistic public provision to outright

liberalisation, provides an interesting framework to compare these regimes (see Van de Velde, 2009; Van de Velde, 2014). Overall, the results of liberalisation are positive, with significant price reductions and improvements in service quality. However, increased market concentration and some non-competitive behaviour related to infrastructure require ongoing market monitoring.

The tendering process for bus services is more complex than a standard price-based auction, as regulators are typically concerned with additional service attributes, such as service frequency, safety, and vehicle emissions. Consequently, the terms of tender specify a scoring function in which each bid variable is assigned a weight and aggregated into a final score. In the absence of additional regulations or constraints, such as rules to exclude abnormally low bids, the contract is awarded to the bidder with the highest score for the pre-specified period. Therefore, the details of the tendering process and the weights assigned to the different elements of the score function are extremely important, as small differences in such design can have substantial effects on firms' decisions to participate in the tendering process and on their submitted bids.

Contrary to what has become the norm in most European countries,

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the Spanish long-distance (intercity) bus (coach) market continues to be protected from open entry, as services are operated under exclusivity contracts awarded by the government. These contracts are intended to be regularly retendered, but frequent regulatory changes and legal disputes since 2007 have resulted in more than 50% of routes operating beyond their original contract durations by 2020. In this paper, we exploit the variation generated by these regulatory changes to quantify their effects on variables related to the bidding process and its outcomes.

The paper's main objective is to provide a quantitative analysis of the outcomes of Spain's intercity bus tendering system from a competition perspective. More specifically, we assess the impacts on the number of bidders, the probability that the incumbent wins the contract, and on the two main economic variables: price and frequency level. Firstly, we assess how the terms of tender affect the winning bid. We then analyse in greater detail the specific changes to the tendering design, including not only changes to the scoring weights but also important modifications such as the progressive removal of participation requirements and incumbent advantages. Using information on all the submitted bids for each contract, we further investigate which specific characteristics of the terms of tender most strongly influence price and frequency bids. In doing so, we exploit a novel database containing bids from all firms and provide a view of Spain's intercity bus market that, to the best of our knowledge, does not exist in the literature.

The paper is structured as follows: [Section 2](#) reviews the relevant literature, [Section 3](#) provides an overview of Spain's intercity bus market, and [Section 4](#) details the changes in the tendering design that have taken place since 2007. In [Section 5](#), we estimate a participation equation and conduct an empirical analysis of the impact of changes in the bidding process on the number of bids received per contract and the prices and bus frequencies offered by the winning firm. In [Section 6](#), we investigate the effects of the main characteristics of the tender terms on the price and frequency bids of all participating firms. [Section 7](#) summarizes the main results and concludes.

2. Literature review

Two clearly differentiated strands of the literature can be distinguished in the analysis of bus markets. The first includes studies that examine processes of full liberalisation that allow for 'competition in the market', while the second focuses on the analysis of 'competition for the market' through tendering processes.

The literature on market opening indicates that the results of liberalisation across countries exhibit a broadly similar pattern: entry of new operators, increasing frequencies, and reducing prices. However, the magnitude of these impacts depends on specific characteristics of each market, including its size prior to being opened, the existence of barriers to entry, and the incumbent's reaction to new rivals. Initial conditions were not the same in all countries. In some cases, such as in the United Kingdom or Portugal, the market was originally served by a regulated monopolist that was subsequently exposed to new competitors ([Reynolds & White, 2022](#)). In Germany and France the long-distance market had been historically reserved for the rail operator, so liberalisation implied the creation of a new market that was previously inexistent ([Blayac & Bougette, 2017](#); [Crozet & Guihéry, 2018](#); [Dürr et al., 2016](#)). In Italy, market opening consisted of allowing regional companies to operate at the national level ([Beria et al., 2018](#); [Grimaldi et al., 2017](#)), while in Sweden, the rail operator managed a complementary bus network, which was divested prior to the market liberalisation in the late 1990s ([Alexandersson et al., 2010](#)).

Following the entry of new rivals, a process of concentration has taken place through mergers and acquisitions, alongside the development of business models that group independent operators under a common umbrella. In general, this concentration has been accompanied by price increases and/or service reductions, although without returning to the situation that existed prior to liberalisation ([Dürr & Hüschelrath, 2017](#)). Beyond market concentration, other factors also require active

monitoring. The ownership of what can be considered essential facilities, such as terminals or garages, may easily lead to anticompetitive practices.

Market liberalisation does not affect all routes in the same way. Those with lower demand levels, which were previously often supported by cross-subsidies from other parts of the network, are not likely to attract the attention of new entrants, who tend to focus on higher demand routes. [Buri et al. \(2022\)](#) find that entry reduced prices only on routes connecting large and mid-sized cities in Finland. Routes whose low demand implies that they are served by only one operator; or by none at all, will require external support with associated welfare implications ([Duberga, 2021](#)).

Another issue is how competition develops relative to other modes, including subsidised ones. Norway's operators have struggled to compete with low-cost air carriers while also facing the expansion of subsidised metropolitan services into the mid-distance segment ([Aarhaug & Fearnley, 2016](#); [Aarhaug, Fearnley, et al., 2018](#)).

The literature on tendering process for bus routes has, in turn, focused on two main aspects. Some papers examine the consequences of adopting a mechanism of competition for the market, while another strand analyses how regulation—particularly the characteristics of the tendering process—affects final outcomes.

Following London's 1987 example, the use of tendering for the provision of bus transport in municipalities and metropolitan areas gradually spread across different locations. Scandinavian countries provide a good illustration of this trend. The main advantage of tendering compared with open competition is that it allows the transport authority to retain the powers necessary to ensure service coordination and set quality standards, which are essential in metropolitan contexts. In interurban settings, tendering has been advocated as a means of ensuring territorial cohesion. Tendering is predominant in Europe's smaller countries, where most bus services operate on a regional scale and rail typically plays a central role in interurban transport. Examples include Austria, Denmark, Estonia, Latvia, Lithuania, and the Netherlands ([Phillips, 2017](#)). More recently, Israel has shifted from monopoly to competitive tendering ([Ida & Talit, 2018](#)). Spain remains the leading example of a large country operating a tendering system for intercity bus routes.

The literature indicates that moving from a monopolistic provision to a tendering system yields significant cost efficiencies, enabling either fare reductions or lower subsidy requirements, while in many cases it also leads to improvements in service quality ([Hensher & Stanley, 2010](#); [Hensher & Wallis, 2005](#)). [Nash and Smith \(2020\)](#) argue that in the UK both competition 'in' the market (long distance buses and local buses outside London) and 'for' the market (London buses and subsidised services elsewhere) have substantially reduced costs, but competitive tendering by local authorities has been particularly successful in increasing patronage. Still within the urban context, there is evidence of diminishing intensity of competition and efficiency gains in the long run ([Aarhaug, Farstad, et al., 2018](#)). One of the mechanisms most frequently examined to continue improving efficiency is the use of direct negotiation as an alternative, but sometimes also a complement, to competitive tendering ([Mathisen & Solvoll, 2008](#); [Sheng & Meng, 2020](#)). From another perspective, some authors emphasize the need to strengthen relationships among market actors by fostering cooperation ([Ida et al., 2025](#)).

In the long-distance bus market, there is a broad consensus that the free-market alternative prevails over tendering. Despite the issues noted above, available evidence indicates that the market remains sufficiently competitive ([Van de Velde, 2009](#); [Van de Velde, 2014](#)). To the best of our knowledge, the most comprehensive comparative quantitative evidence on this issue is provided by [Fageda and Sansano \(2018\)](#). These authors compare prices and service frequencies on routes from six European countries, five of which have opened their markets to new entrants. Spain remains the only heavily regulated case and is found to have higher average prices.

Our contribution relates to the literature examining the outcomes of specific bus tendering designs. Beck and Walter (2013) studied 157 tendered bus contracts in Germany and showed that efficiency could be improved by increasing competition among participants in the process. Amaral et al. (2013), examining the tendering of London routes, find that unbundling an urban transport network leads to a higher number of bidders and lower service costs. In the same setting, Iossa and Waterson (2019) study the dynamics of competition for route contracts and the factors favouring the incumbents. In the context of Swedish regional services, Vigren (2018) concludes that the number of bidders participating in the tendering process could be increased by avoiding restrictive requirements regarding both operators' and buses' characteristics. Aarhaug, Farstad, et al. (2018) observe that the cost implied by winning bids in local bus tendered contracts in Norway has increased over time. They also find that larger contracts would attract more participants. More recently, Ridderstedt and Pyddoke (2024) tested whether a scoring rule is more effective in improving the punctuality of Swedish public buses compared with a traditional auction based on the lowest bid, but did not find any significant differences.

The analysis of procurement auctions in multi-dimensional settings was initiated by Che (1993), who extended standard auction theory to cases in which bidders compete on both price and quality. He shows that the optimal scoring rule should under-reward quality relative to the auctioneer's true preference to mitigate bidders' informational rents. Asker and Cantillon (2008, 2010) extend the analysis of scoring auctions to a multidimensional private information setting and show that, under certain conditions, scoring auctions dominate alternative methods such as price-only auctions, beauty contests, and negotiations. This occurs because the buyer's ability to leverage competition among suppliers leads to prices that more than compensate for the auction's lower flexibility in the design of the final product. Lewis and Bajari (2011) characterize efficient procurement when one dimension of the bids is the speed at which the project is to be delivered. Using their model to assess contracts for highway maintenance projects in California, they find that, compared to other types of contracts, scoring auctions lead to much faster project delivery and generate welfare gains of 22% of the contract value. In the context of public works, Decarolis (2014) provides evidence from Italy on the renegotiation costs associated with first price auctions, as opposed to an optimal scoring rule. Koning and van de Meerendonk (2014) measure the effects of different scoring weights in bids to manage a program of workforce reintegration in the Netherlands and find that higher weights on quality scores lead to higher prices.

3. Spain's intercity bus market

With 28.5 million passenger trips per year, Spain's intercity bus market is the largest in the European Union. In 2023, buses accounted for 61% of all non-metropolitan public transport trips in Spain, while rail represented 24%, air services 12%, and maritime transport the remaining 3%.² The market includes long- and mid-distance regular services operated by private companies under a competition-for-the-market regime that awards exclusive contracts and thus prohibits open entry. Regulatory responsibility for awarding and supervising these exclusive contracts lies with the Ministry of Transport (for contracts with routes spanning more than one region) or with the corresponding regional governments (for routes within their respective regions).

Table 1 summarizes the main characteristics of these contracts. On average, each contract (typically consisting of a set of connected routes) is 890 km long, over which 189 million vehicle-km annually transport 5266 million passenger-km. On average, a passenger trip is 184 km long,

Table 1
Characteristics of the interregional bus contracts. 2023.

Number of contracts	77
Length of the network (kms)	68,539
Average length (kms)	890
Passengers	28,549,098
Passenger-kilometres (millions)	5266
Average trip length (kms)	184
Average vehicle load factor (passengers/vehicle)	28
Vehicle-kilometres (millions)	189.16
Revenue per passenger*km (€)	0.068
Revenue per vehicle*km (€)	1.9

Source: Ministerio de Transportes y Movilidad Sostenible (2024)

with a fare of 0.068 € per km.

Contracts are net-cost, implying that the operators bear both revenue and operational risk. At the national level, operators do not receive subsidies to cover any part of their costs. Loss-making routes are much more common at the regional level, where most contracts are subsidised.³ These subsidies do not create significant competition problems with trains, as subsidised routes usually cover rural services in areas not well served by the rail network.

The absence of subsidies for national contracts implies that an implicit system of cross-subsidies sustains the unprofitable routes within any contract through the margins generated by profitable ones. This is because, as explained later, contracts are awarded with a fare level (defined in terms of price per km) that applies to all routes within the contract. Therefore, differences in operational costs and demand between routes imply that users of higher-demand and/or lower-cost routes pay prices above cost, while the opposite occurs on low-demand and/or high-cost routes. The latter are more typical of rural and low-density areas, giving this mechanism of cross-subsidization an implicit territorial dimension. The existence of cross-subsidies can also help explain the rise of carsharing as a competitor to buses on the country's main corridors, which are precisely the routes that generate these margins.

Contracts are highly heterogeneous. Although the data in Table 1 imply an average size of 370,767 passengers per contract, 19 of them carry fewer than 50,000 passengers while the three largest carry more than 1 million passengers each.

The Ministry of Transport and the regional governments are responsible for defining the network of routes to be covered and grouping them into contracts that are put out to tender. As there is no third-party access, operators interested in serving a route not included in the network can propose it to the Ministry or the regional government, which then decides whether to put it out to tender or include it in an existing contract.

Since the initial design of this market in 1924, Spanish bus operators have been characterized by a high degree of atomization in terms of firm sizes. Contracts were historically handed to small local private companies, each typically operating a single route. Over time, the market structure evolved towards larger operators at a regional scale. Since the 1990s, the market has attracted the attention of international investors and undergone several waves of mergers (CNMC, 2022). In 1999, ALSA became the largest operator by taking over the bus services previously run by the national railway company (RENFE). ALSA's position was further strengthened in 2007 through a merger with Continental Auto, then the second-largest firm. In 2005, ALSA itself was acquired by National Express (currently Mobico). As a result of a corporate

² Estadística de Transporte de Viajeros, 2023, Instituto Nacional de Estadística (INE). [https://www.ine.es/jaxiT3/Tabla.htm?t=20239, last accessed Jan. 27, 2026]

³ This traditional no-subsidization characteristic of the system at the national level has been challenged by the bailout of certain contracts following the COVID-19 pandemic. A policy of heavily subsidizing public transport tickets was implemented following the energy crisis in early 2022. Recently, some long-distance national contracts have been open to tender with explicit government transfers, but they are not included in the analyses in this paper.

restructuring, ALSA controls its parent's group operations since 2026. Measured in terms of vehicle-km run and passenger-km transported (though not in terms of contracts or boarded passengers), Avanza is the second-largest operator. This firm was the result of a merger between three regional companies in 2002.¹ It was subsequently acquired by the Mexican group Autobuses Del Oriente (ADO) in 2013. The third major player (and the second in terms of contracts and boarded passengers) is SAMAR, a family-owned group. It is common for intercity bus operators to also run urban services, both in Spain and abroad. Some operators also provide regular services in liberalised markets such as France or Portugal, as well as international routes.

Table 2 reports different measures of market concentration. As can be observed, the market is highly concentrated, with the three largest groups operating almost half of all contracts, transporting three-quarters of total passengers, and providing nearly eight of every ten bus-kilometre. Table A.1 in the appendix provides detailed information on contracts and activity at the firm level.

4. Evolution of the tendering system

During the period of analysis, the tendering regime in Spain was regulated under the 1987 Land Transport Regulation Act (LOTT),⁴ which characterized intercity bus services as public services to be provided through competitively awarded contracts. Besides granting exclusive rights to the bus operator, the contract specifies the bus routes, including the number and locations of bus stops, maximum fares, minimum service frequencies and timetables, as well as other relevant service attributes. Contracts are awarded through an auction mechanism, in which interested firms submit sealed bids for a set of variables (prices, frequencies, bus fleet age, etc.) specified in the terms of the tender. Once all bids have been submitted, abnormally low bids are identified based on a relative minimum price threshold and excluded. The remaining bids are assessed according to the weights and criteria defined in the score function, which is also specified in the terms of tender. The details of the winning bid become part of the contract.

The Ministry of Transport is responsible for defining the score function as part of the terms of tender under which a contract is awarded. Such terms of tender are therefore common to a set of contracts awarded over a given period, until the Ministry decides to modify the scoring weights, the criteria for participating in the tender, or the definition of the bidding variables.

When the LOTT was passed in 1987, existing bus routes operating under previous concessions were automatically extended for 20 years –

and later to 25 years in most cases- while a set of newly designed contracts was put out to tender. These concessions attracted a relatively large number of bids, with 29 different firms bidding for the Madrid-Algeciras contract, 23 for the coast-to-coast service between Irún and Algeciras, and 21 for the relatively rural Badajoz-Murcia one. Prices for these newly tendered services were lower than those of the extended contracts (OECD, 2000). Although both extended and newly awarded contracts were initially due to expire shortly after 2007, administrative delays and contract extensions justified on various grounds postponed the expiration date of some contracts until 2013 or even later.

In 2007, shortly before the first contracts were due to expire and be put out to tender, the Ministry of Transport reached an agreement with incumbent operators, trade unions, bus manufacturers, and consumer associations on the design of the terms of tender under which those contracts would be awarded. The first row of Table 3 shows that, under these tender terms, only 15% of the score function depended on price and frequency bids. Moreover, price competition was severely limited by the imposition of upper and lower bounds on fare bids. These limits were defined for five categories of contracts based on the number of passenger-kilometres. In each category, the maximum and minimum fares were based on the fares previously charged by incumbents. Similar limits were also imposed on service frequencies.⁵ The terms of tender also included an explicit 5% preference for the incumbent in cases of close valuations. The combination of these limits and the low weight assigned to price and frequency bids effectively made it technically impossible for a new entrant to outbid the incumbent based on better price and frequency offers.

Given their overtly anti-competitive character, the design of these terms of tender was heavily criticised by the Spanish competition authority, which argued that they favoured the continuity of incumbent operators and imposed unnecessary restrictions on competition (CNC, 2008). Despite these criticisms; nine contracts were awarded using those terms before the Ministry of Transport modified the tendering design and incorporated some of the competition authority's recommendations. The revised terms were used to award 10 contracts from 2009 onwards; before a new report by the competition authority (CNC, 2010) argued that the changes made were not substantial and anti-competitive concerns remained. Although the combined weight assigned to prices and frequencies increased to 23%, the continued preference for incumbents and the quantitative limits on prices and frequencies were still regarded as anti-competitive. In addition to these criticisms from the competition authority, the terms of tender were also challenged in court. Several bus

Table 2
Concentration measures in the national intercity bus market. 2023.

Index	Contracts	Passengers	Passengers-km	Bus-km
HHI	1274	3086	4532	3998
CR3	51.32%	79.51%	81.00%	78.62%
CR6	65.79%	91.51%	91.34%	89.63%

Note: The HHI (Hirschman Herfindahl Index) is the sum of the squared market shares of all companies and therefore ranges from a maximum value of 10,000 (monopoly) to values approaching zero in the limit (minimum concentration). CR3 and CR6 refer to the concentration ratios (cumulative market shares) of the 3 and 6 largest companies in the market, respectively.

Source: Own calculations based on Ministerio de Transportes y Movilidad Sostenible (2024)

Table 3
Score function weights to bid variables in different terms of tender (%).

Terms of tender	Fare	Frequency	Technical characteristics	Attention to the public	Other	Total
2007	10	5	38	13	34	100
2009	15	8	35	13	29	100
2011	25	15	31	6.5	22.5	100
2014	35	20	17	10.5	17.5	100
2016	45	10	18	11.5	15.5	100
2018	35	12	17	9	27	100
2019	40	20	9	8	23	100

Source: own elaboration from the terms of tender. See text and Asensio et al. (2016) for details.

⁴ Ley 16/1987 de Ordenación de los Transportes Terrestres (LOTT) (<https://www.boe.es/eli/es/l/1987/07/30/16/con>). The recently approved Ley 9/2025 de Movilidad Sostenible (LMS) does not deviate from LOTT in the case of the tendering model described in the text (<https://www.boe.es/eli/es/l/2025/12/03/9/con>).

⁵ Strictly speaking, bids are made on the total bus-kms offered every year. However, given that the length of the itineraries is fixed, this implies offering an average frequency level. We use the term 'frequency' throughout the paper to refer to this variable, under the assumption that higher or better frequencies imply more bus services per unit of time (and not a wider gap between bus services).

operators filed administrative appeals and succeeded, forcing the Ministry of Transport to issue a new version of the tender conditions in 2011.⁶

Although the weight assigned to prices and frequencies increased to 40%, the 2011 terms of tender were also contentious, as they required the contract winner to subrogate the incumbent's drivers under their existing working conditions⁷ and maintained the preference for the incumbent in the event of a tie. Additionally, although the price variable received a higher weight, effective price competition remained limited, since bidding at the existing contract price was sufficient to obtain 22 of the 25 available points. Only five routes were tendered under these terms before they were again challenged in court.

In 2014, a new version of the terms of tender was published and used to award a new round of contracts, by which time a substantial backlog had accumulated. The 2014 terms assigned a 55% weight to price and frequency bids in the score function. For each of these variables, points were awarded proportionally, with zero points given to the highest fare (lowest frequency) and the maximum score was awarded to the lowest fare (highest frequency). However, the terms of tender maintained an upper limit on fare and a lower limit on frequency (referred to as the 'reference' price and frequency), whose values remained at the discretion of the Ministry of Transport, which has never explained or justified how they are computed. The upper limit on fares was increased in real terms in tenders after 2015,⁸ whereas the lower limit on frequencies was progressively reduced. As can be observed in Table A.2 in the appendix,⁹ the reference fare increased by 0.026 €/km in 2014 relative to 2007, while in subsequent tenders the increase was about 0.01 €/km. In the case of frequencies, Table A.3 shows how the minimum number of bus-kilometres that can be bid relative to existing service levels has decreased since 2007, reaching its lowest value in the 2014 terms of tender.

The 2014 terms of tender also extended labour force subrogation requirements to all route personnel involved in related activities, such as fare collection, maintenance and administrative services. Given the incumbent's ability to define these activities in a flexible manner, this requirement may provide it with a significant advantage, as it is more able than potential rivals to integrate its existing workforce. Other features of the terms of tender that may be detrimental to competition include the obligation of the contract winner to pay an annual fee equivalent to 1% of revenues, the requirement of at least three-year experience in similar services with an equal or larger bus fleet, and the allocation of 35% of total score to variables whose quantification depends on value judgments not defined through an explicit formula, such as comfort levels, fleet quality and customer services.

In 2016, the Ministry of Transport once again revised the terms of tender. Although the total combined weight assigned to prices and frequencies remained unchanged at 55%, the weight of prices increased to 45% at the expense of frequencies. The method used to compute price and frequency bids was also modified, shifting from the previous proportional system to a two-part system, although it rendered similar results. Given the high weight assigned to the price variable, arguably the most important dimension, this version of the terms of tender can be

considered the most pro-competitive.

However, the terms of tender approved in 2018 represented a step backwards in competition due to three main changes. Firstly, the combined weight assigned to price and frequency bids was reduced to 47%. Secondly, the formula used to assign points was again modified to limit the points awarded to the lowest-price and highest-frequency bids. Thirdly, a 'podium' system was introduced for certain variables that required qualitative assessment. Under this system, only the ranking of bids mattered: the best bid received the maximum number of points, the second-ranked bid received fewer points, and all bids ranked third or lower received the same score.

The 2018 terms of tender were again challenged in court, prompting the Ministry to revise them in a 2019 version that more clearly favoured competition on price and frequency. The combined weight assigned to these two variables increased to 60%, and the criteria for assigning points were revised to promote competition, thereby suppressing the 'podium' system. The contracts auctioned under the 2019 terms of tender were scheduled to be awarded in 2020. However, the COVID-19 pandemic halted the process, as the Ministry of Transport considered that market conditions differed significantly from those specified in the terms of tender. Although bids had already been submitted for one contract tendered under this design, the Ministry decided to suspend its award. In 2020, the Ministry announced its intention to reform the system by redesigning the routes included in each contract, making them larger, while transferring responsibility for less profitable routes to the regional governments.

Over a 12-year period, seven different terms of tender were used to award intercity bus contracts in Spain, with substantial differences among them. Starting from a 2007 design widely regarded as not promoting competition, subsequent reforms in 2009, 2011, 2014, and, mostly, 2016 resulted in much more competitive terms of tender. There was a reversal in 2018, before another pro-competitive reform was adopted in 2019.¹⁰ In the next section, we empirically assess the impact of such designs on the outcomes of the tendering processes.

5. Empirical analysis of bidding outcomes

The discussion in the previous section shows that the design of the tendering process has changed across many dimensions, making it difficult to identify the specific effect of each modification. Therefore, in this section, we examine which designs of the tendering terms have encouraged competition and, consequently, led to lower prices and higher frequencies. We begin by analysing the determinants of firm participation in the auctions, and then test whether more competitive terms of tender have effectively encouraged competition for the market. Specifically, we examine their impact on the number of bids per tender, the probability that the incumbent wins the auction, and the prices and frequencies offered by the winning firm.

In order to carry out our empirical analyses, we use data from 59 contracts put out to tender by the Ministry of Transport between 2007 and 2019. For each contract, we identify the year corresponding to the applicable terms of tender: 2007, 2009, 2011, 2014, 2016, 2018, or 2019.

Table 4 shows the distribution of contracts and the average number of bids received according to the type of terms of tender used in their auction. For each contract, we observe the identities of the bidding firms and the details of their bids, along with their resulting scores. We identify the bid with the highest score as the contract winner, even in cases where the contract was not ultimately awarded because the tender

⁶ The series of changes in the terms of tender reported in this section can be considered as a particular case of the shocks influencing the regulatory cycle of bus system operations analysed by Dementiev and Han (2020).

⁷ Previous terms of tender awarded 20 out of 100 points to firms who accepted such subrogation, thus making it de facto compulsory for any winning bid.

⁸ This change allows us to subdivide the contracts under the 2014 terms of tender into two groups: 2014a correspond to those contracts tendered during 2014 while the 2014b are those tendered in 2015. Besides the changes in the reference price and frequency of the latter, the contracts are equal in all other conditions and weights in the score function.

⁹ Equations presented in Tables A.2 and A.3 in the Appendix have been estimated following the procedure described in Section 4.

¹⁰ Table A.4 in the Appendix compares the main characteristics of each type of tender specification in terms of competition.

Table 4
Number of contracts and average submitted bids under each term of tender type.

Terms of tender	Contracts	%	Bids per contract
2007	9	15.2	2.4
2009	10	17	4.9
2011	6	10.2	9.8
2014	24	40.7	5.4
2016	6	10.1	8.7
2018	2	3.4	6.5
2019	2	3.4	5.5
Total	59	100	5.7

terms were challenged in court and/or the Ministry suspended the tendering process before awarding the contract.¹¹

As can be observed, the number of contracts per tender type varies substantially. This largely reflects the discussions with the competition authority and the court challenges brought by some firms, which led to frequent modifications of the terms of tender, as explained in the previous section. The terms of tender used to award the largest number of contracts are those of 2014, when a substantial backlog of contracts awaiting tendering had accumulated.

5.1. Participation

Before analysing the outcomes of the tendering processes, we examine firms' participation in the auctions. To do so, we construct a database of all firms¹² that participated in any auction during the period 2007–2019. The dataset includes information on firms' characteristics (number of employees and age), geographical location (headquarters at the provincial level), and whether the firm belongs to a corporate group.

Therefore, each observation in the database corresponds to a firm-contract pair. We estimate the probability that a firm submits a bid in any of the 59 tenders using a logit model, where the dependent variable equals 1 if the firm submits a bid for a given contract and 0 otherwise. The explanatory variables are the proximity to the location of the contract (defined by a dummy variable that takes the value 1 if any of the contract's routes cover the province where the firm's headquarters are located¹³), firm size (measured by the number of employees in the year before the tender), the contract's volume (measured by passengers-kms transported in the year before the tender) and a set of dummy variables capturing the terms of tender under which the contract is auctioned (with the 2007 design acting as the omitted reference category). The estimated coefficients, reported in Table 5, show that all these variables have a positive impact on the probability of participation, as does being the incumbent operator under the contract. Firms belonging to a group are more likely to participate than independent firms, while the probability of participation decreases with the firms' age. After controlling for both firm and contract characteristics, the 2014 tender design provides the strongest incentives for firms to participate.

Table 5 also reports the marginal effects of each explanatory

¹¹ This implies that data for some contracts may be incomplete. For instance, with the 2018 terms of tender five contracts were tendered but only in one of them was the procedure completed. In the other four cases the tender was suspended at different stages before the opening of the bids. Such eventualities explain why the number of observations differs among the estimated equations reported in this section.

¹² A total of 127 firms have taken part in at least one auction during this period. However, some of them have disappeared during our sample period, either going bankrupt or merging with other firms. Table A.5 details the number of potential bidders in each year in which a tender takes place.

¹³ In the case of groups with various subsidiaries located across the country, we consider always a proximity value of 1. Vigren (2020) also highlights the importance of proximity to explain participation in Swedish tenders, as a nearby location implies a 90% probability of submitting a bid. Large operators are found to be less influenced by proximity.

variable, computed as average effects over the sample. For continuous variables expressed in logarithms, the marginal effects represent the change in the predicted probability associated with a 1% increase in the explanatory variable. Accordingly, a 1% increase in firm size (measured by employment) raises the probability of participation by 1.4%. In turn, a 1% increase in contract size (passenger-kilometres) increases the probability by 2.1%. By contrast, a 1% increase in firm age reduces the probability of participation by 1.4%. For binary variables, marginal effects correspond to the discrete change in predicted probability when the variable shifts from 0 to 1. Being the incumbent firm increases the probability of participation by 20 percentage points, while proximity and group membership each increase it by 6.6 and 4.7 percentage points, respectively.

5.2. Tendering outcomes

We now turn to the analysis of the impact of tender design terms on the outcomes of the tendering process: the number of bids received, the probability that the incumbent wins the contract, and the prices and frequencies offered by the winning firm. The method used to identify the potential impacts of the terms of tender on such outcomes relies on estimating a reduced-form equation for each dependent variable of interest, including dummy variables identifying the terms-of-tender design and other determinants that may help explain the outcomes. Therefore, the equations to be estimated take the following general form:

$$y = \alpha + \beta_1 d_{2009} + \beta_2 d_{2011} + \beta_3 d_{2014} + \beta_4 d_{2016} + \beta_5 d_{2018} + \beta_6 d_{2019} + \gamma X + \epsilon \quad (1)$$

where y is the dependent variable of interest, the d_i are dummy variables capturing the terms of tender in force, and X is a vector of contract characteristics -such as contract size- that may affect the observed outcomes.

5.2.1. Number of bids and incumbent's winning probability

Given the evidence that a higher number of bidders per contract leads to better service conditions (Amaral et al., 2013; Beck & Walter, 2013; Vigren, 2018), the tender design should incentivise potential bidders to participate in the process.

As shown in Table 4, a contract receives an average of almost 6 bids. However, variation in this variable is substantial; it is not uncommon for a contract to receive more than 10 bids, and in three cases, the number reaches 16. To test whether the tender design affects the number of firms, we estimate a version of Eq. (1) with the number of submitted bids as the dependent variable. The number of bids is likely to depend on the expected profitability of the route. Since direct data on profitability are unavailable, we proxy this variable with the number of passenger-kilometres carried in the year prior to the tender.

Given that the number of submitted bids is a count measure, we estimate the effects of tendering design using a Poisson regression. We find no evidence of overdispersion in the data, indicating that the Poisson specification provides an adequate fit.¹⁴ Our estimates rely on the Poisson quasi-maximum likelihood (QML) approach, which yields consistent coefficient estimates as long as the conditional mean is correctly specified, even in the presence of overdispersion or underdispersion.

The estimation results, reported in the first column of Table 6, show that the terms of tender for 2011, 2014, and 2016 attracted significantly more bids. These findings are consistent with those from the firm-level participation equation and can be interpreted as evidence that reducing the anticompetitive elements in the tender terms increases the

¹⁴ The p -value of the Cameron-Trivedi test is 0.148; therefore, we do not reject the null hypothesis of equidispersion.

Table 5

Firms' participation in contract tenders. Logit model and marginal effects.

Dep Var: 1 if the firm submits a bid; 0 otherwise.						
	Coefficient	Std. err.	t stat	Marginal effects	Std. err.	t stat
Constant	-10.587	0.821	-12.89			
Proximity	1.311	0.128	10.23	0.066	0.009	7.52
Group	0.924	0.171	5.39	0.047	0.009	5.24
ln employment	0.269	0.049	5.53	0.014	0.003	4.14
ln (pax-km)	0.418	0.047	8.88	0.021	0.005	4.59
ln (age)	-0.279	0.079	-3.54	-0.014	0.004	-3.88
Incumbent	4.141	0.507	8.17	0.209	0.030	6.95
Terms of tender:						
2009	-0.573	0.299	-1.92	-0.020	0.012	-1.63
2011	0.378	0.297	1.27	0.019	0.030	0.62
2014	0.630	0.233	2.71	0.034	0.013	2.64
2016	0.402	0.261	1.54	0.020	0.010	1.94
2018	-0.336	0.315	-1.07	-0.013	0.012	-1.06
Observations		5955				
Pseudo-R2		0.232				

Table 6

Estimation results. Submitted bids and probability of renewal by the incumbent.

	Number of bids (Poisson regression)		Prob. incumbent wins (Logit model)	
	Coefficient	t stat	Coefficient	t stat
Constant	-2.942	-3.73	-9.266	-2.66
ln passenger-km	0.261	5.06	0.754	3.07
Terms of tender:				
2009	-0.069	-0.29	-2.068	-1.44
2011	0.721	2.47	-2.409	-1.86
2014	0.441	2.49	-2.532	-2.35
2016	0.603	2.92	-4.372	-2.99
2018	0.138	0.64		
2019	-0.032	-0.14	-4.086	-2.50
Observations	59		51	
Pseudo-R2	0.271		0.22	
Mean dep. Var.	5.69		0.59	
St. Dev. Dep. Var.	4.03		0.50	

Note: t-statistics are computed from robust standard errors.

number of bids. By contrast, in the auctions using the last two versions of the terms of tender, the number of bids is not statistically different from that observed under the 2007 terms, which serves as the reference category. It should be recalled, however, that the 2018 and 2019 terms of tender were used for only one and two contracts, respectively.

The second outcome we examine is the probability that the incumbent operator wins the contract when it is put out to tender. In our data, this occurs in 59% of the cases, but our interest lies in whether this probability is influenced by the design of the terms of tender. The second column of Table 6 presents the estimation results of a logit model in which the dependent variable equals 1 if the incumbent wins the contract and 0 otherwise. The sample is limited to auctions in which the incumbent participated, reducing its size to 51 observations. Although the significance levels are low, we find evidence that incumbents are more likely to win larger contracts, and that this probability decreases under the most recent tender terms.

5.2.2. Prices

We now examine how the design of the terms of tender influences the winning bid price. To do so, we regress the winning price -defined as the fare per kilometre- on the terms of tender dummy variables, including the contract's passenger-kms as a control variable. We expect that terms of tender that promote competition will result in lower fares.

Table 7 reports the estimation results using three alternative measures of the dependent variable: the winning price, the ratio of the winning price relative to the price prior to tendering the contract, and the ratio of the winning price to the reference price (which is the price

above which bids would receive no points). In all cases, natural logarithms are applied to prices and passenger-kilometres. Prices are CPI-deflated.

The winning price decreases significantly as the contract size increases. A 10% increase in the number of passenger-kms leads to a 1.1% reduction in the fare per kilometre, suggesting that firms can benefit from economies of scale and are therefore able to bid lower prices. Regarding the impact of the tender design, contrary to what might be expected given previous results on auction participation, the terms of tender in 2014, 2018, and 2019 would have contributed to higher prices. A negative coefficient is obtained only for the 2016 design, but it is not statistically significant.

One possible explanation for these results is that the characteristics of the contracts being tendered may be masking the effect of the terms of tender on the winning price. To account for this possibility, the second column of Table 7 reports the estimation results using the winning price relative to the pre-tender price as the dependent variable. The results show that although the terms of tender for 2008, 2011, and 2014 had no impact relative to 2007, the 2016 design results in a 24% reduction in prices. On the contrary, the reduction in the weight assigned to prices and the limitation on points awarded to extreme price bids under the 2018 tender result in a 37% increase in price. Finally, we define the dependent variable as the winning price relative to the reference price, which acts as an upper bound. In this case, a different picture emerges: the 2014 and 2016 designs have a significant negative impact on price. The apparent paradox that prices in absolute terms do not respond to the terms of tender in those years, yet fall relative to the reference price, can be explained by the discretionary increase in the reference prices introduced in the terms of tender around those dates. More precisely, as shown in Table A.2 in the appendix, the reference price per kilometre under the 2014 terms of tender increased by 0.026 € relative to the 2007 ones, whereas the increases for the subsequent designs were 0.009 € in 2016, 0.012 € in 2017, and 0.01 € in 2019.

The results suggest that, although changes in the terms of tender since 2014 have favoured price competition, the simultaneous increase in reference prices has had a countervailing effect. More intense competition between bidders has not led to lower prices for intercity bus users. In addition, setting higher reference prices in the terms of tender may encourage firms to bid higher to avoid the risk of disqualification for submitting bids considered excessively low on relative terms. For contracts tendered under the 2014 design, the rise in the reference price appears to fully offset the effect of price competition, whereas for those under the 2016 terms of tender, a price reduction relative to the pre-tender level occurs. However, the 2018 terms of tender imply a reversal in the intensity of price competition. Although the number of observations under this design is very limited, and conclusions should therefore be interpreted with caution, prices increase significantly both

Table 7

Estimation results. Winners price (constant 2019 prices).

Dep. Variable	ln (winner's price)		ln (winner's price/ previous price)		ln (winner's price/ reference price)	
	Coefficient	t stat	Coefficient	t stat	Coefficient	t stat
Constant	−5.705	−21.38	0.451	2.09	0.549	4.37
ln passenger-km	−0.110	−5.72	−0.032	−2.12	−0.042	−4.82
Terms of tender:						
2009	0.062	0.70	0.098	1.46	−0.048	−1.01
2011	0.035	0.43	0.044	0.62	−0.030	−0.70
2014	0.149	2.39	0.051	0.88	−0.156	−3.13
2016	−0.017	−0.15	−0.241	−2.19	−0.309	−4.67
2018	0.303	4.59	0.368	7.48	−0.027	−0.83
2019	0.283	2.99			0.026	0.63
Observations	56		54		56	
Adjusted R2	0.56		0.28		0.44	
Regression S.E.	0.18		0.18		0.14	
Mean Dep. Var	−2.78		−0.05		−0.24	
St. Dev. Dep. Var.	0.27		0.21		0.19	

Note: t-statistics are computed from robust standard errors.

In the different equations, we consider the possibility of using cluster-robust standard errors at the tender level. However, given the small number of clusters, the specification with clustered standard errors may not be reliable. Using the generalized information matrix (GIM), we tested the equality of standard errors across specifications with conventional, robust, and clustered errors. In no case did we reject the null hypotheses that simple standard errors are equal to robust standard errors (GIM p -value = 0.48) or to clustered standard errors (GIM p -value = 0.26).

in absolute terms and relative to the pre-tender value.

5.2.3. Frequencies

Besides prices, the main dimension along which bus services compete is the frequency provided. Given that the length of the route itineraries included in each contract is fixed, average frequencies are directly determined by the number of bus-kilometres offered, which is the variable included in the score function. Thus, and in accordance with the terminology used in the terms of tender, we identify better frequencies as an increase in the total number of bus-kilometres operated.

Adapting Eq. (1), we estimate the impact of the terms of tender on frequencies. We consider two alternative specifications of the dependent variable: the number of bus-kilometres offered in the winning bid relative to those of the previous contract, and relative to the minimum reference value specified in the terms of tender. These estimations do not include a control for contract size, since it would be almost perfectly correlated with the dependent variable.

The results in Table 8 show the impact of the tender terms design on bus frequencies. When comparing changes relative to the frequencies observed in the previous contract, the changes in tender terms do not yield statistically significant effects. However, when the dependent variable is defined as the winning bid relative to the minimum level of bus-kilometres specified in the terms of tender, all estimated coefficients become significant. The largest impact is observed for the 2014 terms, with slightly smaller decreases for the 2016 and 2018 designs. These

results should be interpreted in light of changes in the minimum reference level of bus-kilometres: this threshold decreased from 0.98 of the contract's previous year value to just 0.59 in 2014, before increasing slightly in 2016. As in the case of prices, a significant part of the increased competition in frequency bids appears to be offset by the modification of the reference values.

6. Analysis of individual bids

The previous section analysed the relationship between the design of the terms of tender and the outcomes of the tendering processes. We now address the same issue by focusing on individual bidding behaviour, characterising regulatory design by the relative weights assigned to price and frequency components. The data used to estimate the corresponding equations comprise all available bids submitted between 2007 and 2019.

The empirical approach in this section closely follows Koning and van de Meerendonk (2014) in their analysis of the impact of scoring weights in the procurement of welfare-to-work services in the Netherlands. As in our case, these authors exploit variation in the weights of the scoring function over time to examine how firms react in terms of their bid prices and service quality.

We assume that the price and frequency bids made by each firm depend on both contract-specific and firm-specific characteristics. Among the former, we include the weights given to prices and frequencies in the corresponding terms of tender, contract duration (in years), the reference values of the corresponding variables (maximum price and minimum frequencies) and measures of contract size (for price equations, we include the average number of passenger-kms transported over the previous three years, while for frequency equations, we include the average occupancy rate per bus-km.). Firm-specifics characteristics are captured through firm fixed effects, which identify each participating firm, plus a dummy variable indicating whether the bid was submitted by joint venture (JV).¹⁵

Therefore, we estimate the following equations:

Table 8

Estimation results. Winners frequency.

	ln (winner's frequency/ previous frequency)		ln (winner's frequency/ reference frequency)	
	Coefficient	t stat	Coefficient	t stat
Constant	−0.034	−0.46	0.006	1.00
Terms of tender:				
2009	0.013	0.13	0.073	3.88
2011	−0.131	−1.11	0.121	2.88
2014	−0.213	−1.53	0.330	7.83
2016	−0.147	−0.82	0.240	7.61
2018			0.239	2.54
Observations	52		55	
Adjusted R2	−0.02		0.45	
Regression S.E.	0.41		0.14	
Mean dep. Variable	−0.15		0.20	
St. Dev. Dep. Var.	0.40		0.19	

Note: t-statistics are computed from robust standard errors.

¹⁵ We also tested the statistical significance of the variables capturing geographic proximity, firm size, and incumbent status. None of these variables was found to be statistically significant.

$$\begin{aligned} price_i = & \alpha + \beta_1 weight_i + \beta_2 length_i + \beta_3 reference_i + \beta_4 paxkm_i + \beta_5 JV_i \\ & + \sum_{f=1}^F \gamma_f I_{fi} + \varepsilon_i \end{aligned} \quad (2)$$

$$\begin{aligned} frequency_i = & \alpha + \beta_1 weight_i + \beta_2 length_i + \beta_3 reference_i + \beta_4 occupancy_i \\ & + \beta_5 JV_i + \sum_{f=1}^F \gamma_f I_{fi} + \varepsilon_i \end{aligned} \quad (3)$$

where the variables are as defined in the previous paragraph, α , β , and γ are coefficients to be estimated, and the subscript i refers to bids, while I_{fi} is an identifier equal to one if firm f submits bid i . Firm-specific coefficients make it possible to control for unobserved heterogeneity that is constant over time. Price is defined as the submitted bid in euros per kilometre, while frequency is measured as the number of bus-kilometres offered in the bid minus to the minimum level specified in the terms of tender.

Table 9 presents the descriptive statistics for the 253 bids submitted to any of the contracts for which detailed information is available. On average, firms submit price bids of 0.057 € per kilometre when the reference price is 0.073 €, while in terms of service frequencies, bids exceed the reference level of 1.78 million bus-kms by an average of 344,000.

When estimating Eqs. (2) and (3), we consider whether the firms' bidding behaviour varies with the level of competitive intensity induced by the design of the terms of tender. The analysis in Section 4 shows that competition has been more intense since 2014 than in earlier periods. Accordingly, we divide the sample into two subperiods and estimate the same equations for each. The results are shown in Tables 10 and 11.

For both variables, the results for the second period (post-2014) reveal more competitive behaviour by firms. Regarding prices, results

Table 9
Descriptive statistics. Firms price and frequency bids.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Price (€/km)	253	0.057	0.016	0.025	0.123
Frequency	253	344,135	447,914	0	2,256,782
Weight (price)	253	31.50	11.26	10	45
Weight (frequency)	253	14.11	5.39	5	20
Length	253	9.69	1.13	5	12
Joint Venture	253	0.30	0.45	0	1
Pax-km (millions)	253	55.1	63.0	0.258	208
Reference (price)	253	0.073	0.019	0.040	0.135
Reference (freq.)	253	1,782,555	1,602,970	40,420	5,880,138
Occupancy (pax/bus)	253	25.06	11.88	3.23	52.70

Source: individual bids. Note that the average contract's characteristics are weighted by the number of bids received by each contract.

Table 10
Estimation results. Price bids.

Period	2007–2013		2014–2019	
	Coefficient	t stat	Coefficient	t stat
Constant	0.00275	0.12	0.11341	5.50
Weight price	−0.00007	−0.29	−0.00103	−3.58
Length	−0.00239	−1.23	−0.00460	−3.41
Reference price	1.36257	5.03	0.48665	4.29
Passengers-km	−3.08e-11	−1.07	−9.25e-11	−2.98
Joint Venture	−0.00554	−1.65	0.00958	1.89
Individual firms' effects	yes		yes	
Observations	89		164	
R2	0.89		0.82	

Note: t-statistics obtained from robust standard errors.

Table 11
Estimation results. Frequency bids.

Period	2007–2013		2014–2019	
	Coefficient	t stat	Coefficient	t stat
Constant	−2,914,677	−0.64	−532,224	−1.17
Weight frequency	4610	0.83	8931	1.47
Length	20,498	0.47	27,096	0.58
Reference frequency	0.0434	2.37	0.2726	5.99
Occupancy	1935	0.96	11,232	1.76
Joint Venture	3762	0.05	−721,362	−3.51
Individual firms' effects	yes		yes	
Observations	89		164	
R2	0.71		0.88	

Note: t-statistics obtained from robust standard errors.

for the first period show that the only variable that significantly explains price bids is the reference level specified in the tender terms. However, after 2014, firms also responded with lower bids when prices received a higher weight in the score function. On average, a 10 percentage point increase in the weight assigned to price in the score function is associated with a reduction of 1.03 euro cents per kilometre in fares.¹⁶ Additionally, longer contract durations (up to a maximum of 10 years) are associated with lower price bids.¹⁷ On the contrary, a higher maximum price set in the terms of tender leads to higher price bids.

In the case of frequencies, a similar pattern emerges. Under the terms of tender used prior to 2014, the only variable that significantly explains the submitted bids is the minimum frequency level set for each auction. In the more recent period, the weight assigned to frequencies in the score function becomes statistically significant, although its effect is clearly much smaller than in the case of prices. Firms, therefore, appear to be much more responsive to the weight given to price than to that given to frequency.

7. Conclusions

This paper analyses the effects of changes in the design of the terms

¹⁶ Given the transit volumes reported in Table 1, if this impact were to affect all routes it would imply a total welfare gain in terms of consumer surplus of 54.2 million euro per year. Moreover, assuming a price elasticity of −0.5, an 8.15% increase in the number of trips would take place, with an additional consumer surplus for generated trips of 2.2 million euro per year.

¹⁷ Several studies provide evidence against excessively short contracts. Augustin and Walter (2010) estimate that contract duration positively affects the likelihood that the incumbent operator will not renew. Vigren (2014) suggests that longer contract durations increase the price operators are willing to pay to obtain a contract; while Vigren (2018) shows that very short-term contracts reduce the number of bidders interested in the contract. When interpreting these results, it is important to bear in mind that the maximum contract duration in their data is 10 years, so the discouraged lengths correspond to very short-term contracts (less than 4 years).

of tender used to select providers of intercity bus services in Spain since 2007. We focus on the impact on observable outcomes such as the intensity of competition, as well as the prices and frequencies offered to users. The results show that the design of the terms of tender has a significant effect on the intensity of competition for the market and, if implemented in future tendering processes, could allow public transport users to benefit from the gains associated with an increase in competition.

More specifically, the results show that by arbitrarily fixing certain reference values in the tender terms, the regulator can influence the outcome of the competitive process and limit the extent to which its potential benefits are passed on to consumers. Two examples are the limits imposed on maximum prices and minimum frequencies, set at arbitrarily extreme values.

The paper also highlights the important role played by the weights in the score function, particularly those assigned to the price variable. The results show that a 10 percentage point increase in the weight given to price leads to a decrease of 1.03 euro cents/km in the final price. Bids on frequency are also responsive to the weight assigned to this variable, though to a lesser extent than bids on price.

Our results also enable us to draw conclusions regarding the size of the contracts. This issue needs to be addressed empirically, as the relationship between the contract's size and the number of bidders can be either positive or negative. On the one hand, larger contracts may create barriers to entry by increasing the technical and economic requirements for participation. On the other hand, larger contracts may be more profitable, as they enable exploitation of economies of scale and density, thereby attracting more bidders. In our sample, and consistent with [Vigren \(2018\)](#), the second effect prevails over the first. The presence of economies of scale is further supported by the finding that contracts with a larger number of passengers-km allow for lower prices per

kilometre. Therefore, when deciding on contract size, it is necessary to balance the opposing effects of attracting more bidders by designing smaller contracts and exploiting the economies of scale associated with larger ones. In markets with a limited number of potential bidders, the former effect may prevail over the latter.

Although they do not directly arise from the empirical exercises described in this paper, there are other recommendations, based on the analysis of the terms of tender used in Spain, that may be useful to transport procurement agencies seeking to increase the intensity of competition for their contracts. The details about which part of, and at which cost, the incumbent's labour force is to be transferred to the new operator can be particularly relevant, as it acts as a barrier to entry. Similarly, preferential rights granted to incumbent are clear impediments to competition and reduce market dynamism. Finally, the term of tender should avoid criteria based on subjective assessment and instead rely on objective, quantifiable metrics when evaluating bids.

CRediT authorship contribution statement

Javier Asensio: Writing – review & editing, Writing – original draft, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization. **Marco Batarce:** Writing – review & editing, Supervision, Methodology, Formal analysis. **Anna Matas:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization.

Declaration of competing interest

None.

Appendix A. Appendix

Table A.1
Activity levels of intercity bus operators. 2023.

Company	Contracts	Passengers (%)	Passengers-km (%)	Bus-km (%)
ALSA	22	50.88%	66.11%	61.63%
SAMAR	11	18.03%	6.65%	8.39%
AVANZA	6	10.60%	8.23%	8.60%
JIMENEZ	4	3.07%	2.73%	3.04%
MONBUS	4	0.44%	0.85%	1.14%
INTERBUS	3	5.75%	3.99%	3.25%
HIFE	3	1.46%	0.45%	1.29%
SOCIBUS	3	1.19%	3.25%	4.72%
BAM	3	0.92%	1.86%	1.57%
CEVESA	3	0.53%	0.22%	0.74%
AISA	2	0.78%	0.64%	0.75%
R.J. AUTOCARES	2	0.52%	0.33%	0.53%
I.R.BUS	1	3.18%	0.66%	0.55%
BILMAN BUS	1	0.83%	3.10%	2.33%
LAX	1	0.63%	0.08%	0.13%
LEDA	1	0.36%	0.30%	0.32%
SAN SEBASTIAN	1	0.26%	0.10%	0.30%
THERPASA	1	0.25%	0.18%	0.23%
BAD-SEV BUS	1	0.19%	0.18%	0.18%
MOLINERO	1	0.05%	0.01%	0.03%
LA BURUNDESA	1	0.04%	0.02%	0.04%
LINECAR	1	0.03%	0.04%	0.25%
EUGENIO DÍAZ	1	n.a.	n.a.	n.a.

Source: [Ministerio de Transportes y Movilidad Sostenible \(2024\)](#).

Table A.2

Estimation results. Reference price. Maximum fare in terms of tender (€/km).

	Coefficient	t stat
Constant	0.075	47.34
Passenger-kms	-1.26e-10	-5.32
Terms of tender:		
2009	0.002	0.78
2011	0.002	0.57
2014-a	0.006	1.06
2014-b	0.026	4.71
2016	0.009	1.67
2018	0.012	4.03
2019	0.011	4.45
Observations	59	
Adjusted-R2	0.50	
Mean dep. Variable	0.081	
St. Dev. Dep. Var.	0.019	

Notes: prices CPI-deflated (constant 2019 prices); robust standard errors; The terms of tender corresponding to 2014 can be subdivided in two groups: 2014a correspond to those used in contracts during 2014 while the 2014b are those used in 2015.

Table A.3

Estimation results. Reference frequency. Minimum bus-km / Previous bus-km.

	Coefficient	t stat
Terms of tender:		
2009	0.981	12.12
2011	0.920	11.98
2014-a	0.767	7.74
2014-b	0.586	5.91
2016	0.667	11.33
2018	0.681	6.87
Observations	54	
Adjusted-R2	0.19	
Mean dep. Variable	0.771	
St. Dev. Dep. Var.	0.271	

Notes: Robust standard errors. The terms of tender corresponding to 2014 can be subdivided in two groups: 2014a correspond to those used in contracts during 2014 while the 2014b are those used in 2015.

Table A.4

Comparative Table of Tender Specifications in Spain.

Terms of tender	Competition-Restricting Elements	Changes Favourable to Competition
2007	Low weighting of fares and services; minimum/maximum bid limits; high score for staff subrogation; very restrictive entry requirements; incumbent preference; broad discretion in non-economic criteria; duration >10 years.	—
2009	Most 2007 restrictions remain.	Slightly easier participation requirements; lower weight of labour force subrogation compromise; higher weight given to fares and frequencies (23%).
2011	De facto minimum fare threshold remains; mandatory driver subrogation; some restrictive entry requirements remain; incumbent preference.	Higher weight for fares and frequencies (40%); lowest fare sets minimum points; moderate easing of entry requirements; the weight given to non-economic criteria is reduced; contract length capped at 10 years.
2014	Unjustified increase in the maximum fare and the minimum number of service frequencies; a annual fee is introduced; employee subrogation is extended to other staff; some restrictive entry criteria remain.	Higher weight for fares and frequencies (55%); proportional scoring for fares and frequencies; incumbent preference removed after court ruling.
2016	A non-proportional formula is introduced to assess fares and service frequencies. Fee, subrogation and participation requirements as in 2014. Frequency weight reduced to 10%.	The scoring formula gives the highest weight to fares (45%); moderate decrease in the fare cap and a moderate increase in the minimum service frequency
2018	Reduction in the weighting given to fares and frequencies (47%); lower proportionality in the scoring formula to assess fares and frequencies; a 'podium' system is used to score variables evaluated on the basis of value judgments.	Contract length under 10 years.
2019	—	Greater weighting is given to fares and frequencies; more proportional pricing formula; removal of podium system; elimination of the operators' fee.

Table A.5
Number of potential bidders per year.

Year	Number of firms
2007	111
2008	108
2009	106
2010	106
2011	104
2012	104
2014	104
2015	102
2016	102
2017	101
2018	99
2019	99

Data availability

Data will be made available on request.

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