

Workshop 1: Models of Mainstream Public Transport Provision

Competition in passenger rail transport in Europe: evidence from a multi-country panel analysis (2000-2016)

Matthias Aistleitner and Jakob Kapeller

Almost twenty years after the adoption of the first railway package (2001), the liberalisation process of rail transport within the European Union is still continuing. In line with prevailing economic theory (Demsetz 1968, Maskin 2008), policy makers expect that competitive tendering improves incentives and efficiency of transport operations and, hence, will lead to a reduction of public spending, to an increase of passenger volumes and to an improvement of the quality of services. “Competition for the market” thereby is seen as a suitable substitute for “competition in the market” and is assigned a high priority within the reform agenda of the European Union. However, surveying the current literature on the effects of competition in (rail) transport and other fields reveals that empirical evidence on this issue is rather mixed. In line with these findings alternative theoretical positions can be identified, which highlight the possible adverse effects of competitive tendering procedures such as the costs of competition (Boyne 1998, Andersson/Hultén 2016), problems associated with incomplete contracts and the inherent complexity of the relevant services (Bajari et al. 2008, Hensher/Stanley 2008).

In this paper we explore the relationship between competition on the one and performance, costs and service quality on the other hand for the case of passenger rail transport in Europe. To overcome data limitations, we draw on a combination of various existing data sets (OECD/ITF, EC/Eurostat, IRG Rail), secondary statistics (Götz/Schäfer 2018, Nunn/Puga 2012) and complementary data on geographical aspects to construct a panel data set consisting of 21 European countries for the period 2000-2016. By applying conventional panel regression analysis we show that competition in general is not associated with higher performance, lower public cost and better service quality; rather our results point to the converse, namely that competition has, if anything, a negative impact on passenger railway services. However, in terms of effect size the impact of competition seems only marginal. This finding suggests, that rather other factors than competition determine the successful development of a nations' passenger rail system.

Application of incentives for Transantiago drivers to achieve an improvement in the quality of service

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In 2007, a new public transportation system was implemented in Santiago de Chile called Transantiago. One of the most important novelties of this new system was the new contract structure between operators and the government. This consists of concessions assigned in competitive biddings (Gómez-Lobo, Briones, 2013). Another relevant novelty was that drivers of the operating bus companies should have a fixed salary, leaving aside the payment per passenger transported (Puga, 2017; Tiznado et al, 2014). It should be noted that drivers perform a significant task in the operation of the system (Tiznado et al., 2014, De la Vega, 2018). Drivers make decisions in situ on how to operate a bus, they have direct contact with the users and they must know how to face the different unexpected situations of the transit of the city (De la Vega, 2018). Therefore, their workload has elements of multitasking at every moment of the day (Holmstrom and Milgrom, 1991).

Since the beginning of this new system, concession contracts have undergone more than 30 modifications for each of the 7 operating companies (Puga, 2017). One important modification was the incorporation of key performance indexes (KPI) linked with fines to bus operators. However, despite the importance of drivers within the system, their contractual relationship with operators has not been changed since 2007 and for the operators is challenging to achieve better KPIs results under this contractual scheme. Thus, the aim of this paper is to compare and analyze the results on the KPI indexes of two contractual schemes for drivers: a fixed salary contract versus an incentive structured contract.

An incentive contract structure will be proposed and implemented taking into account incentives for drivers of Transantiago based on the Theory of Contracts. Hence, the KPIs fulfillment demanded by the government to the operating companies will be considered. This seeks to align the contracts of the bidding with the contracts that operators have with their drivers. Later, a randomized experiment will be developed with a group of drivers from one of the companies in the system.

There are two types of effects expected in this experiment. First, we expect to provide evidence that when applying the correct incentives there could be an improvement in the level of quality of service that will be

measured through an increase in certain KPI fulfillment making the case for incentive structured contract. Secondly, we expect to find a multitasking effect present in the effort of drivers: when applying an incentive on certain KPI we expect a negative effect on the other indexes due to the multitasking effect and a fixed salary might be preferable.

Therefore, the discussion on which type of contract should drivers have will be enriched by these two expected effects and we hope to provide guidelines on the salaries schemes and incentives that bus drivers should receive, positioning drivers as a pillar to consider in the contractual structure of the transportation system.

Assessment of Brazilian bus contracts ability to promote an efficient service delivery

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The main goal of this article is to assess the elements of bus service contracts in Brazil that may be leading to an inadequate or inefficient service delivery and consequently contributing to the fall in demand. The paper analyzes the bus concession contracts of the 10 largest Brazilian cities. The analysis draws on literature review regarding tender contracts for public transport systems. The main elements assessed are (i) contracting approaches, (ii) remuneration arrangements, (iii) risk allocation in contracts, (iv) performance and quality measurements systems, and (v) incentives and penalties mechanisms.

As of 2008, the concession of public urban bus services took place in the main Brazilian cities through competitive public tendering. This process has initiated a new cycle in the management of the bus systems expecting to bring greater quality to the consumer and greater competition to the market. However, according to the Brazilian Association of Urban Transport Companies (NTU), in the last four years the number of passengers has fallen by 25%. Thus, to ensure the continuity of the public transport services provision and the contracts financial sustainability, private operators require more government subsidies. Nevertheless, before granting greater subsidies to the bus systems it is necessary to analyze the current efficiency degree of operators and contract's ability to stimulate a correct provision of service.

Preliminary results indicate that the new contracts have preserved the logic of cost-plus regulation perpetuated in the country for decades. This model rewards inefficiency of operators while not transferring productivity gains for users through fares. Services remuneration is generally based on the number of paying passengers multiplied by the fares price. However, there are clauses that determine four-year fare review in which compensates the lower demand by dividing the service costs by the number of passengers verified in the period. This model transfers the costs of inefficiency in the provision of services to the fares paid by the users. Only a few contracts contain performance and quality measurements systems linked with incentives and penalties.

A theory of regulatory cycles in public transport

[Andrei Dementiev](#)

The paper examines the nature of regulatory cycles in public transport (Gwilliam, 2008, after Needham, 1983) at a theoretical level employing the traditional regulation literature adopted by Auriol and Picard (2009) to the case of government outsourcing. An ability of governments to extract rents from transport firms (either public or private) is considered as additional regulatory instrument and introduces the ownership dimension to the model. The timing of these government interventions highlights the difference between tendering (a competitive procedure to extract the firm's surplus ex ante via a franchise fee for the right to operate the transport sector as a monopoly) and negotiated contracts (by offering and bargaining over the ex post combination of transportation tariff and volume of services). Such a unified theoretical framework also address the issue of hybrid contractual regimes when transportation service is outsourced to a private firm in exchange for a franchise fee and then the firm chooses to commit (or not) with the government by accepting (or rejecting) the suggested price-output combination.

The original model allows for the direct welfare comparison of the four phases of the industrialised country regulatory cycle: regulated public monopoly, competitive private supply (franchising), unregulated private (laissez faire) monopoly and regulated private monopoly (outsourcing with ex post contract). For instance, in developed economies with relatively low shadow cost of public funds, transportation sectors with increasing

returns to scale (e.g. rail services) that are subjected to large technical uncertainty are then good candidates for outsourcing.

This approach is generalised for the case of developing countries with low income levels where governments are mainly concerned with tax collection which makes the shadow cost of public funds relatively high. Due to immanent fiscal constraints these governments cannot subsidise private firms and outsourcing often takes the extreme form of *laissez faire*. For example, transportation services in African capital cities is almost entirely left to the private (informal) sector.

The missing link in modelling the regulatory cycle for developing countries and the main theoretical contribution of our paper to this generalised analysis is the phase of fragmented informal supply that also featured the Russian bus sector in 1990s. We attempt to capture the emergence of competitive fringe in the transportation sector by decreasing the entry barrier due to either (spontaneous) privatisation/expropriation of the existing car fleet or adoption of less capital-intensive transportation technology (minibuses, etc.). We employ the idea of Wen and Yuan (2010) of segmented market for public service and compare the competitive outcome with that of public regulation and outsourcing.

Our simple theoretical model sheds some light on the transition between the phases of the regulatory cycle. The lack of efficient financial markets makes it impossible for the government to extract sufficient *ex ante* surpluses from private firms through competitive tendering procedures, thus regulation appears to be more preferable. When the legal system matures, and the government increases its credibility outsourcing with *ex post* negotiation becomes an option. These findings are confronted with the developments in Russia's public transport in 1990-2010s.

Regional passenger rail transport Efficiency: a test of measurement and explanation in the case of France.

Christian Desmaris and Guillaume Monchambert

Regional passenger rail transport is a key issue for both public authorities and rail operators. It is particularly true in France, where transport is the regions' second largest budget (30% of operating expenses on average) and where regional rail transport (TER) represents for the incumbent, the SNCF, half of the traffic, 2/3 of the passengers transported and 18% of passenger-kilometers (excluding Ile de France). And nevertheless, the development of the TER is hindered by its high cost for public finances (Arafer, 2018; Spinetta, 2018). The question of productive efficiency is therefore a legitimate question.

The issue of measuring and explaining productive efficiency in public passenger transport has already given rise to a number of studies (Farci et al., 2005; Gagnepain, Ivaldi, 2002; Piacenza, 2006; Holmgren, 2013), but very little concerns regional rail passenger transport in France, in particular for the recent period (Lévêque, 2004, 2007).

This study aims (i) to produce a model for measuring productive efficiency adapted to regional rail passenger transport and (ii) to identify where the inefficiency comes from. For that, we use a stochastic production frontier model, calibrated with new and recent data from French regions coming from several public databases (ARF, ARAFER).

Our model will take as output the volume of production, the train-kilometer and, as inputs, the cost of labour, energy, fixed capital (length of the network), circulating capital (rolling stock) ... We simultaneously will test the effect on productive inefficiency of four sets of factors: the socio-economic environment (population, surface and GDP), the characteristics of the regional rail system (number of stations, number of lines, train-kilometer supply), the quality of the service (reliability rate) and the characteristics of the contract between the operator and the transport authority (duration of the agreement, type of governance, penalties and financial incentive).

This study seems to present a double scientific interest: on the one hand to propose a multi-criterion explanatory model of the inefficiency of regional rail passenger transport; on the other hand, to shed light on the case of France, at a particular moment, when public decision-makers will have the possibility to solicit by tender of railway undertakings other than the incumbent operator (from December 2019). We hope to bring new elements to two major issues: what is the degree of inefficiency of the railway production of each regional operator? What are the explanatory factors for this inefficiency? These elements will be able to inform the choices regarding negotiation with the incumbent operator and with possible new operators.

Towards a simplified incentive-penalty scheme for Spanish performance-based quality contracts
Eneko Echaniz, Chinh Ho, Ruben Cordera and Luigi Dell'Olio

Performance-based contracts have widely been used in public transport sector to incentivise operators for improving customer services. This paper reviews public transport service provision contracts in Spain, focusing on the Key Performance Indicators (KPI) that define the extent to which operators are incentivised and penalised. Most Spanish contracts uses the European standard EN 13816:2002 to define the minimum level of service, including customer satisfaction. However, not all contracts specify incentives or penalties when the minimum level of service is met or not. Also, various formulas are used to decide reward and penalty levels, with patronage growth being the most common input, followed by objective quality indicators such as on-time running (regular headway or timetable punctuality) and serviceable ticketing systems. Perceived quality indicators such as user satisfaction is often measured but not used to decide operator's reward or penalty. This paper develops a choice experiment to study operators' and regulators' preferences for different performance-based quality contracts. The respondents are asked to choose between three different incentive-penalty options, one of them being not having any incentive nor penalty. Discrete choice models are developed to identify the preferences of Spanish operators and regulators. Expected findings from this study will inform the set of KPIs that should be used to define the right levels of reward and penalty to ensure that public transport services are improved over time. The results will help to design performance-based contracts that motivate operators to perform better while keeping the cost of providing public services within the budget.

The potential of multimodal concessions for service improvements; three cases from the Netherlands

Gerald Hoekstra, Wijnand Veeneman, Niels van Oort and Rob Goverde

When tendering public transport, a number of key choices re available for the transport authority. Beside the contract type, remuneration form, length of the concession, size of the concession and other, the authority also has to decide what modes to include in the concession. A major choice is that between multimodal and unimodal concessions. Conceptually, the advantages of unimodal concessions are competitiveness and control. more operators are available to compete for a single mode concession and the authority can have more control on coordination. Disadvantages can be that several operators running concessions with different modes puts coordinative tasks between service design (ticketing and branding), planning (routing and scheduling), and operation (information and transfers) at the authority, with possible higher interorganizational complexity and less flexibility. Contrarily, a multi-modal concession could allow a single operator to come up with a more integrated design of services, tighter aligned scheduling and stream-lined operation, more flexible and with less interorganizational complexity, and eventually leading to better services to the traveller.

In the Netherlands, several authorities have been looking for more integrated concession, including bus, train services and sometimes demand-responsive services. It has been unclear what effect this change had on service levels, patronage and coordinative efforts. This paper describes the analysis of the effect of multimodal concessions.

First, the paper analyses three different forms of coordination between bus and train services, using the STO model. It compares three regional concession in the Netherlands in Limburg (the south of the country), Fryslân, and Groningen (both in the north of the country). They represent one region with a multi-modal concession under net-cost, one region with multiple unimodal concessions under net-cost and one region with multiple unimodal concessions under mixed forms of contract. The different contract types were included into the analysis as they give more or less agency to the authority.

Second, the first region (Limburg Province) moved from uni-modal to a multimodal concession. The paper also analyses effects of that choice for network design, travel times (using weighted generalized travel time), travel costs, patronage (using smart card data analysis), and coordinative interactions between operator and authority (based on interviews).

The paper concludes that multi-modal concessions provide some real-world advantages to travellers and authorities. However, to what extent these advantages materialize is dependent on a number of key factors, including the type of contracts used, the number of transport authorities active in the concession area and the role that the transport authority wants to take up.

Exploring the effects of inter- and intra-modal competition on prices and frequencies in the regional railway market: Evidence from Europe

Florent Laroche and Ayana Lamatkhanova

Background:

This paper explores the effect of competition on prices and frequencies for the regional railway market. The regional train services are considered separately from the long-distance services, respectively in “for the track” competition and in “open access” competition. Considering the existing literature, the analysis is original by an extended perimeter to seven European countries (France, Germany, Italy, Netherlands, Sweden, Switzerland, UK) and a total of 110 routes where usual analyzes are based on specific routes or countries.

Method:

The method is based on an econometric analysis (Sureg) developed for other modes (air, coach) but never yet applied to the rail market and its specificities in terms of competition. For the regional services where competition is “for the market”, the competition needs to be analyzed through a dummy as a threat to lose the tender. Intermodal competition is limited to the coach services (dummy) and carpooling services (dummy).

Results:

Results show that the threat of intra-modal competition have no significant effect on prices or frequencies. The analysis country by country highlights a similar performance for Sweden and Switzerland in spite of high differences in terms of competition. The market in Sweden is open to the competition for the track while it remains close to competition in Switzerland. It suggests that the ability to negotiate contracts of public authorities and political choices can be more determinant than potential competition. Finally, effect of intermodal competition are weak. Intermodal competition is limited on short distance. Most of the time, the coach market is regulated by public authorities and carpooling services are few because of short distances. Nevertheless, results show that the probability to find a carpooling service increases when prices of train services are increasing.

Performance Contributors of Bus Rapid Transit Systems within the ITDP BRT Standard: An Ordered Choice Approach

Zheng Li and David Hensher

Bus rapid transit (BRT) is a mode of public transportation with relatively fast, flexible, comfortable, affordable and environment-friendly services. In this paper, the potential contributors to BRT performance are investigated within an ordered choice modelling framework, in which the dependent variable is the BRT standard (Gold, Silver, Bronze or Basic), developed by the Institute for Transportation and Development Policy (ITDP). The evaluation of an ordered logit model and an ordered probit model shows that the performance of the former is slightly better, which is chosen for the empirical application. The identified significant predictors are peak-hour speed, peak frequency, the average distance between stations, the length of dedicated busway, passing lanes at BRT station, covered station access, enhanced station environment, pre-board and automated fare collection and fare verification, and network integration. Based on a business-as-usual prediction and what-if analysis, this paper offers information for decision makers to plan a high-standard BRT system in line with the ITDP BRT standard.

And the Beat Goes On. The continued trials and tribulations of passenger rail franchising in Great Britain

John Preston and Charles Bickel

National rail passenger services in Great Britain have been largely delivered by a system of franchising since 1996. As reported at previous Thredbo Conferences, this system has had a number of iterations and a number of failures, with one franchise (for the East Coast) having failed three times. This paper will use national level and operator specific data provided by the Office of Rail and Road (ORR) to review recent key trends in rail demand and supply. It will extend an existing modelling framework to determine the costs and benefits of rail franchising at the national level. It will also undertake detailed case studies of two franchises, for the East Coast and South West. In advance of the on-going Williams Review, policy prescriptions will be suggested for both the commercial and the social railway with particular reference to contract specifications.

Can Bus Quality Partnerships or Contracts Make a Difference?

John Preston and Evangelos Darivakis

Deregulated bus services in Great Britain outside of London have been characterised by falling patronage and concerns over the quality of the service offering. The concept of voluntary bus partnerships emerged in Britain

in the mid-1990s as a potential solution to some of these problems but there were concerns that these schemes were undermined by free-riders. As a result, the 2000 Transport Act made provisions for Statutory Quality Partnerships (SQPs) for the bus industry and, in certain circumstances, for London style Quality Contracts (QCs). These provisions were strengthened by the 2008 Local Transport Act and the 2017 Bus Services Act. However, the uptake of these SQPs has been limited and the uptake of QCs outside London is virtually non-existent. This paper reviews quality partnerships and contracts in the bus industry in Great Britain in the light of the Bus Services Act 2017 and the proposals for Advanced and Enhanced Partnerships, along with Franchising. Using data at Local Authority level, published by the Department for Transport and other bodies, the paper assesses whether quality partnerships (either voluntary or statutory) or contracts have revitalised the bus industry, in terms of increased levels of ridership. The applicability of partnerships or franchising to the City of Southampton is also assessed. Methods to overcome the barriers to quality partnerships will be suggested.

Penalties as incentives for punctuality and regularity in tendered Swedish public transport

Roger Pyddoke

For most Swedish public transport authorities (PTA), customer satisfaction ranks among the most important goals. To improve on this, public transport contracts usually contain one or more quality incentives aimed at avoiding quality deficiencies the delivery of the service. Under the observed periods These are often in the form of penalties, where examples include penalties for of delays, cancelled trips, customer satisfaction, wrong vehicle type, or missing ticket revenue. This paper studies the management of penalties in the Swedish Skåne and Stockholm regions from four aspects: how penalties are designed by the PTAs and what they are expected to achieve, how the outcomes are monitored during the contract period, the extent to which the penalties are charged in accordance with the contracts, and finally the outcome in the relevant quality dimensions.

As for previous Thredbo contributions, many papers have mentioned penalties and bonuses as an important component of public transport contracts. Few papers have however attempted to focus on the management and outcome of these incentives in quantitative terms.

This study has been conducted through interviews with officials at the two PTAs and collection of data on quality outcomes to investigate the extent to which the outcome is followed. This has been done both by studying the design of the penalties in the tendering documentation, and by analyzing the data obtained. complimentary

Several findings have been made. There are two forms of penalties, either based on payments per occurrence of a deficiency, or as a payment for the aggregate deviations from acceptable levels of quality over a certain time span. We find no reference to narrated or documented experience of penalty design and the outcomes, but the employees at the PTAs appear to be convinced that the penalties work as intended and are needed. Both PTAs have extensive data for monitoring outcomes. They both claim that the charging of the penalties has become stricter during the last decade, and a few examples from this study supports this observation. Furthermore, the penalty payments are small compared to total contract payments. Finally, the observed levels of punctuality and delivered departures are high and stable over the studied period. This suggests that recent adjustments in the design of penalties may have had little impact on these quality dimensions. A puzzling observation is that customer satisfaction increases in both regions increase in recent years. We cannot explain this with available data. An overall conjecture arising from the study is that the current quality incentives might not improve the outcomes but abolishing them could result in poorer performance in the same.

Governance structure alignment and performance in Japanese publicly-owned bus sector

Hiroki Sakai

Contracting out has become an important method for introducing efficient management Japanese publicly-owned bus sector. The authors have analyzed the effect of the contracting method so far, but this time I will consider new, but classical, discussion in the contracting field, namely this study focusing on the transaction cost of governance structure in the publicly-owned bus sector. As mentioned in previous studies, contract out surely bring benefits to total cost, however from the view of efficiency and productivity the effect is still controversial (Sakai, 2016). Commonly pointed out as such factors are the existence of transaction cost. In other words, it is not enough to verify the effect on costs, but also the effect on transaction costs needs to be noted. Despite a set of periods of time has passed from the indication of its importance in the previous studies, assessment of transaction cost in transport and public utility sector seems inconclusive and the literature that

assessed size and what extent the transaction cost affect their performance are limited to a very small number of studies in Japan. We therefore cannot evaluate it whether a Japanese type of contracting is really more efficient or effective than a European public transport contracting given the existence of transaction cost.

However, it is important to note that the desirable governance structure (i.e. contracting size and type) depends on the exogenous environment in which each operator is confronted. In constructing the model on the effect of contracting, we need to take this into consideration, and it is not preferable to simply discuss whether the introduction of the contract is desirable or not. As a first step to construct a model based on such a viewpoint, this study developed a variable that measures how well the selection of the governance structure of publicly-owned bus operators are align (divergent) from the viewpoint of minimizing transaction costs (Leiblein et al (2002), Nickerson and Silverman (2004) etc). In the construction of misalignment variable, we estimate the governance structure selection model with the actual organization selection as the dependent variable, and the value of the exogenous variables (transaction characteristic) based on transaction cost theory as the independent variable. Thereafter, the absolute value of the residual of each sample is calculated from the parameters estimated from the model.

Subsequently, based on the measured value of the misalignment variable obtained in the first step, the study conducting stochastic frontier analysis to clarify the cost efficiency by including the misalignment variable in the factor decomposition model of inefficiency value. This study evaluates how each firm deviated from the efficient cost frontier and how governance structure is efficacious to their efficiency measure using a panel data set covering 31 operators over the 17-year period from 2000-2016. From the results obtained in the above two analysis, this study reveals the relationship between the effect of governance structure on efficiency and the transaction cost.

Public Bus service contracting: A critical review and future research opportunities

Dian Shen and Qiang Meng

A growing number of transit authorities have resorted to the bus service contracting scheme for improving the productivity and efficiency of their public bus services. This contracting scheme, albeit in varying forms, has already been adopted in major European and North American cities, resulting in around 20%-30% short-term cost savings compared to the traditional in-house service provisions. This study critically reviews a wide range of relevant academic studies over the last two decades, including ex-ante bus service contract design, concurrent service supervision as well as ex post performance assessment. Several hot debated issues on the public bus service contacting studies are identified and analyzed in depth, such as the comparison of alternative contract awarding mechanisms (e.g., competitive tendering or bilateral negotiation), revenue and risk sharing arrangement (e.g., gross-cost model or net-cost model), package design of public bus services, quality incentives design, cost-efficient bus service monitoring strategy, key success factors in bus service contracting and its overall performance in terms of service quality and cost efficiency. To reflect the essences associated with these issues, the representative econometric and operations, research-based models have been examined. This study further elaborates on the needs of the public bus industry and identifies the gap between academic studies and industrial practices.

Developments in Public Transport Governance in the Netherlands; Even More Recent Developments

Wijnand Veeneman

Like in the 2017, 2015 and 2013 versions of this paper, it revisits the latest developments in the governance of public transport in the Netherlands, focusing on bus, tram, metro and train concessions. Most of the concessions are competitively tendered, since the introduction of a legal obligation to tender in 2001. Dutch public transport authorities have since chosen different concession setups and forms of contract remuneration. This variety was strengthened by the fact that the three major cities were allowed in 2012 to choose not to tender out their concessions.

This paper again explores that variety and describes recent changes at the national and regional levels from 2017 onwards and looks at the developments that were first coming up in 2016. The key theme is that tendering has become mature in the country, but changes in the transport landscape are requiring authorities to adapt their approaches. The paper describes how authorities implement three major changes: the decision to have all buses full electric by 2030, the changes in financing from national government controlled to regionally controlled, and the implementation of mobility-as-a-service in or besides public transport

concessions. The paper is based on interviews with representatives of all nine Dutch public transport authorities.

To understand the key lessons from the level of authorities, they all were asked the key challenges that they were facing in their latest tenders, how they overcame them, and what the outcomes were in terms of costs, service levels, ridership, and policy goal attainment. These can be longitudinally compared to earlier challenges. These are understood on the level of the tendering process, contracts, and concession management on the level of the authorities. These key lessons are put in a context of institutional constraints from the level on national and supra national governments.

Disaggregated efficiency measurement as a management approach: An analysis of local public transport companies

Widar von Arx, Philipp Wegelin and Hannes Wallimann

Benchmarking is an important instrument used by public transport companies to review the efficiency of their processes and organisation. It helps to learn from the best in their industry. In the field of public transport, cost efficiency comparisons have a long tradition, especially with the help of stochastic cost frontier models. The insights generated are valuable with regard to cost developments over time, the analysis of economies of scale and scope, and the calculation of actual operational inefficiencies at an aggregated level. However, due to the usually relatively limited data availability, this high level of aggregation limits the benefits of such studies for the management. In order to maximise the benefits of benchmarking tools for the management (and the public transport authority), disaggregation can avert questions of interpretation. In the present research, we therefore analyse the cost functions of 10 Swiss local public transport companies on a more disaggregated level, applying stochastic cost frontier analysis on fine-grained internal cost accounting data of bus and tramlines. We propose to differentiate between different parts of the value chain, such as construction and maintenance of infrastructure; production of transport services; cleaning and maintenance of vehicles; or service planning and market development including sales. We assume that each of these parts of the value chain have their own cost function with different economies of scale and scope as well as more or less modifiable processes and organisation. Our hypothesis is that benchmarking at this level of disaggregation can be a concretely applicable instrument for the continuous improvement of processes or "make or buy" decisions. The contribution of this research is to show the "cost inefficiency contribution" of different stages of the value chain both at the bus or tramline level as well as on an aggregated comparison between the companies. The usefulness of this approach is to provide concrete indications of which part of the company's value chain is responsible for cost inefficiency.

Value for Money in Procurement of Urban Bus Services -- Competitive Tendering versus Negotiated Contracts: Recent New Zealand Experience

Ian Wallis and Roly Frost

One of the key Thredbo conference topics since 1989 has been the relative 'value for money' achievable by different models of procuring urban bus services, particularly focusing on periodic competitive tendering (CT) versus continuing operation by the incumbent operator on a negotiated price basis subject to meeting performance benchmarks (NC). A major practical difficulty generally encountered in attempting such comparisons has been the lack of situations suitable for 'like-for-like' comparisons. The CT and NC situations for comparison have typically differed by such factors as types of area (e.g. inner vs outer urban areas), type of services to be provided, contract sizes and durations, asset ownership and funding, performance requirements and other contract conditions.

Most of these potential comparison problems have been overcome in the recent reforms of local public transport (principally bus) services in New Zealand, under the new Public Transport Operating Model (PTOM). Under this reform model, since 2016 all urban bus service contracts have been specified on a similar basis, involving a group of routes, a gross cost funding basis, bus and depot provision by the operator, with similar contract performance requirements and financial arrangements.

Within this contracting framework, services have been procured on one of two bases:

- (A). Open competitive tendering (CT), with tender evaluation involving price versus quality trade-offs; or
- (B). Negotiation with the incumbent operator (NC)-- with competitive tendering as a fall-back should the negotiation process be unsuccessful.

Apart from these two different bases of operator selection, in most respects the procurement processes were very similar: under both NC and CT procedures, an RfT was issued (on either a 'closed' or 'open' basis), with respondents required to submit contract prices. For the 'closed' (NC) case, negotiations on contract price were then held having regard to contract prices recently established for comparable CT contracts. This situation has provided an almost-ideal opportunity to compare contract prices established for NC with those established through CT for comparable services under comparable conditions. These contract price comparisons are the main subject of this paper.

The paper focuses on analyses for NZ's two major metropolitan areas: for Auckland they cover 50 contracts (23 CT, 27 NC) requiring some 1100 buses, for Wellington 16 contracts (9 CT, 7 NC) for some 400 buses. Analyses of contract costs (prices) were undertaken at the individual contract level, but with the main focus on the comparative price findings for the CT group and NC group of contracts. The analyses also examined any effects of contract sizes and of levels of competition for contracts on relative prices. To complement the cost analyses, interviews were held with the regional authorities and operators involved in the procurement process. These interviews explored the perceived strengths and weaknesses of the two procurement approaches; the factors underlying different findings on comparative costs for different regions; and potential modifications to procedures that could contribute to achieving better value-for-money in future procurement/contracting rounds.

Understanding bidder behaviour: The case of the Mamelodi contract

Jackie Walters

The South African government has had a nearly 17-year moratorium on new commuter bus contracts due to issues such as affordability and organized labour issues with contracting in public transport operations. In late 2017 the government lifted this moratorium which enabled the Gauteng Province in South Africa (one of nine provinces) to design a service for a number of operating areas, one of which was focused on the Mamelodi township to the east of Pretoria. The contract had originally been operated by a bus company (Putco Pty Ltd) but due to escalating costs and the lack of an acceptable annual increase in subsidies to operate the service, the company withdrew its service. The service was then operated by two different companies over a three-year period until the last operator also gave the Province notice of withdrawal due to financial constraints.

The province designed the service with the aid of an advisor and put the service out to tender in November 2017. A number of operators tendered for the service. The result of the tender process was that the tender price was on average between three and four times more expensive than that of the incumbent operator and was therefore not awarded due to the unaffordability for the provincial government.

The purpose of the paper will be to ascertain the reasons for the unexpected increase in the operating costs for the Mamelodi service: whether it could be attributed to the characteristics of the design of the service to be contracted, the lack of a sustainable increase over the duration of the existing contract thus resulting in a widening gap between the current subsidy level and the reality of today's costs, or any other factor or a combination of factors that gave rise for this nearly four-fold increase in costs. The research methodology will be an extended case study, focusing on the Mamelodi contract, by adopting a structured interview process of the companies that bid for the service.

It is envisaged that the results of the study will assist transport authorities in their understanding of how bidding companies viewed the contract design characteristics and how they priced financial risk factors into the contract pricing.

Public transport without competition. Experience from 20 years after the first railway reform in Switzerland's regional public transport.

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In 1999, Switzerland's public transport underwent a major reform that aimed to strengthen public transport companies, effectively and efficiently organise collaboration between authorities and companies, and harmonizing public transport regulation with the regime in the European Union. In regional public transport, a new main principle was established. Public transport authorities now order services from the (incumbent) companies based on a binding ex-ante cost bid. Based on a mutual agreement, companies get compensated their planned rather than their effective uncovered costs (ex-ante fixed payment rule). In this setting, competitive tendering is allowed but optional. While it has been applied to a certain extent in the bus sector, no railway line has been competitively tendered so far. Instead, authorities apply instruments such as incentive

contracts or benchmarking based on simple performance figures to efficiently organise collaboration with public transport companies. Cost inefficiency in regional public rail transport, however, remains a black box.

In this research, we start with a brief overview of the development of supply and demand in regional public rail transport since the reform. We then turn to our main analysis of cost inefficiency and its development over time. In contrast to existing frontier studies for Switzerland that either base upon data from before the reform or analyse cross sections, we apply stochastic frontier models using a unique panel data set from 2007 to 2018 on costs and demand for every line in regional public rail transport. Thereby, we address different research questions: First, we analyse the development of cost inefficiency over time on the line level. Our hypothesis is that inefficiency declines over time and that outliers disappear. Second, we test variables that may enhance or lower cost inefficiency in Switzerland's non-competitive setting. Such variables are economies of scale and density, characteristics of the responsible authorities, characteristics of the corresponding company, or specific contractual settings. Third, we try to compare cost inefficiency on an aggregate level (company and system) to existing studies that use data from before the reform. We expect a lower degree of inefficiency and a smaller variance.

In discussing our results, we focus on lessons learned that can be transferred to other contexts. We believe this to be a useful exercise due to the somewhat different approach chosen in Switzerland with its rather collaborative setting and use of alternative governance instruments instead of widespread (direct) competition for the track.