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The effect of contract renewal and competitive tendering on public transport costs, subsidies and ridership

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ABSTRACT

In this paper, we aim to estimate the effect of contract renewal as well as competitive tendering on public transport costs, subsidies, and ridership. More specifically, we examine to what extent (multiple) contract renewals and introduction of competitive tendering for long-term public transport contracts affect ridership, operational costs and subsidies in concession areas governed by public transportation authorities from 2001 until 2013 in the Netherlands. Our identification strategy improves on the literature as we are able to control for all time-invariant unobserved factors, such as network and area characteristics by using panel data. We show that when renewing long-term contracts, operational costs are reduced by at least 10%, whereas subsidies fall even stronger. For contracts that are renewed at least twice, the reduction in costs is even more substantial and in the order of 16%. We find that the effect of competitive tendering is completely absent, suggesting that the threat of competitive tendering is sufficient in a market where the majority of concessions is competitive tendered. Contract renewal not only reduces costs and subsidies, but simultaneously increases public transport ridership by 7.7%. Furthermore the vehicle-hours elasticity of operational costs is 0.40, pointing to strong economies of density. The geographical scale elasticity of operational costs is around one, which indicates constant returns to scale with respect to the geographical size of the concession area. This suggest that the current size of the Dutch concession area is optimal with respect to costs.

1. Introduction

After 1990 all over the western world reform of the public transport (PT) industry has taken place. In Europe this reform has intensified due to the EU directive 1191/69/EU that put forward competitive tendering for procurement of exclusive PT services as the preferred way.[1] The new regulative framework for PT aims to enable an efficient and effective transfer of subsidies from the public transport authority (PTA) to operators. A reduction in PT ridership (mainly caused by increasing popularity of the car), combined with universal service obligation, led in the 60s and 70s to increasing operational deficits all over the western world, as fare box revenues increasingly failed to cover operational costs. Public budget constraints forced many Western PTAs to implement regulatory reforms. The new regulatory framework generally aimed to introduce incentives

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[1] The directive is formally finalized with the 2007 Public Service Obligations' Regulation' (later modified by 1893/91/EU). See Van de Velde and Beck (2010).

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for operators to increase efficiency, cut down subsidies and increase social welfare.[2] Triggered by these regulatory changes, a large number of studies have examined the determinants of operational efficiency, and specifically the effect of regulative change on firms' performance. In line with this literature we aim to assess the impact of contract renewal and competitive tendering (CT), on operational costs, subsidy, and PT ridership. We employ panel data for the period 2001–2013 on the level of concession areas in the Netherlands and take the most relevant contract attributes into account.[3]

Our focus on contract renewal is a natural one, as contracts serve as a formal stipulation of arrangements between operators and authorities and govern risk-sharing between PTAs and operators. The role of contract renewal as an incentive driver has long been recognized (Laffont and Tirole, 1993; Dalen et al., 2006; Gautier and Yvrande-Billon, 2013). Contract renewal in a market characterized by CT is pivotal as it allows several operators to bid for a new contract.

One of the main econometric issues is that network characteristics of the concession area impact heavily on PT efficiency, and it is therefore essential to control for (exogenous) relevant network characteristics. Most studies control for variables such as network length, average speed, number of stops and lines, however other network characteristics that may influence firms' productivity cannot be assumed away, thereby potentially biasing the analysis. Our approach avoids this issue by using panel data with concession area fixed effects, thereby controlling for all time-invariant unobserved area circumstances that may influence production efficiency of the firm.[4] To our knowledge we are the first to do this.

In Section 2 we review relevant literature on regulatory change in relation to PT costs and efficiency. Section 3 presents models of PT costs, subsidies, and PT ridership. Section 4 describes the institutional context of PT in the Netherland and presents the data we used. In Section 5 estimation results are given. Section 6 contains conclusions and recommendations.

2. Literature review on regulative change and efficiency in PT

Reform of the PT industry in the western world has led to a large number of studies on PT efficiency and effectiveness. These studies especially focus on how, and to what extent, public sector interventions affect efficiency of, and budget transfers to, PT firms. In this section, we review literature on issues related to competitive tendering, contract type, firm ownership and network characteristics. We also describe the ongoing debate on the most appropriate measure of PT output in the economic analysis.[5]

After the directive 1191/69/EU, CT has become a popular instrument to organize PT in the EU. Its primary aim is reduction of public subsidies. Subsidy reductions come fairly evenly from reductions in factor prices (especially labor and fuel), reductions in the use of labor and land, and adaptions to the production process (Preston, 2002). These efficiency gains are, via sharper contract biddings, transferred from operators to PTAs. Typically, the first round of tendering shows substantial cost reductions up to 50% when PT services were previously provided by public firms under public monopolies, but subsequent re-tendering delivers minimal subsidy reductions (Hensher and Wallis, 2005). Probably the greatest inefficiencies in PT provision are removed as result of the first contract renewal. Further cost reductions are thought to be minimal because the system has matured: authorities and bidders become more experienced (leading to less bid errors), PTAs ask for more demanding contract specifications in subsequent rounds of tendering (such as new low-floor vehicles) and bidders take a longer-term perspective and aim at higher profit margins (Hensher and Wallis, 2005). German urban PT companies operating in areas where CT is implemented reveal a significantly higher average efficiency than other companies (Scheffler et al., 2013). Karlaftis (2010) and Boitani et al. (2013) show with panel data of large European cities in nine different countries that firms selected after CT display approximately a 15–20% higher total factor productivity than firms selected under different contract awarding regimes. To summarize: CT effectively increases firm efficiency, and decreases subsidy transfers by PTAs.

Contract type is a powerful instrument for PTAs to govern transactions with the operator, as contracts make it possible to introduce specific incentives (Margari et al., 2007; Roy and Yvrande-Billon, 2007; Karlaftis and Tsamboulas, 2012; Gautier and Yvrande-Billon, 2013).[6] An important distinction is between high powered fixed price contracts such as gross and net costs contracts and low powered costs-plus, or management, contracts.[7] Under identical network conditions operators regulated by fixed-price contracts are more efficient than operators regulated with costs-plus contracts (Dalen and Gómez-Lobo, 2003; Piacenza, 2006). This implies that the latter contract arrangements especially common in France, are not the most efficient way to reach efficiency goals (Gautier and Yvrande-Billon, 2013). There is empirical evidence that firms under gross costs contracts (where the PTA receives all fare box revenues and therefore bares the commercial risks) are more efficient than firms under net costs contracts (where the operator receives all fare box revenues and bares the commercial risks), as gross costs contracts provides more incentives for production efficiency than net costs contracts. Firms regulated by gross costs contracts solely

[2] For reviews of these phenomena, see various volumes of the THREDBO-series (TREDBO, 2015).

[3] As individual contracts are not publicly available, in our econometric analysis we do not control for all attributes in the contracts. However we control for a range of relevant variables including vehicle kilometres and new vehicles that are usually the main attributes.

[4] This method does not shed light on the influence of individual time-invariant exogenous circumstances on efficiency. We examine this with a separate analysis on the effect of network characteristics on operational costs.

[5] This paper would ideally test the influence of all above mentioned factors on operational costs and ridership empirically. Due to data limitations, the empirical analysis however mainly focuses on competitive tendering, network characteristics and PT output measures.

[6] These studies are based on the (implicit) assumption that the type of contract is exogenous, so independent of the performance and network characteristics. This implies that the type of contract is often determined by political motives, rather than economic ones (Gagnepain and Ivaldi, 2002).

[7] Yardstick regulation is another example of a high powered incentive scheme. It uses benchmarking to reduce the problem of asymmetric information between operator and regulator (Dalen and Gómez-Lobo, 2003).