A major concern in procurement and contract design is how to give incentives for efficient provision of goods or services. The problem for the regulator is that the cost reduction effort exerted by the firms providing the public good is not observable. When the regulator’s concern is reduction of costs, fixed-price contracts are more efficient (Laffont and Tirole, 1993). Gagnepain and Ivaldi (2002), who show that firms providing bus services under fixed-price contract exhibit a larger cost reduction effort. These firms are residual claimant of operational cost savings and exert more effort to reduce costs.

Nevertheless, Laffont and Tirole (1991) show that when quality and cost reducing effort are substitutes, firms may reduce costs by lowering quality. If quality is not verifiable, fixed-price contracts may lead the firm to provide low quality, as firms only focus on lowering costs. Moreover, if a large fraction of population has no alternative to public transport and the demand has low elasticity to price and quality, under a fixed-price contract, the bus service operators have incentives to increase profit by reducing cost at the expense of quality (e.g. bus frequency). By contrast, if quality is verifiable, the regulator may establish a monitoring scheme and force a minimum quality level, recovering the incentive power of this type of contract. Consequently, if quality is a concern, the regulator faces a trade-off between developing costly quality performance measures and giving the firm monetary incentives. The extreme case is the implementation of cost-plus contracts, where the firm has no incentives for cost reduction by reducing quality.

For instance, in Santiago between 2007 and 2011, the contracts with bus operators were fixed-price contracts, with no penalties in case of failing to fulfil the operational plan. By mid-2007, the authority implemented a program of compliance measures and fines to enforce the fulfilment of the contracts, increasing the operating fleet from 4,600 to 5,800 (Beltrán et al., 2013). Despite the fines and the increase in bus frequency, the firms however rarely fulfil completely the operational plan, since they compensate the amount of fines with cost savings. Then, the question arising is what should be the level of fines to induce the firms attain the quality standard defined by the regulator.
The goal of this research is to study the design of fines to enforce minimum quality (bus frequency) under fixed-price contract for public transportation in Santiago. This is done taking into account the asymmetries of information between the operating companies and the transport authority.

The methodology comprises the estimation of a cost function for firms operating bus service in Santiago, Chile. I use an unbalanced panel of firms operating between 2007 and 2010. I estimate a structural cost model that takes into consideration two sources of asymmetric information: level of effort and efficiency (Dalen and Gomez-Lobo, 1997; Gagnepain and Ivaldi, 2002, Batarce and Galilea 2014). The former source of asymmetric information is moral hazard because the regulator cannot observe the agent’s effort. The latter source is adverse selection because the regulator cannot observe the firm’s efficiency level. The effort level is a source of endogeneity that bias the estimates, and the efficiency is a source of unobservable heterogeneity.

The level of contract (operation plan) fulfilment is also endogenous, because it is chosen by the firm. Moreover, even if the data contain measures of the fulfilment, it is not uniformly and continuously measure by the regulator. I assume the degree of accomplishment is observable only by the firm, but it choose this level in order to maximize profit, given the fixed-price contract, its level of efficiency, and the rule determining the amount of fine. Therefore, I assume the firm choose the cost reducing effort and degree of fulfilment levels simultaneously. Under parametric assumptions, I can determine the firm’s optimal levels of effort and fulfilment, and introduce them in the cost function to control for endogeneity. To deal with the heterogeneity, I introduce an efficiency parameter as a stochastic component of the cost function and estimate it distribution by maximum simulated likelihood.

The expected results are the estimated model, the level of fulfilment induced by the fines implemented by the regulator, and a rule to determine a fines based on observable indictors of bus operation.

References


