Transport Policy 41 (2015) 5–15

Contents lists available at ScienceDirect

Transport Policy

journal homepage: www.elsevier.com/locate/tranpol

An economic assessment of airport incentive regulation

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ARTICLE INFO

Available online 14 May 2015

Keywords:
Airport economic policy
Airport performance
Regulation
Competition and privatization of airports

ABSTRACT

There has been a gradual trend towards incentive regulation of airports since the privatization of BAA in 1986. Airports are price capped in several countries belonging to the European Union, as well as elsewhere, notably India. However, most of the price caps are not a pure price cap in which the X-factor is set independently of the cost of the regulated airport. Typically, hybrid price caps are used and combined with sometimes complex mechanisms like sliding scales, quality incentives and investment obligations, such that the incentive structures may become distorted. We provide an overview of the changes in the governance structure of airports as a result of privatization, analyze how far the regulatory institutions obey the principles of 'good' regulation, such as fairness and transparency, and investigate the performance of the new regulation in terms of allocative efficiency by reviewing benchmarking studies. Finally, we assess the impact of incentive regulation on productive efficiency using data envelopment analysis and second stage regression, which suggests that incentive regulation is superior to cost plus.

1. Introduction: why incentive regulation?

Incentive regulation (IR) grew out of a dissatisfaction with the way conventional regulation, which had been in place for nearly a hundred years in the US, had been performing. The dominant form of regulation, at least in the US, was Rate of Return (RoR) regulation, which was recognized to have several serious drawbacks, in that it had few incentives for the regulated firm to control costs, and there was evidence that it had led to over-capitalization (the Averch and Johnson effect). In the US, with its long history of regulation, and the UK, which by the 1980s had begun to privatize its public utilities, there was a call for forms of regulation with improved incentive properties.

Proposed changes to the form of regulation were debated at both the theoretical and the practical level. At the theoretical level, models of regulation were developed (e.g. Baron and Meyerson, 1982; Laffont and Tirole, 1986) which attempt to provide the firm with greater incentives to pursue productive efficiency. The main focus was on productive efficiency, but there was an expectation that the new forms of regulation would also encourage allocative efficiency, as RoR regulated firms showed little incentive to pursue profits by adapting their price structures to better reflect costs and demand conditions.

At about the same time, especially in the UK, there was a move away from RoR regulation, replaced by simple rules which incentivized the firm to produce more efficiently. The most common of these is the price cap rule, which was devised by Littlechild (1983) (see Beesley and Littlechild, 1989), and under which the firm is given a predetermined price path which sets the maximum price it may charge. If the firm achieves costs lower than the prespecified price path, it enjoys the additional profits, whereas if costs are higher than that defined by the path, the firm will incur losses. While several versions of the price cap rule exist, price caps are the most common form of practical incentive regulation.

Incentive regulation of airports began when BAA, which owned the major London airports, along with a group of smaller airports, was privatized. Since then regulation of the London airports has remained in place, although regulation of smaller airports has been discontinued. Australia followed the London model when it privatized its airports, beginning in 1997, though it ceased to regulate via price caps in 2001–02. Since then a number of countries have imposed price regulation, although several of the airports are not regulated by traditional price caps.

The primary emphasis of incentive regulation of airports has been on achieving productive efficiency, in addition to avoiding excessive charges. However other aspects of efficiency are expected to be affected by IR. With airports free to maximize profits, there has also been an expectation that price structures will

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http://dx.doi.org/10.1016/j.tranpol.2015.03.008
0967-070X/

become more influenced by costs, by demand elasticities. Incentive regulation may have negative effects on quality of service, since costs can be reduced by cutting quality. With airports, the distinction between aeronautical and non-aeronautical revenues is an important one whether these are included in the regulated prices (single till) or not (dual till). Finally, IR can be expected to have an impact on profitability and its variability.

The objective of this paper is to survey the performance of airports being subjected to different forms of incentive regulation. We first comment on the governance arrangements of airports, and then we try to assess which airports are truly incentive regulated and which are not. In Section 4 we set out what can be expected of incentive regulation. The core of the paper is Section 5, in which we attempt to assess the extent to which incentive regulation has affected performance. In particular we present a benchmarking and econometric study of the impact of incentive regulation on performance. Appendix A details the dataset analyzed and provides summary statistics and Appendix B specifies the type of regulation applied at the 58 airports for which data was available over time. We draw some conclusions in Section 6.

2. Principles of good regulation

Attempts to reform regulation in the direction of incentive based price caps also led to a renewed interest in the institutional aspects of regulation, in particular when these reforms were combined with privatization. The key problem of organizing public utilities is to write long term contracts for investments in long lived assets which have value only in a specific exchange relation. This is no problem in a world of perfect foresight, but in reality asymmetric information makes it infeasible to write complete long term contracts covering all contingencies. Opportunistic behavior might lead to hold-up problems so that markets and long term contracts fail and only regulation can create discretionary commitment. However even regulation can fail to provide this long term stability which is captured by changing interest groups and opportunistic behavior (Gomez-Ibanez, 2003). Such failure of regulation led economists[1] and international institutions to develop principles of good regulation which are now well defined, precise and, at least in principle, accepted by many states. According to the OECD (2005, p. 35) good regulation should "*be carried out by an independent, but democratic authority, because such an institution minimizes opportunistic behavior from the regulated firm, its users, its owners and from policy. An independent authority should try to correct market failure efficiently and avoid regulatory capture*."

The concept of good regulation does not prescribe a method of regulation. Cost based regulation can be part of good regulation if it avoids excessive cost inefficiencies. Good regulation, in particular with its demand for an independent regulator, is a necessary though not sufficient condition for incentive regulation. As incentive regulation implies risks for the regulator, it is equally important that firms should be prevented from influencing the regulator in an attempt to mitigate these risks. Traditional cost based regulation leads to problematic incentives which encourage gold plating and cost padding, but may nevertheless be considered a form of good regulation provided any inefficiencies are not overwhelmingly large.

[1] Stern (1997) provides a good overview.

3. What is incentive regulation at airports?

As the concept of incentive regulation has been developed for all public utilities, we firstly define incentive regulation in general, and then apply it to airports by providing examples of different types of incentives schemes. Thereafter we argue that while 'yes or no' categorization is not possible, it is useful to differentiate between different forms of incentive regulation.

3.1. Incentive regulation

The regulator must design a contract to set incentives for the regulated firm. If the contract reimburses the firm irrespective of its efforts, the contract is referred to as 'low' powered. In this case, regulated prices costs are likely to be high. If the contract only fixes a certain price, so that all cost savings remain with the regulated firm, the contract is referred to as 'high' powered (Laffont and Tirole, 1993). Such a regulatory contract which decouples prices from costs and profits are a means to induce efforts to reduce costs. However, cost based regulation would appear to accentuate the central problem for regulators, that is, the regulator has asymmetric information about the demand and cost functions.

Given the information asymmetry, the regulated firm will provide the regulator with the information only if in a position to keep some of the informational rents. Regulation will not achieve first best outcomes, but incentive regulation should lead to better outcomes than cost based regulation, depending on how high or low powered the contract is designed.

There appear to be three broad forms of incentive regulation that are currently practised. *Price cap regulation* was developed initially by Beesley and Littlechild (1989), and later evolved into British utility regulation. There are different varieties, but it is useful to distinguish between pure price caps, in which the cap is set independently from the costs of the regulated firm, and hybrid price caps, in which the cap is based every few years on the regulated asset base. Pure price caps are high powered; contracts hybrid caps less so. *Revenue cap and revenue sharing agreements* limit total revenues rather than prices (Green and Rodriguez-Pardina, 1999). Revenue and profit-sharing concepts define the level of profits the regulated firm is permitted to earn. Once this benchmark is exceeded, the amount by which the firm surpassed the benchmark must be shared between the firm and its consumers (Kunz, 2000). *Benchmarking and yardstick competition* was developed in particular by Shleifer (1985). The regulator determines the prices for the firm by using the cost levels of comparable firms in order to settle on a regulated price on the basis of costs seemingly unrelated to the regulated firm.

It is important to note that these three systems of price level regulation can be combined and even mixed with low powered cost regulation. The former happens, for example, if benchmarking is used to determine the X in the price cap formula. An example of the latter occurs when prices are regulated on a cost based principle and the quality is defined in terms of standards, which are incentivized by a bonus system.

3.2. Forms of incentive regulation at airports

Traditionally, for most airports, prices were set on a cost based approach. Even in those countries where governments own, operate and regulate their airports, charges were set in relation to costs, although very often in a non-transparent manner. Price capping of airports started with the UK airports in 1986. The UK Civil Aviation Authority (CAA) followed in the track of the price cap approach applied to other UK utilities, which led to a hybrid price cap. Another important feature of UK incentive regulation is that only a few airports, those that were thought to have market