



# A comparison of price-cap and light-handed airport regulation with demand uncertainty



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## ARTICLE INFO

### Article history:

Received 12 May 2014

Received in revised form 2 February 2015

Accepted 3 February 2015

Available online 21 February 2015

### Keywords:

Light-handed regulation

Service quality

Price-cap regulation

Airport

## ABSTRACT

This study analytically compares the performance of *ex ante* price-cap airport regulation vs. *ex post* light-handed airport regulation in the presence of demand uncertainty. Our modeling results suggest that light-handed regulation is a promising method which may lead to higher welfare than price-cap regulation. However, neither regulation strictly dominates the other in terms of welfare, airport charge or service quality. The relative performance of alternative regulations depends on many market factors and the specification of penalty under light-handed regulation. Our analytical results also suggest that if service quality matters and if an airport is allowed to invest in a higher quality, average cost pricing may not be optimal due to possible sub-optimal choices of quality, and the overall performance of alternative regulatory regimes should be assessed with a comprehensive welfare analysis. Our investigation confirms that light-handed regulation is worth preserving subject to monitoring and continuous improvements.

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## 1. Introduction

In recent years, formal price regulation has been removed for all major airports in New Zealand and Australia, and for some medium sized airports in the United Kingdom. A “light-handed” regulation regime has been introduced instead, where airport price and service quality are monitored but not directly regulated. Periodical and irregular reviews of airports are conducted. If the reviewing bodies find that airports have abused their market power, formal regulation may be reintroduced and penalties could be imposed on airports. Therefore, such a regulation regime is also referred to as a “threat of regulation”. Airlines may take actions against airports’ inappropriate actions by either expressing their views in the regulatory review, or by invoking competition laws. For example, in conjunction with its privatization in 2002, formal price regulation was replaced with price monitoring at the Sydney International Airport. When the airport tried to increase its service charges in 2004, Virgin Blue and Qantas, the two main airlines using the airport, filed a case against this plan in the Australian Competition Tribunal. After costly litigation, the tribunal decided that the airport could not implement the price increase unilaterally. This may be regarded as a penalty imposed or triggered by the airlines.

Since the introduction of light-handed regulation in Australia in 2002, various government inquiries and academic studies have been carried out to evaluate the performance of this new regime, yet the findings have been inconclusive. The Australian Productivity Commission conducted two reviews in 2006 and 2011 respectively, and concluded that the policy had brought important benefits and the light-handed regulation should proceed, subject to some improvements

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(Productivity Commission, 2011). In contrast, the International Air Transport Association (2006a,b) argued that price monitoring is ineffective in preventing airports from realizing windfall gains, and thus price control would be preferable. It is notable that another government agency, the Australian Competition and Consumer Commission, also expressed concerns over airport charges and service quality under the new regulatory regime (ACCC, 2010), and argued that more investment will be required if airports plan to adequately deal with current congestion, accommodate future growth, and improve service levels (ACCC, 2014).

A few academic studies have discussed the effects of light-handed regulation on airports with mixed conclusions and recommendations. Forsyth (2004, 2008) concluded that airport prices in Australia are somewhat high, although well below monopoly levels, and most airports performed well in terms of productivity. However, he cautioned that the effects on productivity will probably take longer to identify, and light-handed regulation could lead to distorted investment decisions, and may bear the inefficiencies of cost-plus regulation. In Australia, regulatory changes were introduced almost at the same time as the privatization of major airports (Hooper et al., 2000; Forsyth, 2002, 2003); this has probably made it even harder to precisely identify the effects of light-handed regulation. O'Donnell et al. (2011) argued that light-handed regulation had not effectively controlled monopoly market power, and a stronger regime of regulation to be is required. Littlechild (2012a) regarded the Australian light-handed regulation at the frontier of airport regulation. He argued that concerns over market power and service quality may be unjustified, and could be addressed by independent dispute resolution. With respect to investments, Littlechild (2012b) concluded that “the Australian light-handed approach is yet to be fully tested with respect to agreements on major investments.” These studies provide very good insights into light-handed regulation in particular and airport regulation in general. However, the key conclusions are mainly based on the qualitative examination of anecdotal evidence. Therefore, the interpretation of industry practices and market outcomes in these studies may reflect subjective judgments in certain cases.

Studies of the effects of light-handed regulation in other industries have also been inconclusive. Reviews on the utility industries by Pickford (1996) and Carpenter and Lapuerta (1999) concluded that light-handed regulation did not effectively control firms' market power, and allowed firms to achieve windfall profits in a few cases. King and Maddock (1999) modeled the effects of light-handed regulation in the Australian telecom market using an infinite period bargaining game. They proved that the bargaining solution may not lead to monopoly outcome. Using data from the New Zealand electricity market, Bertram and Twaddle (2005) found that price–cost margins had widened substantially since deregulation, allowing firms to earn more under light-handed regulation compared to rate-of-return regulation.

In summary, the effects of light-handed airport regulation remain unclear, and no consensus has been obtained from empirical and qualitative studies in other industries. This study aims to fill this gap in the research by analytically comparing the performance of *ex ante* price-cap airport regulation vs. *ex post* light-handed airport regulation in the presence of demand uncertainty. This is achieved by modeling the behaviors of a welfare-maximizing regulator, a profit-maximizing airport, and competing airlines in a multistage game. Alternative regulations are examined by benchmarking the corresponding social welfare. The model proposed in this study explicitly considers airport service quality and demand uncertainty. As a result, our analysis not only provides insights that are valuable to policy-makers, but also contributes to the literature on airport regulation.

Most studies on airport regulation and airport–airline vertical arrangements have focused on airport price, capacity and congestion without explicitly considering other quality attributes that affect consumer surplus (see for example Oum and Zhang, 1990; Zhang and Zhang, 1997, 2003, 2006, 2010; Oum et al., 2004; Basso and Zhang, 2008; Czerny, 2006, 2010; Fu and Zhang, 2010; Zhang et al., 2010; Fu et al., 2011; Yang and Zhang, 2012; Xiao et al., 2013. For a comprehensive review, see Gillen, 2011a,b). In practice, however, airports and regulators are increasingly concerned with many other aspects of service quality, and have explicitly incorporated these service measures into regulation. The UK Civil Aviation Authority (CAA, 2009) imposes a set of service performance standards and rebates as part of the economic regulation on the Stansted Airport during the 2009–2014 period, under which the airport operator would reimburse airlines up to 7 per cent of airport charges where the airport's service performance falls short of the defined standards.<sup>1</sup> The Standards and Rebate Scheme has also been applied to the Heathrow and Gatwick airports. In Australia, service quality monitoring is part of the light-handed regulation regime, which is performed by the regulator ACCC. Such regulatory requirements are supported by empirical studies, which identified many quality measures as important determinants of customer satisfaction and utility without affecting airport capacity or congestion (Adler and Berechman, 2001).

The need to treat service quality separately from capacity and congestion also arises from the distinctive natures of airport capacity vs. service quality. Oum and Zhang (1990) recognized that key airport capacity is lumpy in that it can only be added in big quantity or discrete numbers. In addition, it usually takes a long time to install these capacities. However quality investments can often be made in relatively short periods of time (for example, investments related to lounge seats, flight information panels, ground power, people movers, cleanliness, staff training, concessions, and the addition of security lines and security personnel with the support of other stakeholders). Indeed, service quality is monitored and evaluated much more frequently than capacity: airport capacity planning is often dealt with in airport master plans, which may be reviewed every 5 or even 10 years. In contrast, airports such as London Heathrow report service quality monthly. Such a

<sup>1</sup> Service attributes include jetty serviceability, “People movers” (i.e., passenger and goods lifts, escalators, passenger conveyors, transit systems), fixed electrical ground power serviceability, inter-terminal transit systems, departure lounge seat availability (the percentage of passengers who wanted a seat and got one), flight information (availability of information screens/boards), cleanliness, and way-finding.

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