



Total factor productivity analysis of the UK airport industry: A Hicks-Moorsteen index method



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ABSTRACT

This study examines the total factor productivity (TFP) change of the UK airport industry from 2001 to 2009 using a Hicks-Moorsteen index method. The results show that the industry experienced an average annual growth in TFP of 0.32 per cent with efficiency change being the main contributor to the TFP growth. We find that private UK airports enjoy slightly higher TFP growth than those in public or mixed ownership. Regulation and airport size are found to have statistically significant effects on the airport productivity level.

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1. Introduction

Traditionally, airports were owned and operated by the government for strategic, economic and defence reasons (Donnet et al., 2011). However, over the last two decades, the airport industry in many countries has experienced significant changes in ownership structure, governance and regulation. Many countries have adopted different market reforms (e.g. commercialisation, privatisation and deregulation). Privatisation of the airport industry, notably in European countries including the United Kingdom (UK), has been identified as leading to an overall increase in competition, a narrowing of operating margins, and an increase in the vulnerability of the industry (Perelman and Serebrisky, 2012).

Before reform in the UK, almost all airport runways, terminals and other assets were government owned, either centrally or locally. The industry experienced market reforms through privatisation, which started in 1987 after the 1986 Airports Act. The reform not only transferred the capital of the state-owned British

Airports Authority (BAA) to the private sector but also eventually led to direct ownership and management of selected UK airports being transferred from local authorities to autonomous private companies.¹

The UK has a large number of airports with scheduled passenger services, including one of the major transfer hubs in Europe, namely London Heathrow Airport. In 2009, after a two-year inquiry, the UK's Competition Commission concluded that parts of the ownership structure of UK airports were not favourable to competition, especially for the BAA-owned airports, such as Edinburgh, Gatwick, Glasgow and Stansted. One method to increase competition was seen as preventing one company from monopolising and managing the majority of the large international airports in the UK. Therefore, Gatwick and Edinburgh airports were sold to Global Infrastructure Partners (GIP) consortia in 2009 and 2012, respectively. BAA also agreed to sell Stansted Airport to the Manchester Airports Group (MAG) in 2013.

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¹ In the case of the UK, airport privatisation models can be classified into three types, namely, share flotation (e.g. BAA airports in 1987), trade sale (e.g. Leeds Bradford in 2007) and concession (e.g. London Luton in 1998).

Table 1
Characteristics of the major UK airports, 2001–2014.

Airport	Runway (ft)	Year of change in major ownership	Study period (2001–2009)		2014	
			Ownership	Ownership type	Ownership	Ownership type
Aberdeen	6001	2006	BAA	Private	BAA	Private
Edinburgh	8400	2006 & 2012	BAA	Private	GIP	Private
Gatwick	10364	2006 & 2009	BAA	Private	GIP	Private
Glasgow	8720	2006	BAA	Private	BAA	Private
Heathrow	12799	2006	BAA	Private	BAA	Private
Southampton	5653	2006	BAA	Private	BAA	Private
Stansted	10000	2006 & 2013	BAA	Private	MAG	Mixed
Bournemouth	7451	2001 & 2013	MAG	Public	MAG	Mixed
East Midlands	9491	2001 & 2013	MAG	Public	MAG	Mixed
Humberside	7205	2012	MAG	Public	Others	Mixed
Manchester	10000	2013	MAG	Public	MAG	Mixed
Belfast	9121	2005 & 2013	Abertis	Private	Others	Private
Cardiff	7848	2005 & 2013	Abertis	Private	Welsh Gov.	Public
Birmingham	8546	2007	Others	Mixed	Others	Mixed
Blackpool	6132	2004 & 2008	Others	Mixed	Others	Mixed
Bristol	6598	2006	Others	Private	Others	Private
Exeter	6834	2007	Others	Private	Others	Private
Leeds Bradford	7382	2007	Others	Private	Others	Private
Liverpool	7500	2010	Others	Private	Others	Private
London City	4948	2006 & 2008	GIP/others	Private	GIP/others	Private
London Luton	7086	2005	Others	Public	Others	Public
Newcastle	7642	2001	Others	Mixed	Others	Mixed

Notes: BAA: (now known as Heathrow Airport Holdings), MAG: Manchester Airports Group and GIP: Global Infrastructure Partners.

Source: Compiled by author from various sources (Office of Fair Trading 2010; Graham, 2014)

After undergoing restructuring and reform, the UK airport industry is now a mixture of private and public entities. Information about the major UK airports is presented in Table 1. Fifty five per cent of the airports were privately owned, 36 per cent were under mixed ownership, and the rest were publicly owned in 2014. Since October 2012, BAA has been known as Heathrow Airport Holdings (however, for convenience of analysis, this entity is referred to as BAA). MAG (formerly known as Manchester Airports PLC) used to be the largest publicly run regional airport company in the UK, owned by the ten metropolitan borough councils of Greater Manchester. However to raise funds for MAG's takeover of Stansted Airport, Industry Funds Management (IFM), a group of private investors, was allowed to purchase a 35.5 per cent share in the group. As a result, MAG is no longer totally publicly owned. In 2014 four airports (Aberdeen, Glasgow, Heathrow and Southampton) were owned by the former BAA company, while MAG was also responsible for operating and managing four airports – Manchester, Stansted, Bournemouth and East Midlands. Global Infrastructure Partners was the other major owner and operator of airports in the UK and was involved with three UK airports (i.e. Edinburgh, Gatwick and London City).

Ideally, airport privatisation is expected to result in enhanced efficiency, greater market competition and more commercial focus (Graham, 2014). However, there is no guarantee that such market reform will benefit final customers and the economy (e.g. via reduced airport charges and improved airport service quality). Efficiency is clearly a critical factor in airport competitiveness. Some studies (e.g. Oum et al., 2006) have revealed that airport ownership has significantly affected the technical efficiency of airports. On the other hand, other studies (e.g. Barros, 2008) have suggested that there are no significant effects.

Since the early 2000s, there has been an increasing amount of literature describing the role of market reforms in Total Factor Productivity (TFP) growth. To the best of our knowledge, Barros and Weber (2009) is the only study that has estimated the level of productivity growth of the UK airport industry. However, this does not include data after 2005. From Table 1, we observe that a number of airport privatisations occurred in the UK after 2005. In this study,

we assemble a new dataset for UK airports from 2001 to 2009. Hence, this complements the Barros and Webber study on the impact of ownership on UK airport productivity as the years 2006–2009 have been included. A full dataset could not be obtained for more recent years. Our study measures the TFP growth of each UK airport and investigates the determinants (i.e. ownership, size and regulation) that are associated with variations in airport productivity. An analysis of productivity change (i.e. the effectiveness) of the UK airport industry can provide useful information for regulators, policy makers and other stakeholders. The remainder of the paper is structured in the following manner. Several previous TFP studies are discussed in Section 2, while Section 3 provides an extended discussion on the Hicks-Moorsteen TFP index method. The research findings are highlighted in Section 4. Some concluding remarks and policy insights are presented in Section 5.

2. Literature review

Appendix A summarises a sample of selected airport efficiency and productivity studies conducted in various countries. The majority of these were conducted in developed countries with more limited coverage of developing countries. Most of the empirical literature involves the analysis of data from a single country, although the local benchmark study may not be appropriate when there are insufficient airports within the one country. However there are a few cross-country comparison studies, such as that of the Air Transport Research Society (2014) that provides examples of how to measure productivity analysis for a large number of international airports.

Productivity studies of UK airports are limited. These include Parker (1999), Barros (2008, 2009), Assaf (2009) and Assaf et al. (2012) which have estimated the technical efficiency and identified the determinants of inefficiency of UK airports. However as mentioned above, there only appears one study that has estimated the total factor productivity growth of UK airports, namely that of Barros and Weber (2009), based on 2000 to 2005 data, which applied a data envelopment analysis (DEA) Malmquist TFP index to examine the TFP level of UK airports.

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