Transportation Research Part E 61 (2014) 176–191

Contents lists available at ScienceDirect

Transportation Research Part E

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

Rapid capacity expansions and failure: A trap for new airline entrants?

Terence Ping Ching Fan [a,*], Alex Tai Loong Tan [b], Xuesong Geng [a]

[a] Singapore Management University, Lee Kong Chian School of Business, 50 Stamford Road, Singapore 178899, Singapore
[b] University of Western Australia, School of Business, 35 Stirling Highway, Perth, Western Australia 6009, Australia

ARTICLE INFO

Article history:
Received 30 April 2012
Received in revised form 28 March 2013
Accepted 26 October 2013

Keywords:
Capacity
Expansion
Airline
Entrant
Failure
Survival

ABSTRACT

This paper investigates whether fast capacity expansions as a means to narrow cost differentials between a *de novo* airline entrant and established incumbents helps or hinders the survival of the entrant. Evidence from a longitudinal sample of new entrants in the European passenger airline industry showed that these firms exhibited higher failure risks after rapidly expanding capacity. Further, high product market overlap with an established incumbent reduced the probability of new entrants undertaking such expansions, in turn reducing the probability of failure.

1. Introduction

In air transportation, traditional scale advantages are manifested in the strong presence in specific markets such as city pairs and airports (Oum and Zhang, 1991; Zhang, 1996; Brueckner and Zhang, 2001; Wei and Hansen, 2005). These are possible because fundamentally, larger transport equipment or facilities can achieve lower unit operating costs (e.g., Wei and Hansen, 2003), and because frequent scheduled services (relative to competitors) enable carriers to offer a more valuable proposition to consumers (Borenstein, 1989). Moreover, large incumbent airlines can use size-related advantages such as frequent flyer programs (Levine, 1987: 414) to stymie advances from new entrants (e.g., see U.S.A. versus AMR Corporation, et al., 2001). From the perspective of small entrant carriers, it is tempting to grow rapidly so that they too become more comparable to their incumbent competitors in these size-related attributes, and therefore compete on more equal footing. Studies on airline economics have not examined the importance or dangers of the speed of capacity expansion from the perspective of new entrants – whose long-term survival has been rare to begin with (e.g., Levine, 1987: 418, Fan, 2010).

In general, high growth – especially one achieved in a relatively short span of time – is revered in businesses (Barringer et al., 2005; Acs et al., 2008; Baron and Henry, 2010). In view of the size-related advantages of scheduled airlines, it is even more imperative that new entrants increase in size as soon as possible. However, some anecdotal evidence suggests that a rapid expansion strategy could backfire and weaken the position of the focal airline. People Express of the U.S. was one of such instances – expanding to a fleet of more than 80 airplanes including two Boeing 747s only 6 years after inception. It was eventually acquired and integrated into Continental Airlines after liquidity problems (Chen and Meindl, 1991; Gudmundsson, 1998; Wikipedia.org). Axon Airlines of Greece started with 2 airplanes and grew to a fleet of seven before abruptly

* Corresponding author.
E-mail addresses: terencefan@smu.edu.sg (T.P.C. Fan), a.tan@uwa.edu.au (A.T.L. Tan), xsgeng@smu.edu.sg (X. Geng).

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http://dx.doi.org/10.1016/j.tre.2013.11.002

closing down without a suitor within 1 year after this expansion. Independence Air of the US – transformed from a regional carrier after its contract with United Airline was terminated – grew to a network serving 35 destinations before collapsing less than 3 years after it began operating as an independent carrier. SkyEurope – a low-cost entrant that started service from Slovakia in 2002 – expanded to 93 city-pairs within 6 years of its founding while piling up losses every year. It ceased operations without any suitor in 2009. Whether these represent only isolated experiences among many new entrants over the years remains the focus of this paper.

A closely related question concerns if the rapid capacity expansions undertaken by new entrants are linked to the competitive landscape faced by the entrants. Econometric studies of the airline industry have often focused on price competition brought about by new entrants on specific city-pair markets (Dresner et al., 1996; Morrison, 2001; Hofer et al., 2008), but the systematic survival odds of new entrants have received much less attention. Rapid capacity expansions in new entrants could be an important mediator between the competitive landscape faced by a focal new entrant and its survival odds. In particular, the degree of product market overlap between a new entrant and its arch-incumbent is potentially an important determinant on the expansion strategy of the entrant, and this relation is also investigated in this paper.

This paper is organized as follows: The opposing arguments for linking rapid capacity expansions to enhanced or reduced entrant survival odds are explained. The link between the competitive landscape faced by a focal entrant and its probability of undertaking a rapid capacity expansion is then explored. The empirical analysis is drawn from new entrants in the liberalized intra-European scheduled airline industry from 1996 to 2005.

2. Literature review and hypothesis development

2.1. The rationale for rapid expansions

Scholars studying the economics of major domestic carriers in North America have consistently noted the significant returns to density and at least constant returns to scale (Caves et al., 1984; Gillen et al., 1990; Oum and Zhang, 1991). Returns to density refers to the level of increase in outputs made possible by a proportional increase in all inputs, with output characteristics including the number of geographic locations served held constant, while returns to scale refers to the corresponding increase in outputs as well as the number of geographic locations served made possible by a proportional increase in all inputs. In spite of these findings, small entrants generally suffer large unit cost gaps relative to their much larger, more established counter-parts. For instance, using data from the largely regulated era, scholars estimated that a unit cost difference of about 50% between large established trunk carriers versus small, regional carriers in North America (Caves et al., 1984; Gillen et al., 1990), with half of this cost difference explained by the difference in output alone.

Meanwhile, evidence suggests that economies of scope – another attribute correlated with size – are evident in the airline industry (Gimeno and Woo, 1999; Hofer and Eroglu, 2010). Moreover, organizational scholars would also argue that a larger production scale confers more legitimacy to a new entrant from the perspectives of potential customers and suppliers, thereby reducing its failure odds (Zimmerman and Zeitz, 2002). As a result, from the perspective of a *de novo* entrant – by definition without prior operating history, rapidly expanding its capacity can be regarded as an important means to narrow the competitiveness gap vis-à-vis established incumbents.

How far would this gap have to be narrowed for a new entrant to be sufficiently competitive relative to the incumbents? The applied economics literature provides an insight on the gap in unit cost through the notion of minimum efficient scale (MES). In the manufacturing industry, the capacity of a specific plant is a prime determinant of the unit production cost. As an entrant increases its size, its unit cost would fall closer toward that of its much larger incumbents, and its competitive disadvantage would be reduced. Upon reaching a minimum efficient scale, new entrants would have some respite from their established incumbents, since the remaining cost gap may be overcome by other managerial means such as skillful marketing. Studies on manufacturing plants of *de novo* and diversifying entrants in the U.S. used an average plant size of the largest firms whose combined capacities constituted at least half of a particular product market as a proxy for minimum efficient scale (Montgomery and Hariharan, 1991; Hariharan and Brush, 1999). However, when transplanted to the analysis of airline capacity, this notion did not turn out to be a reliable predictor of survival odds among new entrants (Fan, 2010). This suggested that an ever larger scale of operation (with the attendant increase in density, scope and other related attributes) would be preferred in the airline industry.

The preceding perspective highlight strong economic motivation for a new entrant to narrow its competitive disadvantage vis-à-vis large, established incumbents by rapidly increasing its overall size (and related attributes) of operation. Mathematically, this focus on unit cost can be evident when profit (Π) maximization is expressed in terms of quantity sold (Q), unit revenue (P) and unit cost (c) relative to capacity (K) as a function of time (t) – with the pace of capacity changes as a decision variable:

$$\prod = Q(P - c), \text{ where } Q = (P, K); c = c(K);\ K = K(t) \tag{1}$$

Differentiating with respect to time (assuming differentiability) yields:

$$\frac{\partial \Pi}{\partial t} = \left(\frac{\partial Q}{\partial P}\frac{\partial P}{\partial t} + \frac{\partial Q}{\partial K}\frac{dK}{dt}\right)(P - c) + Q\left(\frac{\partial P}{\partial t} - \frac{dc}{dK}\frac{dK}{dt}\right) \tag{2}$$