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Impacts of code-share alliances on airline cost structure: A truncated third-order translog estimation

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Abstract

The airline industry has undergone significant changes following deregulation more than a decade ago. A prominent development in recent years has been the proliferation of airline alliances. An important question arises: are alliances cost savings or competition reducing? This paper addresses the first part of the question. However, the answer has bearing on the second part as well, since results in industrial economics suggest that, unless a merger (or alliance) can substantially reduce costs, consumers are unlikely to enjoy lower prices [e.g., Farrell, J. and C. Shapiro (1990), "Horizontal mergers: An equilibrium analysis," American Economic Review, 80(1), 107–26]. This paper estimates a truncated third-order translog cost function using quarterly firm-level data of 10 airlines for the period 1994QI to 2001QI. Using the estimated function, we assess whether alliances have any impacts on costs, and if so, the extent to which the cost structure of airlines are affected. It is found that the truncated third-order translog is an appropriate specification, and alliances do appear to lower costs. However, while the impacts are statistically significant, in economic terms the magnitude appears to be immaterial.

JEL classification: L120; L430; L930

Keywords: Third-order translog; Airline alliances; Cost function estimation

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1. Introduction

Alliances are voluntary arrangements involving some form of long-term commercial cooperations or exchanges. The operative word here is the voluntary nature of the relationship, which allows firms to remain largely independent in the arrangement. Since deregulation, the world's airline industry has witnessed a proliferation of alliances. Today, almost all airlines participate in some form of alliance agreements. The Airline Business survey conducted in 1994 shows more than 280 alliances between 136 airlines (Airline Business, 1994). The same survey, conducted 6 years later, has revealed that the number has increased to 579 alliances between 220 airlines (Airline Business, 2000). The prevalent view is airlines that do not participate in alliances will be severely disadvantaged (Li, 2000), and may find themselves marginalized and become niche players in localized markets (Oum et al., 1996).

Of the many forms of airline alliances, the most common is code-share alliances.[1] In a code-share arrangement, member airlines can use each other's designator code, and often also coordinate flight schedules and other services, so as to create the impression that the services are run by the same airline. These arrangements provide three important advantages as (i) most passengers would avoid inter-line transfers, i.e., the preference is for a seamless travel through airports and traffic lanes; (ii) computer reservation systems generally display flights without inter-line transfers first; thus, code-sharing gives a marketing edge; (iii) such cooperative arrangements may also enhance efficiency by allowing airlines to rationalize their network structure and exploit economies of scale, density and scope. The last point suggests two major sources of cost advantages that alliances can bring about. First is the coordination and rationalization of flight scheduling, which directly affects the use of labour, capital and materials. Code-share alliances allow member airlines to pool their resources such as flight and ground personnel, aircraft deployment, and ground facilities. It is thus possible for member airlines to achieve a more efficient use of factor inputs and to avoid excesses and duplications. The second way in which airlines' cost structure can be affected is through economies of scale, density, and scope. By forming alliances, airlines not only can concentrate on running the routes that they have a comparative advantage, but may also expand output by extending the reach of their networks via the shared routes of member airlines. It is therefore possible for airlines to increase their output, not only within the same network (economies of density), but also beyond their network (economies of scale and scope). Chen and Chen (2003), in a theoretical model, illustrate how a code-sharing arrangement can reduce airlines' costs in this manner. These and other cost-saving advantages of alliances are also discussed in Park (1997) and Bissessur and Alamdari (1998). A stylized model of possible cost saving effects of alliances is included in Appendix C.

Predictably, airline executives often laud the cost savings and synergies afforded by these alliances. However, consumers and policymakers are concerned that the proliferation of airline alliances may have lessened competition. A priori, it is unclear whether the competition-reducing effect dominates the cost saving effects (Oum et al., 1996). Brueckner and Whalen (2000), Park and Zhang (2000), Bamberger et al. (2001), Goh and Uncles (2003) and Brueckner (2001, 2003) find evidence that alliances result in lower fares and, hence, higher consumer welfare after examining data on route-level traffic and fares. Clougherty (2000) argues that, from a national welfare point of view, U.S. domestic airline alliances enhance the international

[1] According to one estimate by OECD (2000, p.30), 70% of alliances include a provision for code sharing. Other forms of alliances include arrangements on joint marketing, frequent-flyer programmes, and facility sharing.