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THE IMPACT OF ENTRY AND CONCENTRATION IN AUSTRALIAN AVIATION: A TEST OF CONTESTABILITY THEORY

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SUMMARY

Contestability theory predicts that concentration and new entry will not influence price: quite different predictions from the traditional structure-conduct-performance model. Particularly given that contestability theory has been influential in shaping airline public policy, it is important to test which theory most accurately describes the airline industry. This paper contributes to the debate regarding the impact of concentration and entry on prices by providing evidence from the recently deregulated Australian domestic airline industry. The main findings are that fares are significantly influenced by both concentration and the presence of a new entrant.

THE IMPACT OF ENTRY AND CONCENTRATION IN AUSTRALIAN AVIATION: A TEST OF CONTESTABILITY THEORY

I. INTRODUCTION

In the 13 years since deregulation, a large body of empirical research has emerged regarding the U.S. airline industry. One important issue has been the impact of new entry. The traditional structure-conduct-performance paradigm from industrial organization economics posits that alterations in market structure, in particular, new entry, will have major consequences for firm conduct and, in turn, market performance. On the other hand economic theorists have more recently argued that the airline industry is contestable. According to this theory, potential entry restrains firms from charging prices greater than marginal costs. Accordingly, new entry would be expected to have little effect on prices.

This paper contributes to the debate regarding the impact of concentration and entry on prices by providing evidence from the recently deregulated Australian domestic airline industry. The next section of the paper discusses in more detail the previous literature regarding the importance of entry in the airline industry. Then, an overview of the Australian domestic aviation industry is provided. Finally, empirical evidence regarding the effects of entry and concentration in the Australian context is presented and discussed.

II. THE IMPORTANCE OF CONCENTRATION AND ENTRY: STUCTURE-CONDUCT-PERFORMANCE VS CONTESTABILITY

The standard paradigm in industrial organization economics posits that the degree of rivalry among firms in an industry is largely a function of market structure. The industrial organisation economics literature has focused on a number of key structural determinants of the degree of competition (Scherer and Ross, 1990). Particularly important are the number of competitors and the degree of new entry; each will be discussed in turn.

Industrial concentration, as measured by the market share held by the top firms, the Herfindahl index, or by the number of firms, has long been argued to be the key determinant of conduct. Rivalry will generally become more intense as a greater number of firms compete in a market. Coordination becomes more difficult with additional firms, as the number of communication channels increase along with the chances that a maverick firm will set off a fierce competitive skirmish.

The structure-conduct-performance paradigm also assumes that entry will generally have an important impact on prices. New entrants often need to price aggressively to attract customers from established firms and so typically increase the degree of

rivalry in an industry. Also, a new firm may not be familiar with the established signalling and other communication mechanisms to bring about tacit collusion. Also, new entrants frequently increase the degree of industry capacity and heterogeneity, which, as discussed below, also tend to accelerate the intensity of competition. On the other hand, strong entry barriers increase industry stability and can result in lower rivalry, in that firms can more easily engage in long-term mutually beneficial actions if they are confident the same set of players will be in the industry over time.

More recently alternative approaches to the structure-conduct-performance paradigm have been developed, with contestability theory the most prominent (Baumol, Panzar and Willig, 1982). Contestability theory offers an alternative to perfect competition as a welfare benchmark. Key assumptions of the theory are that there are no entry and exit costs, new entrants have access to the same technology as incumbents, and prices charged by incumbents prior to entry are used by new entrants to judge the profitability of entry. Under the assumptions of contestability, an industry with just one firm achieves optimal social welfare. The basic intuition is that the threat of hit and run entry disciplines such a monopolist to lower prices to forestall entry, thus eliminating the usual excess profits (and allocative inefficiency) resulting from monopoly. Contestability theory then minimizes the importance of concentration and actual entry in determining economic welfare.

According to this theory, markets within a contestable industry with only one firm will perform as well as markets with multiple firms, so that concentration would have no effect on prices. Potential competition will discipline the firms in highly concentrated markets as well as will additional firms. Moreover, new entry into a contestable market will have no effect on prices. Again, contestability theory would suggest that potential entry has already forced prices down to costs, so that actual entry has no further effect.

Contestability theory thus offers predictions which are quite different from the traditional structure-conduct-performance model. Particularly given that contestability theory has been influential in shaping airline public policy, it is important to test which theory most accurately describes the airline industry. As discussed in more detail by Levine (1987), the airline industry has been described as contestable (Bailey, Graham and Kaplan, 1985; Bailey and Panzar, 1981). As summarized by Keeler (1991), this issue has been addressed empirically dating back to the early 1980's using data from U.S. airline markets, with Keeler and Abrahams (1981) and Call and Keeler (1985) conducting perhaps the earliest such research. These studies have shown a positive relationship between concentration and prices, with new entry having a downward impact on fares. However, arguments as to the contestability of the airline industry have continued to be used to support deregulation policies and the wave of U.S.

airline mergers which occurred in the 1980's. Levine (1987) provided qualitative evidence regarding airline contestability, pointing out a number of "anomalies" which exist in the U.S. airline industry which are inconsistent with a contestable market. The failure of most new entrants, the wave of merger activity, the complexity of fares and the existence of marketing initiatives such as frequent flyer programs are among the anomolies discussed by Levine.

Although the applicability of contestability theory has been tested with data from the U.S. airline industry, this paper provides additional insights regarding airline contestability by applying evidence from the Australian domestic airline industry. Given that other studies have all drawn from U.S. data, it is useful to investigate data from another country. To the extent that results contradicting contestability drawn from U.S. data may have been influenced by unique institutional features of the U.S. market, drawing from another country provides important additional information. Notably, many of the entry barriers in the U.S. airline industry cited by Levine (1987) are lower in the Australian context. For example, the presence of overcrowded, slot-restricted airports are not prevelant in Australia. In addition, the relatively small number of major cities in Australia, geographically dispursed, allows a new entrant to readily serve most passengers so that the entrant is less disadvantaged by frequent flyer programs and scale economies from hub-and-spoke systems than a U.S.

counterpart serving the same number of markets. The lower entry barriers allows for perhaps a "purer" test of contestability than U.S. data. Also, the Australian airline industry is somewhat simpler its U.S. counterpart and, as will be discussed below, the events since domestic deregulation provide a natural setting for investigating the impact of new entry.

III. AUSTRALIAN AIRLINE DEREGULATION AND THE ENTRY OF COMPASS

As discussed in more detail in Bureau of Transport and Communication Economics (1991), comprehensive regulation of prices and services in Australian interstate passenger aviation was commonly known as the "Two Airlines Policy." The two-airlines policy was a complex set of arrangements which included several Acts of Parliament and a contract between the two major domestic airlines and the Commonwealth Government. The policy had remained fundamentally unchanged since its genesis in 1952. It maintained the competitive balance between the two major domestic airlines now known as Australian Airlines and Ansett Airlines of Australia and excluded entry by other possible competitors. As a component of micro-economic reform throughout the Australian economy, the "two-airlines policy" came to an end at midnight on the 30th of October, 1990. On that date, the government removed economic controls over:

- entry to and exit from interstate routes;
- passenger capacity which could be provided on these routes;
- airfares which could be charged on these routes;
- consultation with each other on such matters as load factors, aircraft utilisation and setting of fares
- the provision of financial and other information to the Minister for submission to Parliament; and
- the importation of aircraft and offset purchases .

It should be noted that initial deregulation did not allow for domestic entry of foreign carriers of Qantas, the Asutralian flag carrier. Also, initial deregulation did not allow Australian Airlines and Ansett Airlines to compete on international routes. More recently, government policy has moved to allow entry into the Australian domestic market by Qantas and Air New Zealand over a multi-year period.

Compass' Entry

As discussed in more detail in Bureau of Transport and Communication Economics (1991), a new domestic carrier - Compass - soon emerged to provide competition across most major airline markets in Australia. Compass commenced operations on 1 December 1990. Compass followed a low-cost strategy, using

large aircraft (initially 2 Airbus A300-600R's), serving only the densest routes, offering a one-class service and trimming labor and overhead costs vis-a-vis incumbents. However, Compass also attempted to provide comparable or better service quality than Ansett or Australian, with more leg-room and in-flight video entertainment not offered by incumbents.

As is common with most new entrants, Compass encountered difficulties in the initial months of service. Delays were caused by a lack of refuelling facilities at Sydney airport. The reservations system purportedly could not handle the volume of calls received in response to discount fare initiatives. Access to terminals, as provided by Australian Airlines at cost according to the deregulation policy, was not ready before the start-up date. In addition, Compass encountered problems with attempts to expand in the next months; the third Airbus' arrival was delayed from February to 1 April 1991.

However, Compass continued to expand, and in the subsequent months added a fourth and fifth aircraft to its fleet. By the September 1991 quarter, Compass had gained 12 per cent of the total aviation market with over 20 per cent share in the markets in which it operated. One of the features of the Australian domestic aviation industry is that a new competitor can gain access to a large number of passengers by operating in a small number of airports and flying a selected number of key routes. This was the strategy pursued by Compass, in that

it operated only in six of the most heavily trafficed airports with its 5 aircraft; Adelaide, Brisbane, Cairns, Melbourne, Sydney and Perth. The ten routes on which Compass offered most of its services are: Melbourne-Sydney, Melbourne-Perth, Brisbane-Sydney, Perth-Sydney, Brisbane-Melbourne, Brisbane-via Melbourne-Perth, Perth-via Melbourne-Sydney, Adelaide-Melbourne, Cairns-Melbourne, Adelaide-Sydney.

Thus, the entry of Compass allows a further test of traditional IO theory vs. contestability. Traditional theory suggests that the specific changes in structure which have occurred since deregulation -- the Compass entry bringing about a decrease in market concentration and providing the presence of a new firm -- would be expected to greatly intensify rivalry among firms. A cross-sectional regression analysis of fare discounting during the height of the June-August fare war is presented to test more formally hypotheses that structural features such as the number of competitors and the presence of Compass are primary determinants of the intensity of price competition. Contestability theory would suggest minimal changes. The next section examines airline rivalry via a cross-sectional analysis of discount fares.

IV. DATA AND METHODOLOGY

The null hypothesis then, in accordance with contestability theory, is that both the number of competitors and the presence of Compass on a route will have no effect on the level of discount fares. The alternative hypothesis, in accordance with the structure-conduct-performance model, is that the number of competitors and Compass will have a significant effect on fares. As the number of competitors increases, we expect fares to be lower; when Compass is present on a route, we also expect fares to be lower. These hypotheses were put to a formal test through regression analysis using a cross-sectional sample of airline routes. In assessing the impact of competition on fares, we also included the distance of the route and the number of passengers on the route as control variables, primarily to reflect cost variations with stage length and density. More specifically, the dependent variable is then, alternatively, discount fare and discount fare per kilometer. The independent variables are: a constant term; great circle distance of route; number of competitors on the route; a dummy variable taking value 1 on routes where Compass serves, 0 otherwise; and the number of uplift/discharge passengers. There are 100 observations in the sample.

The sample consisted of the top one hundred Australian city pairs by passenger volume; the methodology builds on that reported in BTCE (1991). These routes represent a diverse range of operating conditions for the airlines and account for 12.9 million uplifts and discharges or 99.6 per cent of all passengers carried in 1990. The routes range in density from Melbourne-Sydney with 2.52 million uplifts and discharges to Broome-Darwin with 3482 uplifts and discharges. The distances flown on these one hundred routes were between 92 kilometers and 3436 kilometers.

Regarding the dependent variable, a fundamental issue in measuring price in a given market is that there are multiple prices at any given period. One approach common for U.S. studies is to use yield data, in essence computing a weighted average of prices by passenger volume. However, no data source comparable to the DOT's 10% sample exists for Australian data, so that calculating yield is precluded. It should be noted that one problem with yield as a dependent variable is that yield is a function not only of fare levels but of demand for business vs. pleasure airline travel. To the extent that yield is used and this traffic mix variable is not available as a control, a bias could result, particularly in that airline concentration and entry may well be correlated with the business/pleasure mix. In any event, the fare measure used for this study was the best available discount fare during the

December 1991-January 1992 period. More specifically, data was gathered from travel agents regarding the best available fare with departure date flexible over a one-week time period, with return flexible as to dates but to occur in January. In this fashion, seven-day advance purchase discounts could be utilized. It should be noted that, compared to the U.S. (at least prior to American's recent initiative) the Australian fare structure is relatively simple so that the best available discount in a market is quite representative and unambiguous.

V. RESULTS

The results, as shown in Table 1, provide support for the importance of competition in determining fares. The coefficient for number of competitors was negative and statistically significant, indicating that the degree of discounts are a function of the number of competitors operating on each route. The statistically significant negative coefficient on the Compass dummy variable implies that the presence of Compass has an additional impact on discount fares, over and above merely adding one more competitor on a route. The sign on the distance independent variable was as expected, positive and significant when the fare was used as the dependent variable, negative and significant when the fare per kilometer was used. To the extent that fares reflect costs on particular routes, the fare taper present in the sample provides evidence of economies of stage length. The

coefficient on number of passengers was negative and also statistically significant. Again, to the extent that fares reflect costs, the lower fares in denser markets provide an indication that airlines are adjusting prices to reflect economies of density.

VI. CONCLUSION

The results clearly indicate that structure and the existence of new entry play an important role in influencing fares. Indeed, the role that Compass Airlines has played since deregulation has been critical in stimulating passenger demand and fostering substantial discounting of fares. This has been documented by Bureau of Transport and Communication Economics (1991); for example, Compass often took the lead in lowering fares and offering discounts, with the incumbent airlines most often matching such initiatives. The events are quite consistent with Scherer and Ross (1990) description of a new entrant's role in shaking up the market, discounting to get a foothold, adding heterogeneity to an industry, and providing additional capacity by its entry.

If the airline industry is not contestable, efforts to promote deregulation throughout the world must do so with an awareness that entry barriers appear to exist. The linkage of new entry and increased number of competitors with lower fares suggests that public policy should promote and protect competition.

Institutional factors which inhibit entry should be carefully scrutinized; moreover, mergers which increase concentration should be approved only with great caution.

In closing, it should be noted that Compass encountered a fate similar to the majority of new U.S. airline entrants: on December 20, 1991, Compass ceased operations. The post mortem revealed that the main problem was Compass's inability to attract business travelers through lower prices; customers maintained strong brand loyalties to the incumbents, mainly because of flight lounge memberships. In addition, the incumbents could match discount fares for a selected number of seats. Even with a cost advantage held by Compass, they were not able to maintain adequate yield without a high percentage of full fare travelers. The Australian experience provides further evidence regarding the somewhat subtle marketing strategies and brand loyalties which can confer advantages to larger incumbents.

TABLE 1 REGRESSION RESULTS - DISCOUNT FARES

Dependent variable	Constant Term	Great Circle Distance	Number of Competitors	Compass Dummy	U/D Passengers	R^2
Discount fare	3.69134	0.45241	-0.22293	-0.30018	-0.06957	.6372
	(12.298)	(10.5209)	(-2.8089)	(-2.9154)	(-2.9154)	
Discount fare per kilometre	3.69134	-0.54759	-0.22293	-0.30018	-0.06957	.7553
	(12.298)	(-12.7239)	(-2.8089)	(-2.9154)	(-2.9154)	

Note All bracketed figures are t-statistics.

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