

THE IMPACT OF DISCOUNT AIRLINES ON FARES IN CANADA

Analysis of airfares for domestic flights in Canada shows that the presence of low fare carriers has no impact on the fares of major carriers serving a given city pair. WestJet, the sole exception, did have a downward effect on major airlines' fares.

There have often been concerns about competitiveness in the Canadian domestic airline industry due to its oligopolistic nature. The presence of low fare carriers such as WestJet and Canada 3000 in the Canadian domestic airline market ought to exert downward pressure on the airfares offered by the major carriers, but that assumption has not been empirically tested.

Airline pricing has long been an object of study in the United States, principally by economists. From an economist's perspective, the airline industry offers a relatively pure model of market competition, since the costs of adding or deleting a city from one's route network are minimal, when compared to the barriers of entry in, for example, building a factory or a store. Nevertheless, at some U.S. airports a dominant airline controls nearly all gates, making it difficult for another airline to begin service. The term "fortress hub" has been coined to describe a situation where an airport is the hub of an airline's route system, giving that airline a degree of dominance that is very difficult to overcome; examples would include Denver (United), Pittsburgh (USAir), Atlanta (Delta), and Minneapolis (Northwest).

Another phenomenon impeding market forces in the airline industry is the "golden rule" (Evans and Kessides, 1994), whereby airlines are reluctant to reduce fares on a given route, for fear that the other airline will retaliate by reducing fares elsewhere on routes served by both airlines. In other words, airlines are reluctant to initiate a price war on one route because their competitor will retaliate on a route where that competitor is particularly strong. The "golden rule" applies mainly to large competing airlines with extensive, overlapping route networks. Although the term originated in the U.S., it may help to explain why there is so little competition in fare levels between Canada's two major carriers.

A U.S. Department of Transportation report (Competition in, 1998) reported that the presence of a "low fare" carrier serving a city pair resulted in significantly lower fares in that market, and that this effect was especially strong if one of the cities in the pair was an airline hub or if the route was less than 750 miles. In such instances, the presence of a low fare carrier reduced the average fare between the city pair *by more than half*. The data showed that low fare carriers seemed to be the only source of competitive pressure in short distance markets, defined as those under 750 miles. On these shorter routes, even the presence of a large number of airlines did not lead to lower fares unless one of the airlines was a low fare carrier. The U.S. Department of Transportation defined "low fare" carriers to include Airtran, Vanguard, and Southwest Airlines. Of these, Southwest Airlines is by far the largest. Another report by the same agency used city of origination rather than city pairs as the unit of analysis (The Low Cost, 1998), and based on data from 1992 to 1995, demonstrated that the presence of a low cost carrier such as Southwest Airlines lowered the average fare for travel from that city.

Morrison and Winston (1990) concluded that fares are higher at airports served by only a

few carriers, and that this effect is especially pronounced when one looks at an airline's fares in or out of its own hub. However, Berry (1990) made the provocative argument that fortress hubs have unusually high fare levels because consumers are willing to pay a premium for the added convenience (namely, more frequent flights) of using the hub's dominant airline, in contrast to the more usual argument based on market concentration.

A related topic has been the impact of airline mergers on pricing, in which it has been shown that mergers lead to higher fares due to heightened market concentration (Borenstein, 1990; Kim and Singal, 1993). Thus, the argument is not supported that airline mergers benefit the consumer because of increased economies of scale. Fares go up, not down, following U.S. airline mergers, and any savings are not passed on to the consumer. Borenstein (1990) found this effect to be especially severe where the route networks of the merger partners overlap extensively, as occurred in the Northwest-Republic Airlines merger of 1986. If a merger were ever to occur between Canada's two major carriers, it would likewise be reasonable to expect fares to rise.

Although the relevant research has focused almost exclusively on the U.S., there is every reason to expect similar effects to occur in Canada. The Canadian domestic airline industry is characterized by two major carriers, some small airlines, and a variety of low fare carriers such as WestJet and Canada 3000, among others. One would expect the presence of a low fare carrier to result in lower fares between city pairs, similar to the effect that has been observed in the U.S. Hence, the following was proposed:

Hypothesis: The presence of a low fare carrier on a route is associated with lower fares on the major carriers serving that city pair.

Data and Variables

Data sources

Data were obtained using the "lowest published fares" feature of the Microsoft Expedia website (Expedia, 1998), which offers access to a database of schedules and airfares, equivalent to what can be accessed by a travel agent. In accordance with industry custom, the Expedia database expresses all fares on a round-trip basis. Since airfares change constantly, November 11, 1998, was arbitrarily chosen as the point at which data were retrieved from the website for this study. That time had the advantage of being between seat sales; the seat sales that followed Air Canada's 1998 strike had come to an end, and the January 1999 seat sales had not yet been announced. On November 11, 1998, neither of the major carriers were promoting any unusual discounted fares on domestic routes. However, in the airline industry, there is no "typical" time of the year, and it is possible that different results would have been obtained if the study were conducted, for example, immediately prior to the peak summer season.

Data on which city pairs were served by Air Transat and Royal Airlines were obtained from a website titled "Herman's Discount Airlines" (1998), which is a travel agency based in London, Ontario. Data on which city pairs were served by WestJet were obtained from a booklet titled "WestJet Fall 1998 Flight Schedule," distributed by that company.

The study was limited to domestic Canadian airfares, rather than transborder or international flights. (The airlines use "transborder" to refer to flights between the U.S. and Canada.) This limitation was imposed because transborder and international charter flights often consist of air-and-hotel packages, especially for Mexican and southern U.S. destinations, making it especially difficult

to compare charter carriers' fares to those of the major scheduled carriers.

A list was obtained of the 25 most populous metropolitan areas in Canada as of 1996, as defined by Statistics Canada, and every possible city pair among those 25 metropolitan areas was considered. However, five of those metropolitan areas had no scheduled air service, and for certain other city pairs, the Expedia database did not show any airfares. Merely because Expedia showed an airline offering a fare between two cities does not imply that the airline offered a direct flight on that route. For some city pairs, an airline might require one or more connections. Also, commutativity was assumed; that is, the fare from Toronto to Montreal and return is the same as the airfare from Montreal to Toronto and return. This assumption of commutativity, which incidentally does *not* hold true for transborder or international flights, halved the size of the data set. The actual data set consisted of an N of 164, in which the unit of analysis was the city pair.

Airlines in the study

In the Canadian domestic airline industry, it is common to distinguish between major carriers (Air Canada and Canadian Airlines) and low fare carriers (such as Royal Airlines and Air Transat), although this oversimplifies a complex situation. There are a variety of airlines which could be described as minor scheduled carriers, such as Bearskin Airlines, First Air, SaskAir, Harbour Air, and others. These airlines usually (but not always) offer low fares on routes where they compete against the major carriers, often in the form of forgoing advance-purchase and/or Saturday stay over requirements. In addition, the minor scheduled carriers serve remote communities where they enjoy a monopoly on scheduled flights. An airline that constitutes a special case is Canada 3000, which had been a charter carrier but now appears in airfare data banks as a scheduled airline. Another fairly unique airline is WestJet, a low fare scheduled airline not listed in the airfare data banks and operating outside the customary agents' commission structure. In its strategy, WestJet would be most similar to Southwest Airlines in the U.S. The now-defunct Greyhound Airlines would have fallen into this category as well. Lastly, there are Royal Airlines and Air Transat, which are charter operations, although the frequency of flights is so regular that they take on some of the characteristics of a scheduled carrier. It is interesting to note that Air Transat distributes a timetable booklet that creates the illusion that it is a scheduled carrier. Although Royal Airlines was a charter carrier when these data were collected in November 1998, it is now listed as a scheduled airline in airfare data banks, thus making the same transition from charter to scheduled carrier that Canada 3000 had made.

For purposes of this study, the phrase "major carriers" refers to Air Canada and Canadian Airlines, while "low fare carriers" refers to all other air carriers, whether charter or scheduled, serving domestic routes in Canada.

To assess which variables are associated with low airfares in various city pairs, the key variable of this study is the number of low fare carriers serving a given route. In so far as Air Canada and Canadian Airlines are concerned, in this study there were no city pairs that were served by one but not the other.

Dependent Variables

Multiple regression was used in this study. The dependent variable was lowest fare offered by a major carrier (Air Canada or Canadian Airlines) between a given city pair. Two versions of the dependent variable were used: Lowest fare requiring a Saturday stay over, and lowest unrestricted fare. This distinction is potentially of interest due to the assumption in the airline industry that low fare carriers draw off non-business travelers, for whom a Saturday stay over requirement is not an impediment, while business travelers will stay with the major carriers because they are not sensitive to price.

Independent Variables

Of the independent variables, some served as control variables. One such independent variable is the distance between the two cities in each city pair, which is likely to be strongly related to the airfare. It's also necessary to control for the population of the cities in each city pair, since one would expect larger cities to have higher traffic levels and therefore lower fares. A number of formulations of the cities' population were attempted to ascertain which resulted in the highest Adjusted R^2 when regressed against the dependent variable (i.e., lowest major carrier fare available with a Saturday stay over): (a) Adding together the populations of the two cities in each city pair, (b) multiplying the populations of the two cities in each city pair, (c) using only the population of the larger city as an independent variable, (d) using only the population of the smaller city as an independent variable, and (e) using the population of the larger city and the population of the smaller city in the pair as two separate variables. Option "e" yielded the strongest predictive power and was therefore used. Population was expressed as that of the census metropolitan area as defined by Statistics Canada for 1996, the year of the most recent census.

The key independent variable relevant to the hypothesis was the number of low fare carriers serving a given city pair. As explained above, a low fare carrier was defined as any airline (charter or scheduled) other than Air Canada or Canadian Airlines that served a particular city pair. As will be seen, more detailed regression analyses were also performed to identify which specific low fare carriers' presence was associated with lower fares on the major carriers.

Results

Table 1 shows the correlation matrix, and Table 2 shows the regression results. For each of the four regression models, all independent variables were entered simultaneously. An alternative model would be to use a two-step process of entering independent variables, in which the control variables (distance and population) were entered in the first step and the other variables were entered in the second step. When this two-step process was attempted, the same variables were significant as with simultaneous entry, and the Adjusted R^2 's were slightly lower. The simultaneous-entry model was used in Table 2 because the results are easier to present in a clear manner.

Consider each of the four regression analyses shown in Table 2. Regression (1) shows that for fares on Air Canada or Canadian Airlines requiring a Saturday stay over, the significant independent variables are the distance between the two cities, the population of the larger city, the population of the smaller city, and the number of low fare carriers serving that city pair. This last variable is of particular relevance in this study. In other words, the presence of a low fare carrier forces the major carriers to offer lower fares, and the effect increases as the number of low fare carriers serving that route increase. Keep in mind that Regression (1) deals with fares requiring a Saturday stay over – essentially the non-business traveler – where one would expect the competitive effect of low fare carriers to be especially strong.

However, note that the phrase "low fare carrier" covers a variety of kinds of airlines, both scheduled and charter. Hence, Regression (2) is identical to Regression (1), except that the variable "number of low fare carriers" has been broken down into five components. Four of the better known carriers are treated as separate independent variables (Air Transat, Canada 3000, Royal Airlines, and WestJet), while "Other Scheduled Carriers" constitute yet another independent variable. This last variable includes AirSask, Athabasca Airways, Bearskin Airlines, First Air, Harbour Air, Helijet Airways, PemAir, and Tropical Airlines (no longer operating). For instance, if WestJet served a given city pair, it was coded "one" for that city pair; otherwise it was coded "zero." Regression (2) shows that when "low fare carriers" is broken down into smaller components, its effect is attributable

to WestJet alone. WestJet is the only low fare carrier whose service between a city pair is associated with lower fares from Air Canada or Canadian Airlines. The other low fare carriers appear to have no significant effect.

Regressions (3) and (4) are similar to (1) and (2), except that the dependent variable is the *unrestricted* airfare between two city pairs on Air Canada or Canadian Airlines. Here, one would expect the impact of low fare carriers to be muted, since unrestricted airfares are very high and directed toward the business traveler, who is assumed to be insensitive to price. Yet here too, Regression (3) shows that the number of low fare carriers was a significant independent variable. Surprisingly, its predictive power was greater upon unrestricted airfares than it was upon fares requiring a Saturday stay over. Regression (4) suggests this effect was attributable to WestJet alone among the low fare carriers.

A caution should be noted in connection with Regressions (3) and (4): The number of city pairs in the data set dropped from 163 to 107 for these latter two regression analyses. This is because the Expedia data bank lists the various fares available beginning with the cheapest, and if there are a particularly wide variety of inexpensive fares, the website doesn't have room to display the more expensive (unrestricted) airfares. Thus, the 56 city pairs that were dropped from the analysis between the first two and the latter two regressions would be those city pairs with the largest number of inexpensive fares. This introduces an element of bias into Regressions (3) and (4).

Strictly speaking, multiple regression can be used to demonstrate statistical association, but cannot prove causation. Nevertheless, it is assumed in this study that the causation is in the direction of low fare carriers' presence affecting fares of major airlines. Reverse causation in this instance would mean that low fare carriers were attracted to routes where the major airlines maintained fares at an unusually low level – not a tenable explanation.

Discussion

In one regard, these results are not surprising, and confirm that just as Southwest Airlines has a downward impact on U.S. domestic airfares, a similar effect occurs in Canada where WestJet serves a city pair. What is more surprising is that the phenomenon does not appear to carry over to other low fare carriers such as Canada 3000, Royal Airlines, Air Transat, or the small scheduled carriers. It appears that the major carriers fear the entrance of WestJet into a market, but do not fear the entrance of other low fare carriers.

Distinguishing between the business and non-business traveler and treating these as two discrete market segments is overly simplistic. The results suggest that there is an element of the business travelers who are willing to travel on WestJet, but not willing to travel on other low fare carriers. This is shown in the major airlines' reducing unrestricted fares when WestJet serves a city pair, but not when other low fare carriers serve a city pair.

Regarding the non-business traveler, defined as the person who books fares with Saturday-stay over requirements, the major carriers do not lower their fares in response to the presence of Canada 3000, Royal, Air Transat, or the small scheduled carriers. This may be because these low fare carriers are seen as attracting incremental new business to the route – people who would otherwise not fly at all – rather than intruding upon the major carriers' clientele. Otherwise, it would be difficult to explain why their presence has no impact on major carriers' fares. Once again, WestJet is the exception, since the major carriers do react to its presence in a market. These results indicate that where the non-business traveler is concerned, the major carriers do reduce their fares, presumably because WestJet can entice passengers away from the major carriers. There appear to

be two discrete segments of non-business travelers: First, those who will fly Canada 3000, Royal, Air Transat, or the small scheduled carriers, or not fly at all, and are not potential customers of the major airlines. Second, there are those who will switch among WestJet and the major carriers depending on price.

The implications are important for competition policy in the Canadian domestic airline industry. The "golden rule" phenomenon, discussed earlier, states that two large airlines with extensive, overlapping route networks will be unlikely to engage in genuine price competition, for fear that the competitor will strike back with selective fare wars aimed at routes where the first airline is weakest (Evans and Kessides, 1994). Yet the U.S.-based research shows that a merger would be even worse for consumers, resulting in higher fares, not economies of scale (Borenstein, 1990; Kim and Singal, 1993). Thus, one depends on the presence of low fare carriers to exert competitive pressure on the two large airlines. These results indicate that only WestJet effectively exerts competitive pressure on the major carriers; the other low fare carriers bring in incremental increases in passengers and are not treated as a threat by the major carriers.

The implication of this argument is that WestJet is essential to maintain competitive pressure on the major airlines, and more airlines like WestJet would be beneficial to the consumer. The now-defunct Greyhound Airlines operated similarly to WestJet and fulfilled the same role; it was unfortunate for the consumer that it ceased operations, especially since Greyhound Airlines had a broader geographical reach than WestJet. Shortly after Greyhound's start-up, a magazine article (Hutchinson, 1996) detailed its many difficulties, including regulatory battles due to foreign ownership, allegations of false advertising, and customer frustration because all long-haul passengers had to change planes in Winnipeg. On the other hand, the hub-and-spoke system offers definite operational advantages to U.S. airlines despite its inconvenience to customers, and it was reasonable to attempt it in Canada. WestJet also used a hub-and-spoke system based in Calgary, which they have since diluted by creating some long-haul flights that bypass Calgary. Although Greyhound and WestJet appear to have been inspired by Southwest Airlines in most respects, Southwest Airlines itself has avoided a hub-and-spoke system.

More new low fare carriers would be desirable, but there is little government can do to force entrepreneurship in an industry that is so risky and which has such high start-up costs. The National Transportation Agency's battle with Greyhound Airlines, however well-founded in legitimate concerns of foreign control, did nothing to encourage other start-ups. An additional disincentive is that any small new airline would be vulnerable to predatory pricing by the major airlines, as has occurred in the U.S. As well, the trend toward inter-airline alliances such as the Star Network solidifies the position of the larger airlines (Come fly, 1998; Zellner, 1998). There is reason to fear that entrepreneurs may have given up on the airline industry entirely. The U.S. Department of Transportation has expressed concern that the number of new start-ups fell to zero following the 1996 crash of a ValuJet aircraft in Florida (Competition in, 1998). Similarly in Canada, there has been a legacy of failed low fare carriers – Astoria, Nationair, City Express, Wardair – and a dearth of more recent start-ups, apart from some charter carriers which, as has been shown, are ineffective in suppressing major carriers' airfares. Underlying the conundrum of Canadian airline competition policy is this dilemma: Will Canadian entrepreneurs continue to create new low fare carriers on the WestJet/Southwest model when the barriers to success are so high?

References

Berry, Steven A., "Airport Presence as Product Differentiation," *Quarterly Journal of Economics*, 109 (May 1990), 394-399.

Borenstein, Severin, "Airline Mergers, Airport Dominance, and Market Power," *American Economic Review*, 80 (May 1990), 400-404.

"Come fly with me." *Economist*, 347 (No. 8073) (20 June 1998), 69-70.

"Competition in the U.S. domestic airline industry: The need for a policy to prevent unfair practices." [website] U.S. Department of Transportation, 1998; <http://ostpxweb.dot.gov/aviation/intro.htm> [Accessed 10 December 1998].

Evans, William N., and Kessides, Ioannis N., "Living by the 'Golden Rule': Multimarket Contact in the U.S. Airline Industry," *Quarterly Journal of Economics*, 109 (May 1994), 341-366.

"Expedia." [website] n.a.; <http://expedia.msn.com> [Accessed 11 November 1998].

"Herman's Discount Airlines." [website] n.a.; <http://www.herman.on.ca/airline.htm> [Accessed 11 November 1998].

Hutchinson, Brian, "See Spot Fly," *Canadian Business*, 69 (7), June 1996, 91, 92, 94.

Kim, E. Han, and Singal, Vijay, "Mergers and Market Power: Evidence from the Airline Industry," *American Economic Review*, 83 (June 1993), 549-569.

"The low cost airline service revolution." [website] U.S. Department of Transportation, n.d.; <http://ostpxweb.dot.gov/aviation/DomAv/avtndom.htm> [Accessed 10 December 1998].

Morrison, Steven A., and Winston, Clifford, "The Dynamics of Airline Pricing and Competition," *American Economic Review*, 80 (May 1990), 389-393.

Zellner, Wendy, "Where Are All Those Airline Tie-ups Headed?," *Business Week*, (11 May 1998), 32-33.

Table 1

Correlation Matrix

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Lowest fare on Major Carrier (w/ Sat stay)	1.000										
2. Lowest fare on Major Carrier (unrestr'd)	.847	1.000									
3. Distance (kms)	.753	.910	1.000								
4. Pop. of larger city	-.325	-.352	-.117	1.000							
5. Pop. of smaller city	-.300	-.315	-.040	.433	1.000						
6. # of Low Fare Carriers	-.317	-.460	-.083	.311	.448	1.000					
7. Air Transat [†]	-.063	-.098	.013	.160	.065	.549	1.000				
8. Canada 3000 [†]	-.096	-.248	.193	.372	.441	.799	.428	1.000			
9. Royal Airlines [†]	-.066	-.149	.062	.206	.444	.596	.343	.470	1.000		
10. WestJet [†]	-.421	-.487	-.296	-.085	.057	.436	.046	.119	.031	1.000	
11. Other Sch. Carrier(s) [†]	-.223	-.262	-.136	.336	.410	.738	.268	.497	.335	.047	1.000

Note: Pairwise deletion was used to handle missing data.

[†] = Dichotomous variable (e.g., if WestJet served a given city-pair, it was coded "one," otherwise coded "zero.") Correlations between two dichotomous variables should be interpreted with great caution.

Table 2

Multiple Regression Results

Regression #	Lowest fare requiring Sat stay over Major Carriers		Lowest unrestricted fare Major Carriers	
	(1)	(2)	(3)	(4)
Constant	276.142 (25.139)	310.422 (28.259)	351.684 (79.530)	484.367 (75.331)
Distance (kms)	.131 *** (.008)	.125 *** (.009)	.611 *** (.029)	.592 *** (.024)
Population of larger city (000)	-.023 * (.009)	-.030 ** (.009)	.076 * (.030)	-.087 ** (.024)
Population of smaller city (000)	-.097 ** (.036)	-.120 ** (.037)	.130 (.119)	-.063 (.137)
# of Low Fare Carriers	-41.827 ** (14.160)		-273.111 *** (49.251)	
Air Transat [†]		-12.240 (71.433)		129.554 (297.078)
Canada 3000 [†]		-71.849 (44.020)		-151.870 (167.572)
Royal Airlines [†]		64.201 (69.069)		235.636 (360.594)
WestJet [†]		-162.651 *** (36.266)		-742.853 *** (81.836)
Other Scheduled Carrier(s) [†]		37.754 (40.942)		-56.434 (107.554)
R ²	.676	.713	.875	.922
Adjusted R ²	.668	.698	.870	.915
F	82.374	47.777	178.789	143.845
Significance of F	< .001	< .001	< .001	< .001
N	163	163	107	107

Note: For each variable, the unstandardized coefficient is shown, and beneath it in parentheses appears the standard error.

[†] = Dichotomous variable (e.g., if WestJet served a given city-pair, it was coded "one," otherwise coded "zero.")

One-tailed significance levels: * $p < .05$ ** $p < .01$ *** $p < .001$