

Airline Mergers, Airport Dominance, and Market Power

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Although the laissez-faire antitrust policies of the 1980s affected market structure in many U.S. industries, the effects have probably been most visible in the airline industry. In the last few years, there has been increasing focus on the market power that an airline may obtain when it offers most of the service from an airport. This power may result not just from the ability to exclude competitors from city-pair markets, but also from the advantage that a dominant airline could have when competitors are present. For instance, the dominant airline in an area may be able to utilize marketing devices such as frequent flyer plans and travel agent commission overrides (programs that reward agents for directing a high proportion of their business to the airline) more effectively than other airlines in order to attract travelers who originate their trips in that area.¹

This paper analyzes the effects of two controversial airline mergers that resulted in airport dominance and may have created substantial market power. Both acquisitions occurred in the fall of 1986—Northwest's merger with Republic Airlines and Trans World Airlines' (TWA) purchase of Ozark Airlines. In each case, the merger left the surviving carrier with more than three-quarters of the traffic at the major hub airport where the merging airlines had competed, Minneapolis/St. Paul (MSP) for Northwest and St. Louis (STL) for TWA.

I. History of the Mergers

Prior to their merger, Northwest (NW) and Republic (RC) airlines served many of the same routes from MSP and were the

most likely potential competitors for one another when only one of them served a MSP route. They were by far the two largest carriers at MSP, with NW accounting for 42 percent of the enplanements there and RC getting 37 percent. The same basic description applies to the merger of TWA with Ozark (OZ) and its effect in St. Louis, though the carriers' positions were not quite as symmetric. TWA had carried 57 percent of the traffic from STL and OZ 25 percent. Both MSP and STL received some service from other carriers, but it was limited in most cases to flights from the other airlines' hub airports. United, for instance, flew nonstop to MSP both before and after the merger, but only from Denver and Chicago, its two primary hubs.

Preliminary discussions of each of the mergers began in 1985 and final agreements were completed during the first quarter of 1986, at which point permission for each merger was requested from the U.S. Department of Transportation (DOT). The NW/RC application was granted in August of 1986 and the TWA/OZ application in September. Both mergers took place in October 1986.

II. The Evidence on Price Changes

One obvious test of the acquisition of market power is a before and after comparison of the merging firms' prices. Table 1 presents the prices of the eight largest domestic carriers on routes that include their major hubs *relative* to the industry average prices for routes of the same distance.² The data are from the third quarters of 1985, 1986, and 1987. The first of these periods is probably before or during the preliminary merger negotiations. The second is after

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¹See Michael Levine (1987) and my 1989 paper for a description of airport dominance advantages.

²For each route, the ratio of the carrier's average price on the route to the industry average price for similar distance routes is calculated. Each route is weighted by the passenger-miles that the carrier provided on the route.

TABLE 1—AVERAGE PRICES OF MAJOR AIRLINES
AT THEIR PRIMARY HUBS

Airline	Airport	Relative Prices ^a			Change ^a
		1985	1986	1987	85-87
Texas Air	Denver	-19.4	-20.6	-4.3	18.7
NW/RC	Minneapolis	12.4	10.0	25.2	11.4
TWA/OZ	St. Louis	11.0	7.1	20.5	8.6
Piedmont	Charlotte	14.3	26.0	24.0	8.5
American	Dallas (DFW)	20.0	22.5	26.9	5.8
Delta	Atlanta	26.2	37.8	24.4	-1.4
USAIR	Pittsburgh	23.9	17.5	13.1	-8.7
United	Chicago (ORD)	15.8	19.1	1.9	-12.0

^aShown in percent.

agreement on the mergers and just before they were consummated. The third is nearly a year after the mergers took place. The table shows that, with the exception of Texas Air's increases of the depressed prices at Denver (following the demise of Peoples Express and Frontier), the two mergers examined here accounted for the largest hub-airport price increases during this time. Minneapolis and St. Louis were two of the least expensive hubs to travel to or from in 1985 (with prices of the dominant airlines at these airports just 11-12 percent above the national average prices), but by 1987 were about as expensive as the other major dominated hubs.

The aggregation done to produce Table 1 weights each route by the number of passenger miles that the carriers provided on it. Though this is appropriate in gauging the impact of price changes on aggregate consumers' welfare, it is not appropriate for a cross-sectional comparison of market power. Table 2 presents unweighted average price changes on routes from the hubs (relative to the change in average industry prices for similar distance routes) and divides the markets into four categories based on the market structure before and after the merger. The routes are partitioned into those on which only one of the merging carriers was an active competitor prior to the merger and those on which both merging carriers competed. Each of these groups is then divided into routes with at least one other competitor and those without another airline.³

³Active competitor is defined to be a market share of at least 10 percent. Routes with at least 10 passengers

TABLE 2—MERGING AIRLINES' PRICES
AT THEIR PRIMARY HUBS

	Other	Firms	Mkts	Relative Prices ^a			Av. Change ^a
				1985	1986	1987	1985-87
NW & RC	Yes	16	3.1 (2.8)	0.2 (4.5)	10.1 ^d (5.9)	6.7 (4.3)	
NW or RC	Yes	41	14.3 ^b (2.6)	21.2 ^b (3.5)	19.9 ^b (2.8)	6.0 ^c (2.6)	
NW & RC	No	11	15.2 ^d (8.2)	32.1 ^b (10.3)	37.8 ^b (7.5)	22.5 ^b (5.2)	
NW or RC	No	16	27.0 ^b (6.7)	36.6 ^b (9.5)	39.4 ^b (7.1)	12.0 ^c (5.5)	
Total		84	14.7 ^b (2.3)	21.5 ^b (3.3)	24.1 ^b (2.7)	9.5 ^b (2.1)	
TWA & OZ	Yes	19	-1.3 (6.1)	-2.7 (4.0)	3.2 (4.6)	4.6 (7.5)	
TWA or OZ	Yes	29	10.5 ^c (4.0)	4.7 (4.2)	5.7 (4.4)	-3.0 (3.1)	
TWA & OZ	No	9	39.6 ^b (7.5)	55.5 ^b (13.2)	27.4 ^b (2.4)	-5.8 (6.4)	
TWA or OZ	No	10	56.0 ^b (12.0)	61.4 ^b (11.8)	33.5 ^b (8.1)	-12.3 ^c (4.0)	
Total		67	17.8 ^b (4.0)	17.9 ^b (4.6)	12.1 ^b (3.0)	-0.0 (3.5)	

^aShown in percent.

^bSignificant at 1 percent level (two-tailed test).

^cSignificant at 5 percent level (two-tailed test).

^dSignificant at 10 percent level (two-tailed test).

The first conclusion from Table 2 is that it provides no evidence that the TWA/OZ merger had a systematic impact on these carriers' prices on St. Louis routes. In fact, their price changes on the 67 STL routes observed averaged almost exactly the same as the industry average price changes. The discrepancy between this result and the impact calculated in Table 1 is accounted for by the large price increases on some of the highest density STL routes. The apparent absence of a strong effect from the merger, however, does not imply that TWA/OZ lacked substantial market power. While the merging carriers' prices stayed near industry average on routes with other carriers, prices were consistently and substantially above industry average where no other carriers were

per day are included. Price change is measured as the ratio of relative price in 1987:3 to relative price in 1985:3, so the average change is not equal to the change in the average relative price. All route data count only local traffic, not through or connecting passengers.

present. Still, even these prices fell relative to the industry average around the time of the merger, significantly so for the routes that had been served by only one of the merging airlines.

In contrast, analysis of NW/RC price changes indicates that this merger increased market power at Minneapolis. In all four categories, the merging carriers' prices increased faster than industry average, with the largest average (relative) increase coming on the routes in which the merging carriers had been the only two competitors. Prices on these routes had been substantially above the industry average prior to the merger and they increased to average 38 percent above the industry level by 1987.

The statistically significant 12 percent average (relative) increase in prices on routes that were NW or RC monopolies before the merger as well as after gives support to one or both of two hypotheses about the advantages of a dominant airline at an airport: 1) that airport dominance allows use of marketing devices that increase the attractiveness of a carrier, and 2) that airport dominance lessens the threat from potential competition. The timing of the price increase in this category (coming predominantly before the merger, during the time of negotiations and agreement) lends greater support to the potential competition theory.

The increase in NW/RC prices on routes that had another competitor is less impressive, but the timing of these changes is quite interesting. In fact, only in the first category of markets shown in the table, where both of the merging carriers competed along with at least one other airline, was there a significant average price increase between the third quarters of 1986 and 1987—averaging 10.5 percent (standard error = 4.0 percent). In the other three categories, significant price increases occurred only between the third quarters of 1985 and 1986. The result that routes served by only NW and/or RC experienced price increases primarily before the merger, but price increase on routes with both merging carriers and at least one other airline occurred only after the merger gives support to the conclusion of David Graham et al. (1983) that airlines find it much more difficult to tacitly collude in markets with

three carriers than in markets with two carriers.⁴

Not shown in Table 2 are the price changes of competing airlines in the first two categories of routes. For both merger cases examined here, the other airlines on these routes displayed average price increases very close to those of the merging airlines, indicating that the merger did not substantially change the premium that the dominant and merging carriers could charge over its competitors. Still, for both NW/RC at MSP and TWA/OZ at STL, a significant price premium existed, with the dominant airlines' prices averaging about 10 percent greater than those of other airlines.

III. The Evidence on Market Shares

Another approach to diagnosing market power that results from airport dominance is suggested in my 1990 paper, and focuses on market shares. If TWA's dominance of the St. Louis airport increases its attractiveness to people who live in St. Louis, then on the St. Louis-Pittsburgh route, for example, one would expect TWA to capture a higher proportion of the traffic that originates in St. Louis than originates in Pittsburgh. In fact, on this route, TWA/OZ got 57 percent of the St. Louis-originating traffic and 52 percent of the Pittsburgh-originating traffic during the third quarter of 1985. By third quarter 1987, this difference had grown to 61 percent vs. 51 percent. Thus, the difference in TWA's route share by point of passenger origin had increased by 5 percentage points. These differential route shares by point of origin are unlikely to be explained by quality or price differences, because passengers who fly a given route with a given carrier generally face the same prices and service quality regardless of which end of the route is their origination point.

Table 3 presents the average change in the merging carrier's difference in route shares by point of origin for routes on which competition existed both before and after the

⁴The difference in changes between the first and third categories in Table 2 is statistically significant for the 1985-86 period, but not for the 1986-87 period.

TABLE 3—AVERAGE DIFFERENCE IN ROUTE SHARE CHANGES BY POINT OF ORIGIN

	All Routes ^a			Direct Routes ^a		
	Mkts	1985–	1986–	Mkts	1985–	1986–
		86	87		86	87
TWA/OZ at STL	48	0.8 (1.3)	5.0 ^b (1.5)	16	-3.4 (2.5)	6.6 ^c (2.9)
NW/RC at MSP	57	0.8 (1.7)	1.7 (1.7)	7	0.1 (1.9)	4.5 ^d (2.1)

^{a, b, c, d}See Table 2.

mergers. In addition, the table presents similar results for direct passengers for the subset of these routes on which at least 80 percent of the passengers traveled direct. The results speak fairly clearly: there is no apparent increase in attraction of the dominant airlines before the mergers (third-quarter 1985 to third-quarter 1986), but there does seem to be an increase in the difference in route shares by point of origin in the year following the mergers. On St. Louis routes that TWA/OZ served with other competitors, the merging airlines' net change in share of passengers was 5.0 percent greater for travelers who originated at St. Louis than for those who originated at the other endpoint of these routes. On the direct routes, the difference was 6.6 percent. The figure is roughly comparable for NW/RC on its direct routes from Minneapolis, but is much smaller and statistically insignificant for the sample of all routes it served competitively from MSP. The sign of these route-share changes is consistent with increased attractiveness of the merged carrier to passengers who originate at its dominated airport. The timing of these changes supports the hypothesis that they may be due to frequent flyer programs and other marketing devices. The ability to use such marketing programs was probably enhanced by the mergers only after the mergers actually took place and the programs of the merging companies were combined.

IV. The Evidence on Changes in Service

Studies both before and after airline deregulation have found a strong positive correlation between concentration on a route

TABLE 4—MERGING CARRIERS' CHANGES IN LOAD FACTORS AND AVAILABLE CAPACITY AT THEIR PRIMARY HUBS

	Other Firms	Mkts	Capacity Change ^a	Relative Load Factors ^a		Rel. L.F. Change ^a 1986–87
			1986–87	1986	1987	
NW & RC	Yes	6	-28.3 ^b (5.7)	-19.4 ^b (5.0)	0.8 (1.9)	12.8 ^b (3.2)
NW or RC	Yes	3	-6.2 (22.0)	1.6 (6.2)	-4.1 (7.1)	-3.4 (4.5)
NW & RC	No	19	-14.4 ^b (5.0)	-10.0 ^b (2.9)	5.9 ^b (2.0)	10.1 ^b (1.4)
NW or RC	No	27	53.0 ^b (15.4)	-5.7 ^c (2.7)	0.6 (2.2)	3.3 ^d (1.9)
TWA & OZ	Yes	9	-23.9 ^b (4.0)	-0.4 (5.5)	0.3 (2.7)	0.4 (3.4)
TWA or OZ	Yes	6	3.6 (6.8)	-17.7 ^d (9.1)	1.2 (5.6)	11.0 ^d (5.4)
TWA & OZ	No	19	-25.5 ^b (4.1)	-5.6 ^d (2.9)	3.8 ^d (2.0)	5.4 ^b (1.8)
TWA or OZ	No	39	18.2 ^d (9.9)	-8.0 ^b (2.6)	-1.8 (1.8)	3.6 ^c (1.5)

^{a, b, c, d}See Table 2.

and load factors (the proportion of seats filled). It appears that prior to deregulation when airlines could not adjust prices, they instead competed by adding flights on a route, which tended to drive down load factors. This sort of competition has decreased, but has persisted since deregulation.

Competition in capacity implies that the mergers examined here would result in a *decrease* in the capacity that the merged carrier would offer on routes where the merging airlines had competed with one another, and an *increase* in average load factors on such routes. The implications for routes on which only one of the merging carriers had operated is less clear. Table 4 examines nonstop routes from the dominated airport on which at least one of the merger partners had offered capacity of at least 110 seats, about 1 flight per day, prior to the merger. The relative load factors and their changes are calculated comparably to the relative price calculations in Table 2.⁵

⁵These data are for the second quarters of 1986 and 1987. Data for the third quarter of 1986 are likely to reflect disruption in the carriers' operations just prior to their mergers. Capacity is measured in available seats. Similar results were found using flights.

Table 4 verifies that there were substantial service cutbacks on routes where both of the merger partners had operated, regardless of whether or not other airlines competed on these routes. For NW/RC these decreases in service were accompanied by substantial increases in load factors, averaging about 11 percent of the (relative) load factors prior to the mergers, or about 6 percentage points. Passengers on these routes, however, did not suffer particularly poor service after the merger, given the amount of traffic. Rather, the load factor increases seem to have been a normalization from the depressed levels that had existed on these routes prior to the merger. On the St. Louis routes where both TWA and OZ had competed, the load factor increases that accompanied service cutbacks were less substantial and less statistically significant.

Defenders of these mergers have pointed out the merging carriers' new nonstop service on some routes from their hubs. Overall, however, capacity at these airports seems to have declined following the merger. NW/RC capacity on flights to and from MSP fell 7.6 percent following the merger, though a 3.3 percent increase in MSP service by other carriers caused the overall change to be a 5.5 percent decrease. At St. Louis, overall capacity declined 11.4 percent with TWA/OZ service falling 11.1 percent and the capacity of all other carriers falling 12.4 percent.

These capacity changes may give a hint at the cause of the small price changes at STL following the merger there. At STL, TWA's capacity decrease was met with decreases by other carriers and overall decreases in passenger traffic. At the same time, load factors at STL increased much less than the national average. Thus, it appears that the weak indications of increased market power following the TWA/OZ merger may be a result of weakening demand for travel to and from St. Louis.

V. Conclusion

The two mergers analyzed here offer a unique opportunity to learn more about the market power and competitive advantage that can result from airport dominance. The

effects that I have found from the NW/RC and TWA/OZ mergers are broadly consistent with the conclusions that Gregory Werden et al. (1989) reach using substantially different methods: The evidence of increased market power at Minneapolis following the NW/RC merger is consistent and convincing, but the evidence in the TWA/OZ case is weaker. NW/RC's price increases were significant not just on routes that both airlines had served prior to the merger, but also on routes where only one of the two merger partners competed with another airline or operated without active competition. Furthermore, the timing of many of these price increases implies that a reduction of competition occurred even before the merger was consummated. In contrast, the changes in market share and capacity that might indicate market power did not appear until after the mergers. Theories that explain these differences in the timing of price changes vs. capacity and market share changes remain for future work. Likewise, the distinctly different results from two fairly similar mergers are also worthy of further investigation.

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