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## A Map Analysis of United States Airline Competition

Edward J. Taaffe

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## A MAP ANALYSIS OF UNITED STATES AIRLINE COMPETITION<sup>1</sup>

BY EDWARD J. TAAFFE

Assistant Professor of Geography, Northwestern University

### PART I — THE DEVELOPMENT OF COMPETITION

#### *Introduction*

THE development and effects of airline competition in the United States have already stimulated a considerable postwar literature, dealing both directly and indirectly with the subject.<sup>2</sup> This study represents an addition to that literature from the viewpoint of geography. Modern geographers are interested in air and other forms of transport insofar as they represent aspects of the spatial organization of human activities and provide some evidence as to the nature of the complex interrelationships existing between places. From the point of view of students of air transportation, it is felt that the geographer's use of maps and his emphasis on individual route characteristics in considering problems of airline competition may provide a somewhat different view of a familiar situation. This particular paper presents a cartographic history of competitive change in airline traffic from 1940 to

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<sup>1</sup> This article is the result of work being carried on at the Transportation Center at Northwestern University. The material was developed to provide an empirical traffic analysis in connection with a current study dealing with the role of the Civil Aeronautics Board in the development of United States air transportation. The author wishes to express his thanks to Richard Carter and Ronald Miller, Transportation Fellows in geography, for assistance in cartographic and computational work.

<sup>2</sup> This includes: Frederick W. Gill and Gilbert L. Bates, *Airline Competition*, (Cambridge: Harvard University Press, 1949); Herbert H. Whitehead, "Effects of Competition and Changes in Route Structure on Growth of Domestic Air Travel," *JOURNAL OF AIR LAW AND COMMERCE*, XVIII (Winter, 1951), pp. 78-90; Harold D. Koontz, "Domestic Air Line Self-Sufficiency: A Problem of Route Structure," *American Economic Review*, XLII (March, 1952), pp. 103-125; David W. Bluestone, "The Problem of Competition Among Domestic Trunk Airlines," *JOURNAL OF AIR LAW AND COMMERCE*, XX, (Autumn, 1953) pp. 379-402; Gilbert L. Bates, "Current Changes in Trunkline Competition," *JOURNAL OF AIR LAW AND COMMERCE*, XXII, (Autumn, 1955) pp. 379-405; Aaron J. Gellman, "The Regulation of Competition in United States Domestic Air Transportation: A Judicial Survey and Analysis," *JOURNAL OF AIR LAW AND COMMERCE*, XXIV, (Autumn, 1957) pp. 410-434; Samuel B. Richmond, "Creating Competition Among Airlines," *JOURNAL OF AIR LAW AND COMMERCE*, XXIV, (Autumn, 1957) pp. 435-464.

1956. The maps give both an overview of competition among the 100 leading city pairs and a view of the competitive characteristics of individual city pairs in the visual context of other major city pairs. The evaluation of generalizations about airline competition is aided by noting on the maps the varying degrees of conformity of specific cases to such aggregative generalizations.

In this study, attention will be focused on the premium air travel markets of the United States, the 99 leading city pairs (as based on passenger-mile production in March, 1956).<sup>3</sup> The use of the 99 city pairs may be considered something of a compromise between the obviously impractical alternative of considering all city pairs and the obviously biased alternative of selecting isolated city pairs to illustrate certain competitive characteristics. The degree of concentration of air traffic is such that these 99 pairs accounted for nearly half of U. S. total passenger-miles during March, 1956 despite the fact that there are many thousands of city pairs with scheduled air service. The degree of participation in high-density traffic such as this is of considerable importance to an airline (although the relation of such economies of scale to profits is a complex and uncertain one). Koontz attributes much of the regional carriers' weakness to their small share of these markets.<sup>4</sup> A study of Chicago's air traffic also indicated a high degree of concentration on premium markets.<sup>5</sup> Two or three cities accounted for 50 per cent of the Chicago passenger-miles for most of the airlines concerned. Thus, a close examination of the measurable extent of competitive change as reflected in traffic maps of the 99 city pairs would seem to be helpful in attaining a better overall understanding of airline competition.

In the first part of this two-part study, the 99 city pairs will be mapped and examined in terms of the nature and extent of airline competition among them. The development of these competitive characteristics will then be traced in a series of maps designed to establish realistic categories for the consideration of the effects of competition on traffic growth. The second part of the paper (to appear in the next issue of the JOURNAL OF AIR LAW AND COMMERCE), will deal with the patterns of traffic growth among the 99 city pairs for selected periods. The hypothesis that competition is associated with growth will be tested against the competitive categories established in the first part of

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<sup>3</sup> For purposes of comparison with previous city pair figures, Tampa-Chicago and St. Petersburg-Chicago, both of which were among the 100 leading passenger-mile generators in March, 1956, were considered as a single city pair. The term "premium markets" will be used interchangeably with "leading city pairs" to refer to these 99 pairs. The term "route" will also be used occasionally to refer to city pairs. All maps were compiled from two-way origin-destination data in: Civil Aeronautics Board, *Airline Traffic Survey*, Washington: U.S. Government Printing Office and Air Transport Association, *Origination-Destination Airline Revenue Passenger Survey*, Airline Finance and Accounting Conference, Washington, D. C. March and September totals were used in all cases but 1940 where September figures alone are used.

<sup>4</sup> Koontz, *op. cit.*

<sup>5</sup> Edward J. Taaffe, *The Air Passenger Hinterland of Chicago*, University of Chicago, Department of Geography Research Paper No. 24, (University of Chicago Press: 1952), p. 87.

the paper. Attempts will also be made to separate the effects of competition from certain other growth factors.

The basis for mapping competitive and growth characteristics of the 99 leading city pairs is provided by Figure 1. The degree of concentration was such that traffic to and from the four major centers (New York, Chicago, Los Angeles, Miami) accounted for 87 of the 99 leading pairs in March, 1956. Three additional centers accounted for the remaining 12 (Washington, Tampa, San Francisco). This made possible the cartographic representation of the passenger-mile magnitude of each city pair by plotting graduated circles on four inset maps, one for each of the four major centers on which air traffic is concentrated. Thus, the area of the circle marked DEN on the New York map is proportional to the number of air passenger-miles flown between New York and Denver during a two-week period in March, 1956 and a two-week period in September, 1956, a number which is considerably greater than the traffic between Los Angeles and Denver, as is evident from the smaller DEN circle on the Los Angeles map. In order to make the inset maps complete, traffic to the three additional centers was added in the form of graduated squares. Tampa squares were added to the Miami map; San Francisco squares to the Los Angeles map; Washington squares to the Chicago map. Thus on the Miami map the square above the circle representing Detroit-Miami represents the smaller Detroit-Tampa traffic; on the Chicago map, there is a Detroit-Washington square above the Detroit-Chicago circle; and a Detroit-San Francisco square above the Detroit-Los Angeles circle on the Los Angeles map. No city pairs are repeated since the goal is to let the four inset maps provide a cumulative picture of the 99 city pairs rather than to have each inset map provide a complete picture of the traffic for the particular city. The complete Miami traffic among the 99 city pairs, for instance, consists not only of all the city circles on the Miami map, but also the Miami circles on the other three maps.

The disproportion between the circle sizes in Figure 1 provides further evidence of the degree of concentration of passenger miles on the very largest city pairs. Particularly dominant are: the long-haul traffic from the Pacific Coast to Chicago and New York; Miami traffic to Chicago and New York; and New York-Chicago traffic. Also conspicuous is the heavy traffic between other American Manufacturing Belt<sup>6</sup> centers, on the one hand, and Chicago, New York, and the Pacific Coast on the other. Below this traffic level, there is a considerable fall-off, as witness the many small circles, particularly on the Chicago and the Los Angeles maps. This magnitude map has been used to construct a base map for the consideration of each airline's share of traffic. For cartographic clarity, the discrepancies in traffic shown on Figure 1 have been reduced by categorizing the 99 city pairs into three size groups based on March and September, 1956 passenger-miles. These size

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<sup>6</sup> The American Manufacturing Belt as it is commonly delimited by geographers consists of the cities within a rectangle bounded roughly by Milwaukee and St. Louis on the West; Boston and Baltimore on the East.

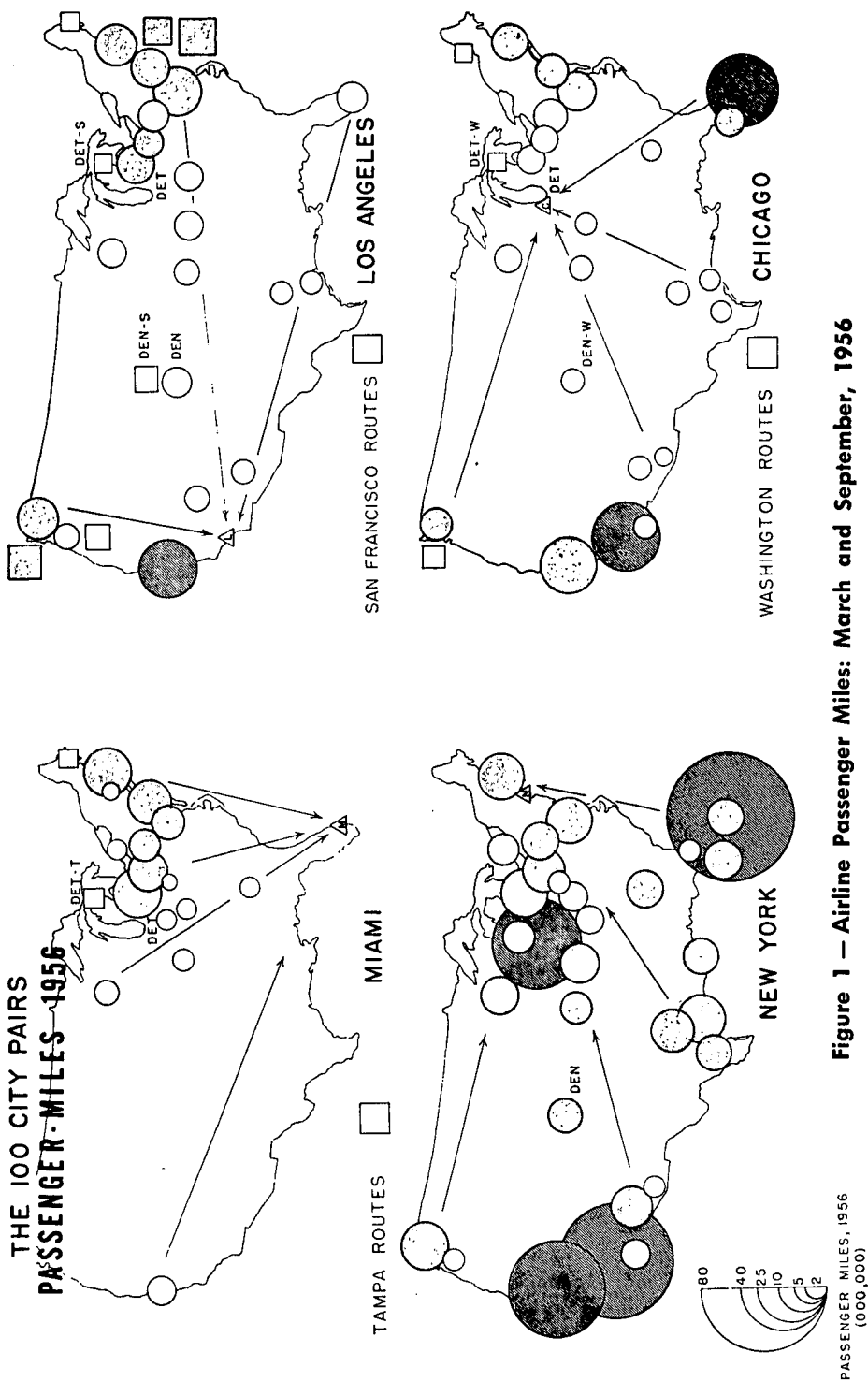


Figure 1 — Airline Passenger Miles: March and September, 1956

groups correspond to the dark-shaded, light-shaded and unshaded circles in Figure 1. All the remaining maps are drawn on the categorized base. Competitive breakdowns will be represented by pie charts within the circles for four different years. Text comments will attempt to point out significant competitive characteristics and changes reflected in each of these traffic maps.

### *Comments on the September, 1940 Map*

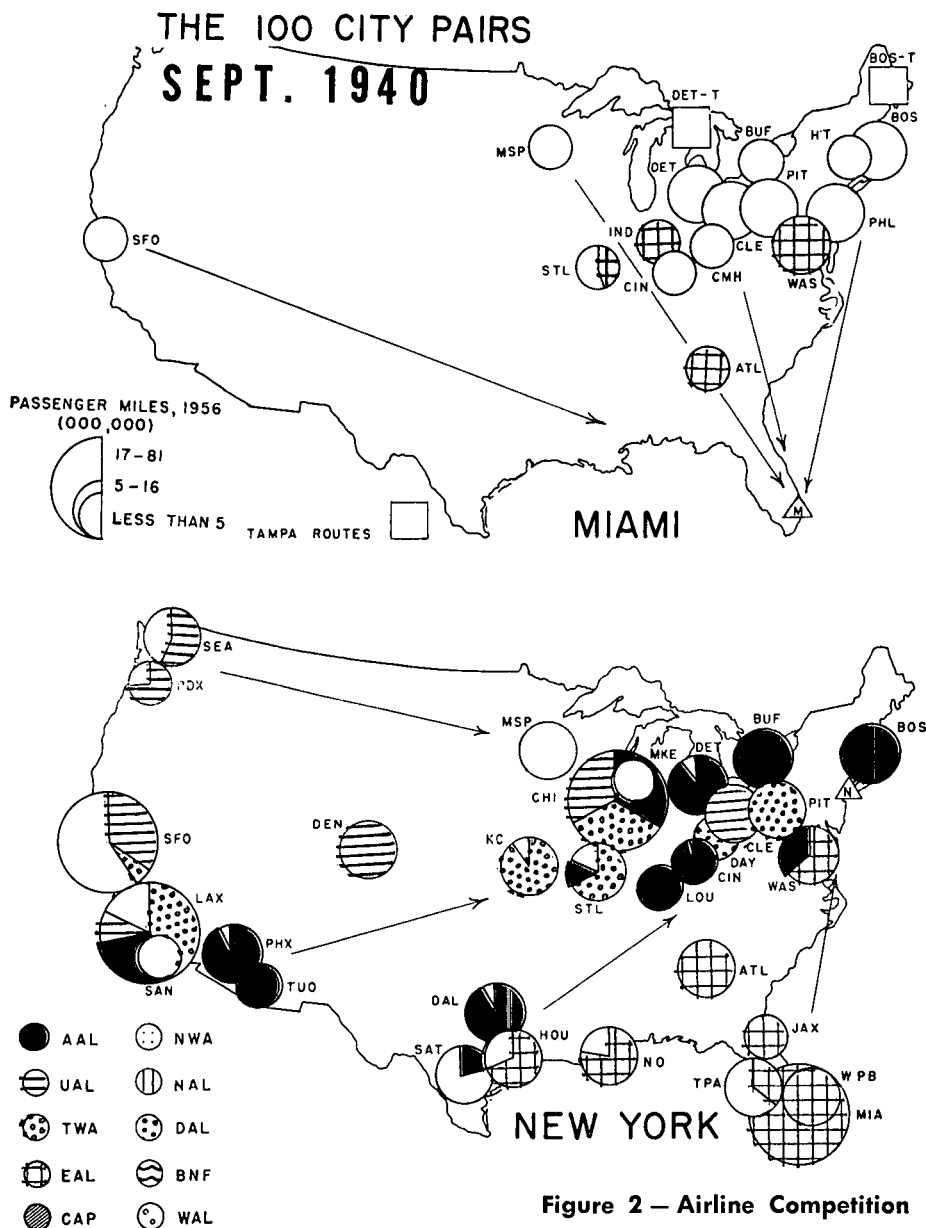
Figure 2 represents airline competition in September, 1940.<sup>7</sup> The size of each circle represents the magnitude of the particular city pair as determined by 1956 passenger-miles. The September, 1940 figures are represented by the breakdown within the circle, which gives the percentage share of each airline. The red patterns represent members of the Big Four; the black and white patterns represent regional carriers;<sup>8</sup> the blank circles or circle sectors represent connecting services involving more than one carrier. For instance, the large circle at LAX on the New York map indicates that Los Angeles-New York falls in the largest size group on the basis of March, 1956 passenger miles.<sup>9</sup> The breakdown within the circle indicates that, in September, 1940, TWA was the leading carrier of Los Angeles-New York passengers with 43 per cent, American Airlines was second with 28 per cent, United Airlines was third with 11 per cent, and the remaining 18 per cent traveled via connecting carriers.

The most striking features of the September, 1940 maps of the leading city pairs are: the dominance of the Big Four, the general absence of competition, and the prevalence of connecting flights. The many blank circles and circle sectors, particularly on the Los Angeles and Miami maps, indicate the weak development of many of the routes which had become premium city pairs by 1956. Both local and area monopolies appear on the maps. Services to the Southeast from the Eastern Seaboard as well as from Chicago were dominated by Eastern Airlines; American generally dominated services to the Southwest, particularly from the Eastern Seaboard and the Pacific Coast. United monopolized the intra-Pacific Coast traffic, as well as the external connections of San Francisco and the Pacific Northwest. Local monopolies were evident in the control by different members of the Big Four individual large centers. American was the only carrier providing service

<sup>7</sup> Only September origin-destination figures were available for 1940. All other years include data for two survey months (or half-months): March and September.

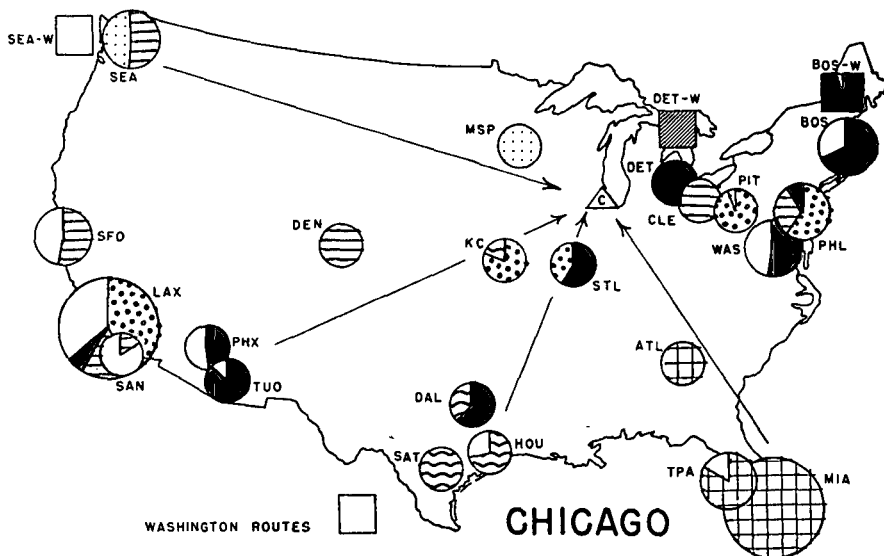
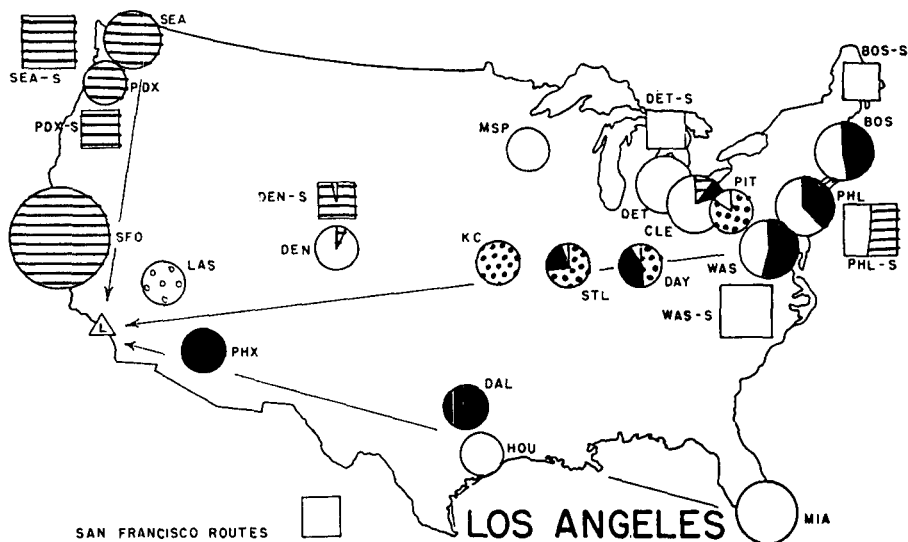
<sup>8</sup> The term "regional carrier" is used in this study for the smaller trunklines (Capital, Northeast, National, Delta, Braniff, Continental, Western and Northwest); Big Four refers to American, United, TWA and Eastern. Only single carrier service as recorded in the origin-destination survey is credited to each carrier. Interchange services are regarded as connecting services. Its share of connecting traffic is merely grouped with all connecting traffic. The pie chart breakdown is arranged so that the airline with the largest share is always shown in the upper right quadrant with the other airlines ranked in clockwise order. Percentages of less than five per cent are not shown on the map.

<sup>9</sup> The standard three-letter airline code is used on the map with the following exceptions: HT-Hartford; WAS-Washington; CMB-Columbus; LOU-Louisville; DET-Detroit; NO-New Orleans; KC-Kansas City.



**Figure 2 – Airline Competition**

over Detroit, Boston and Buffalo routes as well as over routes to the Ohio Valley centers of Cincinnati and Louisville. United dominated Cleveland traffic in eastern United States, Denver in western United States. TWA dominated Dayton and Pittsburgh in the east, Kansas City in the west. There was already, however, intra-Big Four competition on some of the high-density routes. Los Angeles-New York and New York-Chicago were served by three carriers providing effective competition. Two-carrier Big Four competition was present over some of the Chicago and the St. Louis routes as well as the New York-Washington route.



— September, 1940

The regional carriers were quite insignificant on the pre-war map, providing effective (10 per cent) competition<sup>10</sup> on only four routes, all on the Chicago map. (Braniff's services to Kansas City and Dallas; Chicago and Southern's services to St. Louis; and Northwest's services to Seattle.) There were also five monopoly routes controlled by regional carriers (Braniff's Chicago-San Antonio and Chicago-Houston traffic, Northwest's Chicago-Minneapolis, Capital's Washington-Detroit, and

<sup>10</sup> Gill and Bates, *op. cit.*, and others have used the 10 per cent figure as an arbitrary measure of effective competition. It will be used throughout as the criterion for separating one-, two- and three-carrier pairs.



Western's Las Vegas-Los Angeles). It is interesting to note that no regional carriers whatsoever were recorded on either the New York or the Miami maps.

The prominence of the Big Four in air traffic of the leading city pairs is emphasized by Table 1. Of the total passenger-miles of the 99 pairs on Figure 1, the Big Four accounted for fully 95 per cent. A significant aspect of this degree of concentration is that the Big Four had a higher percentage of the premium market passenger miles than they did of all passenger-miles. The regional carriers had less than five per cent of the premium market passenger-miles, although they accounted for 17 per cent of all passenger-miles in 1940. The second part of the table emphasizes the lack of airline competition in 1940.

TABLE 1  
AIRLINE PERCENTAGE SHARE PASSENGER-MILES: 1940\*

<i>Airline</i>	<i>100 City Pairs (Sept.)</i>	<i>Total (Year)</i>	<i>Difference</i>
	<i>Per Cent</i>	<i>Per Cent</i>	
American	36.35	29.96	+ 6.39
United	26.19	21.37	+ 4.82
Trans World	20.87	14.92	+ 5.95
Eastern	12.92	15.20	— 2.29
Big Four	95.33	81.45	+13.88
Capital	1.08	3.60	— 2.52
National	—	0.46	— 0.46
Northwest	2.40	4.91	— 2.51
Delta	0.52	2.79	— 2.27
Western	0.20	1.51	— 1.31
Braniff	0.44	4.07	— 3.63
Northeast	—	0.39	— 0.39
Regional Carriers	4.66	17.73	—13.07

	<i>No-Carrier Pairs</i>	<i>One-Carrier Pairs</i>	<i>Two-Carrier Pairs</i>	<i>Three-Carrier Pairs</i>
Big Four Only	—	55	6	2
Regional Carrier Only	—	5	—	—
Big Four—Regional Carrier	—	—	4	—
Total	27	60	10	2

\* Airline percentages for the 100 city pairs were computed from the total single-carrier passenger-miles represented by the 99 pairs used as the basis for this study; total airline percentages were computed from the annual passenger-mile totals for all domestic trunklines. Since the latter includes such airlines as Colonial and Continental which are not represented among the 100 city pairs the figures in the table will represent something less than 100 percent of the total. This fact as well as errors due to rounding figures account for most apparent discrepancies in this series of tables. Both in the tables and on the maps, figures for Delta and Chicago and Southern have been combined and reported as Delta figures for those years preceding the merger of the two airlines. Annual figures were taken from: Civil Aeronautics Board, Office of Carrier Accounts and Statistics, *Certificated Air Carrier Mileage and Traffic Data*.

Twenty-seven of the city pairs had connecting services only. Of the remaining 72 with single-carrier service, 60 were one-carrier pairs (55 of these Big Four), 10 were two-carrier pairs, and only two were three-carrier pairs.

The 1940 pattern may thus be considered a "grandfather" pattern inherited in large measure by the Board and used as a base on which to erect a structure of airline competition. The premium markets were almost completely dominated by the Big Four and most of the city pairs were non-competitive.

#### *Comments on the 1949 Map*

Figure 3, the 1949 map, presents the pattern at the end of a period during which large-scale commercial air transportation had come into being. Considerable competition had been added to the 1940 grandfather pattern. In particular, this consisted of competition between the Big Four and the regional carriers stemming from the series of cases decided during and shortly after the War. Wartime CAB decisions in effect created new trunkline competitors by strengthening and drastically altering the nature of many small pre-war carriers such as National, Capital (then Pennsylvania-Central), Delta and Western.

Many regional and local Big Four monopolies became subject to regional carrier competition. Note on the New York and Chicago maps how Eastern's monopoly of services to Florida and the Southeast became competitive as National received an extension to New York and Delta received an extension to Chicago. United lost its regional monopolies when Northwest became competitive in the New York-Pacific Northwest market and Western appeared on the Los Angeles map as a competitor for intra-Pacific Coast traffic. Capital's extension to Chicago removed a number of local monopolies within the American Manufacturing Belt. Note on the New York and Chicago maps how Capital became competitive with American, United and TWA respectively at each of their principal intermediate stops between New York and Chicago (Detroit for American; Cleveland for United; Pittsburgh for TWA). Remaining area monopoly elements included Eastern's continued dominance of much of the Southeast (on the New York map, Atlanta, New Orleans and Houston traffic), and American's dominance of much of the Southwest (Dallas on both the New York and Los Angeles maps). Among the few remaining local monopolies were American's Buffalo service (New York map) and United's Denver services (New York, Chicago and Los Angeles map).

Table 2 indicates the extent to which the regional carriers had become competitive with the Big Four by the early post-war period. The regional carriers accounted for 17 per cent of the leading city pair passenger miles as compared to only 4 per cent in 1940. All seven of the regional carriers increased their share of these premium markets. The Big Four dropped from 96 per cent to 83 per cent with American registering the steepest decline (from 36 per cent to 25 per cent as

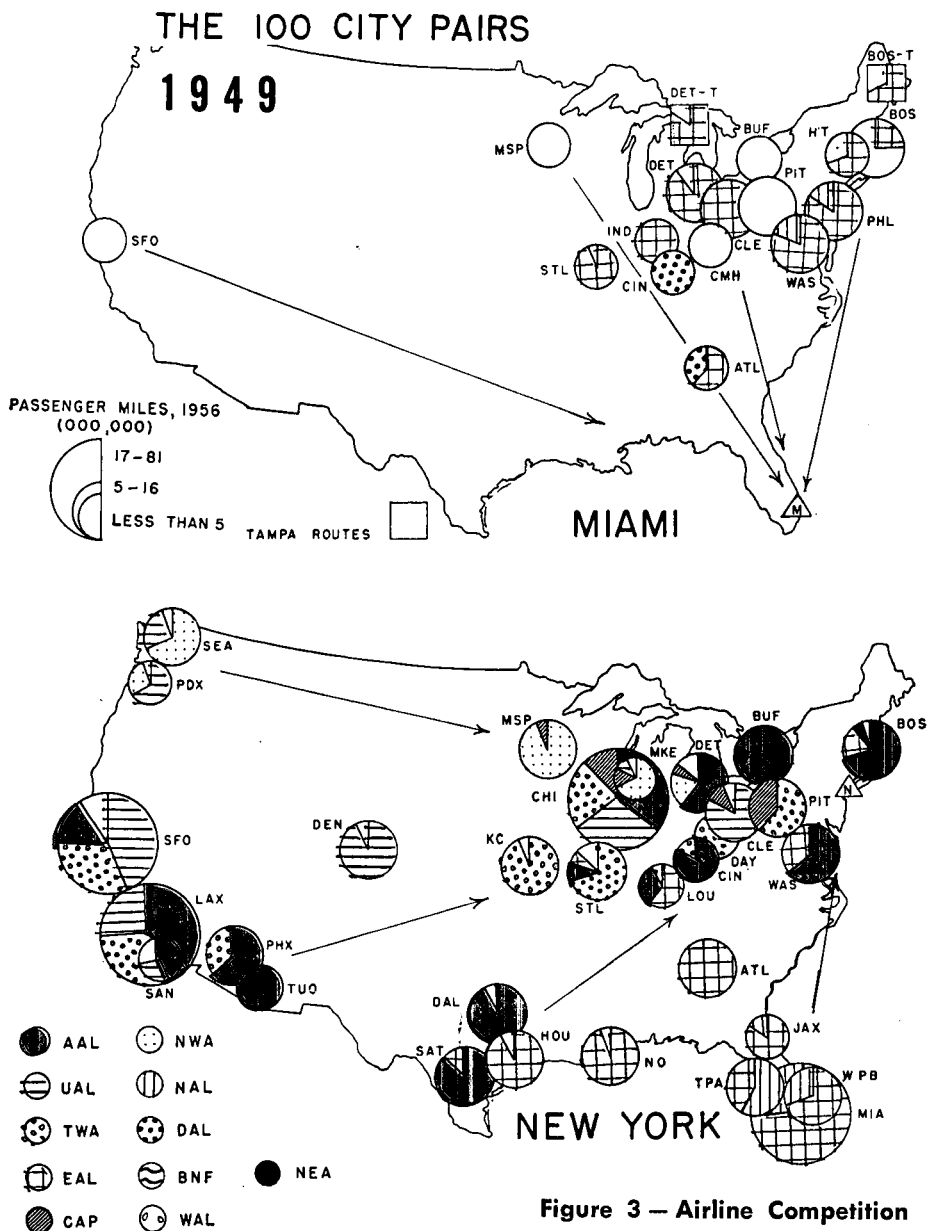
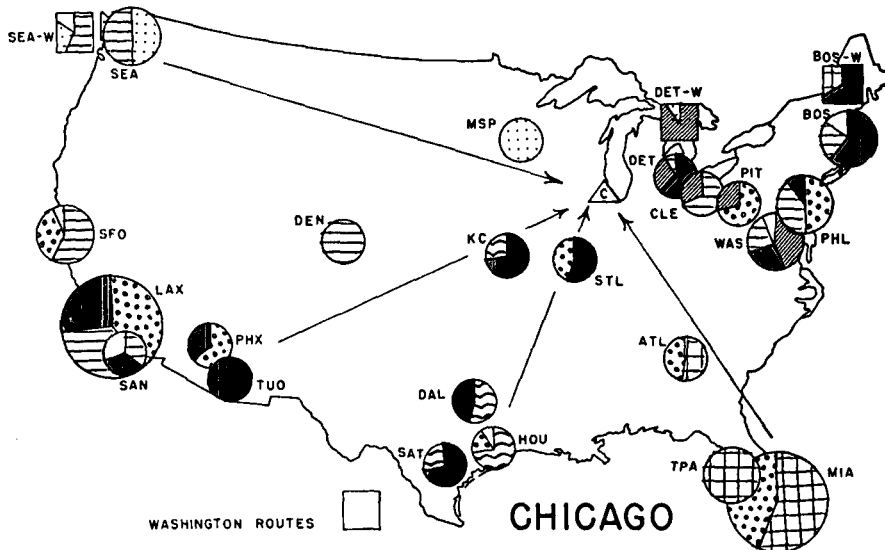
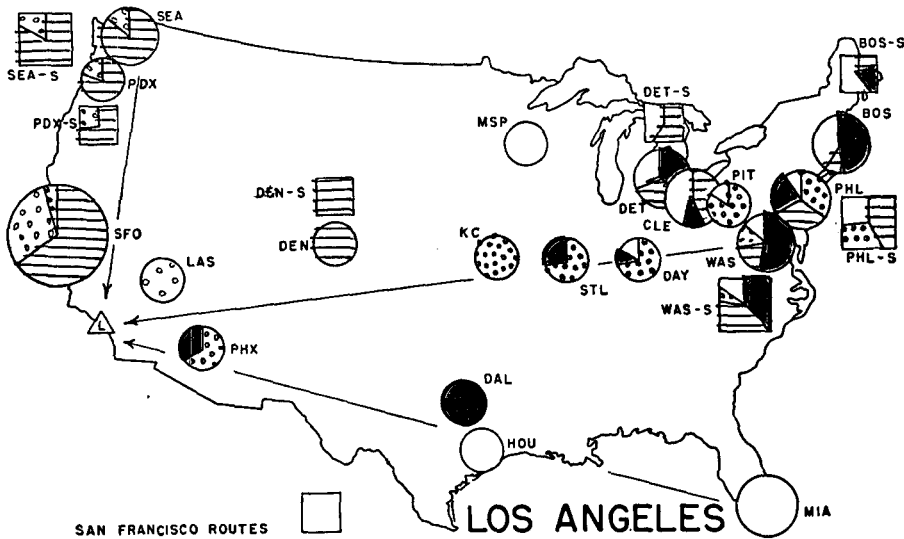


Figure 3 — Airline Competition

traffic to Boston, Detroit and the Ohio Valley cities became competitive). Eastern was the only member of the Big Four to increase its share of the premium market traffic since 1940. This increase is deceptive, however, since most of it is due to seasonality. Figures for 1940 included only September, a seasonal low for Florida; figures for 1949 included both September and March.

Despite a major reduction, however, there persisted a consistent discrepancy between airline participation in total passenger miles and in premium market passenger-miles as is indicated in the column labeled "Difference." There was a discrepancy of over 10 per cent



### — March and September, 1949

between the Big Four's 83 per cent share of the premium markets and its 73 per cent share of the total market. All of the Big Four registered larger shares of the premium markets than of the total market, as compared to only two of the seven regional carriers. The second part of Table 2 shows further the extent to which competition increased among the 99 city pairs from 1940 to 1949. Monopoly city pairs were nearly halved (from 60 to 33) and two-carrier city pairs became the largest group with an increase of from 10 to 50. The technological maturing of air transportation is indicated by the fact that the number of city pairs which had only connecting services was reduced from 27

TABLE 2  
AIRLINE PERCENTAGE SHARE PASSENGER-MILES: 1949

Airline	100 City Pairs (Sept. & March)		Total (Year)		Change in Difference
	Per Cent	Change from 1940	Per Cent	Difference	
American	24.90	-11.45	23.28	+ 1.62	
United	22.98	- 3.21	19.60	+ 3.38	
Trans World	18.21	- 2.66	14.37	+ 3.84	
Eastern	17.12	+ 4.20	15.42	+ 1.70	
Big Four	83.21	-12.12	72.67	+10.54	-3.34
Capital	3.59	+ 2.51	5.43	- 1.87	
National	3.03	+ 3.03	2.61	+ 0.42	
Northwest	5.52	+ 3.13	6.49	- 0.97	
Delta	1.51	+ 1.00	4.88	- 3.37	
Western	1.88	+ 1.68	1.60	+ 0.28	
Braniff	1.06	+ 0.62	4.57	- 3.51	
Northeast	0.19	+ 0.19	0.95	- 0.76	
Regional Carriers	16.78	+12.12	26.53	- 9.75	+3.32

1949	No- Car- rier		One- Car- rier		Two- Car- rier		Three- Car- rier	
	Change		Change		Change		Change	
Big Four Only	—	—	28	-27	21	+15	5	+3
Regional Carrier Only	—	—	5	0	1	1	0	0
Big Four— Regional Carrier	—	—			28	+24	3	+3
Total	8	-19	33	-27	50	+40	8	+6

to 8. In terms of Big Four regional carrier competition, the table indicated that in 1949 there was a fairly even division between the three major categories of city pairs; Big Four monopolies, (28); Big Four-regional carrier two-carrier pairs (also 28); Big Four two-carrier pairs (21).

#### *Comments on the 1954 Map*

Figure 4, the 1954 map, represents the pattern of airline competition at the end of a period of relative stability, despite rapidly increasing traffic. According to Bates, the period from 1947 to 1954 was a static one during which the CAB had engaged in little direct promotion of competition as compared to the dynamic period of increased competition from 1938 to 1947.<sup>11</sup> It is probable that the Board's attitude toward competition was colored by its desire to end airline subsidy, an

<sup>11</sup> Bates, *op. cit.*, used a number of measures to show that airline competition increased greatly from 1938 to 1947, remained static from 1947 to 1954 and increased again in 1955.

objective which had, in large measure, been achieved by 1954. Chief problems faced by the Board during this period included mergers, interchanges, non-scheduled and local service airlines. Action, with respect to the first three of these, had a deterrent effect on additional competition. Mergers reduced the total number of potential competitors; interchange agreements were sometimes recommended in lieu of route extension<sup>12</sup> (note on the Miami map that Los Angeles-Miami is still without single-carrier service); and further expansion of non-scheduled airlines was discouraged. To a certain extent, the support of mergers designed to strengthen weak carriers might be considered as having a promotional effect on competition, at least within the leading city pairs, since none of the merged carriers provided effective competition to each other in a premium market. Action with respect to local service carriers had a promotional effect on competition although not among the 99 leading city pairs.

The pattern of competitive change from the 1949 to the 1954 map was quite restricted. Regional carriers either dominated or provided effective competition in 37 markets, the same as in 1949. Probably the most striking change has been the development of National into a strong competitor in markets formerly dominated by Eastern. National approximately doubled its share of Miami traffic from the big Eastern Seaboard centers (see Miami on the New York map; Philadelphia and Washington on the Miami map). One change of secondary importance appears on the Los Angeles map where a route extension gave Western a monopoly on single-carrier service to Minneapolis.

Three of the other regional carriers registered declines in important markets, Northwest (on the New York map, decreases of 22 per cent at Seattle, 16 per cent at Minneapolis); Braniff (on the Chicago map, decreases of 22 per cent at Houston, four per cent at San Antonio and Dallas); and Capital (a number of 6-8 per cent decreases on the New York and Chicago maps, and a decrease of 11 per cent in the New York-Chicago market). Capital's reduced share of the Chicago-New York traffic was symptomatic of its difficulties during this period, when the widespread introduction of coach fares had offset the competitive advantage gained by Capital in initiating these services in 1948.

Table 3 confirms the visual impression of competitive stability among the 99 leading city pairs. The principal change in share of the total premium market, the large increases recorded by Eastern and National, was associated with the boom in Florida traffic. Big Four regional carrier relationships changed only slightly as the Big Four share of the leading markets dropped 1 per cent to 81.89 per cent. Three of the seven regional carriers registered increases, with National's increase of 3.90 per cent by far the largest. All of the Big Four still had larger shares of the premium market than of the total market, although

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<sup>12</sup> See Aaron J. Gellman, "The Regulation of Competition in United States Air Transportation: A Judicial Survey and Analysis—II," in this issue of the JOURNAL OF AIR LAW AND COMMERCE.

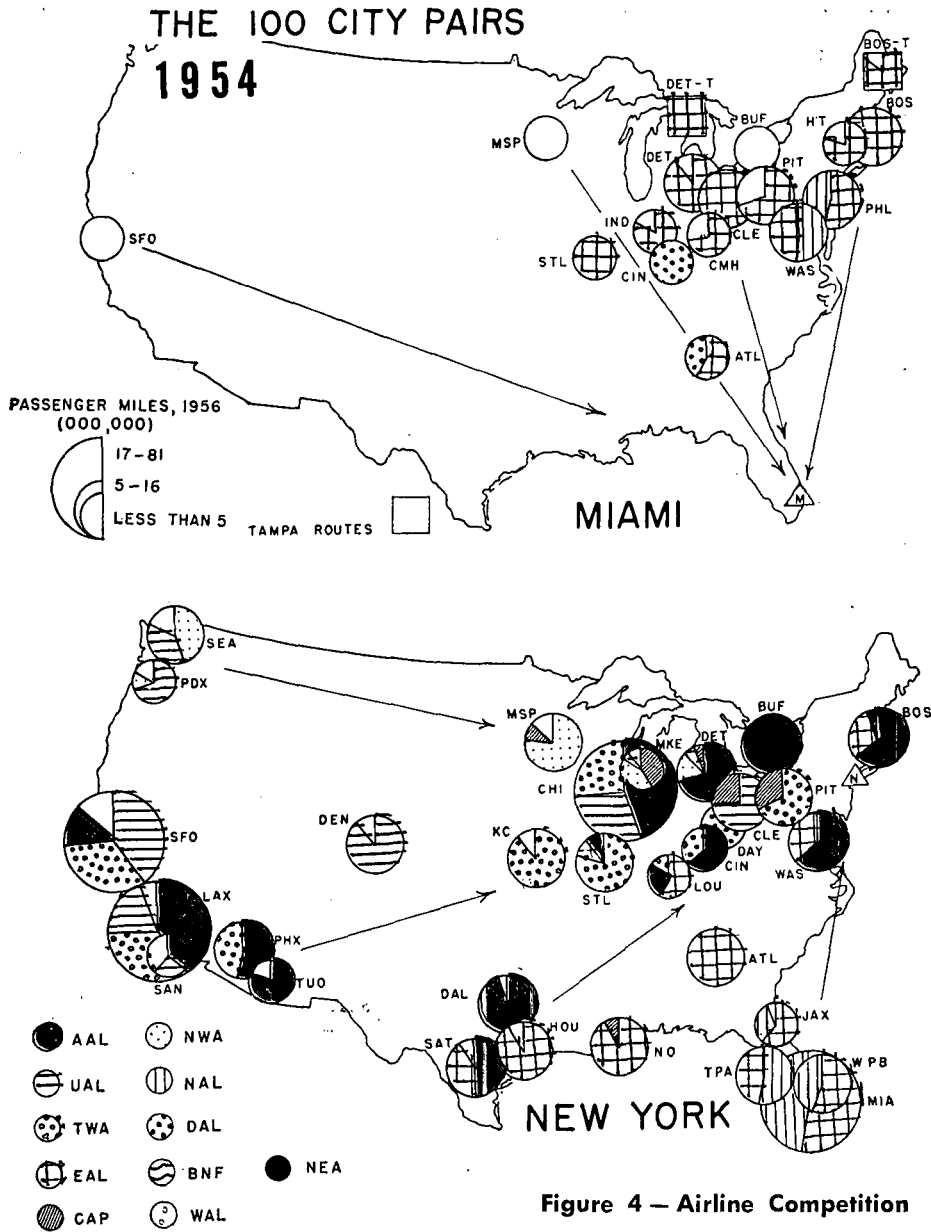
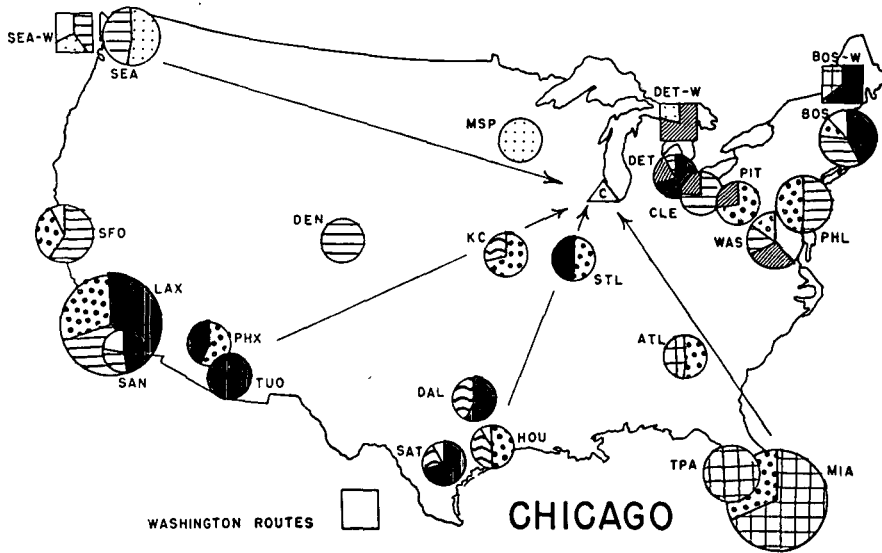
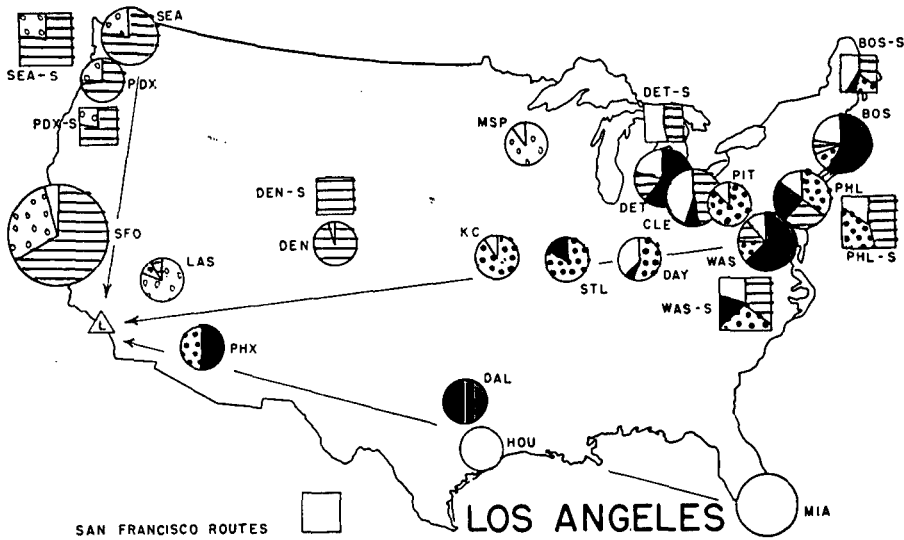


Figure 4 — Airline Competition

the difference in the case of TWA had become slight. Again all of the regional carriers but National and Western had lower shares of the premium market than of the total market. The proportion of one-, two- and three-carrier city pairs remained remarkably stable (34; 49; 11; as opposed to the previous 33; 50; 8). The two dominant categories of city pairs were still Big Four monopolies (30) and Big Four-regional carrier two-carrier pairs (28). Two-carrier Big Four pairs dropped somewhat from 21 to 18.



— March and September, 1954

The early post-war competitive pattern had thus remained virtually unchanged through a period of increased traffic, initiation of coach fares, pressures from non-scheduled carriers and a marked movement away from subsidy on the part of the certificated carriers. The few competitive changes which did occur were related more closely to such basic trends as increased Florida resort travel rather than to CAB decisions. The stage was set for the next round of decisions designed to increase competition.



TABLE 3  
AIRLINE PERCENTAGE SHARE PASSENGER-MILES: 1954

Airline	Per Cent	100 City Pairs (Sept. & March)	Total (Year)	Difference	Change in Difference
		Change from 1949	Per Cent		
American	22.18	-2.72	20.76	+1.42	
United	21.96	-1.01	19.30	+2.66	
Trans World	16.47	-1.74	16.08	+0.39	
Eastern	21.28	+4.16	17.53	+3.85	
Big Four	81.89	-1.32	76.67	+8.30	-2.24
Capital	2.15	-1.44	4.59	-2.44	
National	6.93	+3.90	4.27	+2.66	
Northwest	3.32	-2.20	4.61	-1.29	
Delta	2.36	+0.85	4.84	-2.48	
Western	2.78	+0.90	2.47	+0.31	
Braniff	0.47	-0.59	3.23	-2.76	
Northeast	0.09	-0.10	0.64	-0.55	
Regional Carriers	18.10	+1.32	24.65	-6.58	+3.17

1954	No- Car- rier	Change	One- Car- rier	Change	Two- Car- rier	Change	Three- Car- rier	Change
Big Four Only	—	—	30	+2	18	-1	9	+4
Regional Carrier Only	—	—	4	-1	3	+2	—	—
Big Four— Regional Carrier	—	—	—	—	28	0	2	-1
Total	5	-3	34	+1	49	-1	11	+3

*Comments on the 1956 Map*

The pattern of airline competition on the 1956 map (Figure 5) shows a marked change from that of 1949 and 1954. The greater cartographic complexity is associated with increased competition; the greater prominence of the black and white patterns is associated with the improved position of the regional carriers. Both of these are linked to the Board's 1955-1956 decisions, particularly the *New York-Chicago Case*, the *Denver Service Case*, and the *Southwest-Northeast Case*.<sup>13</sup> The 1956 map represents the initial impact of some, but not all of these de-

<sup>13</sup> Civil Aeronautics Board Order No. E-937, *New York-Chicago Case*, Docket No. 986, *et. al.*, dated September 1, 1955 (mimeographed decision); Civil Aeronautics Board Order No. E-9785, *Southwest-Northeast Service Case*, Docket No. 2355, *et. al.*, dated November 21, 1955 (mimeographed decision); Civil Aeronautics Board Order No. 9735, *Denver Service Case*, Docket No. 1841, *et. al.*, dated November 14, 1955 (mimeographed decision). Other cases include: Civil Aeronautics Board Order No. E-10645, *New York-Florida Case*, Docket No. 3051, *et. al.*, dated September 28, 1956 (mimeographed decision) and Civil Aeronautics Board Order No. E-10487, *Tucson Airport Authority Application*, Docket No. 5564, July 7, 1956 (mimeographed decision). Later a Civil Aeronautics Board press release dated

cisions.<sup>14</sup> The policy of strengthening the weak carrier seems to have had the greatest effect on the map, although increased intra-Big Four competition is also evident.<sup>15</sup> In order to emphasize the competitive changes which have occurred in the New York and Chicago maps since 1954, Figure 6 has also been prepared. Pie sectors on this map represent increases of more than 5 per cent in competitive share. On the New York map, for instance, the sectors in the Detroit circle indicate that Capital has increased its share of total Detroit-New York traffic by 12 per cent (from 5 per cent to 17 per cent), and that TWA has increased its share by 8 per cent (from 0 to 8 per cent). The prevalence of black and white patterns on Figure 6 further emphasizes the improved competitive position of the regional carriers relative to the Big Four. All but a few of the red patterns on the competitive increase map are associated with intra-Big Four competition, chiefly on western routes.

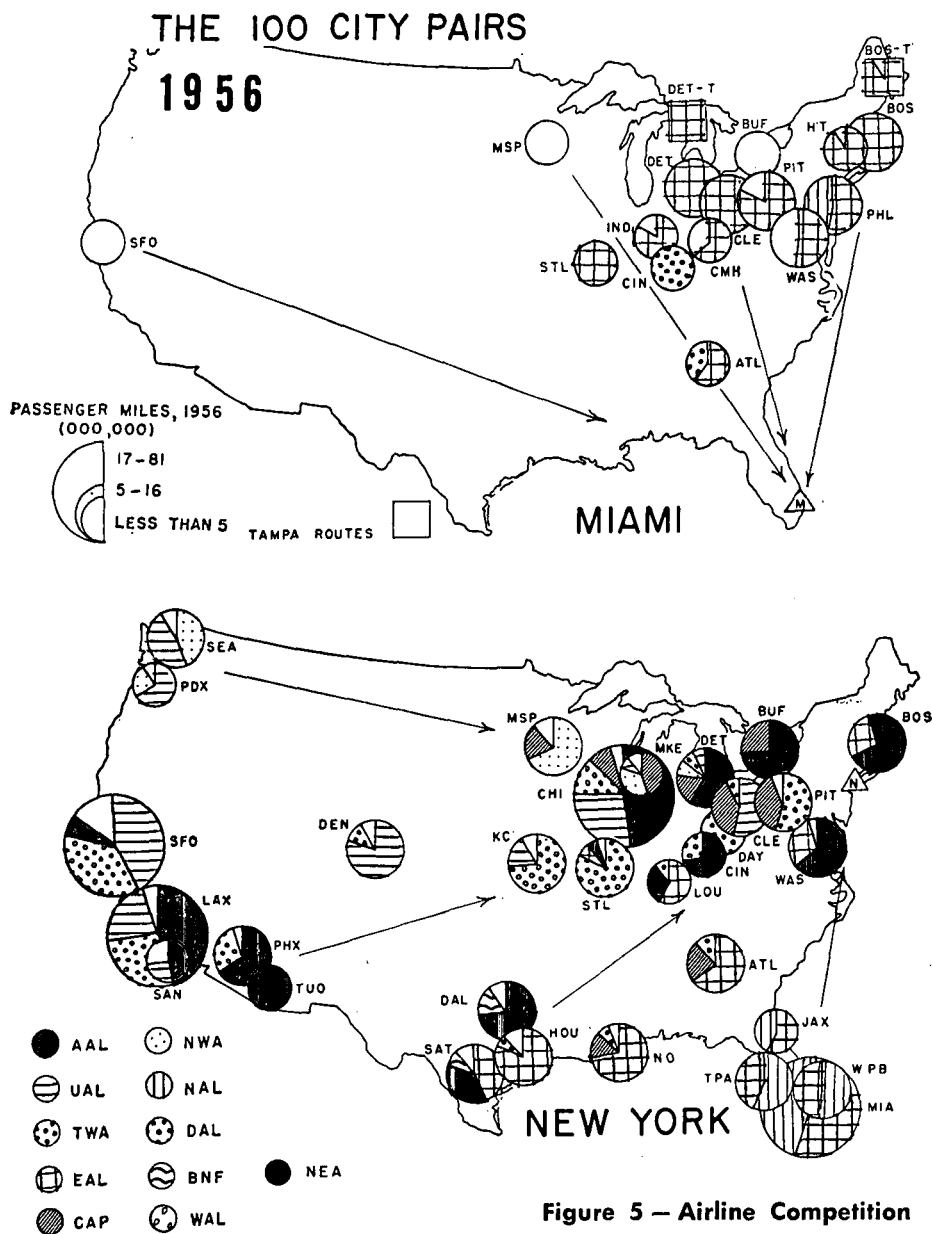
One of the most interesting and conspicuous examples of a weak carrier which has been strengthened is to be found in the increased prominence within the Manufacturing Belt of the dark pattern representing Capital Airlines. On the New York inset on Figure 5, American's local monopoly of the New York-Buffalo city pair was eliminated when Capital entered the market with fully 28 per cent of the traffic; on the Chicago inset, Capital entered the Chicago-Philadelphia market as a third carrier with a 14 per cent share. Gains associated in part with the removal of operating restrictions were registered by Capital at other important Manufacturing Belt centers, such as Pittsburgh, Cleveland, Detroit, Chicago, Milwaukee and Minneapolis. These gains, ranging from 6 to 16 per cent, are particularly evident on Figure 6, the competitive increase map. Outside of the Manufacturing Belt, Capital's Southeastern service to New York resulted in a 10 per cent gain at New Orleans, 24 per cent at Atlanta. That this was not a transitory phenomenon is evident from the fact that further gains were registered in March 1957. The increase in Capital's share of the premium market passenger-miles from 2.15 to 4.49 (see Table 4) is by no means a simple result of CAB policy, however. A closer look at Capital's traffic indicates that the competitive impact of the Vicker's Viscount was also a vital factor. The competitive share graphs in Figure 7 show Capital's percentage of the traffic of its major city pairs for each March and September from 1948 through 1956. The remarkable upsurge of Capital in the 1956 section of each of these graphs follows the initiation of Viscount service, represented by a small "v" on the graph. The Chicago-Washington route (and to a lesser extent the Chicago-Cleve-

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March 31, 1958 indicated that considerable competition had been added to the Miami map with the decisions in the *Great Lakes-Southeast Service Case*, the *St. Louis-Southeast Service Case*, and the *TWA-Cincinnati-Detroit Route Transfer Case*. Other cases being considered at the time of writing include Dallas Service to the West and a southern transcontinental.

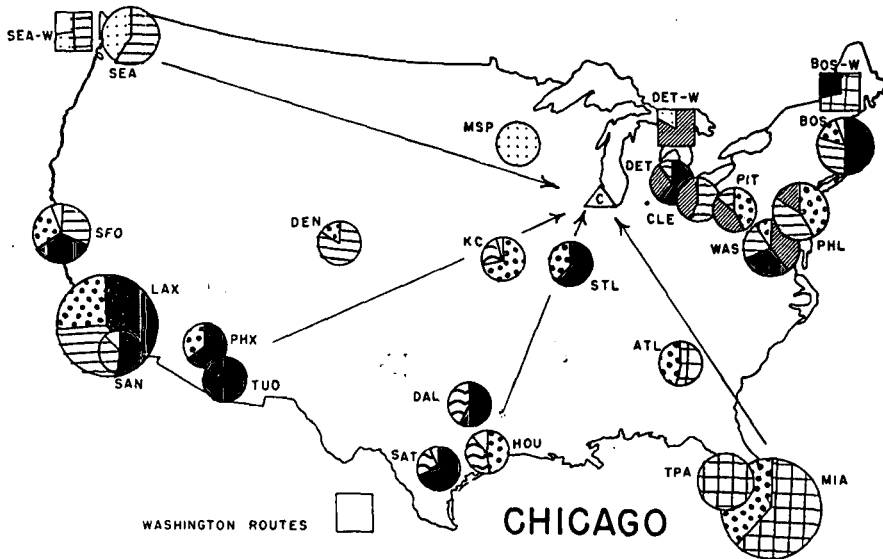
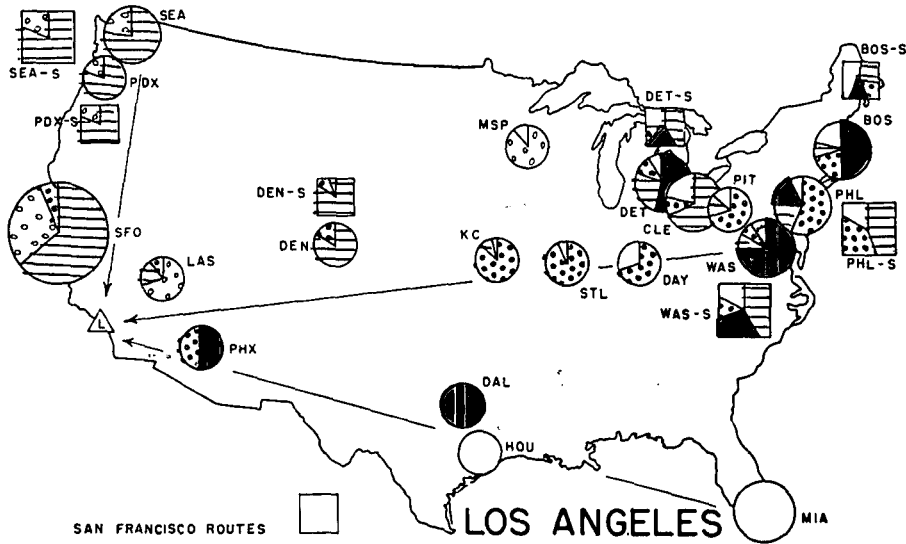
<sup>14</sup> Although only the 1956 figures were mapped, origin-destination figures for March, 1957, which became available before completion of the study, have been incorporated in the text discussion.

<sup>15</sup> Gellman, *op. cit.*, (Part I), p. 427.



land route) effectively exemplifies the three phases in the ebb and flow of Capital's fortunes since 1948. First came the period through 1950 when the early initiation of coach fares helped Capital maintain its leadership over American; secondly, the period from 1952 through 1954 when American expanded coach services and dominated the market; thirdly, Capital's revival in 1955 with the initiation of Viscount services. By March 1957 this dominance had increased from 42 to 55 per cent while American's share had dropped to 17 per cent.

Further evidence of the policy of strengthening the weak carrier is



— March and September, 1956

to be found both on Figure 5 and Figure 6 on the New York inset. The last two regional monopolies, Eastern's in parts of the Southeast, and American's in the Southwest were virtually eliminated, largely through the decisions in the *Southwest-Northeast Case*. Note the sizable share of Delta and Capital in the Atlanta and New Orleans markets, both of which had been virtually monopolized by Eastern. American lost 17 per cent of its New York-Dallas traffic to Braniff, and a later decision brought TWA into the Tucson market. The 1956 map is misleading in that it represents only the initial impact of Delta and

# COMPETITIVE INCREASE 1954 - 1956

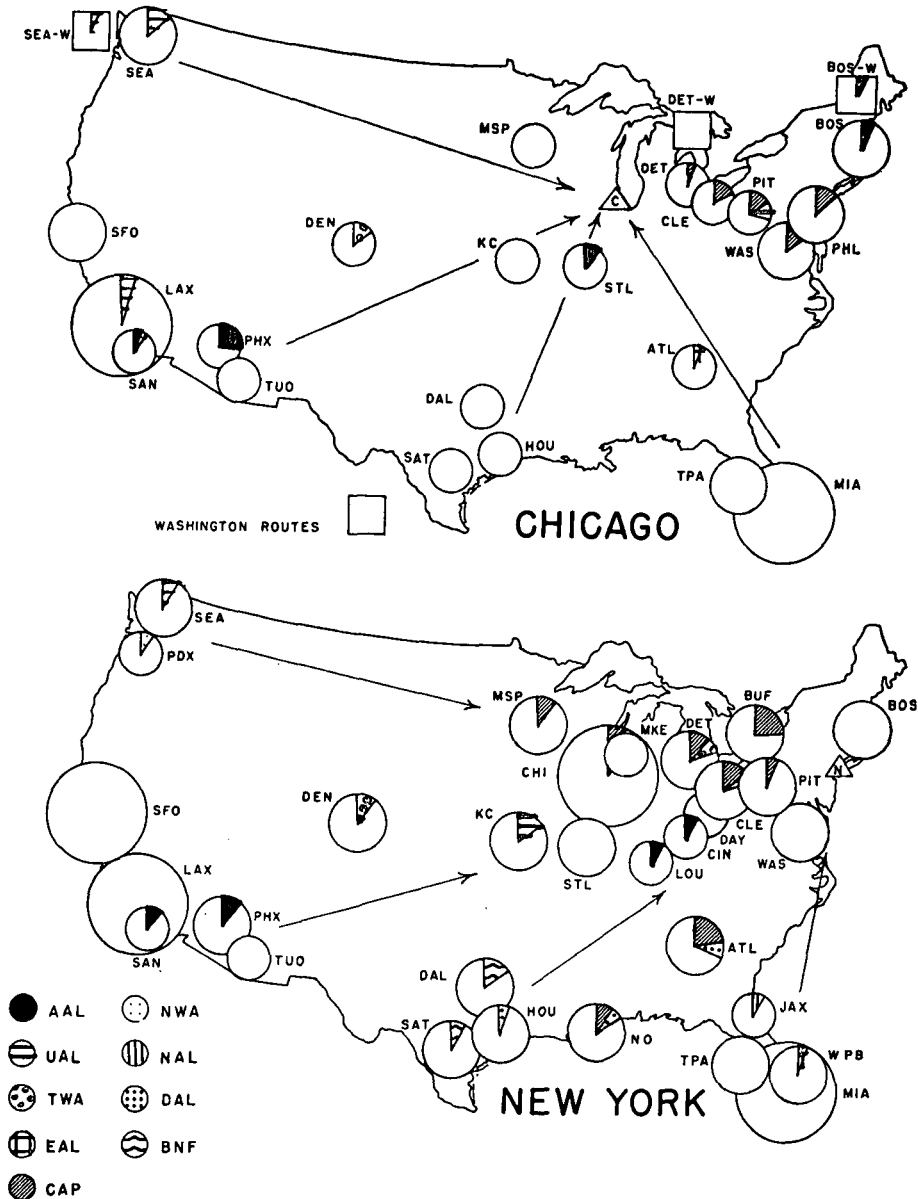


Figure 6 — Increase in Competitive Share: 1954 to 1956

Braniff on the above markets. By March 1957, Delta had gained an additional 18 per cent of the Atlanta-New York traffic, Braniff an additional 12 per cent of the Dallas-New York market. Although not evident on the 1956 map, it is probable that awards to other regional carriers

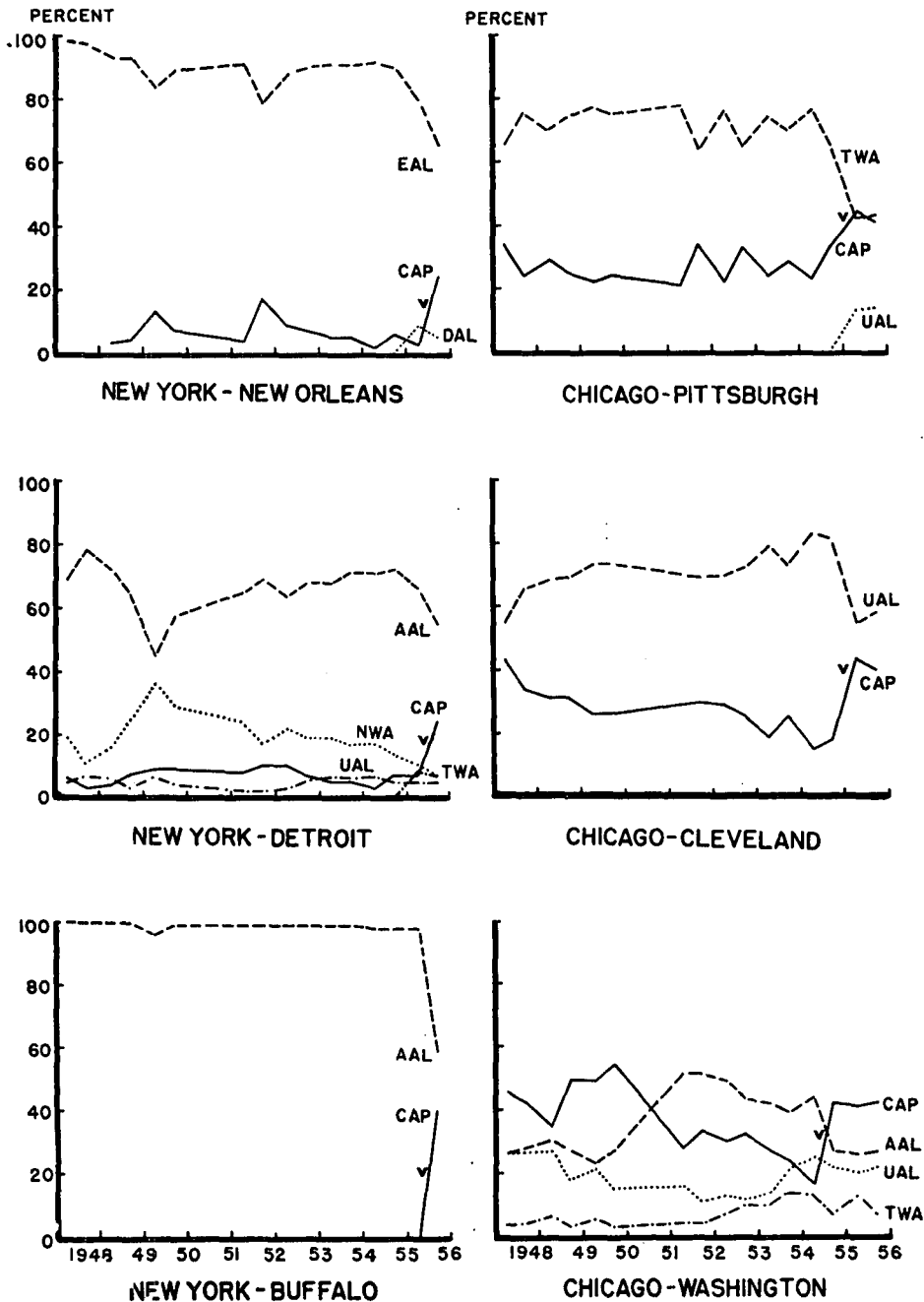


Figure 7 — Competitive Share Graphs: Capital Airlines

such as Northeast's Florida routes, Continental's Chicago-Denver and Chicago-Los Angeles routes, and Western's Denver-San Francisco routes will ultimately result in effective competition.

The feeling that increased competition in general was needed appears to have been the principal motive in creating increased com-

TABLE 4  
AIRLINE PERCENTAGE SHARE PASSENGER-MILES: 1956

Airline	100 City Pairs (Sept. & March)		Total (Year)		Change in Difference
	Per Cent	Change from 1954	Per Cent	Difference	
American	21.84	-0.34	22.14	-0.30	
United	20.94	-1.02	19.53	+1.41	
Trans World	15.25	-1.22	15.06	+0.19	
Eastern	21.65	+0.37	17.50	+4.15	
Big Four	79.68	-2.21	74.23	+5.45	-2.85
Capital	4.49	+2.34	4.71	-0.22	
National	7.16	+0.23	4.36	+2.90	
Northwest	2.97	-0.35	4.02	-1.05	
Delta	2.61	+0.25	5.19	-2.58	
Western	2.21	-0.57	2.11	+0.10	
Braniff	0.78	+0.30	3.31	-2.54	
Northeast	0.09	—	0.55	-0.46	
Regional Carriers	20.32	+2.22	24.23	-3.91	+2.67

1956	No- Car- rier	Change	One- Car- rier	Change	Two- Car- rier	Change	Three- Car- rier	Change
Big Four Only	—	—	22	-8	23	+5	10	+1
Regional Carrier Only	—	—	3	-1	3	0	—	—
Big Four— Regional Carrier	—	—	—	—	30	+2	3	+1
Total	5	0	25	-9	56	+7	13	+2

petition among the Big Four, either by new certifications or the lifting of restrictions. A great deal of this comprised competition between TWA and United in an unusual pattern of reciprocal awards. The entry of TWA eliminated United's local monopoly of Kansas City services to New York and Los Angeles, as well as Pittsburgh services to Los Angeles. In addition, TWA joined Capital as a United competitor on the New York-Cleveland route; United joined Capital as a TWA competitor on the Chicago-Pittsburgh route. On the competitive increase map, five of the Big Four increases are associated with this musical chairs pattern. These awards illustrate the difficulties involved in striving for an equitable distribution of new awards. In these instances, carriers were compensated for being subjected to additional competition in some markets by being certificated as new competitors in other markets.<sup>16</sup>

Another aspect of intra-Big Four competition worthy of mention is the addition of a third Big Four carrier to another major California

<sup>16</sup> *Ibid.*, p. 432 has further discussion of these awards.

market. On the Chicago map, American entered the San Francisco market with a surprisingly high 32 per cent. Thus, nine out of a total of 13 three-carrier pairs now involved California traffic. An interesting feature of this traffic is the vigorous competition between the Big Four. As the competitive share graphs in Figure 8 indicate, the Los Angeles traffic to both New York and Chicago has sustained three effective competitors since 1948.

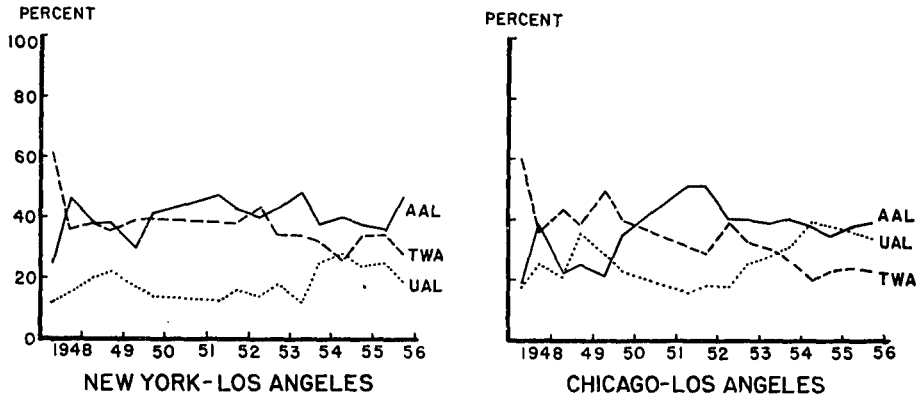


Figure 8

Only a few monopolies remain on the 1956 map. One group is that of the seasonal city pairs (Tucson and Florida traffic), many of which would probably not be ranked among the 99 leading city pairs if twelve-month origin-destination figures were available. After 1956, however, the Tucson routes became competitive with the addition of TWA, and, in 1958, a series of CAB decisions markedly altered the Miami map by adding a competitor (a regional carrier or TWA) to most of the Manufacturing Belt routes to Florida which were Eastern monopolies in 1956.

Other monopolies on the 1956 map were Dallas-Los Angeles (American), New York and Los Angeles to Dayton (TWA), and the three regional-carrier monopolies: Chicago-Minneapolis (Northwest); Los Angeles-Minneapolis (Western); and Miami-Cincinnati (Delta). The survival of the regional carrier monopolies may be taken as another manifestation of the policy of strengthening the weak carrier. The Dallas-Los Angeles market, as well as three of the five city pairs without single-carrier service save in the form of interchange (Miami to San Francisco and Los Angeles; Houston to Los Angeles), were involved at the time of writing in proceedings designed to provide additional Dallas to the West Coast services and to consider the possibility of establishing a southern transcontinental route. Although this latter had earlier been rejected in the favor of interchange, there was, by 1958, evidence that single-carrier service between Florida and California was imminent.

Table 4 indicates that in 1956 the Big Four still dominated the 99 leading city pairs. They accounted for 79.68 per cent of the premium



market passenger-miles, a drop of 2.21 per cent since 1954.<sup>17</sup> There was actually a very slight increase in Big Four dominance of total passenger-miles in 1956. It is possible that the continuation of this degree of domination by the Big Four, in the face of an increasing regional-carrier share in many new markets, is associated with a re-shuffling of available equipment, reducing regional-carrier participation in lesser markets. The Big Four also continued to have a larger share of the premium market traffic than of the total traffic, although this discrepancy had declined from 8.30 per cent in 1954 to 5.45 per cent. However, one of the Big Four, American, had reached the point where its share of the premium markets had dropped below its share of the total markets. This slight drop in overall Big Four domination continued in March, 1957, when the Big Four total was 77 per cent as compared to 78 per cent in March, 1956, and 79 per cent in March of 1954.

Most of the regional carriers experienced a slight increase in their share of the premium markets. Northwest and Western were the only regional carriers to decline in their share of the premium-market passenger miles. As was evident from visual inspection, Capital had the greatest increase in both absolute and relative terms. Its increase of 2.34 per cent more than doubled its 1954 figure. It should also be noted that the small increases for Delta and Braniff were modified by the later competitive resurgence described above. Nonetheless, the only two regional carriers which had a greater share of the premium-market passenger miles were still National and Western, just as in 1954 and 1949. The number of premium markets in which regional carriers offered effective competition had only increased from 37 to 40.

The overall structure of one, two, and three carrier city pairs did not change greatly. However, as emphasized in Figure 9, which shows those categories since 1940, there was enough change to indicate the prevalence of the two-carrier pairs. The number of one-carrier pairs had decreased considerably, and the number of three-carrier pairs had increased only slightly.<sup>18</sup> The most common single category of city pair was the Big Four-regional carrier two-carrier pair. There were 31 of these, as compared to 22 Big Four monopolies and 23 Big Four two-carrier pairs. The cumulative pattern of change since before the war in these categories is shown in Figure 10, which gives the number of each, arranged from left to right in order of 1956 rank. The sharpest contrast in Figure 10, as in Figure 9, is, of course, that between the pre-war curve, when the 99 city pairs were dominated by Big Four monopolies, and the post-war curves, which are relatively closely grouped. The general direction of change to 1956 has been for the Big Four-regional carrier category to increase at the expense of the Big

<sup>17</sup> Both on the map and in the tables, the effects of the Western Airlines' pilot strike, which eliminated that airline from the March, 1956 figures, has been modified by pro-rating 1956 totals according to 1954 percentage shares for those city pairs involving Western.

<sup>18</sup> Although in terms of premium-market passenger-miles, three-carrier pairs accounted for 26 per cent.

NUMBER OF CITY PAIRS

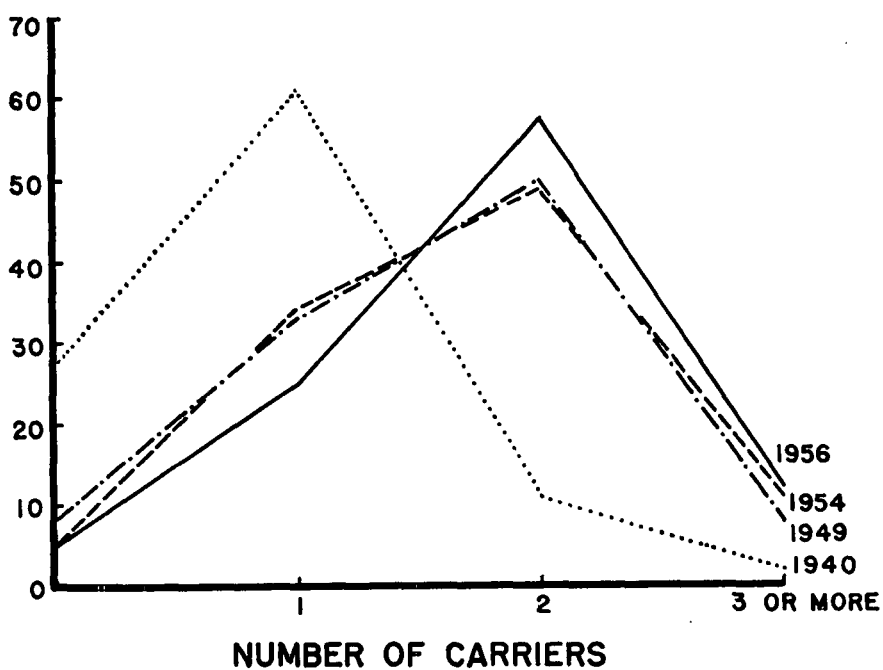
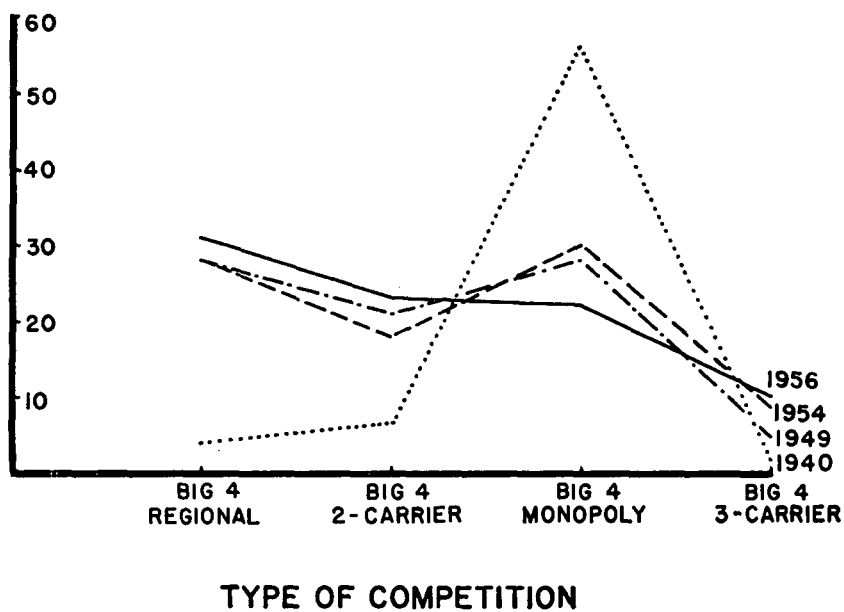


Figure 9

NUMBER OF CITY PAIRS



TYPE OF COMPETITION

Figure 10

Four monopoly category, with a slight but steady increase in the three-carrier Big Four category.

### *Summary*

The set of maps portraying airline competition within the 99 leading city pairs for selected years, thus shows the development of competition in two waves of expansion. Some competition retrogression was evident in the static period between these two waves. The second expansion wave has to date been of considerably less magnitude than the first, although the full effects of the later decisions have not yet evidenced themselves in origin-destination data.

In terms of the entire 99 city pairs, it could be said that it had taken approximately ten years since the beginning of the era of large-scale commercial air transportation for competition to spread through the premium markets. Both regional and local monopolies were virtually eliminated by 1956. The only major exceptions to this, the Florida routes, were made competitive by later decisions. The discrepancy between Big Four participation in the premium markets and in the total market had also been reduced during the ten year period. It should be noted, however, that the Big Four still controlled nearly 80 per cent of the 1956 premium-market traffic, and that there still persisted a discrepancy between this and a 74 per cent share of the total market.

The most conspicuous thread of CAB policy running through both the first and the second waves of competitive increase has been that of strengthening the weak carrier. Regional carriers increased their share of the premium market passenger-miles and provided effective competition to the Big Four in an increased number of the 99 leading markets. In addition, some regional-carrier monopolies remained intact and there were few instances where additional competition between regional carriers was certificated. The idea of strengthening the weak carrier was also important in the later decisions, adding regional carriers to many Florida routes. Closely intertwined with the strengthening of the weak carriers has been the Board's desire to end subsidy and to either help weak regional carriers off subsidy or keep them from reverting to a subsidized status. To a degree the mergers in the static competitive period were designed to strengthen the surviving regional carriers so as to reduce their subsidy needs.

The competition maps also reflect many competitive changes which are not related to the policy of strengthening the weak carrier. It is probable that the end of subsidy has been associated with the increase of intra-Big Four competition. The element of compensation has also been prominent in many route awards, particularly in the instances where United and TWA entered a number of each other's markets. These and such other complicating factors as incident awards<sup>19</sup> and

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<sup>19</sup> Richmond, *op. cit.*, p. 439, discusses such awards which refer to the apparently unintentional certification of additional competition on low density routes as a by-product of an additional certification on a major city pair.

rapidly changing traffic levels emphasize the difficulties of establishing volume-based norms for the number of competitors. No consistent evidence of such norms was noted on the traffic maps despite scattered references to volume as a certification criterion in Board decisions.<sup>20</sup>

Managerial factors are also evident on the maps as significant factors in apportioning the share of traffic on individual routes. The remarkable, competitive impact of Capital's Viscount is an outstanding example of the importance of the equipment aspects of service competition (or product differentiation) in air transportation. The growth of National during a competitively static period is an example of a competitor which had been certified over many routes for some time before becoming a serious threat to the original carrier. The presence on many city pairs of certified carriers with less than a 10 per cent share of the market is an indication of the importance of managerial decision as to route participation.<sup>21</sup> It might be said that regulatory policy sets the limits of potential competition within which managerial decision sets the extent of actual competition. This is, in part, a contrast between the short-run and the long-run effects of added competition, although effective competition has not yet materialized from a number of competitive authorizations.

In terms of 10 per cent participation representing effective competition, the 99 city pairs were, by 1956, dominated by two-carrier pairs. Many of the one-carrier pairs were Florida routes, many of the three-carrier pairs were California routes. The anticipated trend toward three- and four-carrier pairs as dominant types was not yet evident in the 1956 data for the 99 city pairs, although potential three-carrier competition was now present on many routes and a small but steady increase in three-carrier pairs had been evident from 1949 to 1956. The characteristic 1956 city pair had two effective competitors, usually one regional carrier and one Big Four carrier. Most of the awards in the later Florida decisions were also of this nature. Of secondary importance were Big Four monopolies and Big Four two-carrier pairs.

In the second part of this study, one-, two-, and three-carrier city pairs will thus comprise the competitive frame of reference for evaluating differences in traffic growth characteristics. Periods investigated will be 1949-1954 and 1954-1956. Pre-war to post-war changes in competitive structure were so sweeping (see figures 8 and 9) that analysis of this period would seem to be of dubious value.

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<sup>20</sup> For instance, in the *New York-Chicago Case*, Docket No. 986, *et. al.*, dated September 1, 1955 (mimeographed decision) are contained the following: New York-Detroit is cited as having the size and potential for three turn-arounds instead of one (p. 7); a figure of 60,000 passengers is cited as evidence of need for a second Detroit-Philadelphia carrier (p. 16); the Cleveland-New York total is regarded as being too small to support a third carrier (p. 19).

<sup>21</sup> Richmond, *op. cit.*, p. 436.