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THE PROBLEM OF COMPETITION AMONG DOMESTIC TRUNK AIRLINES—Part I

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INTRODUCTION

COMPETITION among domestic trunk airlines cost at least \$84,000,000 in 1953. The purpose of this paper is to answer these questions:

How is this cost estimated?

What advantages are claimed for airline competition to justify these costs?

What is airline competition, and how does it differ from competition among free enterprises?

Since the costs greatly outweigh the claimed advantages, what can be done to reduce airline competition?

"Competition" and "monopoly" are words highly charged with emotion. The outlook of each person on these words is an integral part of his personal orientation toward politics, economics, and society in general. The American people are almost unanimous in feeling strongly pro-competition and anti-monopoly. They believe that competition is basic to the "American way," the normal for economic relationships just as freedom is the ideal for political relationships, the best way to balance supply and demand without outside interference. They believe that the competitive urge is the most powerful drive in business, provides the vigor which has made the United States the world leader in economic power, and is the mechanism of American progress.

By contrast, monopoly is thought of as evil in itself. It is economic dictatorship, fattening on consumers, and crushing the life from independent enterprisers who are the backbone of the American economy.

*This paper is an abridgment of the author's Ph.D. dissertation. The views expressed are entirely his own, and not those of the government agencies of his present or past employment.

Any so-called economies of monopoly are delusory, far outweighed in the long run by the destruction of competitive initiative.

These conclusions are quite correct, on the average. But it should be remembered that averages, although reasonably accurate for a majority of cases, may be definitely inaccurate for the minority. Few people stop to think that the traditional ideas of free enterprise are true only of part of the American economy, and in varying degrees. Few realize how completely the public utility industries are removed from the workings of the free enterprise system. Unlike others, these industries cannot independently set their own prices and determine their own services, maintain control over their profits, or have freedom to enter into business. They are thoroughly regulated by public agencies. These industries were once part of free enterprise, but they have been excluded from it. Competition did not make them work properly; monopoly was feared; public regulation was therefore chosen for them.

Air transportation is not part of the free enterprise system. Here, competition does not work any inexorable process of survival of the fittest, with the weakest being driven to the wall, the most efficient remaining, and the government keeping its hands off. Here, a monopoly does not have its usual power to restrict production, raise prices, and hold its customers powerless. Of all industries, public utilities are the least free to operate under any theoretical iron laws of economic mechanics. Of all public utilities, air transportation is probably the most minutely regulated by the government, and is normally subsidized by the government as well.

Criticisms of Airline Competition

In 1938 the airlines pleaded for government regulation. It was not the public who demanded it, as had been true of the move for regulation of railroads. It is sometimes difficult, when listening to the views of many airline people today, to realize that it was the airlines themselves who asked the government to step in and regulate them. The spokesman of the industry said in 1938, in urging the passage of the Act:

... it is necessary for this bill to pass at this session of the Congress if you are going to retain this air industry. . . . Without your immediate help, this industry as we now know it cannot exist. . . .¹

The airlines were in desperate shape. In the dozen years of their existence, half of the \$125,000,000 invested in them had been lost.²

Excessive competition was the major reason given for the industry's troubles. The board of the Air Transport Association said that air

¹ Testimony of Edgar S. Gorrell, President, Air Transport Association of America. U. S. Congress, House, Committee on Interstate and Foreign Commerce, *To Create a Civil Aeronautics Authority* (Hearings, 75th Congress, 3rd Session. Washington: U. S. Government Printing Office, 1938), p. 298.

² Testimony of Edgar S. Gorrell. U. S. Congress, House, Committee on Interstate and Foreign Commerce, *Aviation* (Hearings, 75th Congress, 1st Session. U. S. Government Printing Office, 1937), p. 62.

transportation, like the early railroads that were destroyed, was wide open to destructive competition and wasteful practices.³ It was highly competitive within itself, and highly competitive with other means of transportation, far transcending what had once been thought possible.⁴ Nowhere was cutthroat competition so dangerous as in transportation⁵ and the threat from unbridled and irresponsible competition might be more serious than the danger of monopolistic control.⁶

The proposed new regulation was not unopposed.⁷ The Post Office Department said that monopolies would most likely result from the requirement prohibiting flights by independent operators unless they could obtain a certificate,⁸ and the Department of Commerce was "unalterably opposed" to the certificate requirement when the industry was so young, so devoid of secondary routes, and without "enough competition to promote the potential traffic."⁹ But Congress passed the Act.

The sponsor of the Civil Aeronautics Act of 1938, said, in urging the passage of his bill, "The industry has reached the point where unbridled and unregulated competition is a public menace," and one of the two major aims of his bill was protection against cutthroat competition.¹⁰ Nine years later, the head of the Air Transport Association said that the airline situation "approaches, in some respect, what I call cutthroat competition, which to my mind is not only fantastic but decidedly uneconomical. I think it goes beyond the purview of the Act."¹¹

In September 1940, on a route system slightly expanded over that made permanent by the Act, 41 percent of airline passenger traffic was competitive.¹² By September 1947, this figure had gone up to 59 percent.¹³ By 1950, it was 63.5 percent.¹⁴

³ Testimony of Edgar S. Gorrell. *To Create a Civil Aeronautics Authority*, p. 309.

⁴ Testimony of Edgar S. Gorrell. U. S. Congress, Senate, Committee on Interstate Commerce, *Regulation of Transportation of Passengers and Property by Aircraft* (Hearings before a subcommittee, 75th Congress, 1st Session. U. S. Government Printing Office, 1937), p. 501.

⁵ Testimony of Edgar S. Gorrell, *Ibid.*, p. 513.

⁶ Testimony of Edgar S. Gorrell, *Aviation*, p. 67.

⁷ *Ibid.* p. 67.

⁸ Letter from James A. Farley, Postmaster General, to Hon. Burton K. Wheeler, Chairman, Committee on Interstate Commerce, March 11, 1937. *Aviation*, p. 122.

⁹ Letter from J. M. Johnson, Assistant Secretary of Commerce, to Hon. Pat McCarran, Chairman, Committee on Interstate Commerce, December 16, 1936. *Regulation of Transportation of Passengers and Property by Aircraft*, p. 89.

¹⁰ Remarks of Hon. Clarence F. Lea, Chairman, House Committee on Interstate and Foreign Commerce, 83 Congressional Record 6407 and 6507, 1938.

¹¹ Statement of Vice Admiral E. S. Land, President, Air Transport Association of America. President's Air Policy Commission, *Public Testimony*, Vol. 1, p. 60, September 15, 1947.

¹² Frederick W. Gill and Gilbert L. Bates, *Airline Competition* (Boston: Harvard University Printing Office, 1949), p. 27.

¹³ *Ibid.*, p. 27.

¹⁴ Based upon new route authorizations of the CAB between September 1947 when Gill and Bates computed their figures, and March 1950 when such certifications practically ceased.

Many people familiar with the industry agree that there is too much airline competition. The President's Air Policy Commission attributed the 1947-1948 difficulties of the industry primarily to over-expansion based on mistaken assumptions as to postwar traffic.¹⁵ The authors of part of the Hoover Commission study on transportation stated that there has been unplanned competitive development with over-expansion and general financial instability, caused by a gross miscalculation of the air transportation market.¹⁶ The Secretary of Commerce agreed that the CAB fostered competition on the basis of optimistic estimates of the potential market.¹⁷

Gill and Bates said in 1949 in their book "Airline Competition" that the most detrimental effect on airlines was competition in their major markets, and that the competition of more than two carriers was the major flaw in the expansion of the system.¹⁸ The Aviation Securities Committee of the Investment Bankers Association stated that competition was excessive, and that one of the main problems of the industry was how to reduce it.¹⁹ The presidents of the five largest airlines and one of the smaller ones stated that there was too much route duplication and competition.²⁰ Others have made qualified criticisms, saying that there is too much competition in some sections and not enough in others. These include the Congressional Aviation Policy Board,²¹ and four of the medium-sized carriers, with varying degrees of emphasis.²²

The Civil Aeronautics Board, which granted the competitive routes, has generally defended its actions. At times it has said "There is no basis for a conclusion that there is excessive, uneconomic or destructive competition"²³ and "We do not believe . . . that a general reduction in the present degree of competition would be desirable . . ." ²⁴ In

¹⁵ U. S. President's Air Policy Commission, *Survival in the Air Age* (Washington: U. S. Government Printing Office, 1948), p. 100.

¹⁶ Charles L. Dearing and Wilfred Owen, *National Transportation Policy* (Washington: The Brookings Institution, 1949), p. 369.

¹⁷ U. S. Department of Commerce, *Issues Involved in a Unified and Coordinated Federal Program for Transportation*, A Report to the President from the Secretary of Commerce (Washington: U. S. Government Printing Office, 1949), p. 16.

¹⁸ Gill and Bates, *op. cit.*, pp. 506, 628, 631.

¹⁹ Investment Bankers Association of America, Aviation Securities Committee, "Report on Air Transportation," *THE JOURNAL OF AIR LAW AND COMMERCE*, 16:223, Spring, 1949.

²⁰ U. S. Congress, Senate, Committee on Interstate and Foreign Commerce, *Air-Line Industry Investigation* (Hearings, 81st Congress, 1st Session. Washington: U. S. Government Printing Office, 1949-1950). American at pp. 742, 744, 745; United at p. 671; TWA at pp. 1775, 1776; Northwest at p. 565; Continental at p. 1614. Eastern in *Statement Submitted to the President's Air Policy Commission*, p. 11.

²¹ U. S. Congress, Congressional Aviation Policy Board, *National Aviation Policy* (80th Congress, 2nd Session. Washington: U. S. Government Printing Office, 1948), p. 26.

²² *Air-Line Industry Investigation*. Capital at p. 693; Delta at p. 1076; Braniff at pp. 1359-1360; National at p. 2112.

²³ U. S. Civil Aeronautics Board, *Statement Before the President's Air Policy Commission*, October 27, 1947, p. 240.

²⁴ *Air-Line Industry Investigation*, pp. 554-555.

other places the CAB has admitted that competition may have been carried too far in certain instances.²⁵ The CAB has also pointed out that the airline industry itself pressed hard for expansion. In 1943, there were almost 350 applications for more than 500,000 miles of routes to over 3,600 cities; granting them all would have expanded the airline system ten times its existing size to a route mileage more than all railroad and common-carrier bus routes combined.²⁶

And the CAB has had support from various sources. One transportation authority said in 1945 that the industry would be better off with double its existing number of major firms.²⁷ The president of one of the smaller airlines pointed out that between 1941 and 1947, route mileage increased less than three-fold while traffic increased almost five-fold, and that an 80-percent rise in route density could not be called over-expansion.²⁸ An economist also disputed the conclusions of Gill and Bates, stating that the major trouble of the airlines was not competition, but the size and density of the carriers' routes.²⁹

It is to be expected, of course, that most of the airlines speak with something less than complete objectivity. The larger carriers are well established, and would generally like to reduce competition or at least to maintain their present dominant position. The medium-sized and smaller carriers are against more competition when it means another airline coming into their territory; they are for competition when they either have recently been expanded into another's area or see the possibility of such expansion. The noncertificated carriers, since they are not in the semi-protected position of the certificate holders, criticize the envied "monopolies."

Practically all arguments have been advanced by all contenders. Whoever takes any position at all must of necessity agree with some arguments of one of the major groups. Any objective analysis will therefore sound in part like the echoes of some special-interest pleading. In fact, it is extremely difficult to find an objective analyst, even if he has no financial stake in the industry. For one thing, many conclusions are based on the social and political orientation of the person making the analysis. For another, by the time he has acquired sufficient detailed knowledge of economic theory or the air transportation facts of life, he has usually also acquired a set of opinions that may seem to others to be only personal prejudices.

²⁵ *Ibid.*, pp. 13, 56. U. S. Congress, House, Committee on Interstate and Foreign Commerce, *Transportation Study* (Hearings, 81st Congress, 2nd Session. Washington: U. S. Government Printing Office, 1950), p. 18.

²⁶ U. S. Civil Aeronautics Board, *Annual Report, 1943* (Washington: U. S. Government Printing Office), p. 10.

²⁷ Kent T. Healy, "Workable Competition in Air Transportation," *American Economic Review*, 35:239, May, 1945.

²⁸ Carleton Putnam (President of Chicago & Southern Air Lines), "Air Line Outlook," *Air Affairs* 2:499, Winter, 1949.

²⁹ Harold D. Koontz, "Economic and Managerial Factors Underlying Subsidy Needs of Domestic Trunk Line Air Carriers," *THE JOURNAL OF AIR LAW AND COMMERCE*, 18:121, Spring, 1951.

WHAT ARE THE COSTS OF AIRLINE COMPETITION?

How much does airline competition cost? In all the arguments about competition and monopoly in the airlines, no one has yet produced the answer to this question.

There are several kinds of cost which might be caused by competition. One is the cost of excess transportation capacity flown, which is the cost for which a dollar estimate is made in this chapter. Another is the cost of excess capital and labor which a competitive industry entails. Another is the cost of unnecessary promotional expense to the extent that it is devoted to attempted diversion of traffic from other air carriers. Another is the social cost produced by the other costs — the other costs have made the price of the service higher than it would otherwise have been, which thereby restricts the size of the market, and therefore deprives a large proportion of society from benefiting by the efforts of the industry and the subsidy paid by the entire society via government taxes. To the extent that only the first of these costs is measured, the figures in this paper are only partial and therefore understate the true aggregate cost of airline competition.

Excess Capacity Flown

To estimate the excess capacity caused by parallel competition, two effects were analyzed. One was the effect of splitting route densities. It is common experience that dense traffic routes have higher load factors than light traffic routes. If a route is operated by more than one carrier, the traffic of the route is split and each carrier operates a route of only a fraction of the traffic density he would have had with a monopoly of all the traffic. Because of this fact alone, each competitor would therefore run at lower load factors than would a monopolist.

The other effect is competitive overscheduling. There is a tendency for airlines to schedule more capacity on their competitive routes than on their noncompetitive routes of similar traffic density.

In order to test the validity of these hypotheses, it was necessary to develop statistical measures. The data readily available for analysis of revenue passenger load factors was quite limited. It consisted of the CAB's published Station-to-Station Airline Traffic Surveys, which for the postwar period began with September 1946 and covered March and September of each year through 1949, after which they were abolished.

The survey of September 1948 was selected for this analysis.³⁰ The revenue passenger load factor for the domestic trunklines in that month was 59.9 percent. This is relatively low for the usually near-peak month of September, but not too far below the six-year average for 1947-1952 of 64.3 percent.³¹

³⁰ U. S. Civil Aeronautics Board, *Airline Traffic Survey, September 1948* (Washington: U. S. Government Printing Office).

³¹ The revenue passenger load factors for the domestic trunk air-lines for 1947 through 1952 were 65.7, 58.3, 59.0, 62.7, 69.6, and 65.6 percent respectively (U. S. Civil Aeronautics Board, *Recurrent Report of Mileage and Traffic Data*).

The Survey shows as a separate segment every portion of a route between every successive point listed in the route certificates, or 711 segments. Consolidation of route segments was desirable. Minor intermediate points should not define a route segment for the purpose of this analysis; distinction should be made only where a segment has some real operational meaning, such as where schedules originate or terminate or split into alternative branches. It is also desirable to reduce the number of segments to minimize the duplicated reporting of the same traffic, since the station-to-station type of flow data repeats the same traffic on each segment over which it flows.

It was therefore decided to consolidate all geographically contiguous route segments where the seating capacity varied by less than 5 percent.³² The number of segments was reduced by this process from the 711 originally reported to 291.³³

In this analysis, it was decided to use medians rather than means. The median, which is the central item in any group arrayed in order of size, gives equal importance to every item in the group; the mean, which is the arithmetic average of all items, shows a greater effect due to extreme items. Because means would give even more effect to the extreme values of duplicated traffic, they were rejected in favor of medians.

Effect of Splitting Route Densities

The 291 segments were arrayed in rank order of daily revenue passengers. These were then divided into 29 groups of 10 items each, and the median found for each group. A freehand curve was next drawn through these 29 medians. The values of average load factor, corresponding to each hundred passengers of daily route traffic density, were then read off this smoothed trend curve. These are shown in Table 1.

What does this mean in the way of average load factors where two or more competitors evenly split the traffic of any route of a particular density? For example, if any route with a density of 100 passengers per day were operated by any carrier, its load factor would typically be 55.9 percent. If two parallel routes, each of 100 passengers density, were operated by two carriers, each would theoretically have this same load factor. However, if a carrier operated a single route with a density of 200 passengers per day, the load factor would typically be 58.8 percent. Now suppose that, replacing two competitive parallel routes of 100 passengers each, a single combined route of 200 passengers were operated by only one carrier. The load factor would typically go up from 55.9 to 58.8, a gain of 2.9 points, or a gain of 5.2 percent when computed on the base of the original 55.9 points.

As another example, three parallel routes of 800 passengers density

³² Where the final segments combined more than one of the original segments, the daily revenue passengers and available seating capacity were obtained by averaging the first and last of the component segments.

³³ This detailed tabulation is too bulky for reproduction here. For those interested in examining it, a very limited number of typewritten copies is in the possession of the author.

would each typically have a load factor of 65.9. A single route of 2400 passengers density would normally have a load factor of 74.4. If three separate carriers each operating 100-passenger routes were combined into a single carrier operation, the same traffic could be expected to produce an average load factor of 74.4 instead of 65.9, a gain of 8.5 points or 12.9 percent of the initial 65.9 load factor. The results of these computations can now be applied to the airline industry. Of the total 291 segments, half the total traffic is carried on the top-ranking 45 segments with a median density of 850 passengers a day and an average of three competitors. For this half the total traffic, the penalty of competition is 12.9 percent.

An additional 42 percent of the total traffic is carried on the next-ranking 174 segments with a median density of 150 passengers a day and an average of two competitors. Their penalty of competition is 5.5 percent.

TABLE 1

AVERAGE PASSENGER LOAD FACTOR FOR PASSENGER DENSITY INTERVALS, BASED ON FREEHAND CURVE OF MEDIAN VALUES OF 10-SEGMENT GROUPS, SEPTEMBER 1948

<i>Revenue passengers per day</i>	<i>Revenue passenger load factor</i>
100	55.9
200	58.8
300	60.8
400	62.3
500	63.5
600	64.5
700	65.3
800	65.9
900	66.4
1,000	66.9
1,100	67.5
1,200	68.0
1,300	68.5
1,400	69.1
1,500*	69.6
1,600	70.1
1,700	70.7
1,800	71.2
1,900	71.7
2,000	72.3
2,100	72.8
2,200	73.3
2,300	73.9
2,400	74.4
2,500	75.0

*This was the last value on the curve. From 1,600 through 2,500, a straight-line increase was assumed. A maximum terminal value of 75.0 at 2,500 was also assumed, with all densities above that value assumed to be stable at 75.0.

The remaining 8 percent of the total traffic is carried on the lowest 72 segments with a median density of 65 passengers a day and no competition. This group therefore suffers no penalty from competition.

When these three groups are combined and given their appropriate relative weighting, a figure is produced for the domestic trunk airline system as a whole. The presence of competition, on the basis of splitting

route densities only, is estimated to cost the airlines an average of 8.8 percent in load factor.

A number of objections can be made to this method. For one thing, it is entirely a statistical approach. Obviously, individual load factors differ considerably from the "typical" values. There are many variables, aside from the number of operators of a route, which affect the load factors, and this particular statistical approach neglects them all. It treats all segments as though their lengths were the same, which of course neglects the relative passenger-mile weighting of the segments. It assumes that competitors split traffic evenly, which of course they do not because of varying degrees of competitive effectiveness.

These objections are of some validity. If the purpose of this analysis were to produce a precise figure, the evaluation and refinement of each of these factors would be necessary, and would require a vast amount of statistical work. But in order to get a first approximation to the cost of competition, such refinement is not necessary.

There is one factor which would tend to lower this estimated cost. That is the fact that, as schedules are added, some traffic is attracted merely by the fact that there is a higher frequency of service. This effect decreases as the number of frequencies is increased, since there is a decline in the relative gain in passenger convenience. And since most of the competitive traffic is on the heavier routes with high schedule frequency, this factor is not as important as it would be on the lighter routes. In addition, some of the schedules added competitively are at about the same hours of the day, and therefore contribute little to added passenger convenience other than gross capacity at peak hours.

There is also one factor which, as an offset to the above, would tend to increase the estimated cost. In deriving the curve of load factor related to traffic density, it is obvious that the higher end of the curve is made up of segments that are exclusively competitive, and the lower end is based primarily on noncompetitive segments. To the extent that competitive routes operate at lower load factors, and noncompetitive routes operate at higher load factors, then, the curve as presented here does not have as steep a slope as it should, since its upper end is unduly depressed and its lower end is unduly raised. If a correction could be made for this, the effect of splitting route densities would be greater.

Effect of Competitive Overscheduling

In attempting to test the hypothesis of competitive overscheduling, the first problem was one of definition and classification. Some routes are highly competitive, many are noncompetitive, and most are intermediate between the two extremes. A method of classification was needed which, though by the underlying nature of its material could not wholly eliminate the element of personal judgement, could still set up a reasonably objective grouping.

The highly competitive routes were therefore defined by the following statistical process. The hundred pairs of cities ranking highest

in September 1948 traffic volume were selected. Their distribution by carrier is shown in the Survey, and traffic was considered competitive when at least one other airline carried ten percent or more of the traffic of the dominant airline.³⁴ Where there were possible alternative routings within the routes of a single carrier, a distribution among them was made on the basis of number of through flights via each routing. In this way, the competitive traffic of these hundred city combinations was credited to each carrier route segment. Wherever this traffic was more than half the total flow of passengers, the segment was considered to be highly competitive.

This definition obviously excludes many other segments which are highly competitive but which do not meet this particular statistical test. Since the base includes only the hundred top-ranking pairs of cities with 44.4 percent of the total passengers in the Survey month, it leaves out all the remainder of the 16,682 combinations of cities having 55.6 percent of the traffic. This has two effects: the degree of competition on the heavier route segments is understated, and many of the lighter route segments are omitted even though their degree of competition may be just as high. As a statistical sample for comparative purposes, however, it is composed solely of highly competitive segments, even though it does not contain all of them.

The definitely noncompetitive route segments were selected from the airline system map for September 1948, by visual inspection for cases where there could obviously be neither long-haul nor short-haul competition. Here, too, the selection excluded a number of segments which, though more or less paralleled by other route lines on the map, are essentially noncompetitive on a traffic basis.

On the basis of these particular definitions, the 291 route segments were grouped into the three classes of highly competitive, definitely noncompetitive, and other segments. They were next subdivided into groups by traffic density, and the median load factor was then found for each group. The results are shown in Table 2.

The conclusions from this table are clear. In every density group except the lowest, the load factors of definitely noncompetitive segments are higher than the "other" group.³⁵ The differences, as a percent of the "other" group load factor, are as follows:

0 - 25	passengers	minus	10.2	percent
25 - 50	"	plus	7.4	"
50 - 75	"	"	10.8	"
75 - 100	"	"	10.3	"
100 - 150	"	"	8.2	"
150 - 200	"	"	18.4	"
200 - 700	"	"	3.5	"

The over-all median difference is 8.2 percent.

³⁴ The reasons for using this criterion are explained in Frederick W. Gill and Gilbert L. Bates, *op. cit.*, p. 23.

³⁵ The probable reason for the lowest density group showing a different result from all other groups in the two brief tabulations below is fairly clear. Where traffic is low, carriers normally provide minimum service in terms of trip fre-

TABLE 2

PASSENGER LOAD FACTOR OF DOMESTIC TRUNKLINES FOR DEFINITELY NONCOMPETITIVE, HIGHLY COMPETITIVE, AND OTHER ROUTE SEGMENTS, GROUPED BY PASSENGERS PER DAY, SEPTEMBER 1948

Passengers Per Day	Definitely Noncompetitive			"Other"			Highly Competitive		
	Num-ber	Pas-seng'rs	Load fact'r	Num-ber	Pas-seng'rs	Load fact'r	Num-ber	Pas-seng'rs	Load fact'r
0 — 24.9	15	13.9	34.3	10	15.4	38.2	1	22.6	45.6
25 — 49.9	15	38.0	53.7	17	42.0	50.0	—	—	—
50 — 74.9	10	63.8	59.4	22	61.4	53.6	—	—	—
75 — 99.9	7	89.4	52.5	10	85.9	47.6	1	75.4	39.5
100 — 149.9	12	119.8	61.0	20	131.0	56.4	5	116.5	55.1
150 — 199.9	6	171.6	66.8	18	172.7	56.4	—	—	—
200 — 699.9	8	376.2	65.2	75	352.4	63.0	11	390.2	59.9
700 and over	—	—	—	18	882.3	67.4	10	1148.3	67.4
Total	73			190			28		

Because of the much smaller sample for comparison, similar percentage differences between the definitely noncompetitive and the highly competitive route segments are somewhat less reliable. They are:

0 - 25 passengers	minus	24.7	percent
75 - 100	"	plus	32.9 "
100 - 150	"	"	10.7 "
200 - 700	"	"	8.8 "

The median of these differences is about 9.7 percent.

Unfortunately for this test, there are no definitely noncompetitive route segments with traffic densities above 700 passengers per day. Between the highly competitive and "other" segments the median load factors are the same. But since the median density of the highly competitive segments is almost 1150 compared to 880 for the "other" segments, it would seem to be true that the highly competitive segments tend to have lower load factors for comparable densities.

On the basis of the above analysis, it is probable that the presence of competition in the domestic trunk airline system costs something over 9 percent in load factors due solely to competitive overscheduling.

Translation of Load Factors Into Cost

The total effect of competitive overscheduling is about a 9 percent loss in load factor and the effect of splitting route densities is another 9 percent loss in load factor. The total is 18 percent.

This does not mean 18 percentage points loss in load factor, but a loss of 18 percent of the load factor percentage. In other words, if the experienced load factor of the airline network were 50 percent, a system which was comparable in every way except for being wholly noncompetitive would have a load factor of 59.0 percent; if the competitive

quency, such as two round trips per day. Capacity on these routes therefore has little relationship to traffic volume, as long as such volume remains low. Load factors on these route segments consequently show little if any correlation with volume of traffic carried.

system had a 60-percent load factor, a comparable noncompetitive system would have a load factor of 70.8 percent.

Suppose now that there were two hypothetical airline systems, each with identical traffic and other characteristics, but one with the competition of the existing domestic trunk airlines and the other with no competition. The competitive one would have a particular load factor; the noncompetitive one would have a load factor 18 percent higher. Since both would have the same traffic, and since the load factor is equal to the traffic divided by the available capacity, the capacity of the noncompetitive system would be lower by the reciprocal of 1.18, or 15.3 percent. All expenses that vary with capacity would be less by 15.3 percent; all expenses that vary with traffic volume would be the same.

Segregation of these two types of expense is difficult when using the standard accounts of the air carriers. However, in the "Big Four" investigation, the CAB staff made a useful functional distribution. For the three years 1947-1949, the total costs of the "Big Four" carriers were as follows:⁸⁶

<i>Item</i>	<i>Thousands of dollars</i>
Operating costs	468,248
Ground operations	78,603
Traffic	58,925
Passenger service	57,614
Selling	118,898
General	80,250
Amortization, expansion and integration costs	2,990
Total	865,528

The first two items vary directly with capacity provided. The next three vary with traffic handled. Of the total of these five items, the capacity variables account for 69.9 percent of the total, and the traffic variables account for 30.1 percent. Since the general expenses of the last two items are usually allocated in proportion to the other groups, the total expenses of these four airlines can therefore be divided about 70 - 30 between capacity and traffic costs. Smaller airlines usually show some differences from Big Four experience, but the average industry distribution is probably reflected very closely in this computation.

Now, return to the hypothetical noncompetitive airline system. The 70 percent of costs that vary with capacity would be reduced 15.3 percent below the existing competitive system. The 30 percent of costs that vary with traffic would not be reduced at all. The total cost of the noncompetitive system would therefore be 10.7 percent below that

⁸⁶ Direct Exhibits of Public Counsel, *Big Four Mail Rate and Efficiency Investigation (Dockets Nos. 2849 and 3663)*, Washington, October 13, 1950. Exhibits PC 350, pp. 4 and 5, PC 351, pp. 4 and 5, and PC 352, pp. 4 and 5, "Financial Results, before Cost and Fare Level and Volume Adjustments, Allocated Among Types of Services," Calendar Years 1949, 1948, and 1947.

of the existing competitive system. For the domestic trunk airlines in 1953, with a total operating expense of about \$783,000,000,³⁷ the cost of competition due solely to load factor losses is therefore estimated at almost \$84,000,000.

Of course, the percentage would vary somewhat from year to year, depending among other things upon the relative size of the experienced load factors. At low load factors, the improvement possible through the elimination of competition is fairly high; at high load factors, the possible range between existing load factors and the highest attainable is narrowed. This 10.7 percent figure should therefore vary somewhat in its application to any particular year.

WHAT ADVANTAGES ARE CLAIMED FOR AIRLINE COMPETITION?

Does Competition Increase Traffic?

One of the major advantages claimed for airline competition is that it increases airline traffic. The industry and the CAB have generally believed this claim. Applicants have presented evidence of it in numerous cases before the CAB. A former chairman of the CAB, testifying before a Senate committee, summed it up clearly:

I have listened to argument again and again . . . where there is competition the traffic potential has been developed, where there is no competition the drive to develop the traffic potential is missing. That is pretty impressive evidence that has accumulated over the years.³⁸

The CAB also summed it up statistically for the President's Air Policy Commission: on segments where competition was not increased, the average growth in passengers was 3.37 times from September 1940 to September 1946; on segments where competition was first established or increased, the growth was 4.38 times, or about 30 percent higher.³⁹

Unfortunately, these conclusions are wrong. In the route cases, the applicants for the new competitive routes presented selected illustrations or compilations aimed at proving their contentions. A wide range of growth rates has been experienced in both competitive and non-competitive routes, due to causes largely unrelated to competition, and a selective sampling can be used to support almost any desired position.

In the statistical conclusion, the CAB made the honest but unfortunate error of disregarding at least two important facts. One fact was that the figures lumped together the true "monopoly" routes — where a single carrier retained exclusive rights to a route — with competitive routes where the competition was not increased. The other fact is that

³⁷ Estimate made by L. C. Sorrell, economic director of the Air Transport Association. AVIATION WEEK, December 28, 1953, p. 54.

³⁸ Statement of James M. Landis, U. S. Congress, Senate, Committee on Interstate and Foreign Commerce, *Air-Line Industry Investigation*, pp. 306-307.

³⁹ Statement of Civil Aeronautics Board before the President's Air Policy Commission, October 27, 1947, p. 33.

September 1946 was selected for a comparison; 1946 was a year of post-war demand far outstripping postwar supply in air travel; competitive routes add more capacity than noncompetitive routes; competitive routes were therefore higher simply because there was more space on them to accommodate the huge traffic bulge of that period.

The CAB has published a series of origination-destination Airline Traffic Surveys showing, for March and September of each peacetime year, a complete count of all tickets sold and the routings taken between all airline points. The earliest of these complete surveys is for September 1940, relatively close to the basic "grandfather" route structure. The latest useful one for this test is September 1948, comparable seasonally to the 1940 survey, but before the introduction of low sky-coach fares increased particular traffic movements so greatly as to conceal the effects of competition.

The heavy traffic combinations are the ones for which competitive route authorizations are primarily designed. The smaller station combinations generally receive competitive service only incidentally. A valid statistical test can therefore be based on the highest-ranking station combinations.

The station combinations chosen were the one hundred ranking highest in either passengers or passenger-miles in the continental U. S. in September 1948, with one-carrier service in 1940. These 119 top-ranking pairs of stations accounted for slightly over 44 percent of total continental U. S. passenger travel in September 1948.

A competitive service was defined as one where any carrier received ten percent or more of the traffic of the dominant carrier. City combinations were grouped by length of haul, since detailed analysis shows a marked effect of this factor on rate of traffic growth. They were also grouped by number of carriers serving them during the two survey months.

The statistical results can only be considered as approximate. They neglect all variables other than distance and competition, many of which have a marked effect on traffic growth. However, they produce a reasonable degree of accuracy.

A summary of the results, showing the times increase in number of passengers between September 1940 and September 1948, and using the arithmetic averages of all city combinations, is as follows:

	<i>Distance intervals in miles</i>			<i>Total</i>	<i>Number of cases</i>
	<i>0-499</i>	<i>500-999</i>	<i>1000 & over</i>		
No increase in competition:					
1 carrier	4.05	5.35	6.57	4.41	41
2 carriers	2.34	4.23	4.38	2.46	13
3 carriers	—	3.17	5.10	3.63	6
4 carriers	—	—	9.66	9.66	1
Total	3.26	3.72	5.77	3.59	61

Increase in competition:

From 2 to 3 carriers.....	3.02	3.80	5.22	3.77	4
From 1 to 2 carriers.....	3.45	4.23	7.54	3.96	46
From 1 to 3 carriers.....	3.86	5.15	5.09	3.89	7
From 1 to 4 carriers.....	—	4.12	—	4.12	1
Total	3.64	4.21	6.76	3.93	58

At first glance this table would seem to prove the CAB's conclusions correct; the increased-competition group had higher growth rates in all distance intervals. But on more detailed examination it becomes obvious that the true "monopoly" routes showed the greatest increase of all. In total, this group grew 10 percent more than the best of the competition-added group. It ranked highest under 500 miles and highest between 500 and 1000 miles. It ranked second at distances over 1000 miles, but the average distance for this group was only 1415 miles compared to the average of 1729 for the highest-ranking group.

As far as concerns differences between groups where no competition was added, there may be room for some argument as to the reason. On the one hand it may be, as the pro-competition viewpoint would have it, that in the early period there were already two or three competitors who had developed traffic to a greater extent than had the single-carrier route; it was therefore more difficult to achieve a greater percentage increase. Or it might be true, as the anti-competition viewpoint would have it, that over a long period of time a single carrier can develop traffic more fully; he can spread his schedules in proportion to the demand at all hours, rather than bunch them competitively only at the most popular hours and thereby neglect the less profitable but still lucrative secondary hours.

But this latter argument is valid only for the case of a single carrier remaining in sole possession of a route, and not for the case where there is an increase from an initial multiple-carrier to an increased multiple-carrier operation. This is also shown by the traffic increase of the continuing one-carrier service as compared to the continuing two-carrier and three-carrier services.

It is also to be expected that the very method of granting competitive routes would give the competition-added group a more rapid expansion. The CAB undoubtedly granted more competition where it thought more traffic would develop, and denied it where it thought the traffic potentials were less favorable. If the CAB's judgment was at all better than mere chance, the competition-added groups should have done better than the continued single-carrier group. The fact that this did not result makes more convincing the conclusion that competitive routes develop no more traffic than do noncompetitive routes.

Whitehead⁴⁰ has made a detailed study, also for the months of

⁴⁰ Herbert H. Whitehead, "Effects of Competition and Changes in Route Structure on Growth of Domestic Air Travel," *THE JOURNAL OF AIR LAW AND COMMERCE*, 18:78-90, Winter, 1951.

September 1940 and September 1948, of all traffic to and from the ten largest traffic centers of the country. His sample accounted for over 35 percent of the nation's domestic passenger traffic. He made a statistical analysis of the effect of competition and other factors affecting the rate of growth for specific city combinations: initially low traffic volume, early stage of route development, mileage reductions and corresponding fare cuts in new routings, length of travel, improvements in airport convenience, the addition of new stations diverting travel from older nearby stations, the domestic portions of international traffic, and new gateways for international traffic. One of his major conclusions was "Claims for greatly stimulated air travel resulting from competition have not been borne out."⁴¹

Gill and Bates⁴² also made a brief study of this claim. They analyzed the 106 top-ranking city combinations, for the months of September 1940 and September 1947, by distance intervals. Their statistics show that, on an arithmetic average basis, the combinations where competition was added showed passenger increases of 315 percent compared to 278 percent for the same-competition combinations. On a median basis, the latter group showed a 366-percent increase compared to only 337 percent for the former. Their conclusions were that the addition of competition had little to do with traffic growth.

These figures are not absolutely conclusive. Any such statistical compilation leaves many variations unexplained because it does not take into account all variables. But the statistics do seem to indicate that the claim that airline competition generates additional traffic is of extremely dubious validity.

Does Competition Decrease Fares?

Everyone agrees that the long-term trend of air fares should be downward. The public interest is best served by the lowest possible fares, producing the greatest volume of air transportation, and yet allowing the carriers a reasonable rate of return. One of the virtues claimed for competition is that it decreases fares.

Even though prices are usually identical via each competitive airline between the same points, it has often been said that competition has been a major influence in reducing the general fare level, that it assures potential economies being passed on to the public in the form of lower fares rather than being kept as higher profits, and that even with equal fares there is competition in service.

Gill and Bates said that "airline competition has been and continues to be a major influence in preserving a low level of air fares in the domestic United States," although they pointed out that this is true only of the first competitor added and not of the second and third and fourth competitors.⁴³ They gave as an illustration of the opposite effect Eastern's ability to charge higher fares than the other three of

⁴¹ *Ibid.*, p. 88.

⁴² Gill and Bates, *op. cit.*, p. 33.

⁴³ *Ibid.*, p. 475.

the Big Four carriers because of its relative lack of effective competition.⁴⁴

Competitive reduction in fares was, of course, one of the major reasons for the Civil Aeronautics Act. In 1937, the Interstate Commerce Commission said that there had recently been a sharp reduction in passenger fares by at least five scheduled airlines in a competitive race for traffic, and that this situation might endanger the stability of the industry unless government regulation was adopted.⁴⁵

Drastic competitive reductions in air passenger fares were also made after the fall of 1929. Fares were cut to approximately Pullman levels by airlines directly competitive with railroad passenger services; airlines not directly competing with the rails also cut their rates in many cases, but not to as great an extent.⁴⁶

Since then, airlines have used a variety of special fares competitively: the Universal Air Travel Card plan, round-trip discounts, the family fare plan, seasonal fares, coach fares, and other promotional devices. The airlines were seeking to expand their market. They knew, of course, that the other airlines would meet their fare cuts as usual. The expansion of their market came, not at the expense of other airlines, but at the expense of railroad and other surface travel. Competition with other transportation was the major justification for airline fare reductions, rather than competition with the parallel routes of other airlines.

There is a close relationship between price and cost in all industries — price equals cost plus profit. In the airlines, there is the additional element of subsidy — price equals cost plus profit less subsidy. In any public utility, the regulatory agency in the long run sets the upper limit to the profit margin, usually as a rate of return on investment. Therefore, in air transportation, the government determines two of the factors, profit and subsidy. As a rule, then, the carriers do not control their general fare levels. The CAB does. For airlines, price equals cost plus two elements fixed by the CAB.

Aside from CAB policy, then, what sets the airline fare level is their cost level. Airline competition is not a cheap commodity. It is estimated that the cost due solely to lower revenue passenger load factors is about 10.7 percent of total airline expenses. In 1953 this amount was almost \$84,000,000. In the eleven years from 1938 through 1952, excluding the years 1942-1945 during the war when load factors were at a maximum regardless of competition, this extra cost of competition came to almost \$372,000,000.⁴⁷ This may be compared with total air mail payments to the carriers by the government during the entire 15 years (including the four war years) of \$447,000,000, which included

⁴⁴ *Ibid.*, p. 537.

⁴⁵ Letter from Interstate Commerce Commission to Hon. Clarence F. Lea, Chairman, Committee on Interstate and Foreign Commerce, March 29, 1937. U. S. Congress, House, Committee on Interstate and Foreign Commerce, *Aviation*, p. 18.

⁴⁶ G. Lloyd Wilson, *Air Transportation and Regulation* (Chicago: The Traffic Service Corporation, 1940), p. 25.

⁴⁷ U. S. Civil Aeronautics Board, *Recurrent Report of Financial Data*.

not only the subsidy element but the service element for the cost of carrying the mail.

The effect of competition on the fare level, therefore, cannot be measured solely by the immediate effects of fare reductions on particular routes. Through its effect on costs, it has a far greater influence in keeping fares up, not in reducing them.

The judging of fare levels and profit margins and subsidy payments is not, of course, a very scientific process. All are considered together, largely without even analyzing their interrelationship, and the whole financial result of the regulatory and managerial process comes out as a single "package." Many factors vary to make estimates of future trends inaccurate, and individual CAB members and individual airline executives differ widely in their judgments of what these various levels should be.

In a number of particular instances, competition has a tendency to press for lower fares. In the downward direction, if one carrier introduces reduced-fare programs such as family fare or coach fares, his major competitors are forced to follow quickly or lose practically all of their traffic. And acting as a brake in the upward direction, if one carrier wants to raise his fares and his competitors will not do so, he must leave his fares at the lower level or lose most of his business. In individual cases, then, competition helps reduce fares when there is unilateral action downward, and helps keep them down where there is a unilateral decision to raise them.

But suppose that competition had never been created in the airline network, and suppose that the costs of competition had never been incurred. Suppose further, in order to keep other variables out of this line of reasoning, that the CAB had not tried to apply the savings to other objectives such as reducing the subsidy cost to the taxpayers or extending uneconomic services to a greater number of lean routes and small cities. And suppose, if the airlines had not done so on their own initiative, that the CAB had exercised its power under the Civil Aeronautics Act to reduce fares in line with the resultant lower costs. Would not the air fares of this hypothetical airline system have been lower, based as they would be upon a whole cost level that was lower, than those of the actual system of route competition with its pressures for lower fares aided by individual situations but resting upon a higher floor of costs?

*Does Competition Increase Quality of Service?*⁴⁸

Another advantage generally claimed for airline competition is that it is a powerful force to improve the quality of service. This improvement is of particular value in public utilities where the regulatory process is said to be typically unsuited to encouraging positive

⁴⁸ This subject has been treated in exhaustive case-by-case detail in Gill and Bates, *op. cit.* The 200-page sections (pp. 195-394) dealing with it are unapproached in thoroughness by any other source, and they have therefore been liberally used in preparing this section.

advances. Competition in quality has been likened to competition in rates: instead of the public getting the same service at a lower price, they get more service at the same price.

Before going into the details of this claim, it should be recognized that better service is not a free gift. Rarely in this world does anyone get something for nothing, and air transportation is no exception. Better service requires additional costs.

Gill and Bates listed seven major measures of schedule quality: frequency, equipment type, arrival and departure times, elapsed time, number of stops, turnaround versus beyond-terminal service, and connecting versus one-plane service to terminal.⁴⁹ They are the basic product offered to the public.

Gill and Bates defined, as significant improvement in schedule quality, an improvement in at least one (and usually in more than one) of the seven measures. They then found that, of the 87 city pairs served competitively in the postwar period, only 33 showed significant improvement.⁵⁰ In many cases of non-improvement, the cause was route franchise restrictions which reduced the effect of competition.⁵¹ In addition, they found that of the twenty markets where competition was by three or more competitors, significant improvement due to the third or fourth competitor was produced in only one instance.⁵²

They found that one of the major determinants of schedule quality is flight equipment, since it determines elapsed time, capacity for passenger comfort, and the possibility of nonstop flights.⁵³ As will be shown next, airline competition has little influence in developing new aircraft types, although once a new type has been developed competition hastens its spread to other carriers.

The only measure of schedule quality that Gill and Bates found was significantly improved in practically all cases was the volume of available capacity at peak periods.⁵⁴ But this product of competition was largely unused, and this excess capacity is expensive.

It is unfortunate that there has not been a thorough analysis of improvement in schedule quality between noncompetitive city combinations, comparable to that made by Gill and Bates between competitive city pairs. Such an analysis would provide a needed "control" group or yardstick. Gill and Bates found significant improvement in 33 of their 87 competitive city combinations, or 38 percent. There were probably also significant improvements in schedule quality between noncompetitive city combinations. It would be very interesting to compare those results against the 38-percent improvement figure.

Aside from schedule quality, there are a number of other improvements in overall quality of service. They include such ground services

⁴⁹ *Ibid.*, p. 95.

⁵⁰ *Ibid.*, p. 95.

⁵¹ *Ibid.*, p. 117.

⁵² *Ibid.*, p. 110.

⁵³ *Ibid.*, p. 59.

⁵⁴ *Ibid.*, p. 628.

as reservations, ticketing, and handling of passengers and baggage at terminals; they also include in-flight services such as meals, lounges, compartments and sleeping accommodations, cabin attendants, lighting, ventilation, etc.

Parallel competition has undoubtedly contributed to the development or more rapid introduction of such services, even though air transportation would also have developed some of them as a competitive device against ground transportation. The degree to which they would have occurred without parallel airline competition is not known.

In any event, the CAB has the power to correct inadequate service. Section 404 of the Act states that it shall be the duty of every air carrier to provide adequate service, equipment, and facilities. Under Section 1002 (a) any person may file a complaint with the CAB with respect to alleged violation of any provision of the Act, and the CAB must investigate the complaint if there appears to be reasonable ground for it; Section 1002 (b) empowers the CAB to institute such an investigation on its own initiative. It is true that the direct use of these powers would be very difficult, since adequacy of service is difficult to define in formal CAB hearings, even though the CAB has said in several cases that Section 404 is effective.⁶⁵ It might also be objected that the CAB has never used this power, and that the power would therefore be ineffective. Which of these views is correct is something that has not been tested by experience. But it would seem to be wise to try to exercise existing powers to correct service inadequacies, and then see whether or not they were effective, rather than to disregard entirely the existence of the legislative provisions and to try to achieve similar results by certifying additional competition at additional cost.

There have been some improvements in quality of service due to competition. There might have been some of them without competition. But improvements in service, whether caused by competition or any other factor, generally increase costs. If they increase revenues more than proportionately, they are profitable; if they increase revenues less, they are unprofitable.

If service improvements due to competition have increased revenues at all, they must have done so by increasing the fare-paying traffic. But as previously shown, there was no greater growth of traffic in competitive markets than in noncompetitive markets. This must be somewhat qualified by the knowledge that improvements developed on purely competitive routes normally spread to the noncompetitive routes of the same and other carriers. But the simple fact remains that competition's claimed improved quality of service is not discernible in the statistical measurement of traffic volume increases.

⁶⁵ 4 CAB 215, *Continental Air Lines, Inc. et al., Additional Air Service in Texas*, decided May 10, 1943, p. 239.

⁸ CAB 152, *Transcontinental & Western Air, Inc., et al., Cincinnati-New York Additional Service*, decided June 10, 1947, p. 158.

Does Competition Develop Aircraft More Rapidly?

Another advantage claimed for airline competition, directly dependent upon the claim of greater incentives, is that it produces rapid improvement in aircraft and engines. This claim is generally believed to be true. Haven't the U. S. competitive airlines always led the world in technical advances? Aren't most of the world's airways flown with American-built planes?

And yet something seems recently to have gone awry with U. S. leadership. "We are losing the world leadership in transport types of aircraft," said the head of the CAA.⁵⁶ This country is at least several years behind the British in developing jet transport aircraft.

Why was there this great change in the effectiveness of competitive airlines to produce rapid improvement in aircraft and engines? Or is it really true that competition did not have as much to do with it, even in the past, as was claimed?

Before the war, all airlines were on a subsidy basis. They normally suffered operating deficits in their commercial operations, which were largely made up by government mail payments. It was to the advantage of each airline to try out new planes. If the experiment was successful, the airline had made a forward stride toward economic self-sufficiency. If it was unsuccessful, the government stood the loss. This remained true after the war to the extent that mail payment rates still contained a subsidy element.

Technical difficulties in two new postwar types of planes — the four-engined DC-6 and Constellation — grounded them for a time. In setting the mail rates of the carriers, the CAB took into account amortization charges for the losses caused by these groundings in the amount of \$9,262,000, and the costs of \$3,635,000 for integrating these planes into the operations of three companies.⁵⁷ Another carrier on a subsidy rate had the misfortune to be the only purchaser of one type of postwar twin-engined plane; of the twenty aircraft bought, five crashed within a few years and the fleet was sold; the integration and grounding costs were \$1,876,000, and the integration costs of still another four-engined postwar plane for the same carrier were \$1,497,000, all of which were taken into account in the government's mail payments.⁵⁸

Even aside from the subsidy factor, it is doubtful that airline competition was the major determinant in developing the newer four-engined planes. It is true that most pre-war types were first developed by the manufacturers with the orders of single airlines; these included the twin-engined Boeing 247-D, Douglas DC-2 and DC-3, and the four-

⁵⁶ Statement of Delos W. Rentzel, Administrator of the Civil Aeronautics Administration. U. S. Congress, House, Committee on Interstate and Foreign Commerce, *Development of Improved-Type Aircraft* (Hearings, 81st Congress, 2nd Session. Washington: U. S. Government Printing Office, 1950), p. 9.

⁵⁷ CAB Order E-5560, Big Four Rate Case, Revised Statement of Tentative Findings and Conclusions, decided July 31, 1951, p. 6 and Appendix No. 10.

⁵⁸ CAB Order E-5839, Northwest Airlines, Inc., Domestic Operations (Mail Rate Case), Statement of Tentative Findings and Conclusions, decided November 2, 1951, pp. 11, 15, and 21.

engined Boeing Stratoliner. For several years before the war, however, all major lines and many of the smaller ones were rapidly standardizing on the DC-3.

When it came to the four-engined planes and their mounting costs, however, the airlines began to pool their efforts. The Boeing Stratoliner was backed by only a single carrier, but it turned out to be very costly for its capacity, and very few were ever manufactured. On the Constellation, two noncompetitive carriers collaborated.⁵⁹ Five airlines helped finance the prototype of the DC-4 three of whom were the three large transcontinental competitors.⁶⁰

Military orders have also been an important factor in developing new flight equipment. Military aviation was a prime influence in producing better engines, and also in some of the most advanced types of planes which were reworked from military transport models to civil use.⁶¹

Of course, airlines continually try to improve their operations, and the key to improvement is the type of aircraft flown by the company. Different managements make different estimates of the efficiency and desirability of new airplane types. Some of the variation in judgment is because of the differences in route characteristics among the carriers, and some is due simply to differences in the personal judgments of the managers making the decisions.

Competition, of course, is a major element in the decisions on new equipment. Each of the competitors on a route jealously watches the aircraft programs of the others, and each knows that in the long run he must match the others in the speed and comfort of service or lose out in the market. But for the larger carriers this is a complex choice, since they compete with different carriers over different routes; each route has somewhat different characteristics; the ultimate choice must be a compromise between competitive considerations, the economical operation of most of the routes, and the necessity for standardizing upon very few types of aircraft to keep costs down.

The choices are limited. In the field of long-range and high-capacity postwar four-engined planes, there are only three manufacturers — Douglas with the DC-6, DC-6B, and DC-7; Lockheed with its series of Constellations, the 049, 649, 749, and 1049; and Boeing with its Stratocruiser. In the twin-engine postwar planes, there are only two manu-

⁵⁹ Testimony of CAB Chairman James M. Landis. U. S. Congress, House, Committee on Interstate and Foreign Commerce, *Overseas Air Transportation: by Steamship Operators, by a Consolidated Air Carrier* (Hearings, 80th Congress, 1st Session. Washington: U. S. Government Printing Office, 1947), p. 1229.

⁶⁰ The five airlines were American, United, TWA, Eastern, and Pan American. AMERICAN AVIATION DAILY, Souvenir Issue, June 1, 1952, quoting from the issues of June 1 and June 15, 1937.

⁶¹ Testimony of W. A. Patterson, President, United Air Lines. U. S. Congress, Senate, Subcommittee on Aviation, Committee on Commerce, *To Create the All-American Flag Line, Inc.* (Hearings, 79th Congress, 1st Session. Washington: U. S. Government Printing Office, 1945), p. 75.

Testimony of Robert A. Lovett, Assistant Secretary of War for Air, War Department. *Ibid.*, p. 261.

facturers — Convair with its model 240 and 340; Martin with its model 202 and 404.

It is true that parallel airline competition has increased the speed with which new aircraft were purchased and placed in service after they were developed. When one carrier has a new fleet, his competitors are forced to re-equip regardless of their previous plans and current desires and regardless of the losses they may take in excessive depreciation on the aircraft to be replaced. However, competition with surface transportation would also have produced considerable advances, as would the desire for more economical planes. Just how much is not known, since the major carriers who purchase the great bulk of new planes have always been highly competitive in the transcontinental markets.

It is interesting to note that in the international field, which of course differs in some important respects from the domestic systems, there was very great experimentation in types of aircraft by the company which for the entire prewar period was a monopoly for U. S. operations — Pan American. This carrier always had in its inventory by far the greatest variety of makes and models, both landplanes and seaplanes, and in twin-engined and four-engined configurations. Although part of this is advisable because of its far-flung operations throughout the world and under widely different physical and traffic conditions, it is still true that even now it is the only carrier operating all three manufacturers' postwar four-engined aircraft, as well as having foreign jet planes on order. Only one other carrier operates as many as two of these manufacturers' aircraft; the others fly only one.

When the influence of competition is weighed against other factors — government mail pay subsidy, the stimulation of military orders, the cooperative developmental efforts of competing airlines — competition seems to be less important in developing new aircraft, although it does hasten their rate of introduction.

Turning from the past to the present and the future, it seems evident that airline competition will not be of great influence in producing new planes. The cost of a single new type of transport plane has been estimated in the tens of millions of dollars.⁶² The airlines undertake a heavy financial burden in the first few years of breaking in a new type of plane — training flight crews and operations personnel, familiarizing the maintenance crews with the planes, eliminating unforeseen "bugs," and taking the penalties of excessive delays and out-of-service time.

It is now generally agreed that the development of new aircraft types is probably beyond the financial ability of the air carriers. The argument that parallel competition between airlines is an extremely

⁶² "Upward of 30 or 35 million dollars per type," according to a statement of Lawrence B. Richardson, President, Fairchild Engine and Airplane Corp. *Development of Civilian Aircraft Adaptable to Auxiliary Military Service*, p. 61.

important factor in the technological development of new planes and engines, of dubious validity in the past, is even more doubtful now.

Does Competition Provide Yardsticks?

Another advantage claimed for airline competition is that it provides cost and service experience by which to measure the relative efficiency of one airline against another. This fact has been stressed as of great importance among public utilities, and particularly so when the government pays large amounts of subsidy.

This view has been generally maintained by the CAB in dealing with certificated air carriers in domestic new route cases. It has been strongly supported in U. S. international aviation by the CAB and other government agencies.

In practice, however, it is quite difficult to use competitors' experience as yardsticks of managerial efficiency. Conditions are never identical, and frequently are very dissimilar. The competitive routes of any carrier are usually paralleled by different competitors on various routes, and each carrier's system is a different mixture of competitive and noncompetitive traffic combinations. Evaluation of the competitive routes separately from the noncompetitive routes has never been done, and is probably an almost impossible statistical and accounting job.

Cost comparisons are normally made by the CAB in testing the reasonableness of carrier costs. The CAB has said that extensive staff study over the years shows that the unit costs of the carriers are related to the primary operating factors of length of traffic haul and average distance between stops, density of traffic, and volume of operations.⁶³ Degree of competition is not one of the factors which they have yet found to be of great importance in making cost comparisons.

As a matter of fact, their use of "yardsticks" requires only the existence of separate carriers, not the existence of competitive carriers. What they require are carriers of comparable operating characteristics, not of comparable competition. This objective would be just as well served by regional monopolies that were completely noncompetitive; it would be even better served, since the varying degrees of competition would not add an additional complication to the attempted comparisons.

An important distinction should also be made between competition and diversification. A multiplicity of enterprises has some social advantages: it provides a field for individual experimentation in business and management methods, and an opportunity for more people to move up into the ranks of management. But here again, a number of regional monopolies would serve just as well as the same number of competitors.

(TO BE CONTINUED)

⁶³ U. S. Civil Aeronautics Board, "Board Establishes Administrative Separation of Service Mail Payments from Subsidy Mail Payments for All U. S. Domestic Air Carriers," press release, October 1, 1951, p. 3.