Title

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Publication Date

1989-10-01

Peer reviewed

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Working Paper No. 89-123

Airline Deregulation and Market Performance: The Economic Basis for Regulatory Reform and Lessons from the U.S. Experience

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October 1989

Key words: airline deregulation

Abstract

There is much evidence on the effects of airline deregulation in the United States which could be relevant to plans for regulatory reform in Europe. This paper summarizes that evidence from varied sources, and suggests that the U.S. experience has been basically a good one; similar policies could be expected to yield equivalently good results in Europe. The paper also suggests ways in which other countries could learn from the U.S. experience and avoid some mistakes made in the U.S.

JEL Classification: 612, 615, 619

Acknowledgements

This paper was presented at the ESRC Seminar on Privatization and Deregulation of European Airlines, Oxford, UK, September 8, 1989. This work benefited from support from the Institute of Transportation Studies at the University of California, Berkeley. It has also benefited from the assistance of Melanie Mauldin and the comments of Marjorie Nathanson Keeler, Philip A. Viton, Michael Levine, and Clifford Winston. This paper is forthcoming in a volume edited by Kenneth Button, published by Macmillan, 1990.

AIRLINE DEREGULATION AND MARKET PERFORMANCE: THE ECONOMIC BASIS FOR REGULATORY REFORM AND LESSONS FROM THE U. S. EXPERIENCE

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July 27, 1989; Revised October 6, 1989

I. Introduction

Ever since airline deregulation was first proposed for the United States, it has been the cause of controversy. Proponents have seen little but benefits from it, yet opponents have found much to criticize about it. The purpose of this paper is to survey the evidence from the United States with the following set of questions in mind:

First, what were the analytical motivations for passenger airline deregulation[1] in the United States, as expressed by its advocates before it occurred? This question is of more than historical interest, because the issues that were relevant to the issues that were relevant to the decision to deregulate in the United States are still relevant in Western Europe today. To the extent that conceptual advances in economics have changed arguments affecting air deregulation, such changes should obviously be considered, also.

Second, to what extent has airline deregulation met the expectations of its advocates in the United States over the past eleven years? Whatever theoretical motivations there may be for airline deregulation, the proof is in the degree of success of the outcome. To the extent that airline deregulation has failed to live up to the expectations of its advocates, is that due to deregulation itself, or to extraneous factors?

Third, what (if any) unanticipated policy problems have occurred in the United States as a result of air deregulation, and, to the extent that they have happened, what lessons can be learned for those who would deregulate elsewhere?

Fourth, what are the implications of all this evidence for airline deregulation in Western Europe? Should it be done, and, if it is, are there specific policies needed to avoid potential pitfalls, such as those experienced in the U. S.?

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[1]This paper does not consider the effects of deregulation on air cargo transportation, though the evidence there also suggests that the reform has been successful. See, for example, Carron (1981).

Finally, what are the implications of all these matters for future research in the economics of air transportation?

In line with these questions, the next section of this paper (section II) discusses the conceptual motivations for airline deregulation in the United States, both as it was originally conceived and as it has been subsequently revised with both experience and conceptual improvements in economics over the past decade. The third section discusses some of the prior concerns which skeptics had about airline deregulation.

Section IV reviews the evidence on the economic effects of the Airline Deregulation Act of 1978, as it relates to a variety of economic and social criteria, including fares, service quality, service to small communities, factor use and returns, and, finally, the question as to whether air deregulation has met the expectations, theoretical and practical, of its advocates.

The fifth section of the paper addresses current policy problems faced under deregulation, including airports and airways, safety regulation, and antitrust policy.

The final section summarizes the evidence compiled through the paper, discusses its implications for policy in Western Europe, and suggests directions for further research.

II. Industry Structure and the Motivation for Airline Deregulation

As all students of microeconomic theory know, there are several reasons why markets can fail, thereby requiring regulation.[2] They include natural monopoly, externalities, immobility of factor markets, imperfect information, a belief on the part of the policymaker that consumer sovereignty does not apply, or issues relating to income distribution and macroeconomic stabilization which the free market fails to take account of. Some of these reasons (especially imperfect information and externalities) remain a motivation for regulation of air safety in the U. S., and will likely remain a motivation for some regulation in Europe in 1992. In our discussion of the desirability of airline deregulation, our emphasis will be on those sources of market failure in most discussions of classic economic regulation (i.e., of rates and entry): these include issues of natural monopoly and factor mobility (i.e., ease of entry and sunk costs). We shall, however,

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[2] For a summary of possible reasons for market failure, see Francis Bator (1958). For a discussion, specifically, of the economic considerations of market failure which might lead to the sort of regulation applied to transportation and public utilities, see Kahn (1970, pp. 11-12).

also discuss the relationship between economic regulation and safety, a topic of some controversy since air deregulation in the United States.

In attempting to evaluate the viability of competition or regulation in an industry, economic theorists often consider the extreme cases of high levels of efficiency achievable by a perfectly competitive market, or by an omniscient regulator dedicated completely to the goal of economic efficiency. This is of course unlikely to reflect the true realities facing policy-makers. In many industries, competition is considerably less than perfect, and, based on available evidence, regulators are often unwilling or unable to pursue the goal of economic efficiency to the exclusion of other goals.[3]

The real question facing policymakers, then, is what level of performance can be practically achieved by the marketplace or by regulation.[4] Some years back, J. M. Clark (1940) made this point by noting that competition is workable in an industry, provided that the free marketplace can achieve a level of efficiency at least as high as can be practically achieved by any form of government ownership or control. By this criterion, which is the relevant one here, deregulation is appropriate as long as competition is workable. With this as a criterion, it should be quite evident that the question as to whether an industry should be regulated cannot be resolved in a theoretical vacuum: the answer will most likely hinge on a combination of theoretical arguments and empirical evidence.

Consistent with this, our goal is to analyze (theoretically and empirically) the structure of the airline industry (i.e., the extent to which it is monopolistic or competitive, and how easy entry is). Arguments made by original advocates of deregulation in the 1960s and 1970s are relevant here, as are more recent empirical and empirical and theoretical developments.

It is worth noting, then, that the evidence considered in this section is of three types: first, theoretical discussion of the structure of the airline industry and its likely impact on the workability of competition; second, empirical evidence on the structure of the airline industry both before and after 1978; and, finally, the likely implications of this

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[3] For discussions of the motivations of regulators, see, for example, Stigler (1971), Peltzman (1976), Becker (1983), and Keeler (1984).

[4] This viewpoint is consistent with that advanced by Levine (1987) though he does not relate it to the concept of workable competition.

structure for performance after deregulation.[5] Performance after deregulation is discussed separately in Section IV, below.

In analyzing the workability of competition in the airline industry, we shall work largely in the framework of the "structure-conduct-performance" paradigm of industrial organization (with some revisions to account for more recent developments in industrial organization).[6] By this paradigm, if the structure of an industry is sufficiently competitive (i.e., not naturally monopolistic) the performance should also be good in terms of economic efficiency. The reader may object to this that there is reason to be skeptical of the structure-conduct-performance paradigm; yet, as relates to airline deregulation, skeptics should find this framework adequate, for if airline deregulation makes sense from this viewpoint, which has a more stringent test for a laissez-faire policy than a free-market approach, then a fortiori, it also makes sense from the viewpoint of a free-market advocate who is skeptical of the structure-conduct-performance paradigm.[7]

So the first question we are concerned with is whether the airline industry is a natural monopoly. It is to that which we now turn.

A. Scale economies and the potential for natural monopoly

For a long time, economists have been aware that industries with high levels of scale economies relative to the size of the demand curve are quite possibly natural monopolies. The idea here (in the simple, single-product case) is that if the average cost curve is falling when it hits the demand curve for a product, it is clearly less costly to society for one firm to be producing the product than for two or more to be doing so.

In the case of airlines, much evidence has been found to indicate that large airlines have costs no lower than smaller ones (see, for example, Caves, 1962 and

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[5]This discussion of likely implications of structure for conduct and performance occasionally necessitates bringing in evidence regarding conduct and performance, especially before 1978. It is a weakness of the structure-conduct-performance paradigm (and the subsequent attempts at its modernization) that it is difficult to compartmentalize the discussion completely.

[6]This paradigm is set forth in many books on industrial organization. For example, see Boon (1956) and Waterson (1984).

[7]That is, most free-market advocates, such as Brozen (1982), would argue that free-market policies are justified in much more highly-concentrated industries than the structure-conduct-performance paradigm would suggest.

Keeler, 1972).

This evidence of lack of scale economies in airlines was initially cited as indicating that airline markets are naturally competitive. However, before deregulation occurred, some observers came to understand that because scale economies are defined with respect to a market, the lack of correlation between costs and airline size was not in itself evidence that there was no natural monopoly in airlines (Keeler, 1978, Keeler and Abrahams, 1981). To see this point in clearer detail, we must take an analytical look at costs for a single airline market.

Scale economies in a simple airline market. As in most real world attempts to define markets, they can be difficult to define in the case of airlines. Nevertheless, the simplest definition of a market in airline services is both useful and, to a certain degree, realistic (our analysis will be further modified to reflect greater realism later).

For the moment, let us consider a market in air transportation to be for nonstop service between two cities (say Paris and London). Regarding scale economies, then, the question is whether costs per passenger for an airline rise or fall as the airline increases the flow of passengers it accommodates between those two cities. Clearly, if one airline can accommodate all the traffic between the two cities more cheaply than can any combination of two or more airlines (holding service quality constant), then we can think of the route (in this simplified case) as being a natural monopoly.

The economies of scale we are considering here are often called economies of density, and they cannot be measured simply by plotting a (multi-route) firm's total output (or traffic accommodated) against average costs (clearly, total traffic accommodated and total accommodated on a particular route, or even on an average route, are different concepts).

What, then, is the evidence regarding economies of density in airlines? We first consider a priori engineering evidence. Technically, engineers have often argued that larger aircraft indeed have lower costs per seat-mile (for a given length of haul) than do smaller aircraft. Thus, as the number of passengers on a route increased, we should expect the average aircraft size to increase (holding frequency constant, or perhaps increasing it), which would in turn cause costs to fall. This would suggest that there are economies of density in air transportation.

There are, however, limits to this process: the structural integrity of the aircraft and the runway length of the airports (which must longer the larger the aircraft) place limits on the extent of these scale economies. Also, at least as they are generally

engineered, large, heavy aircraft have high take-off costs which make them ill-suited for short hauls, which many low-density domestic routes tend to be. Additionally, at some level of crowding, the corridor on which the planes are flying will become congested, and congestion will drive costs up for all flights, resulting in decreasing returns to density.

How do these effects balance out? Graphic evidence from a Civil Aeronautics Board study from the mid-1970s is presented in Figure 1. It indicates that by as the route density of the typical "trunk" airline was reached, economies of density appeared to be exhausted (since that time, the CAB and the U. S. Department of Transportation have ceased to develop data on route densities, so similar graphs with more recent data are impossible to calculate).

Two recent pieces of evidence, in studies by Caves, Christensen, and Tretheway (1984), and by Gillen, Oum, and Tretheway (1985), indicate that economies of density may be greater than previous studies would indicate, so that the average route served by the average trunk airline around 1980 would have been subject to considerable economies of density.

However, the theoretical interpretation of Caves, Christensen, and Tretheway's results (and those of Gillen, Oum, and Tretheway, as well) is open to some question. It can be argued that when certain ambiguous econometric procedures are controlled for, their results are consistent with very few economies of density on the average trunk route in the U. S.[8] On the other hand, Gillen, Oum, and Tretheway's results indicate clearly that a large fraction of the thinner routes in Canada are subject to economies of density.

In any event, it should be evident from this that many routes which are in fact below average in density in the U. S. could be natural monopolies.

Empirical evidence supports this, although it also suggests that the extent of natural monopoly in U. S. airline markets is limited: as of 1988, only 11 per cent of passenger-miles traveled were in markets with only one carrier, compared with 22 per

[8]The problem with Caves, Christensen, and Tretheway's analysis is that they base their conclusion that there are economies of density on dummy variables allowing for different regression intercepts for each firm. It is argued that the different intercepts represent different route structures, and that the output coefficients represent costs of output holding route structure constant. The difficulty here is that the dummy variables could just as easily represent immobile factors, which would mean that the coefficients are in fact representative of short-run, rather than long-run costs. When CCT use a true density variable, cities served, rather than these mysterious dummies, they get a result much like those of other studies, of few if any economies of density for the typical trunk airline.

cent in 1979, just after deregulation; on the other hand, 20 per cent of passenger-miles
occur on routes with over four firms, compared with only 4 per cent in 1979 (Lublich, 1989, p. 84). This suggests that while natural monopoly exists in U. S. airline markets, its importance should not be overstated.

Nevertheless, it is worth asking whether such routes are sufficiently competitive to allow for a competitive (or near-competitive) market outcome. Before considering this question in more detail, it makes sense to consider, further, the question as to how the situation here is changed by the fact that airline markets are more complicated than simply single end-to-end routes. Specifically, we know that airline markets in reality involve rather intricately interconnected networks of service.

Scale economies in more realistic and complicated airline markets. Because there appear to be, to at least some degree, economies of density on a given airline route, it follows that it is not economical to offer nonstop service between all city-pairs served on an airline route network. Rather, traffic needs to be concentrated and channeled through corridors so as to concentrate it, offering two advantages: first, ability to realize economies of higher-density operation and second, ability to offer frequent service (it should be evident that these reasons are closely-interconnected, however: if there were no economies to concentrating traffic into relatively large planes, there would be great advantage to offering very high frequencies with arbitrarily small planes).

This need to concentrate traffic while still providing convenient service has resulted in the phenomenon of "hubbing," a process begun by U. S. airlines well before deregulation began, but which accelerated with the advent of deregulation.

Under this scheme, all flights converge on "hub" airports, usually large and centrally-located ones, allowing for convenient on-line transfers of passengers and baggage. This sort of network allows for both the exploitation of economies of traffic density described above, as well as frequent (connecting) service.

One might ask why it is necessary to have on-line (same airline) connections at a hub. Might it not be possible to have hubs served by several airlines, wherein interline connections are made? Most travelers would find it obvious that this is not so: on-line connections are usually much more convenient than interline ones: there is less distance between gates, a better chance of making the connection, a better chance of airline help if connections are missed, a better chance of baggage making the connection, and a

better chance of a low fare. This preference for on-line over interline connections is strongly confirmed by empirical evidence.[9]

This suggests that not only is the number of carriers on a given route limited by economies of density, but the number of carriers in a system may well be limited by a combination of economies of density and economies of route integration. The question then arises as to how many carriers can be accommodated in a national set of markets, such as the U. S. (or, for that matter, Western Europe). No one knows the to answer this. Keeler and Abrahams (1981) guessed that the total number would be somewhere between 5 and 10 carriers for the U. S., a number reasonably consistent with experience in the U. S. But it is impossible here to be very precise.

These economies of route integration can be thought of as "economies of scope" in the more current parlance of Baumol, Panzar, and Willig (1982), because, with these network-related economies, there are extra benefits to serving numerous city pairs (and hence providing several different products), all with one firm through one hub.

This would not seem to change any of our arguments about scale economies in air transportation, except as they affect ease of entry, which is, in turn, another important variable in determining the competitiveness (actual or potential) of airline markets. Clearly, if there is only a finite amount of room for carriers in a national market, and if hubbed networks take time to build and duplicate, this could impose a significant entry barrier in commercial air transport. It is to the topic of entry barriers that we now turn.

B. Conditions of entry into airline markets

There are really two questions we need to consider here (albeit very briefly, compared with the voluminous literature on the topic): first, what relationship can be expected to occur between ease of entry and performance in an industry, and, second, what are the implications of this possible relationship for airlines? To answer these questions requires a brief review of a large literature, starting some years ago.

Beginning at least with the work of Joe S. Boon in the 1950s, economists have been aware that the ease of entry into an industry has a strong impact on the

[9] See Carlton, Landes, and Posner (1980). It is, however, also possible that carriers can coordinate their activities at hubs in such a way as to make most of the conveniences mentioned here available. This happens now on a large scale between short-haul commuter carriers and large major carriers, often with the commuter carrier taking on a name similar to that of the major, such as United Express.

competitiveness of its outcome. Boon hypothesized that this is so because, with easy entry, even if an industry is relatively concentrated, established firms will be forced to set prices well below monopoly levels in order to forestall entry. Or, alternatively, they may well choose to set prices higher and earn temporary profits before entry occurs, but, under those circumstances, entry of firms will soon bring profits down.[10]

Boon tested his theoretical analysis by classifying manufacturing industries into three groups regarding entry barriers: high, substantial, and low to moderate (Boon, 1951, 1956). These classifications were based both on judgments as to the degree of product differentiation and empirical evidence as to the investment level needed to enter a given industry at minimum efficient scale. He found that, indeed, industries with high and moderate to substantial entry barriers earned higher returns on investment than did industries with low to moderate entry barriers. Furthermore, he found that, whereas increased concentration resulted in increased profits in industries with moderate to substantial barriers, there seemed to be no relationship between concentration and return on investment in industries with low to moderate entry barriers.

Since Boon, a large literature has developed, specifying (both theoretically and empirically) the relationship between various types of entry barriers on the one hand and firm pricing on the other.[11]

Of the newer theoretical models regarding the effects of entry barriers on prices, the contestability theory of William Baumol most requires more detailed consideration. By this theory, if entry and exit costs are zero, even a natural monopolist will be forced to set prices at zero-profit (competitive) levels. When a natural monopoly has these attributes, Baumol (1982) has labeled it a "contestable" market. Obviously, if a market is contestable, there is a compelling case for its deregulation, regardless of whether it is a natural monopoly.

The question we now wish to consider is, based on structural evidence, how easy is entry into the airline market, and what are the implications of this for competitiveness?

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[10] Many more sophisticated theories of oligopoly pricing under the threat of entry have been developed, though many have a flavor similar to Boon's. For a reasonably recent survey of these models, see Waterson (1984, Chapter 4).

[11] For a survey of theoretical models relating to these issues, see Waterson (1984, Chapter 4). For a survey of the empirical evidence, see his Chapter 10.

Views on this issue have tended to shift over time. To get some perspective on the evidence, we start with earlier studies. In his early and important analysis of the airline industry (one of the first to advocate deregulation), Caves (1962, Chapter 4) discussed the height of entry barriers for two different types of airline: one which duplicated the full, integrated route structure of what was then called a "trunk" airline (American, Delta, TWA, United, etc.), and another for a carrier entering a single route (i.e., such as one of the California Intrastate carriers which entered before nationwide deregulation, but which served only a single dense city-pair route, such as Los Angeles-San Francisco).

After analyzing capital requirements and product differentiation in the manner of Boon, Caves concluded that in a deregulated environment (i. e., without CAB restrictions on entry), entry barriers would be at least "substantial" for trunk carriers and "moderate" for smaller carriers serving only one or two city pairs.

In the end, Caves (1962, pp. 447-448) nevertheless advocated deregulation of airlines, because he argued that competition was just as workable there as in many other oligopolies in the U. S. economy.

Levine (1965) saw entry barriers as perhaps lower than did Caves, having looked at the California intrastate experience in more detail than did Caves.

Indeed, if one considers the writings of Jordan (1970), Keeler (1971, 1978), Eads (1975), and the U. S. Senate Committee of Administrative Practices and Procedures (1975; this was an important government study leading to deregulation), one finds a stronger and stronger view that entry into airline markets is easy, especially if one considers entry by existing firms on to new routes, as well as entry of totally new firms.

The wave of economists' consensus moved more and more towards a belief that entry into airline markets was easy. By the early 1980s, a group of economists went so far as to argue that airline markets were more or less nearly fully contestable, i.e., that the discipline of potential entry would exert just as strong a downward push on airline fares as would the actual entry of new firms.

Although deregulation had essentially occurred in full force before contestability theory was developed, nevertheless, contestability was used as a rationale for the speed with which airline routes were deregulated, and for the readiness of the U. S. Department of Transportation to grant airline mergers.[12]

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[12] For a discussion of these policy developments and the role of contestability in policies towards airlines see Levine (1987), pp. 403-405.

Since deregulation has occurred, however, the pendulum of academic sentiment has swung away from contestability, based both on theoretical arguments and empirical evidence. We shall consider empirical evidence in our analysis of the effects of U. S. airline deregulation. But we should summarize here the arguments, most thoroughly made by Michael Levine (1987) and based on some recent thinking in the field of industrial organization. This analysis is based on observations of the behavior of new entrants and incumbents under deregulation.

Levine argues that there are seven attributes of deregulated airline markets which raise entry barriers (and hence hinder contestability), which many advocates of air deregulation did not foresee. These include the following:

1. Costs on the part of airlines of communicating to travelers complex information regarding services and fares provided.

2. Economies of scope in making these communications and establishing a reputation (much akin to the old scale economies in advertising).

3. Costs of monitoring behavior of travel agents on the part of airlines, and costs of monitoring traveling employees on the parts of firms funding business travel.

4. Production indivisibilities in providing information to travel agents that cause a few computer reservations systems to dominate a nation's air travel network.

5. Information costs facing lenders which make them prefer established carriers (this has been cited in the "old industrial organization" literature as entry barriers from imperfect capital markets).

6. Airline behavior designed to raise rivals' costs or hinder their earning of revenue, such as the hoarding of unused slots at busy airports by established carriers with the intent of making survival difficult for new entrants.

7. High transactions costs between airlines and travel agents which make it costly for travel agents to switch frequently among the computer reservations systems they subscribe to.

Levine argues that most of the observed impediments to contestability in the deregulated airline industry stem from these factors in one way or another. However, he also concludes quite strongly that none of these barriers is strong enough to prevent competition from being workable in airlines. He in fact believes that none of these barriers is anywhere near strong enough to justify regulation of airlines in an environment such as the one in the United States. His argument is similar to that of Caves (though more sophisticated) in that he states that, although the airline industry is

a noncompetitive oligopoly with some entry barriers, the entry barriers are quite sufficiently low to make competition workable.

The most recent analysis of entry barriers is a 1988 study by Reiss and Spiller. In it, they develop a model of oligopoly behavior and an econometric model of airline entry and price competition in low-density markets. Variations of the model are based on Cournot and Bertrand behavior. They find that fixed costs are very small in a given low-density market, a result consistent with others surveyed here in that they imply low entry barriers, at least for existing firms on to new routes (Reiss and Spiller, 1988, p. 21).

We shall have more to say about these considerations in our own evaluation of the workability of competition in airlines, and in our discussion of ways in which to make deregulation work better, as well.

C. The Structure of the Airline Industry and the Appropriateness of Deregulation

Pre-deregulation arguments in the U. S. Although some observers viewed the deregulated airlines as potentially competitive,[13] others viewed the likely outcome as more oligopolistic.[14] But even to those who believed that the natural structure of the airline market was oligopolistic, the deregulated outcome appeared much better than did observed markets under regulation.

The point must therefore be made here that advocates of airline deregulation generally did not favor it for purely theoretical reasons: there was a clear awareness that in intrastate markets, where pricing and entry were free, airline fares were lower than they were on equivalent interstate routes, by as much as 50 per cent (but, more often, around 20-35 per cent).

More than that, there was evidence that even with regulated fares set above free-market levels, regulated trunk airlines were in general unable to earn an average return on investment above a competitive, average level for the corporate sector in the U. S.

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[13] Among those arguing for competitiveness were Levine (1965) and Keeler (1978). After deregulation occurred, the present writer shifted views (from observing airline markets) rather quickly--Keeler and Abrahams (1981) views the industry as an oligopoly.

[14] Caves (1962), Jordan (1970), and Kahn (1970, pp. 210-211) for example.

(see, for example, Keeler, 1971). This is despite the fact that the CAB was ready to grant a higher return than that to the carriers.

There was strong evidence that, despite high and regulated fares, the carriers dissipated excess rents through service quality competition (mainly adding frequency and capacity until profits were dissipated, much in the way that Bertrand competitors in an undifferentiated oligopoly dissipate their profits through price competition).[15] Certainly, there was an awareness that on more highly-concentrated routes, service competition was less and load factors were higher (see Eads, 1975). Furthermore, it was clear that some carriers, such as Delta and Northwest, were able to earn above-normal profits under regulation (see Table 3). But, as in many industries, such experiences seemed balanced by others which entailed lower-than normal profits.

It appears, then, that the airline industry is one in which, even under regulation, it was difficult for firms to coordinate service well enough to earn excess profits. This situation, incidentally, may have been different in other regulated environments, such as Western Europe, in which carriers have been allowed to collude on capacity as well as on fares.

In any event, in the face of this evidence in the U. S., there was a strong belief that, despite the fact that airline markets could be quite concentrated under deregulation, nevertheless, airlines were overall unable to coordinate their activities in either fares or service well enough to prevent competitive forces from working their effects on the airline markets. While some economists (especially Panzar, 1979, and Douglas and Miller, 1974) believed that in a non-collusive equilibrium, unregulated air carriers would offer "too high" a service quality, despite zero profits, there was nevertheless a consensus that the outcome of this process would be superior to the regulated markets existing at the time.

These beliefs on the part of earlier advocates of airline deregulation are supported by both theory and evidence developed since deregulation. More recent evidence indicates the existence of some entry barriers and market power, but the evidence is that both are relatively low and competition is workable.

Evidence on the workability of competition in the airline industry. We can now summarize the evidence which the literature (past and recent) suggests regarding the desirability of deregulation (but excluding evidence from the outcome in U. S. markets, which we discuss below).

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[15] This behavior was alluded to by Keyes (1949), Caves (1962), Jordan (1970), and Keeler (1972), but it was analyzed in most and clearest detail by Douglas and Miller (1974).

First, whatever the views might be on ease of entry into airline markets, there is a view that potential entry should play a role in affecting fares. This was true even before the concept of contestability was coined (see, for example, Keeler, 1978).

Second, close substitutes for air services should put downward pressure on fares, especially on the sort of low-density routes which could otherwise be natural monopolies. In the United States, this is true not only of bus and rail service, which provide competition for some passengers on some routes, but, most importantly, it is true of the private automobile, which has now controlled 80-90 per cent of the intercity passenger travel market for half a century, and which appears likely to continue to play that role into the foreseeable future.[16] For business travelers, the use of auto rentals is common, and certainly rental cars are a close substitute for taking connecting air service on the sort of relatively short-haul, low-density routes on which airlines are most likely to have a natural monopoly.

Third, the inability of the airlines themselves to coordinate service to keep profits at super-normal levels, despite regulation of fares that should have allowed that, was taken as strong evidence that airlines would be unable to behave as price-coordinating oligopolists; that evidence is supported by subsequent experience, as we shall see.

Fourth, in addition to low entry barriers, there are other structural reasons why airlines have difficulty coordinating prices. For example, in the very short run, marginal costs (i.e., of an extra passenger with seats there) are very low relative to average costs. Scherer (1980, pp. 205-212) has argued that such a divergence between short-run marginal and average costs makes price coordination difficult. Similarly, airlines may believe that if fare cuts are selective enough, they will not be matched. Paradoxically, as Scherer also points out (1980, pp. 222-225), this belief that cuts may not be matched often causes the breakdown of oligopolistic coordination, as well.

Fifth, evidence from intrastate routes suggests strongly that competitive forces should drive down fares compared with regulated levels. Even before deregulation, not all that evidence came from high-density routes. In Texas, Southwest Airlines charged very low fares (below regulated levels) even on low-density routes, such as Houston-Harlingen, where it had a monopoly.

Sixth, more recent observers of U. S. airlines have argued that there are indeed entry barriers, and that competition appears to fall short of perfect. But most who have

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[16] See Crandall and Keeler (1987, section 2). In recent years (since deregulation), the share of airlines has risen at the expense of the auto. As of 1987, air transportation had a market share of 17.8 per cent of intercity passenger-miles, an all-time high.

observed the situation under deregulation in the U. S. nevertheless believe that airline competition is workable. The evidence behind this assertion regarding experience in the deregulated airline industry will be considered below. There are, however, some other concerns regarding the effects of deregulation which many observers have and which need to be addressed, and in other environments in which deregulation is being considered, these issues are likely to arise, as well. Before considering the post-deregulation evidence for the United States, we consider those matters.

III. Other concerns regarding airline deregulation

Two attributes of air transportation which it has been thought that deregulation may adversely affect are safety and service to small communities.

A. Safety

There are problems with externalities and imperfect information relating to safety, so the potential is clearly there for market failure. For that reason, very few advocates of deregulation favor elimination of safety regulations (i.e., certification for airworthiness of aircraft or training of pilots). Most emphatically favor strengthening inspection budgets in this area, in order to make sure that airlines (new entrants or those with financial problems, especially) were well-policed. Although some disagree with it, there is a sense among most observers that entry and rate deregulation should have no adverse effect on safety as long as regulation was done correctly in the safety sphere.

Again, the limited available evidence from markets in which new entrants were allowed (intrastate markets in California and Florida, and interstate charter carriers) supported this viewpoint regarding safety (post-deregulation results for the U. S. are considered below).

B. Service to small communities

An ostensible goal of regulation by the Civil Aeronautics Board was to assure service to a large network of cities, perhaps larger than the free marketplace would support. It used subsidies to achieve this goal, at least in part.

But one of the CAB's consistent policies was to try to force airlines to use profits earned on long-haul and high-density routes in order to cross-subsidize service on shorter-haul and low-density routes (Caves, 1962, pp. 267-269, 402-412).

There are two reasons why this policy has been viewed as a failure, at least as of the late 1960s and the 1970s, by economist observers. First, there is evidence that airlines tended to pull out of providing service if they were not fully compensated for it (Eads, 1971). This is only natural, because there is little reason to believe that they would willingly surrender profits. Second, on the long-haul and high-density routes which were to cross-subsidize the short-haul and low-density routes, service quality competition dissipated many of the profits meant for cross subsidy,[17] so it is not clear that there was much profit from these routes to do any cross subsidizing.

It is likely that there was still some cross subsidization in the years just before deregulation (Caves, 1962, pp. 402-411 provides evidence of this). If there were, then deregulation would indeed result in some increase in fares on lower-density routes. But it is difficult to view this elimination of cross subsidization as a bad thing, given its questionable basis in either economics or ethics.[18] The view, then, was that cross-subsidization could be occurring, but that it was unlikely to be much, it was likely to be at a high cost in inefficiency, and its ethical basis was in any event questionable.

We have now briefly summarized the motivations, theoretical and empirical, for airline deregulation in the United States. Our next goal is to review the actual evidence from the American experience.

IV. The U. S. Experience under Airline Deregulation

Much has been written about the U. S. experience under airline deregulation, and much more could be--it is impossible to all the details here. Rather, the goal will be to summarize the experience in the terms most important for the task at hand: what

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[17] For a summary of the evidence on this, see Keeler (1978).

[18] It could certainly be argued that subsidization low-density routes is a worthwhile social goal (the U. S. Department of Transportation maintains a modest program to do so subsequent to deregulation). But if society desires to provide such subsidies, it can be argued that the most efficient way to do so is through broad-based general revenues, rather than through internal subsidization, which taxes one good (high-density service) heavily in order to provide the subsidy. Moreover, Posner (1971) has argued that cross-subsidization is a form of fraud, because it appears to be a means of taxation which the public might not tolerate if it had to pay it directly.

lessons can be learned regarding the U. S. experience that are important for other countries contemplating similar reforms?[19]

Perhaps the most important question regarding the effects of airline deregulation is its effect on fares. We therefore discuss that issue first. The next question which follows naturally relates to the extent of contestability in the industry, and that issue is pursued next. Other issues relate to service quality (including service to small communities) and safety. Those issues are considered next. Finally, there are possibly policy problems in the U. S. relative to air deregulation which are unresolved, either because policy has not yet dealt with anticipated difficulties, or because new and unanticipated difficulties have emerged.

A. Deregulation and fares

Of all the aspects of airline service which concerned advocates of air deregulation, fares were the most important. There was a sense that, overall, deregulation would reduce fares. If it increased them on low-density routes, it was expected to more than offset that effect by reducing them on medium- and high-density routes (this expectation was elaborated above).

There are at least two ways in which deregulation might affect plane fares: it can affect the level of fares (overall yield per passenger-mile) and the structure (fares on long hauls, short hauls, high- and low-density routes, and in first class versus economy service). We now consider available empirical evidence on each of these effects. In each case, the studies cited have attempted to measure deregulated fares against estimates of what the regulated fare would have been,[20] had regulation persisted, and

[19]This survey was written before I had a chance to see the excellent surveys of the same issues by Kenneth Button (1989a, b). In many areas, this survey arrives at the same conclusion as Button's, but there are areas of difference, as in mergers.

[20]Most of the studies cited, including Bailey, Graham, and Kaplan (1985), Call and Keeler (1985), and Meyer and Oster (1987) use the Standard Industry Fare Level for their estimates of the regulated fare for a given city pair. It was necessary for the CAB (and later, the DOT) to continue calculating this regulated fare as a function of miles for purposes of regulation of fares on international routes, such as U. S.-Canada. Morrison and Winston (1986), on the other hand, calculate their own estimates of what the regulated fare would have been. But the stories told are quite consistent.

though their methods differ, the basic thrust of their conclusions is quite consistent across studies.

The level of fares under deregulation. With the advent of deregulation in 1978, the evidence is strong that the overall level of fares declined, first slowly and then more substantially.

One study found that by 1980, revenue yield on the top 100 routes was 15 per cent below what it would otherwise have been under regulation, and the cheapest unrestricted fare on these routes was, on average, nearly 20 per cent below what the regulated fare would have been; by 1981, the cheapest unrestricted fare was only 75 per cent of what the regulated fare would have been.[21] Another study estimates that, by 1984, overall revenue yield was 25 per cent below what it would otherwise have been under regulation.[22]

Previous studies of plane fares have concentrated on relatively early years of deregulation, 1981-84. Although a thorough study of the effects of deregulation on the level and structure of plane fares is beyond the scope of this work, nevertheless, a modest amount of direct evidence on plane fares can tell us much about the effects of deregulation on fares, both past and present. In presenting this evidence, we do not attempt a complete counterfactual analysis as the cited studies have done, but we do convert nominal fares to real terms to get roughly accurate comparisons over time.

Table 1 presents evidence on the behavior of nominal and real plane fare levels (revenue per passenger-mile, often called revenue yield) over the 1968-87 period. Evidence is presented for economy passengers only (85-95 per cent of the total over the period) and for all passengers.

Nominal values are converted to real ones through deflation by the consumer price index. This admittedly crude procedure, perhaps not reliable for analyzing small or short-term fluctuations in fares, should nevertheless provide insight as to at least orders of magnitude of long-term changes.

Although airline deregulation officially occurred with the Airline Deregulation Act of 1978, it is in 1977 that it began to have its first effects on fares, with the

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[21] Call and Keeler (1985), p. 233. This comparison is based on the standard industry fare level, a current estimate of the regulated fare, which continues to be calculated for purposes of regulating international fares. It has some shortcomings, discussed below, but it is a handy and reasonably accurate basis for comparison.

[22] This result is from Morrison and Winston (1986), as summarized by Morrison and Winston (1989, p. 29).

appointment of Alfred Kahn and others sympathetic to deregulation to the Civil Aeronautics Board. So 1976 is the last year in which fares might be thought to be independent of deregulation.

The results shown in Table 1 are illuminating. Note that the real coach yield fell slightly from 1968-76, from 4.9 cents per mile to 4.4 cents. This is probably the result of the Domestic Passenger Fare Investigation, which reduced coach fares in order to eliminate an observed cross-subsidy to first class.

From 1976 to 1987, on the other hand, the real fare fell sharply, from 4.4 cents to 3.2 cents. Furthermore, it is worth noting that a large part of this decline in real fares took place between 1984, when the last detailed fare studies cited here occurred, and 1987, after many mergers were allowed (more about them below). This implies that the studies cited here may have missed much of the fare reductions from deregulation.

These estimates are very much in line with what proponents of deregulation predicted would occur. If anything, these results are better than were hoped for, in that the yields discussed here are for overall fares, combining high- and low-density routes, rather than the savings achieved on high-density routes alone.

Clearly, the effects of deregulation on the structure of plane fares, as well as the level, are relevant, and it is to that topic that we now turn.

Deregulation and the structure of plane fares. Regarding the structure of plane fares, there were two predictions which early advocates of air deregulation made: first, that fares on high-density routes would be reduced more than fares on low-density routes (indeed, fares on low-density routes might increase) and that first class fares could actually rise in response to deregulation, because there was evidence that, at least before the full effects of the Domestic Passenger Fare Investigation had worked their way through in 1976, coach passengers were cross-subsidizing first class.[23] A third matter of fare structure worth considering is that of changes in restricted discount fares versus changes in unrestricted (i.e., no advance purchase or length-of-stay requirement) fares. Although there were some predictions regarding this, namely that new entrants coming in under deregulation would cut fares on an unrestricted basis, nevertheless, there was some ambiguity as to the likely outcome.

We turn first to the issue of general availability of discount fares. The Air Transport Association publishes annual information about the use of these fares, shown

[23] For examples of both predictions (relating to fare class and fare restrictions), see Keeler, 1972.

in Table 1. These figures provide evidence on the per cent of total passengers traveling at a "discount" fare, and the average amount off the published full fare that an average discount passenger paid.

This evidence is striking indeed, indicating that the per cent of passengers traveling at a discount on major carriers rose from 71 per cent in 1981 to 91 per cent in 1987, and the average amount of the discount rose from 46 per cent off the regular fare in 1981 to 62 per cent off in 1987. Given the number of people using them, many of these "discount" fares must have very few restrictions, despite their label. They also include unrestricted fares which are marked down from the official unrestricted fare, but offered on a capacity-controlled basis. It should be clear from these figures that in our analysis of "discount" versus "non-discount" travelers, we should give strongest weight to evidence for discount travelers, because in the late 1980s, they constitute the overwhelming majority of all travelers, for business and pleasure alike. With that in mind, we now consider further evidence on the structure of fares by route type.

Consistent with the evidence in Table 1, a recent study (Meyer and Oster, 1987, pp. 111-118) indicates that as of 1984, all routes did enjoy discount fares, and, although high-density routes enjoyed somewhat greater discounts than did low- and medium-density routes, travelers able to plan their trips ahead and stay a minimum amount of time benefitted substantially on all routes.

On the other hand, the picture as to the effects of air deregulation was different as to unrestricted fares. Several studies indicate that unrestricted coach fares fell, in some cases substantially, on the top 50 or so routes in density.[24] On the other hand, for the next 100 or so routes, fares seemed to rise from the regulated level (6 per cent or so) subsequent to deregulation, and on a sample of lower-density routes, those fares rose slightly more, (8 per cent or so; see Meyer and Oster, 1987, pp. 112-113).

Of these unrestricted fares, three comments are necessary. First, the increases on low-density routes were quite small. Second, as we have seen, given that 91 per cent of all travelers on major carriers in 1987 went at discount fares, the behavior of full fares even on these routes may be of limited interest. Third, compared with the fares that prevailed under all but the last two or so years of regulation, even these fares are lower. The reason for this is that the CAB's Domestic Passenger Fare Investigation of 1971 (which took full effect only in 1976) reduced coach fares in real terms by 20 per cent, to

[24] See Call and Keeler (1985, pp. 240-243) and Meyer and Oster (1987, pp. 111-118).

eliminate a cross subsidy that seemed to have occurred from coach to first class before that time.[25] On this basis, it can even be argued that, compared with practically all the years of regulation, coach fares fell on even the lower-density routes.

Viewed in this perspective, the outcome of deregulation would appear to be in line with the optimistic expectations of those who favored it: the rewards have been considerable and the disappointments have been few.

If there is one aspect of air fares under deregulation which did not meet expectations, it is the extent of seemingly discriminatory discount fares. The original intrastate airlines reduced their fares on a uniform, unrestricted basis, and, while this has indeed happened on high-density routes, many of the fare reductions from deregulation are available on a discount basis, with demand elasticity seeming to play a substantial role.[26]

There are a number of possible reasons for this. It is possible, for example, that the discriminatory fares are something akin to Ramsey prices, resulting from scale economies in the provision of airline services (Robert Frank, 1983). This is especially plausible on lower-density routes, on which economies of density are not exhausted.

It is possible, as well, that each carrier has some small amount of market power (something akin to monopolistic competition) because most flights leave at different times, and each one will have some market power attached to it, to the extent that other flights are not substitutes.[27] Certainly, the existence of this elasticity-based discrimination casts doubt on the belief that the airline industry is perfectly competitive (more about that as relates to factor payments, however). But, as we have seen, many advocates of air deregulation (including Caves and Jordan, for example) did not claim perfect competitiveness: their most important hope was that market performance under deregulation would be better than under regulation, and that result seems to be the case as regards fares. This brings us to the important question as to whether airline markets

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[25] For a discussion of the Domestic Passenger Fare Investigation, see Douglas and Miller (1974).

[26] The costs of computer memory and storage have fallen dramatically since the late 1960s and early 1970s, and that, in and of itself, has probably played an important role in the dramatic and unforeseen increase in the airlines' use of very sophisticated capacity management and fare adjustment strategies under deregulation.

[27] Borenstein (1985) presents a model showing that free entry and atomistic competition can produce such a result. Shephard (1989) finds empirical evidence that this sort of behavior has occurred in retail gasoline sales in the U. S. Earlier, Panzar (1979) developed a model embodying similar market power for each carrier.

have proven to be contestable under deregulation.

Evidence on Contestability. Initially, some students of airline deregulation were optimistic that airline markets were contestable.[28] Others (including the present writer) have consistently been skeptical of the contestability hypothesis as relates to airlines, going back to the very beginning of airline deregulation.[29] Studies published by the present author as far back as 1981 have shown that there is a correlation between concentration (as measured by a Herfindahl index) and fares, and they have also shown that the entry of a new firm (even an established, "high-cost" carrier) has a downward effect on plane fares.[30] Other authors, starting in the mid-to-late 1980s, have published evidence giving cause to question the contestability hypothesis, as well, also based on the finding that there is a relationship between concentration and fares on various routes. These studies include Bailey, Graham, and Kaplan (1985),[31] Strassman (1986), Morrison and Winston (1987), Bailey and Williams (1988), Borenstein (1988) and Hurdle et. al. (1988).

Additionally, there have been other tests of the contestability hypothesis, one based on financial markets (Michael D. Whinston and Scott C. Collins, 1988) and another an indirect test based on two different models of oligopoly behavior (Reiss and Spiller, 1988). Of numerous studies done on the contestability hypothesis in the past five years, only the last-mentioned, based on very indirect evidence, has supported it. It is therefore not surprising that now the contestability hypothesis has been questioned by many students of air deregulation.[32]

Nevertheless, most students of air deregulation in the United States continue to believe that deregulation is worthwhile, despite the lack of perfect contestability. This is true for the following reasons.

First, despite the fact that the airline industry may be less than perfectly competitive or contestable, performance under competition seems better than under

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[28] See Bailey and Panzar (1981), and Bailey, Graham, and Kaplan (1985).

[29] Skepticism on this count was first presented in this writer's comments on Bailey and Panzar at a conference at Duke University in 1980, and were elaborated on in Call and Keeler (1985).

[30] See Keeler and Abrahams (1981) and Call and Keeler (1985).

[31] These authors believed, however, that the evidence against the contestability hypothesis was rather weak. See pp. 171-172.

[32] This shift in consensus is noted by Kahn (1988)

regulation (we have presented evidence of this regarding fares; we shall present evidence below regarding service, safety, and other variables).

Second, it remains clear that potential entry does play an important role in determining fares (Morrison and Winston, 1987), as predicted by contestability theory, and as deregulation's proponents originally predicted (see Keeler, 1978, Appendix).

Third, surface competition clearly plays an important role here. In the United States, that is especially true of the private automobile.[33] In Europe (and in the Northeast Corridor of the U. S.) rail transportation can play an important role here, also.[34]

Fourth, even if the industry is not perfectly contestable, the return on investment earned so far by the deregulated airlines is not, in the aggregate, substantially above most peoples' guesses of a competitive return (see the section on factor payments, below). This is consistent with evidence that before deregulation, service quality competition similarly eroded monopoly returns. Low or nonexistent monopoly rents are obviously suggestive of a workably competitive market.

Indeed, in practical terms, there may be very little distinction between a reasonably contestable market and a workably competitive oligopoly with low entry barriers and little collusive behavior. The oligopoly models estimated for airlines by Reiss and Spiller (1988) are consistent with both stories.

B. Deregulation and Air Service Quality

A number of those who proposed air deregulation felt that it would result in a decline in service quality. This was true for two reasons.

First, the high fares enforced by the Civil Aeronautics Board, along with service quality competition on the part of the airlines, kept load factors low, which made it easier for peak hour travelers to get reservations. Furthermore, Douglas and Miller believed that, given reasonable estimates of demand elasticities, CAB policies tended to

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[33] The substitutability between auto and air transportation is evident from what has happened to the relative shares of the two modes in U. S. passenger transport since 1978. Air share rose from 10.9 per cent in 1977 to 17.8 per cent in 1987, and auto fell from 87.2 per cent to 80.7 per cent in the same period. See Air Transport Association, Air Transport, 1988. More evidence of substitutability comes from Abrahams (1983) and Morrison and Winston (1985).

[34] or a discussion of the economic role of rail passenger transportation, see Keeler (1971b) and Meyer and Oster (1987).

set fares so as to maximize frequencies, so that a reduction in fares would also reduce frequencies (it must be noted, however, that even at that time, there was some skepticism of this conclusion, including some published comments by the present writer).[35]

Second, because regulation supposedly allowed for cross subsidization from high-density to low-density routes, there was a belief that service quality would be reduced for low-density routes.

In service, as in a number of other areas, initial expectations did not materialize. It is true that load factors rose, but flight frequencies also rose as a result of the lower fares.[36]

These higher frequencies, combined with an elaborate hub-and-spoke route system (which many airline began before deregulation, but which deregulation undoubtedly facilitated), produced much greater travel frequencies between most origins and destinations.[37] One study (Morrison and Winston, 1986) estimates the benefits of these service improvements at well over $1 billion, as of the mid-1980s. Whatever the value of these service improvements, it is clear that the fears some pessimists had about the effects of airline deregulation on service were unfounded. If anything, the problem was the opposite--congested facilities from increased service (discussed further in the next section).

Some travelers have said that there appears to be more crowding of aircraft and facilities than before, and, undoubtedly, there are service problems from this crowding (these problems are discussed below). But it is significant that the complaint rate (based on passenger complaints to the Civil Aeronautics Board and then the Department of Transportation) per passenger-mile has fallen substantially since 1978.[38] This is certainly not reflective of a severe deterioration in service.

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[35] For this argument, see Douglas and Miller (1974), and for a skeptical view, see the appendix to Keeler (1978).

[36] Morrison and Winston (1986, p. 33). This is consistent with the predictions in Keeler (1978, Appendix).

[37] See Keeler and Abrahams (1981), Bailey, Graham, and Kaplan (1985), and Morrison and Winston (1986).

[38] Not only was the complaint rate substantially lower in 1988 than in 1978, but it was also lower than 1978 for nine out of the ten years of deregulation. See Lublich (1989, p. 82).

As regards service to small communities, the outcome is also a favorable one, although it appears that in the early years of deregulation, service to small communities declined.[39] By 1984, however, there is evidence that, overall, service improved, with more frequent flights and more carriers serving smaller, nonhub airports.[40] In many cases, service increases for small communities have been achieved with smaller aircraft than were previously used, but that represents a better matching of aircraft and route. If there has been a decrease in service from airline deregulation, it might be in first class. This is not because the quality of first class food, seats, or the like have deteriorated, but rather, unlike the situation under regulation, first class compartments seem smaller on most aircraft, and the seats in them tend to be much fuller.[41] But it is difficult to believe that the large, empty first class sections which existed under regulation represented an efficient use of resources.

C. Safety

One of the primary concerns of opponents of airline deregulation was safety. Even though the Air Deregulation Act of 1978 did not deregulate safety (which remains under the control of the Federal Aviation Administration), one might have feared that with new entrants with less experience in airlines, with new financial pressures, and with existing safety inspectors stretched more thinly, safety could be a problem under deregulation. Yet it could also be argued that the marketplace would offer adequate incentives for safety, even in the absence of increased FAA inspections.[42]

Although there is some slight ambiguity in the results regarding air safety under deregulation, the overwhelming evidence so far is that it has not been a problem.

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[39] The initial decline in service to small communities may have been due to an increase in energy prices, combined with a recession, as well as by deregulation. See Bailey, Graham, and Kaplan (1985), chapter 6.

[40] Bailey, Graham, and Kaplan (1985), Chapter 6, and Meyer and Oster (1987), pp. 118-121. See also Morrison and Winston (1986), pp. 47-50.

[41] Consider, for example, load factors and configuration in first class, first well before deregulation had a chance to exert an influence, and then in the recent past. During 1971-2, the first class load factor averaged 37.6 per cent, and 24.6 per cent of total seat-miles offered were first class. By 1987-88, only 11.9 per cent of the seat-miles offered were first class, and the load factor was 51.9 per cent. These two-year averages were calculated from Air Carrier Traffic Statistics, Monthly, published before 1985 by the U. S. Civil Aeronautics Board, and after that by the U. S. Department of Transportation.

[42] For examples of such arguments, see Andrew Chalk (1987), Chance and Ferris (1987) and Morrison and Winston (1988).

There have been some studies (based on periods of regulation as well as deregulation) which indicate that less-experienced airlines tend to have higher accident rates than do more-experienced carriers (see, for example, Rose, 1988). Yet, when a very recent sample of incumbent and newly entrant carriers is used, the effect is too small and too fine to show up in an actual comparison of outcomes between established and newly-entrant carriers in the mid-1980s. The work of Kanafani and Keeler (1989) shows no difference over this period in accident rates or safety posture for new entrants versus established carriers.

Perhaps the most important question to ask regarding U. S. airline safety is what has happened to it, in terms of fatalities, as a result of deregulation? One study which has tried to answer that question directly is that of Kanafani and Keeler (1989) who examined monthly time series evidence on fatalities per passenger-mile in all domestic scheduled U. S. service. Their analysis takes full account of substitution of small commuter aircraft for larger jets, because it aggregates over all passengers using both types of aircraft during both periods.

Examination of time series evidence in this way cannot assure the measurement of a cause-effect relationship. Nevertheless, observing the behavior of the fatality rate on a month-by-month basis should provide some insight into the situation.

Kanafani and Keeler consider monthly evidence on the passenger fatality rate from 1966 through 1987. They find that the fatality rate decreased consistently at the same rate (.7 to .8 per cent per month) over the entire 1966-87 period both before and after deregulation. The difference in this trend before and after deregulation is very near zero, quite insignificant statistically, and the sign of the difference is itself dependent on when the effect of deregulation is assumed to start.[43] It is of course still impossible to determine for sure what would have happened had regulation continued, but this is very strong evidence that deregulation had no impact on overall safety.

D. Deregulation and the return to productive factors

The effects of deregulation on the returns to factors of production (capital and labor) are matters of considerable policy concern. Effects on wages and employment

[43] See Kanafani and Keeler (1989b). This study finds that the trend towards increased safety decelerated (insignificantly) if the 1979-80 transition period is included in the sample, and it accelerates slightly (but again insignificantly) if this transition period is excluded from the sample. This seems to be caused by the many fatalities caused by the crash of an American Airlines DC-10 in 1979, and it appears that this was caused by maintenance policies pursued under regulation, so it is not clear that it can be attributed to deregulation or to the transition.

have obvious impacts on labor relations, and effects on the return to capital have equally obvious impacts on the ability to finance capacity for expansion. We now consider each of these effects

Employment and wages. We consider each of these obviously interrelated variables in turn.

To the extent that deregulation increased the overall amount of service provided (because of lower fares and more attractive schedules), we should expect it to increase employment. Indeed, the most recent evidence indicates that air deregulation has increased employment in the industry. Specifically, Meyer and Oster (1987, p. 105) find that, during the first four years of airline deregulation, total employment in the industry would have been 3.7 per cent lower than it in fact was had CAB regulation continued[44]. Although this is not a strong effect, it indicates very clearly that airline deregulation at very least did not reduce employment in the industry.

As relates to wages, a number of studies (Moore, 1986, Card, 1986, Capelli, 1985, and Northrup, 1984) have suggested that the entry of nonunion airlines, plus revised agreements on the part of unionized carriers to stay competitive, have reduced wages overall in the industry. The most recent study, by Peoples (1987) indicates that as of 1984, deregulation did reduce airline wages, but not below average levels for equivalent skill levels in the U. S. economy. Peoples shows that before deregulation, airline wages were equivalent to the very highest for a given skill level in the U. S. economy, found only in the most concentrated and profitable industries. By 1984, they had fallen to a level very close to average for the entire U. S. economy. While this is certainly a decline, it is consistent with the workings of an efficient market, and it is also difficult to call it unfair, although some observers may judge it to be so.

Deregulation and airline financial performance. One of the concerns which were expressed before airline deregulation was that "ruinous competition" would make it impossible for most airlines to earn an adequate return on investment, and that would in turn make it difficult or impossible for the industry to finance new capacity or to replace obsolete equipment.

[44] Meyer and Oster (1987), p. 105.

Certainly, some airlines have gone bankrupt since deregulation; that happens in all industries in which the free market is allowed to work its way. On the other hand, overall evidence on the financial performance of the industry has been very favorable to deregulation.

Perhaps the most important indicator of the extent to which the financial markets favor the outcome is the way in which they have capitalized expected future profits as a result of deregulation. As Moore (1986) has pointed out, the financial markets have viewed airline deregulation very favorably in this light.

Furthermore, direct observation of airline profitability during deregulation has also supported the view that things have improved as a result of this change (see Morrison and Winston, 1986, Meyer and Oster, 1987, and below in the present paper). There is also evidence that the overall risk connected with investing in airlines has been reduced since 1978.[45]

As this was being written in the summer of 1989, all commercial aircraft manufacturers had record order backlogs (see Ramirez, 1989); if there was a difficulty, it was in getting the aircraft delivered that the airlines needed, rather than raising the capital needed to acquire them. This would provide further (if casual) evidence that deregulation has not impeded the financial performance and the ability to finance capital expansion of the U. S. domestic airline industry.

Given the evidence against contestability and suggesting oligopoly behavior, one might well ask whether airlines have gone too far under deregulation in the opposite direction: have their profits become excessive and monopolistic?

As in the case of fares, this is not the place for a detailed investigation of airline profitability. But, once again, direct examination of very basic empirical evidence can provide insight. Table 2 provides estimates of the return on invested capital (debt plus equity) for all U. S. carriers, as estimated by the Air Transport Association, for the period from 1966 through 1987. The figures indicate that returns have fluctuated widely over the years, not surprising for such a cyclical industry.

The results shown in Table 2 are striking in two ways: first, they show that the average return on investment was the same during the nine years after deregulation and

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[45] See McMullen (1985) and Meyer and Oster (1987). Also, in a very recent study, Cunningham, Slovin, West, and Zaima (1988) have found that airline deregulation actually reduced the amount of systematic risk associated with investment in airlines, at least for the sample of larger carriers analyzed in that study. This happened only after some time, however. The years of the transition to deregulation seemed initially to entail more systematic risk.

during the 23 years before deregulation: the average for both periods is 6.6 per cent. Second, that average return on investment is remarkably close to the average return on investment in the U. S. corporate sector. The recent work of Schmalensee finds a net, after-tax return on debt plus equity capital of 5.93 per cent for the U. S. corporate sector for the 1953-83 period.[46] Obviously, there are errors and comparability problems with accounting data such as this. Nevertheless, it is difficult to believe that the return on investment earned by the U. S. airline industry, either before or after deregulation, contains a very large monopoly rent component (if there is one at all). Such a return on investment is certainly consistent with a workably competitive market.

It is of course possible that some U. S. airlines do earn super-competitive rents. It is also possible that in 1988 and 1989, after mergers and with aircraft in short supply, returns on investment in the industry are higher. Although full data for 1988 were not ready as this was written, nevertheless, data for the most profitable large airlines from 1988 suggest that their return on investment is still below that of equivalently large firms in other parts of the unregulated economy.[47] Also, as Table 3 shows, 1988 was not an exceptionally profitable year for most large carriers compared with equivalent points in the business cycle over the past.

E. Productivity change

There have been several studies of the effects of airline deregulation on productivity in the industry, and they all suggest that deregulation has had a strong, salutary effect.[48] Perhaps the most revealing of these studies is that of Caves, Christensen, Tretheway, and Windle (1987). They provide the most theoretically elaborate study of productivity change in airlines to date, and they compare productivity improvement in the U. S. during the five years following deregulation with equivalent

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[46] Schmalensee (1989, p. 340). The figure of Schmalensee most nearly comparable to the Air Transport Association figures is labeled by him as r_3 in Table 1.

[47] In 1988, two of the most profitable large airlines, American and Delta, earned returns of 14.5 and 13.7 per cent on equity respectively (United's return in 1988 was distorted by the sale of the Westin Hotel chain). USAir and Northwest both earned returns below 10 per cent on equity. See Fortune 119 (June 5, 1989), pp. 382-383. It is worth noting that the average return for Fortune 500 firms in retail trade (generally thought of as a competitive industry not in need of regulation) in 1988 was 16.3 per cent, which was larger than that of either American or Delta.

[48] See Bailey, Graham, and Kaplan (1985) and Meyer and Oster (1987). Kahn (1988a) also provides some interesting evidence on this count.

productivity change in airlines of other countries during the same period. They conclude (1987, p. 299) that productivity among U. S. carriers occurred at a significantly faster rate than it did in foreign countries. If indeed this difference is due to deregulation in the U. S. (and there is good reason to believe that it is), then their results imply that factor productivity growth in U. S. airlines would have been only 1.8 per cent per year under regulation, rather than the 3.6 per cent number actually observed. Thus, the rate of productivity growth in U. S. airlines during the 1978-83 period may well have doubled as a result of airline deregulation. Independent evidence of these effects in productivity is found by Saunders (1987), who finds that the more flexible internal organizations of firms entering the airline market after deregulation allow for substantially lower costs and higher labor productivity than were previously feasible.

F. Deregulation and income distribution

There have been no precise studies of the effects of airline deregulation on income distribution in the U. S. economy, but a few (somewhat speculative) comments are possible.

First, we have already presented evidence that airline employees earning very high wages before deregulation may have lost something from it. On the other hand, it would appear that airline investors, so far, have fared reasonably well from airline deregulation.

Second, among travelers, it is possible that the most affluent business travelers (those going first class) may have lost from airline deregulation.

Third, it is very likely that lower-income travelers have gained from air deregulation. In the not-too-distant past, air travel was a distinctly luxury good, out of reach for many consumers.

To the extent that airline deregulation has reduced fares, it has brought air travel within the reach of many more people than was previously the case.[49]

For this reason, it is quite likely that airline deregulation has had a progressive effect on income distribution in the United States.

[49] As recently as 1971, half of all Americans had never flown. By 1988, only 25 per cent had never done so. Lublich (1989, p. 84).

V. Policy Problems Posed by U. S. Airline Deregulation

From the evidence presented so far, the reader might conclude that airline deregulation has had no adverse effects, and presents no current policy problems in the U. S. One might even conclude that if it were to be done again, the present writer would admit to no mistakes having been made, and would suggest that everything be done precisely the way it was.

Such inferences would be inaccurate. We now turn to some adverse effects of airline deregulation, and to some policy problems which have occurred, at least partially as a result of it.

Specifically, we consider three sets of problems: those relating to mergers, to competitive trade practices (i.e., travel agents, reservations systems, and frequent flyer programs), and to airport and airways capacity.

A. Mergers

In the years since air deregulation occurred, mergers have perhaps been a source of more controversy than any other aspect of public policy towards airlines. Proponents of contestability have argued that, in the absence of any artificial barriers to entry (such as limited airport slots), the threat of entry into airline markets should keep fares at efficient levels. Therefore, if mergers have any benefits (such as improved service through network integration), then they should be allowed.

Opponents of mergers have argued that airline markets are not contestable, that there is a positive correlation between concentration and fares in those markets, and that mergers which increase the control of hub by a particular airline will have especially serious effects by way of higher fares.

The U. S. Department of Transportation has approved a number of mergers, including some which, it is widely believed by many observers, have increased the market power of major carriers at some hubs (these mergers include TWA-Ozark and Northwest-Republic, in particular).

Given the arguments made in the present paper that airline markets fall well short of perfect contestability, it would seem to follow that the most desirable policy would be one of preventing mergers with any possible anticompetitive effects, except in

the cases of failing firms. The present author has indeed made arguments to exactly that effect, starting back in the early period of deregulation (Keeler and Abrahams, 1981). It would seem to follow from that, as well, that it was a mistake on the part of the U. S. Department of Transportation to have allowed mergers which increased concentration in some markets and in some hubs.

The appendix to this paper contains a more detailed summary and evaluation of U. S. airline merger policy since deregulation. We state only our broad conclusions here.

The permissive policies the U. S. government had towards airline mergers probably did have some adverse effects on market performance in airlines, but, as is argued in the appendix to this paper, such effects appear to be quite small. If this permissive policy was a mistake, it was not a large one.

On the other hand, it would appear to be an unwise idea to allow yet more mergers among large, healthy U. S. airlines. As the number of carriers operating in trunk airline markets in the U. S. has decreased from mergers over the past few years, it has become more important (in the opinion of this writer) that the trend towards further mergers be stopped.[50]

B. Anticompetitive practices

Reservations systems. A significant fraction of the total space reservations on U. S. airlines are booked through the systems of the dominant airlines, Sabre, owned by American, and Apollo, owned by United. Travel agents generally only subscribe to only one reservations system, a majority of travel agents subscribe to either Sabre or Apollo.

Rival airlines claim (with some evident justification) that there are biases in the systems which cause travel agents to give preference to the airline that owns their reservations system. This bias was originally thought to stem from the preferential listing that airline reservations systems gave to their own flights, but that problem has been eliminated.

Another problem stems with the difficulty travel agents have switching away from dominant airlines' systems: the contracts which the airlines require make switching very difficult and unprofitable.

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[50]This overall opinion is consistent with that expressed in Levine (1987) and Morrison and Winston (1988) though some of the reasoning behind it is different. See the appendix for an elaboration of this point.

The extent of the anticompetitive problem caused by airline reservations systems remains a subject of considerable debate, and it is difficult to provide a definitive conclusion, given that fact.

Nevertheless, it is reasonable to ask whether society gains in a significant way from the ownership of reservations systems by the largest airlines. If research clearly cannot document such gains, what (if any) good reasons are there not to require divestiture and separate ownership of reservations systems relative to airlines? If such gains cannot be documented clearly, society would seem to gain from the benefits in fare competition which such divestiture would allow.

Predatory practices. There are other competitive practices in the industry, the effects of which require more research. If a small airline enters a market, and a large firm sharply expands capacity against that small firm, forcing that small firm to leave, it could represent predatory behavior, even if it were not predatory pricing. But does predatory capacity-dumping exist in the airline industry? If so, are there antitrust policies which can prevent it without stifling market forces? No one to date has come up with strong proposals in this area, but it would seem to justify further research. Similarly, in the area of pricing, if an incumbent airline reduces its fares down below the fares of a new entrant, despite the fact that the incumbent has higher costs than does the new entrant, does that constitute predation? As Levine (1987) states, this is a serious problem, but there appear to be no policies yet devised to deal with that predation for which the cure is not worse than the disease. Research in this area would also appear to be justified.

Frequent flyer programs. Another market practice which large airlines use to impose entry barriers is the practice of frequent flyer programs. Incumbent airlines can generate brand loyalty through them, making frequent flyers reluctant to switch carriers for fear of giving up these benefits. And, though small airlines can certainly band together to form large route networks in these programs, nevertheless, large carriers with large route networks would seem to have an inherent advantage here.

To reduce these entry barriers, some observers, including Levine (1987), Borenstein (1988), and Morrison and Winston (1989) have suggested taxing frequent flyer benefits as income. There are problems with this, however.[51] Those travelers who build up frequent flyer miles for personal and pleasure travel should not be taxed on

[51] These problems are consistent with those cited by Levine (1987).

them, because for these travelers, frequent flyer miles represent a price cut (a quantity discount of a sort offered by many retailers), rather than increased income. It is only frequent flyer miles awarded for business travel which are arguably untaxed compensation from an employer, and separating the two for each tax return could pose practical problems. These problems become greater when one takes account of the fact that the reward structure of frequent flyer programs is nonlinear, so that for passengers who travel for both business and pleasure in a given year, it is difficult indeed to separate the benefits from the two types of travel. So it is not now clear that taxation of frequent flyer benefits represents a fair and viable policy alternative.

C. Airports and Airways

Advocates of airline deregulation in the U. S. failed to anticipate the effects of deregulation on the demand for air services. Indeed, some of the most important analysts of these issues in the 1970s thought that deregulation would reduce the number of flights provided, rather than increasing it.[52]

Partly as a result of that, but partly, as well, because of conflicting political goals and environmental concerns, capacity of the airport and airways program was not expanded to meet demand. The problem was compounded by President Reagan's 1981 decision to fire striking air traffic controllers, and compounded further by the budget deficits coming as a result of tax cuts in the early 1980s.[53]

The combination of growth of commercial aviation and limited capacity have produced air travel delays which have increased compared with the ones in the late 1970s, and, apparently, there are some who believe that this is a failing of deregulation.

For people who hold this view, however, it is easy to forget that there were also times during the long periods of regulation in which air traffic delays were a problem.

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[52] Douglas and Miller, 1974, pp. 176-177. Not all analysts agreed, however. Keeler, 1978, Appendix, argues that deregulation would very likely increase frequency, rather than decreasing it, as Douglas and Miller argue. And Kahn (comments included in Morrison and Winston, 1989, p. 120) notes that by 1978, he was, as Chair of the Civil Aeronautics Board, arguing strongly better pricing and investment policies for airport and airways capacity.

[53] Expenditures for projects (in airports and airways) is supported by the Federal ticket tax, and supposedly earmarked for use for airports and airways. However, administrative problems at the FAA, combined with a need for some expedient way of reducing the Federal deficit on the part of Congress, have caused the trust fund formed by this ticket tax to go largely unspent for a long period of time. See, for example, Morrison and Winston (1989).

Specifically, in the late 1960s and early 1970s, especially in the Northeast, delays represented a very serious problem.

As an example, in the early 1960s, the typical jet flight (to the extent they were operated) between New York (La Guardia) and Washington (National) was scheduled to take 45 minutes. By 1968, because of congestion delays, it took an hour or more. By 1971, the same flight took only 45 minutes, because the FAA improved the air traffic control system, and because private aircraft were discouraged from using large New York airports. Now, the typical New York-Washington flight is scheduled to take an hour (or slightly more) again, worse than 1971, but much the same as in 1968.[54] So travel delays may come about on a cyclical basis, more independent of deregulation than it might first seem.[55]

In addition to problems of delays, lack of airport capacity has posed problems for competition, especially at certain airports used to full capacity and facing restrictions on the number of takeoff and landing slots (such as La Guardia in New York and National in Washington). In these situations, it is difficult or impossible for new competitors to enter markets, though there has been some experimentation allowing airlines to sell landing slots to each other.

This problem is compounded when incumbent airlines hoard unused landing slots as a part of a strategy to exclude new entrants.[56] This is probably a reason why smaller, new-entrant airlines often develop service from satellite airports undeveloped by the majors (such as Midway from Midway Airport in Chicago, Southwest from Dallas Love, Houston Hobby, and Detroit City Airport, etc.) Satellite airports do not totally solve this sort of problem, but they clearly help competition in a slot-controlled area.[57]

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[54]These times are gleaned from the Official Airline Guides for the relevant years.

[55]Morrison and Winston (1989) rightly point out that if deregulation increased the number of flights it exacerbated the problem. But they may have overstated the amount by which that happened: they state that deregulation increased passengers by about 25 per cent, and base their estimates of the effects of deregulation on delays on that figures. But the number of passengers per plane went up quite substantially from deregulation (smaller first class compartments, higher-density coach seating, and higher load factors all played a role) so the assumption that the number of flights went up by 25 per cent may have exaggerated the effects of deregulation. Morrison and Winston may to some extent have compensated for this, however, because they believe that 25 per cent is a conservative estimate of the rise in traffic from deregulation.

[56]Levine (1987) provides a detailed discussion, both of this strategy and of anecdotal evidence of its use.

[57]Airlines in the United States have tried to use their bargaining power with airport authorities to prevent the development of satellite airports. The most blatant recent example involves USAir's condition of agreement relating to a new airport in the Pittsburgh area. USAir agreed to pay for gate space in a new airport only the airport authority would agree never to allow the old airport to be used by another carrier

It may be that airline deregulation, combined with the budgetary problems of the FAA and the firing of the striking controllers, have constituted poor management of the transition. But it is also worth pointing out that, even under a regulated environment, the industry experienced problems with bottlenecks and delays from time to time, and some observers would argue that the industry has done well to have as few problems as it has under deregulation.

This is not to deny that the situation could be improved considerably, first by proper pricing of airport capacity, and second, by construction of more airport capacity.[58] Indeed, the benefits of both alternatives appear to be substantial, and they would not have been negligible, even under regulation.[59] But, from the perspective of the present, it is difficult to see all the problems that would have occurred under regulation, at least if it were of the imperfect form which occurred in the U. S. before 1979.

VI. Conclusions and Lessons for Europe

Deregulated airline markets in the United States have worked exceedingly well in almost every dimension. Fares have fallen substantially in real terms for most travelers in most markets. Returns on investment have neither exceeded nor fallen short of competitive levels so far (on average over firms and time--certainly a sign of a workably competitive market). Service has improved, in the sense that frequencies and route networks provide increased convenience for most passengers, and the complaint rate has fallen. Productivity growth has accelerated. Safety has, so far, continued to improve along the same trends as before deregulation.

Academic observers may disagree as to whether to call airlines a competitive industry, a contestable oligopoly (in the aggregate, the return on investment is consistent with either of these), or a reasonably well-performing oligopoly with moderate entry barriers. The borders between these classifications are indeed not sharply drawn, and

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once the new one was opened. Research would be merited in appropriate legal and institutional policies to prevent this sort of behavior.

[58]The need for airport congestion pricing was well understood long before deregulation. See, for example, Levine (1969), Keeler (1970), Carlin and Park (1971), Morrison (1979, 1983), and, most recently, Morrison and Winston (1989). Morrison and Winston conclude that the potential benefits of airport pricing in the U. S. are in the range of over $2 billion per year. That is quite plausible.

[59]Morrison and Winston estimate that even under regulation, the benefits from proper airport pricing would be over $1 billion per year.

arguments can be made for each of them. But from the viewpoint of regulatory policy, the distinction is largely irrelevant. All three classifications suggest that competition is workable in airlines, and direct regulation of fares and firm entry is simply not necessary.

Intercity travel markets in Europe likely have even more competition than in the United States, in that many distances are shorter, and surface transportation (especially high-speed rail) may be more competitive in Europe with air than in the U. S.

Indeed, there is ample reason to conclude that airline deregulation in the United States has been a good experience. Whatever problems have occurred from it seem to be easily outweighed in benefits: fares are lower for the vast majority of all travelers. Service has, if anything, improved for most travelers, in that most people have more convenient schedules and connections to choose from than they would have had under regulation, and the complaint rate has fallen. Finally, at least under the first eleven years of deregulation, safety (as measured in fatalities per passenger-mile) not only did not deteriorate after deregulation, but it actually continued to improve along very nearly the same trend as under regulation.

Certainly, flights are somewhat more crowded than previously, and first class fares may have risen slightly. But these changes seem to reflect consumer preferences and the reality of the marketplace, rather than economic inefficiencies imposed by deregulation.

If (as has been argued here) the U. S. experience suggests that Europe, too, would be successful in deregulating airlines, it is reasonable to ask what lessons there might be to learn from the U. S. experience, to plan more effectively.

First, it makes sense to be cautious before approving mergers, especially mergers which grant airlines increased control of hubs.

Second, air deregulation is likely to increase the demand for airport and airways capacity, and plans to deal with that eventuality should be put in place.

Third, it appears that airline controls of reservations and ticketing systems can have a deleterious effect on competition, and there is much to be said for a policy under which ownership of reservations systems is separate from ownership of airlines.

Fourth, there is room for more research on the extent and appropriate policy towards predatory practices, whether they involve pricing or capacity expansion. Most observers in the United States presently believe that any possible remedies for this problem are worse than the problem itself, but more research would appear to be justified.

Of considerably more controversy was a larger and more substantial wave of mergers which hit in the mid-1980s, including United's purchase of Pan American's Pacific routes (1985), Northwest-Republic (1986), TWA-Ozark (1986), Texas Air's purchase of Eastern and People Express (which had just purchased Frontier (1986)), Delta-Western (1986), USAir-Pacific Southwest (1987), American-Air California (1987), and USAir-Piedmont (1987).

Although some economists consistently questioned the desirability of large-scale airline mergers except for failing firms (eg., Keeler and Abrahams, 1981) many economists, early on, believed in the doctrine of contestability, and it played a role in the acceptance of mergers on the part the Department of Transportation judges responsible for the decisions.[62] As evidence has come in calling contestability into question, policy-makers have also retreated from a pro-merger stance.[63]

It is appropriate, therefore, to ask whether the mergers which were allowed were a mistake, and under what circumstances mergers in the airline industry might make sense. The economics of the situation would seem to suggest two directions of thought about mergers.

First, there is considerable evidence that the "natural" structure of the airline industry entails a finite number of integrated (with hubs and spokes) nationwide airlines, perhaps five or six.[64] Although there may be some room for smaller, more specialized carriers, as well, the amount of such room may be finite. As a result, it is possible that, for an orderly transition to a more efficient structure of the airline industry, mergers are necessary.

Second, there is also evidence (consistent in the data from 1977, when airlines were first given significant fare flexibility through the latest available data in the 1980s) that there is a relationship between concentration and fares on a given route.[65] There is also strong evidence that domination of a hub by an airline results in higher fares in

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[62] For an example of an economist's view highly supportive of the contestability hypothesis for domestic U. S. routes, plus a discussion of some of the earlier decisions, see, for example, Fisher (1987).

[63] For a summary of some of the views in Washington to the effect that competition is inadequate in the airline industry, see, for example, Lublich (1989).

[64] See, the above discussion on the airline industry, Keeler and Abrahams (1981), and Levine (1987).

[65] See Keeler and Abrahams (1981), Bailey, Graham, and Kaplan (1985), Call and Keeler (1985), Hurdle, et. al., (1987), Morrison and Winston (1987), and Borenstein (1987).

and out of that hub than would otherwise prevail.[66] So mergers which result in increased concentration on any route, or which allow one carrier to further dominate a hub, will likely have consequences of higher fares for at least some passengers.

What policies should be pursued as a result of these considerations? One possible solution would be to deny mergers unless one of the firms was failing (as evidenced by financial losses), or unless there were overwhelming cost-saving or service-quality benefits from the merger which could not be achieved by internal expansion, and which indisputably outweighed any costs of the merger to consumers in the form of market power. Such a policy would assure the benefits of competition, while at the same time allowing any mergers whose efficiency benefits were demonstrably strong enough to significantly outweigh costs.

By such a criterion, how might one evaluate the recent wave of mergers? The acquisitions by Texas Air (People Express and Frontier; Eastern) appear to be justifiable on a failing firm basis. What of the remaining mergers?

The most complete study to date (Morrison and Winston, 1989, p. 80) estimates that these mergers have given airlines the market power to charge higher fares, with a cost to consumers from reduced competition of $423 million per year. On the other hand, this study finds these and other costs to consumers outweighed by benefits exceeding costs by about $70 million, including better connecting service, the ease calling a single carrier for most service needs for customers living in hub cities, and, most importantly, enhanced frequent flyer benefits from using larger single-carrier route networks (elimination of net frequent flyer benefits would change the net benefits of the mergers from $70 million to -$335 million).

Morrison and Winston study may have overestimated the benefits of these mergers, especially as relates to frequent flyer programs.[67] But even if the benefits were

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[66]This result was evident in Bailey, Graham, and Kaplan, 1985. Bailey and Williams (1988) point out its full implications for market power.

[67]Morrison and Winston's argument is this: frequent flyers get relatively few benefits from small airlines, because they allow the traveller to go relatively few places when cashing in. A merged airline offers many more places to go and many more opportunities to build up mileage than an unmerged one. To measure these benefits, Morrison and Winston include a variable in their travel demand equation (estimated in 1983 when frequent flyer programs were new and relatively few carriers had them) reflective of whether an airline has a frequent flyer program, and of the number of cities served. They can then infer the value of extra cities served in a single program, and they use these estimates the measure the benefits of these programs to consumers. This interesting procedure has a problem which probably causes Morrison and Winston to overestimate the benefits of frequent flyer programs from mergers. This stems from the fact that during the year that they estimated the benefits from the programs for (1983), airlines operated in their frequent flyer programs on a solo basis, so that their system sizes did indeed reflect the value consumers were willing to

zero (including net benefits to frequent flyers), the costs of reduced competition, by these calculations, would be on the order of magnitude of only 1 per cent of total domestic U. S. scheduled airline revenues.[68] So, especially if these mergers have any benefits at all (and one would certainly expect them to have some benefits), their net cost to society was not very large.

These mergers, then, were not large policy mistakes, but rather, at most, small ones. This is true not only because of their small net cost to society, but also because, in some of the markets in which mergers have caused the worst fare increases, there has indeed been entry of new (and often low-cost) firms, in turn lowering fares.

Consider the St. Louis hub, which TWA dominates strongly as a result of its merger with Ozark. Southwest Airlines, a low-cost, low-fare carrier, has expanded its service in this hub over the past several years, and there is reason to believe that it will (perhaps rather slowly and quietly) continue to do so. Similarly, when USAir and American (traditionally high-fare oligopolists when their dominate routes) took over from PSA and AirCal (which had perhaps decaying traditions of charging low fares in California), the fare between Los Angeles and San Francisco rose significantly (though this fare increase is more the result of airline policies than of shifts in concentration). Recently, however, Southwest Airlines has entered that route at much lower fares, as well. As of this writing it was still too soon to tell whether Southwest would find it profitable to stay on this route, because other airlines have matched its fares, and some airlines seem to be expanding expand their capacity in hopes of chasing Southwest out. Nevertheless, it is clear that, despite the fact that mergers and bankruptcies have

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pay for larger systems. By 1986-87, however (the years of the mergers), however, most smaller airlines had joined much larger ones (or in consortia of smaller ones) in partnership for their frequent flyer programs, and, as a result, the benefits of using large airlines were much smaller than they were in 1983. To illustrate, let us take the example of Pacific Southwest Airlines, which was bought by USAir in 1987. PSA was a relatively small airline in 1987, and it would appear, based on Morrison and Winston's assumptions and simulations, that travellers on PSA would get significant benefits from PSA being taken over by USAir, which served many more cities in a different part of the U. S. from PSA. Yet by 1987, PSA had been a partner in TWA's frequent flyer program, with access to mileage and benefits for all the cities served by TWA and its partners. When the merger occurred, travellers were no longer able to take advantage of this TWA partnership. It is not clear in this case that PSA travellers gained much at all from the USAir-PSA merger, Morrison and Winston's calculations to the contrary. Similarly, before its merger with American, AirCal was partners with Northwest Orient Airlines and others. It may be that there is some benefit to shifting from Northwest and its partners to American in a frequent flyer program, but the incremental benefits would seem to be less than Morrison and Winston calculate.

[68] For the year ending June 30, 1988, total revenues from regularly-scheduled domestic U. S. air service were between $47 and $48 billion per year. See U. S. Department of Transportation, Monthly Report on Carrier Operating Statistics, June, 1988.

eliminated many potential carriers from U. S. routes over the past half dozen years, nevertheless, the possibility for entry of new routes by existing carriers is still there, and that should play a role in mitigating the anticompetitive effects of mergers which have been allowed.

In conclusion, there is much to be said for a "go slow" policy towards airline mergers in a deregulated environment, but it would appear that mergers, even on a level allowed so far in the United States, have come nowhere near eliminating the benefits of deregulation.

Table 1. Trends in Airfares, 1968-87

Year	Nominal values (cents/mi.)		Real values (1967 cents/mi.)		Percent[a] Going at Discounts (Per cent)	Average Amount[a] of Discount
	Economy Yield	Total Yield	Economy Yield	Total Yield		
1968	5.1	5.6	4.9	5.4		
1969	5.3	5.8	4.8	5.3		
1970	5.5	6.0	4.7	5.2		
1971	5.8	6.3	4.8	5.2		
1972	5.9	6.4	4.7	5.1		
1973	6.1	6.6	4.6	5.0		
1974	6.9	7.5	4.7	5.1		
1975	7.1	7.7	4.4	4.8		
1976	7.5	8.2	4.4	4.8		
1977	7.7	8.4	4.2	4.6		
1978	7.8	8.5	4.0	4.4		
1979	8.3	8.9	3.8	4.1		
1980	10.8	11.5	4.4	4.7		
1981	12.2	12.8	4.5	4.7	71	46
1982	11.7	12.2	4.0	4.2	78	46
1983	11.4	12.0	3.8	4.0	82	48
1984	12.2	12.7	3.9	4.1	81	51
1985	11.3	12.2	3.5	3.8	85	56
1986	10.7	11.0	3.3	3.3	90	61
1987	11.0	11.3	3.2	3.3	91	62

[a] On major carriers.

Source: U. S. Air Transport Association: Air Transport, various years.

Table 2. Trends in Return on Investment, All U. S. Airlines

Year	Return on Invested Capital (Per cent)
1987	7.3
1986	4.9
1985	9.6
1984	9.9
1983	6.0
1982	2.1
1981	4.7
1980	5.3
1979	6.5
1978	13.3
1977	10.2
1976	8.0
1975	2.5
1974	6.4
1973	5.1
1972	4.9
1971	3.5
1970	1.2
1969	3.3
1968	4.9
1967	7.6
1966	11.0
Average,	
1979-87	6.3
1966-78	6.3

Source: Same as Table 1.

Table 3. Returns on Equity--Major Airlines, 1968-88 (Per cent)

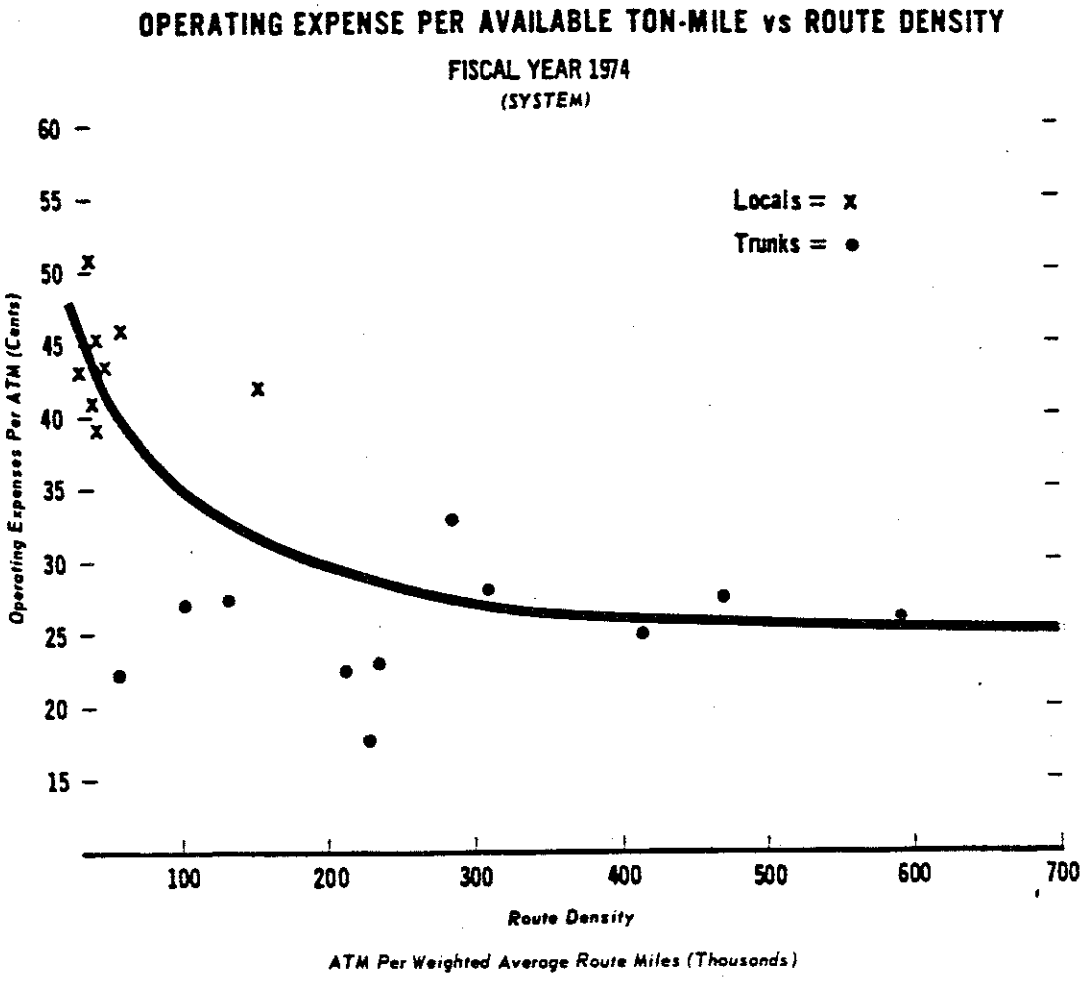
Year	American	Delta	Northwest	United	USAir
1988	14.5	13.9	8.3	91.7[a]	8.0
1987	7.4	13.6	6.8	-0.1	10.3
1986	11.2	3.6	7.0	0.5	9.3
1985	15.9	20.1	7.7	3.1	12.3
1984	15.5	16.8	9.7	15.9	16.6
1983	17.6	-9.7	5.9	10.2	13.2
1982	-2.4	-2.1	0.6	1.0	13.0
1981	2.3	14.0	1.3	-6.5	14.7
1980	-21.9	10.1	0.8	-1.8	27.0
1979	11.3	16.1	8.6	-6.4	19.9
1978	19.1	17.8	7.8	25.7	19.7
1977	10.2	14.8	12.4	10.1	18.8
1976	9.2	12.9	7.8	2.4	6.6
1975	-3.9	10.2	6.9	-0.7	-17.7
1974	3.6	20.5	11.0	12.7	0.7
1973	-8.9	18.1	9.7	7.1	8.8
1972	1.0	13.2	3.7	3.0	8.7
1971	0.5	10.6	4.4	-0.8	-5.9
1970	-7.2	17.1	9.5	-7.2	1.5
1969	9.7	17.2	12.2	7.7	-40.8
1968	9.5	18.5	16.3	7.4	-20.9
Average,					
1979-88	7.1	9.6	5.7	4.2	14.4
1968-78	3.9	15.5	9.2	6.1	-1.9

Results are for the holding companies controlling the airlines. For American and United, holding companies are involved in some additional businesses.'

[a]United's results are distorted by the sale of the Westin Hotel Chain in 1988.

Sources: Fortune 119 (June 5, 1989), pp. 382-383; Standard and Poor Stock Reports, 1988; Value Line, January 5, 1979.

FIGURE 1.



Source: Pulsifer, et. al. (1975, p. 105).

Acknowledgements

This paper was presented at the ESRC Seminar on Privatization and Deregulation of European Airlines, Oxford, UK, September 8, 1989. This work benefited from support from the Institute of Transportation Studies at the University of California, Berkeley. It has also benefited from the assistance of Melanie Mauldin and the comments of Marjorie Nathanson Keeler, Philip A. Viton, Michael Levine, and Clifford Winston. This paper is forthcoming in a volume edited by Kenneth Button, published by Macmillan, 1990.

AIRLINE DEREGULATION AND MARKET PERFORMANCE: THE ECONOMIC BASIS FOR REGULATORY REFORM AND LESSONS FROM THE U. S. EXPERIENCE

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July 27, 1989; Revised October 6, 1989

I. Introduction

Ever since airline deregulation was first proposed for the United States, it has been the cause of controversy. Proponents have seen little but benefits from it, yet opponents have found much to criticize about it. The purpose of this paper is to survey the evidence from the United States with the following set of questions in mind:

First, what were the analytical motivations for passenger airline deregulation[1] in the United States, as expressed by its advocates before it occurred? This question is of more than historical interest, because the issues that were relevant to the issues that were relevant to the decision to deregulate in the United States are still relevant in Western Europe today. To the extent that conceptual advances in economics have changed arguments affecting air deregulation, such changes should obviously be considered, also.

Second, to what extent has airline deregulation met the expectations of its advocates in the United States over the past eleven years? Whatever theoretical motivations there may be for airline deregulation, the proof is in the degree of success of the outcome. To the extent that airline deregulation has failed to live up to the expectations of its advocates, is that due to deregulation itself, or to extraneous factors?

Third, what (if any) unanticipated policy problems have occurred in the United States as a result of air deregulation, and, to the extent that they have happened, what lessons can be learned for those who would deregulate elsewhere?

Fourth, what are the implications of all this evidence for airline deregulation in Western Europe? Should it be done, and, if it is, are there specific policies needed to avoid potential pitfalls, such as those experienced in the U. S.?

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[1]This paper does not consider the effects of deregulation on air cargo transportation, though the evidence there also suggests that the reform has been successful. See, for example, Carron (1981).

Finally, what are the implications of all these matters for future research in the economics of air transportation?

In line with these questions, the next section of this paper (section II) discusses the conceptual motivations for airline deregulation in the United States, both as it was originally conceived and as it has been subsequently revised with both experience and conceptual improvements in economics over the past decade. The third section discusses some of the prior concerns which skeptics had about airline deregulation.

Section IV reviews the evidence on the economic effects of the Airline Deregulation Act of 1978, as it relates to a variety of economic and social criteria, including fares, service quality, service to small communities, factor use and returns, and, finally, the question as to whether air deregulation has met the expectations, theoretical and practical, of its advocates.

The fifth section of the paper addresses current policy problems faced under deregulation, including airports and airways, safety regulation, and antitrust policy.

The final section summarizes the evidence compiled through the paper, discusses its implications for policy in Western Europe, and suggests directions for further research.

II. Industry Structure and the Motivation for Airline Deregulation

As all students of microeconomic theory know, there are several reasons why markets can fail, thereby requiring regulation.[2] They include natural monopoly, externalities, immobility of factor markets, imperfect information, a belief on the part of the policymaker that consumer sovereignty does not apply, or issues relating to income distribution and macroeconomic stabilization which the free market fails to take account of. Some of these reasons (especially imperfect information and externalities) remain a motivation for regulation of air safety in the U. S., and will likely remain a motivation for some regulation in Europe in 1992. In our discussion of the desirability of airline deregulation, our emphasis will be on those sources of market failure in most discussions of classic economic regulation (i.e., of rates and entry): these include issues of natural monopoly and factor mobility (i.e., ease of entry and sunk costs). We shall, however,

[2]For a summary of possible reasons for market failure, see Francis Bator (1958). For a discussion, specifically, of the economic considerations of market failure which might lead to the sort of regulation applied to transportation and public utilities, see Kahn (1970, pp. 11-12).

also discuss the relationship between economic regulation and safety, a topic of some controversy since air deregulation in the United States.

In attempting to evaluate the viability of competition or regulation in an industry, economic theorists often consider the extreme cases of high levels of efficiency achievable by a perfectly competitive market, or by an omniscient regulator dedicated completely to the goal of economic efficiency. This is of course unlikely to reflect the true realities facing policy-makers. In many industries, competition is considerably less than perfect, and, based on available evidence, regulators are often unwilling or unable to pursue the goal of economic efficiency to the exclusion of other goals.[3]

The real question facing policymakers, then, is what level of performance can be practically achieved by the marketplace or by regulation.[4] Some years back, J. M. Clark (1940) made this point by noting that competition is workable in an industry, provided that the free marketplace can achieve a level of efficiency at least as high as can be practically achieved by any form of government ownership or control. By this criterion, which is the relevant one here, deregulation is appropriate as long as competition is workable. With this as a criterion, it should be quite evident that the question as to whether an industry should be regulated cannot be resolved in a theoretical vacuum: the answer will most likely hinge on a combination of theoretical arguments and empirical evidence.

Consistent with this, our goal is to analyze (theoretically and empirically) the structure of the airline industry (i.e., the extent to which it is monopolistic or competitive, and how easy entry is). Arguments made by original advocates of deregulation in the 1960s and 1970s are relevant here, as are more recent empirical and empirical and theoretical developments.

It is worth noting, then, that the evidence considered in this section is of three types: first, theoretical discussion of the structure of the airline industry and its likely impact on the workability of competition; second, empirical evidence on the structure of the airline industry both before and after 1978; and, finally, the likely implications of this

[3] For discussions of the motivations of regulators, see, for example, Stigler (1971), Peltzman (1976), Becker (1983), and Keeler (1984).

[4] This viewpoint is consistent with that advanced by Levine (1987) though he does not relate it to the concept of workable competition.

structure for performance after deregulation.[5] Performance after deregulation is discussed separately in Section IV, below.

In analyzing the workability of competition in the airline industry, we shall work largely in the framework of the "structure-conduct-performance" paradigm of industrial organization (with some revisions to account for more recent developments in industrial organization).[6] By this paradigm, if the structure of an industry is sufficiently competitive (i.e., not naturally monopolistic) the performance should also be good in terms of economic efficiency. The reader may object to this that there is reason to be skeptical of the structure-conduct-performance paradigm; yet, as relates to airline deregulation, skeptics should find this framework adequate, for if airline deregulation makes sense from this viewpoint, which has a more stringent test for a laissez-faire policy than a free-market approach, then a fortiori, it also makes sense from the viewpoint of a free-market advocate who is skeptical of the structure-conduct-performance paradigm.[7]

So the first question we are concerned with is whether the airline industry is a natural monopoly. It is to that which we now turn.

A. Scale economies and the potential for natural monopoly

For a long time, economists have been aware that industries with high levels of scale economies relative to the size of the demand curve are quite possibly natural monopolies. The idea here (in the simple, single-product case) is that if the average cost curve is falling when it hits the demand curve for a product, it is clearly less costly to society for one firm to be producing the product than for two or more to be doing so.

In the case of airlines, much evidence has been found to indicate that large airlines have costs no lower than smaller ones (see, for example, Caves, 1962 and

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[5]This discussion of likely implications of structure for conduct and performance occasionally necessitates bringing in evidence regarding conduct and performance, especially before 1978. It is a weakness of the structure-conduct-performance paradigm (and the subsequent attempts at its modernization) that it is difficult to compartmentalize the discussion completely.

[6]This paradigm is set forth in many books on industrial organization. For example, see Boon (1956) and Waterson (1984).

[7]That is, most free-market advocates, such as Brozen (1982), would argue that free-market policies are justified in much more highly-concentrated industries than the structure-conduct-performance paradigm would suggest.

Keeler, 1972).

This evidence of lack of scale economies in airlines was initially cited as indicating that airline markets are naturally competitive. However, before deregulation occurred, some observers came to understand that because scale economies are defined with respect to a market, the lack of correlation between costs and airline size was not in itself evidence that there was no natural monopoly in airlines (Keeler, 1978, Keeler and Abrahams, 1981). To see this point in clearer detail, we must take an analytical look at costs for a single airline market.

Scale economies in a simple airline market. As in most real world attempts to define markets, they can be difficult to define in the case of airlines. Nevertheless, the simplest definition of a market in airline services is both useful and, to a certain degree, realistic (our analysis will be further modified to reflect greater realism later).

For the moment, let us consider a market in air transportation to be for nonstop service between two cities (say Paris and London). Regarding scale economies, then, the question is whether costs per passenger for an airline rise or fall as the airline increases the flow of passengers it accommodates between those two cities. Clearly, if one airline can accommodate all the traffic between the two cities more cheaply than can any combination of two or more airlines (holding service quality constant), then we can think of the route (in this simplified case) as being a natural monopoly.

The economies of scale we are considering here are often called economies of density, and they cannot be measured simply by plotting a (multi-route) firm's total output (or traffic accommodated) against average costs (clearly, total traffic accommodated and total accommodated on a particular route, or even on an average route, are different concepts).

What, then, is the evidence regarding economies of density in airlines? We first consider a priori engineering evidence. Technically, engineers have often argued that larger aircraft indeed have lower costs per seat-mile (for a given length of haul) than do smaller aircraft. Thus, as the number of passengers on a route increased, we should expect the average aircraft size to increase (holding frequency constant, or perhaps increasing it), which would in turn cause costs to fall. This would suggest that there are economies of density in air transportation.

There are, however, limits to this process: the structural integrity of the aircraft and the runway length of the airports (which must longer the larger the aircraft) place limits on the extent of these scale economies. Also, at least as they are generally

engineered, large, heavy aircraft have high take-off costs which make them ill-suited for short hauls, which many low-density domestic routes tend to be. Additionally, at some level of crowding, the corridor on which the planes are flying will become congested, and congestion will drive costs up for all flights, resulting in decreasing returns to density.

How do these effects balance out? Graphic evidence from a Civil Aeronautics Board study from the mid-1970s is presented in Figure 1. It indicates that by as the route density of the typical "trunk" airline was reached, economies of density appeared to be exhausted (since that time, the CAB and the U. S. Department of Transportation have ceased to develop data on route densities, so similar graphs with more recent data are impossible to calculate).

Two recent pieces of evidence, in studies by Caves, Christensen, and Tretheway (1984), and by Gillen, Oum, and Tretheway (1985), indicate that economies of density may be greater than previous studies would indicate, so that the average route served by the average trunk airline around 1980 would have been subject to considerable economies of density.

However, the theoretical interpretation of Caves, Christensen, and Tretheway's results (and those of Gillen, Oum, and Tretheway, as well) is open to some question. It can be argued that when certain ambiguous econometric procedures are controlled for, their results are consistent with very few economies of density on the average trunk route in the U. S.[8] On the other hand, Gillen, Oum, and Tretheway's results indicate clearly that a large fraction of the thinner routes in Canada are subject to economies of density.

In any event, it should be evident from this that many routes which are in fact below average in density in the U. S. could be natural monopolies.

Empirical evidence supports this, although it also suggests that the extent of natural monopoly in U. S. airline markets is limited: as of 1988, only 11 per cent of passenger-miles traveled were in markets with only one carrier, compared with 22 per

[8]The problem with Caves, Christensen, and Tretheway's analysis is that they base their conclusion that there are economies of density on dummy variables allowing for different regression intercepts for each firm. It is argued that the different intercepts represent different route structures, and that the output coefficients represent costs of output holding route structure constant. The difficulty here is that the dummy variables could just as easily represent immobile factors, which would mean that the coefficients are in fact representative of short-run, rather than long-run costs. When CCT use a true density variable, cities served, rather than these mysterious dummies, they get a result much like those of other studies, of few if any economies of density for the typical trunk airline.

cent in 1979, just after deregulation; on the other hand, 20 per cent of passenger-miles
occur on routes with over four firms, compared with only 4 per cent in 1979 (Lublich, 1989, p. 84). This suggests that while natural monopoly exists in U. S. airline markets, its importance should not be overstated.

Nevertheless, it is worth asking whether such routes are sufficiently competitive to allow for a competitive (or near-competitive) market outcome. Before considering this question in more detail, it makes sense to consider, further, the question as to how the situation here is changed by the fact that airline markets are more complicated than simply single end-to-end routes. Specifically, we know that airline markets in reality involve rather intricately interconnected networks of service.

Scale economies in more realistic and complicated airline markets. Because there appear to be, to at least some degree, economies of density on a given airline route, it follows that it is not economical to offer nonstop service between all city-pairs served on an airline route network. Rather, traffic needs to be concentrated and channeled through corridors so as to concentrate it, offering two advantages: first, ability to realize economies of higher-density operation and second, ability to offer frequent service (it should be evident that these reasons are closely-interconnected, however: if there were no economies to concentrating traffic into relatively large planes, there would be great advantage to offering very high frequencies with arbitrarily small planes).

This need to concentrate traffic while still providing convenient service has resulted in the phenomenon of "hubbing," a process begun by U. S. airlines well before deregulation began, but which accelerated with the advent of deregulation.

Under this scheme, all flights converge on "hub" airports, usually large and centrally-located ones, allowing for convenient on-line transfers of passengers and baggage. This sort of network allows for both the exploitation of economies of traffic density described above, as well as frequent (connecting) service.

One might ask why it is necessary to have on-line (same airline) connections at a hub. Might it not be possible to have hubs served by several airlines, wherein interline connections are made? Most travelers would find it obvious that this is not so: on-line connections are usually much more convenient than interline ones: there is less distance between gates, a better chance of making the connection, a better chance of airline help if connections are missed, a better chance of baggage making the connection, and a

better chance of a low fare. This preference for on-line over interline connections is strongly confirmed by empirical evidence.[9]

This suggests that not only is the number of carriers on a given route limited by economies of density, but the number of carriers in a system may well be limited by a combination of economies of density and economies of route integration. The question then arises as to how many carriers can be accommodated in a national set of markets, such as the U. S. (or, for that matter, Western Europe). No one knows the to answer this. Keeler and Abrahams (1981) guessed that the total number would be somewhere between 5 and 10 carriers for the U. S., a number reasonably consistent with experience in the U. S. But it is impossible here to be very precise.

These economies of route integration can be thought of as "economies of scope" in the more current parlance of Baumol, Panzar, and Willig (1982), because, with these network-related economies, there are extra benefits to serving numerous city pairs (and hence providing several different products), all with one firm through one hub.

This would not seem to change any of our arguments about scale economies in air transportation, except as they affect ease of entry, which is, in turn, another important variable in determining the competitiveness (actual or potential) of airline markets. Clearly, if there is only a finite amount of room for carriers in a national market, and if hubbed networks take time to build and duplicate, this could impose a significant entry barrier in commercial air transport. It is to the topic of entry barriers that we now turn.

B. Conditions of entry into airline markets

There are really two questions we need to consider here (albeit very briefly, compared with the voluminous literature on the topic): first, what relationship can be expected to occur between ease of entry and performance in an industry, and, second, what are the implications of this possible relationship for airlines? To answer these questions requires a brief review of a large literature, starting some years ago.

Beginning at least with the work of Joe S. Boon in the 1950s, economists have been aware that the ease of entry into an industry has a strong impact on the

[9] See Carlton, Landes, and Posner (1980). It is, however, also possible that carriers can coordinate their activities at hubs in such a way as to make most of the conveniences mentioned here available. This happens now on a large scale between short-haul commuter carriers and large major carriers, often with the commuter carrier taking on a name similar to that of the major, such as United Express.

competitiveness of its outcome. Boon hypothesized that this is so because, with easy entry, even if an industry is relatively concentrated, established firms will be forced to set prices well below monopoly levels in order to forestall entry. Or, alternatively, they may well choose to set prices higher and earn temporary profits before entry occurs, but, under those circumstances, entry of firms will soon bring profits down.[10]

Boon tested his theoretical analysis by classifying manufacturing industries into three groups regarding entry barriers: high, substantial, and low to moderate (Boon, 1951, 1956). These classifications were based both on judgments as to the degree of product differentiation and empirical evidence as to the investment level needed to enter a given industry at minimum efficient scale. He found that, indeed, industries with high and moderate to substantial entry barriers earned higher returns on investment than did industries with low to moderate entry barriers. Furthermore, he found that, whereas increased concentration resulted in increased profits in industries with moderate to substantial barriers, there seemed to be no relationship between concentration and return on investment in industries with low to moderate entry barriers.

Since Boon, a large literature has developed, specifying (both theoretically and empirically) the relationship between various types of entry barriers on the one hand and firm pricing on the other.[11]

Of the newer theoretical models regarding the effects of entry barriers on prices, the contestability theory of William Baumol most requires more detailed consideration. By this theory, if entry and exit costs are zero, even a natural monopolist will be forced to set prices at zero-profit (competitive) levels. When a natural monopoly has these attributes, Baumol (1982) has labeled it a "contestable" market. Obviously, if a market is contestable, there is a compelling case for its deregulation, regardless of whether it is a natural monopoly.

The question we now wish to consider is, based on structural evidence, how easy is entry into the airline market, and what are the implications of this for competitiveness?

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[10] Many more sophisticated theories of oligopoly pricing under the threat of entry have been developed, though many have a flavor similar to Boon's. For a reasonably recent survey of these models, see Waterson (1984, Chapter 4).

[11] For a survey of theoretical models relating to these issues, see Waterson (1984, Chapter 4). For a survey of the empirical evidence, see his Chapter 10.

Views on this issue have tended to shift over time. To get some perspective on the evidence, we start with earlier studies. In his early and important analysis of the airline industry (one of the first to advocate deregulation), Caves (1962, Chapter 4) discussed the height of entry barriers for two different types of airline: one which duplicated the full, integrated route structure of what was then called a "trunk" airline (American, Delta, TWA, United, etc.), and another for a carrier entering a single route (i.e., such as one of the California Intrastate carriers which entered before nationwide deregulation, but which served only a single dense city-pair route, such as Los Angeles-San Francisco).

After analyzing capital requirements and product differentiation in the manner of Boon, Caves concluded that in a deregulated environment (i. e., without CAB restrictions on entry), entry barriers would be at least "substantial" for trunk carriers and "moderate" for smaller carriers serving only one or two city pairs.

In the end, Caves (1962, pp. 447-448) nevertheless advocated deregulation of airlines, because he argued that competition was just as workable there as in many other oligopolies in the U. S. economy.

Levine (1965) saw entry barriers as perhaps lower than did Caves, having looked at the California intrastate experience in more detail than did Caves.

Indeed, if one considers the writings of Jordan (1970), Keeler (1971, 1978), Eads (1975), and the U. S. Senate Committee of Administrative Practices and Procedures (1975; this was an important government study leading to deregulation), one finds a stronger and stronger view that entry into airline markets is easy, especially if one considers entry by existing firms on to new routes, as well as entry of totally new firms.

The wave of economists' consensus moved more and more towards a belief that entry into airline markets was easy. By the early 1980s, a group of economists went so far as to argue that airline markets were more or less nearly fully contestable, i.e., that the discipline of potential entry would exert just as strong a downward push on airline fares as would the actual entry of new firms.

Although deregulation had essentially occurred in full force before contestability theory was developed, nevertheless, contestability was used as a rationale for the speed with which airline routes were deregulated, and for the readiness of the U. S. Department of Transportation to grant airline mergers.[12]

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[12] For a discussion of these policy developments and the role of contestability in policies towards airlines see Levine (1987), pp. 403-405.

Since deregulation has occurred, however, the pendulum of academic sentiment has swung away from contestability, based both on theoretical arguments and empirical evidence. We shall consider empirical evidence in our analysis of the effects of U. S. airline deregulation. But we should summarize here the arguments, most thoroughly made by Michael Levine (1987) and based on some recent thinking in the field of industrial organization. This analysis is based on observations of the behavior of new entrants and incumbents under deregulation.

Levine argues that there are seven attributes of deregulated airline markets which raise entry barriers (and hence hinder contestability), which many advocates of air deregulation did not foresee. These include the following:

1. Costs on the part of airlines of communicating to travelers complex information regarding services and fares provided.

2. Economies of scope in making these communications and establishing a reputation (much akin to the old scale economies in advertising).

3. Costs of monitoring behavior of travel agents on the part of airlines, and costs of monitoring traveling employees on the parts of firms funding business travel.

4. Production indivisibilities in providing information to travel agents that cause a few computer reservations systems to dominate a nation's air travel network.

5. Information costs facing lenders which make them prefer established carriers (this has been cited in the "old industrial organization" literature as entry barriers from imperfect capital markets).

6. Airline behavior designed to raise rivals' costs or hinder their earning of revenue, such as the hoarding of unused slots at busy airports by established carriers with the intent of making survival difficult for new entrants.

7. High transactions costs between airlines and travel agents which make it costly for travel agents to switch frequently among the computer reservations systems they subscribe to.

Levine argues that most of the observed impediments to contestability in the deregulated airline industry stem from these factors in one way or another. However, he also concludes quite strongly that none of these barriers is strong enough to prevent competition from being workable in airlines. He in fact believes that none of these barriers is anywhere near strong enough to justify regulation of airlines in an environment such as the one in the United States. His argument is similar to that of Caves (though more sophisticated) in that he states that, although the airline industry is

a noncompetitive oligopoly with some entry barriers, the entry barriers are quite sufficiently low to make competition workable.

The most recent analysis of entry barriers is a 1988 study by Reiss and Spiller. In it, they develop a model of oligopoly behavior and an econometric model of airline entry and price competition in low-density markets. Variations of the model are based on Cournot and Bertrand behavior. They find that fixed costs are very small in a given low-density market, a result consistent with others surveyed here in that they imply low entry barriers, at least for existing firms on to new routes (Reiss and Spiller, 1988, p. 21).

We shall have more to say about these considerations in our own evaluation of the workability of competition in airlines, and in our discussion of ways in which to make deregulation work better, as well.

C. The Structure of the Airline Industry and the Appropriateness of Deregulation

Pre-deregulation arguments in the U. S. Although some observers viewed the deregulated airlines as potentially competitive,[13] others viewed the likely outcome as more oligopolistic.[14] But even to those who believed that the natural structure of the airline market was oligopolistic, the deregulated outcome appeared much better than did observed markets under regulation.

The point must therefore be made here that advocates of airline deregulation generally did not favor it for purely theoretical reasons: there was a clear awareness that in intrastate markets, where pricing and entry were free, airline fares were lower than they were on equivalent interstate routes, by as much as 50 per cent (but, more often, around 20-35 per cent).

More than that, there was evidence that even with regulated fares set above free-market levels, regulated trunk airlines were in general unable to earn an average return on investment above a competitive, average level for the corporate sector in the U. S.

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[13] Among those arguing for competitiveness were Levine (1965) and Keeler (1978). After deregulation occurred, the present writer shifted views (from observing airline markets) rather quickly--Keeler and Abrahams (1981) views the industry as an oligopoly.

[14] Caves (1962), Jordan (1970), and Kahn (1970, pp. 210-211) for example.

(see, for example, Keeler, 1971). This is despite the fact that the CAB was ready to grant a higher return than that to the carriers.

There was strong evidence that, despite high and regulated fares, the carriers dissipated excess rents through service quality competition (mainly adding frequency and capacity until profits were dissipated, much in the way that Bertrand competitors in an undifferentiated oligopoly dissipate their profits through price competition).[15] Certainly, there was an awareness that on more highly-concentrated routes, service competition was less and load factors were higher (see Eads, 1975). Furthermore, it was clear that some carriers, such as Delta and Northwest, were able to earn above-normal profits under regulation (see Table 3). But, as in many industries, such experiences seemed balanced by others which entailed lower-than normal profits.

It appears, then, that the airline industry is one in which, even under regulation, it was difficult for firms to coordinate service well enough to earn excess profits. This situation, incidentally, may have been different in other regulated environments, such as Western Europe, in which carriers have been allowed to collude on capacity as well as on fares.

In any event, in the face of this evidence in the U. S., there was a strong belief that, despite the fact that airline markets could be quite concentrated under deregulation, nevertheless, airlines were overall unable to coordinate their activities in either fares or service well enough to prevent competitive forces from working their effects on the airline markets. While some economists (especially Panzar, 1979, and Douglas and Miller, 1974) believed that in a non-collusive equilibrium, unregulated air carriers would offer "too high" a service quality, despite zero profits, there was nevertheless a consensus that the outcome of this process would be superior to the regulated markets existing at the time.

These beliefs on the part of earlier advocates of airline deregulation are supported by both theory and evidence developed since deregulation. More recent evidence indicates the existence of some entry barriers and market power, but the evidence is that both are relatively low and competition is workable.

Evidence on the workability of competition in the airline industry. We can now summarize the evidence which the literature (past and recent) suggests regarding the desirability of deregulation (but excluding evidence from the outcome in U. S. markets, which we discuss below).

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[15]This behavior was alluded to by Keyes (1949), Caves (1962), Jordan (1970), and Keeler (1972), but it was analyzed in most and clearest detail by Douglas and Miller (1974).

First, whatever the views might be on ease of entry into airline markets, there is a view that potential entry should play a role in affecting fares. This was true even before the concept of contestability was coined (see, for example, Keeler, 1978).

Second, close substitutes for air services should put downward pressure on fares, especially on the sort of low-density routes which could otherwise be natural monopolies. In the United States, this is true not only of bus and rail service, which provide competition for some passengers on some routes, but, most importantly, it is true of the private automobile, which has now controlled 80-90 per cent of the intercity passenger travel market for half a century, and which appears likely to continue to play that role into the foreseeable future.[16] For business travelers, the use of auto rentals is common, and certainly rental cars are a close substitute for taking connecting air service on the sort of relatively short-haul, low-density routes on which airlines are most likely to have a natural monopoly.

Third, the inability of the airlines themselves to coordinate service to keep profits at super-normal levels, despite regulation of fares that should have allowed that, was taken as strong evidence that airlines would be unable to behave as price-coordinating oligopolists; that evidence is supported by subsequent experience, as we shall see.

Fourth, in addition to low entry barriers, there are other structural reasons why airlines have difficulty coordinating prices. For example, in the very short run, marginal costs (i.e., of an extra passenger with seats there) are very low relative to average costs. Scherer (1980, pp. 205-212) has argued that such a divergence between short-run marginal and average costs makes price coordination difficult. Similarly, airlines may believe that if fare cuts are selective enough, they will not be matched. Paradoxically, as Scherer also points out (1980, pp. 222-225), this belief that cuts may not be matched often causes the breakdown of oligopolistic coordination, as well.

Fifth, evidence from intrastate routes suggests strongly that competitive forces should drive down fares compared with regulated levels. Even before deregulation, not all that evidence came from high-density routes. In Texas, Southwest Airlines charged very low fares (below regulated levels) even on low-density routes, such as Houston-Harlingen, where it had a monopoly.

Sixth, more recent observers of U. S. airlines have argued that there are indeed entry barriers, and that competition appears to fall short of perfect. But most who have

[16] See Crandall and Keeler (1987, section 2). In recent years (since deregulation), the share of airlines has risen at the expense of the auto. As of 1987, air transportation had a market share of 17.8 per cent of intercity passenger-miles, an all-time high.

observed the situation under deregulation in the U. S. nevertheless believe that airline competition is workable. The evidence behind this assertion regarding experience in the deregulated airline industry will be considered below. There are, however, some other concerns regarding the effects of deregulation which many observers have and which need to be addressed, and in other environments in which deregulation is being considered, these issues are likely to arise, as well. Before considering the post-deregulation evidence for the United States, we consider those matters.

III. Other concerns regarding airline deregulation

Two attributes of air transportation which it has been thought that deregulation may adversely affect are safety and service to small communities.

A. Safety

There are problems with externalities and imperfect information relating to safety, so the potential is clearly there for market failure. For that reason, very few advocates of deregulation favor elimination of safety regulations (i.e., certification for airworthiness of aircraft or training of pilots). Most emphatically favor strengthening inspection budgets in this area, in order to make sure that airlines (new entrants or those with financial problems, especially) were well-policed. Although some disagree with it, there is a sense among most observers that entry and rate deregulation should have no adverse effect on safety as long as regulation was done correctly in the safety sphere.

Again, the limited available evidence from markets in which new entrants were allowed (intrastate markets in California and Florida, and interstate charter carriers) supported this viewpoint regarding safety (post-deregulation results for the U. S. are considered below).

B. Service to small communities

An ostensible goal of regulation by the Civil Aeronautics Board was to assure service to a large network of cities, perhaps larger than the free marketplace would support. It used subsidies to achieve this goal, at least in part.

But one of the CAB's consistent policies was to try to force airlines to use profits earned on long-haul and high-density routes in order to cross-subsidize service on shorter-haul and low-density routes (Caves, 1962, pp. 267-269, 402-412).

There are two reasons why this policy has been viewed as a failure, at least as of the late 1960s and the 1970s, by economist observers. First, there is evidence that airlines tended to pull out of providing service if they were not fully compensated for it (Eads, 1971). This is only natural, because there is little reason to believe that they would willingly surrender profits. Second, on the long-haul and high-density routes which were to cross-subsidize the short-haul and low-density routes, service quality competition dissipated many of the profits meant for cross subsidy,[17] so it is not clear that there was much profit from these routes to do any cross subsidizing.

It is likely that there was still some cross subsidization in the years just before deregulation (Caves, 1962, pp. 402-411 provides evidence of this). If there were, then deregulation would indeed result in some increase in fares on lower-density routes. But it is difficult to view this elimination of cross subsidization as a bad thing, given its questionable basis in either economics or ethics.[18] The view, then, was that cross-subsidization could be occurring, but that it was unlikely to be much, it was likely to be at a high cost in inefficiency, and its ethical basis was in any event questionable.

We have now briefly summarized the motivations, theoretical and empirical, for airline deregulation in the United States. Our next goal is to review the actual evidence from the American experience.

IV. The U. S. Experience under Airline Deregulation

Much has been written about the U. S. experience under airline deregulation, and much more could be--it is impossible to all the details here. Rather, the goal will be to summarize the experience in the terms most important for the task at hand: what

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[17] For a summary of the evidence on this, see Keeler (1978).

[18] It could certainly be argued that subsidization low-density routes is a worthwhile social goal (the U. S. Department of Transportation maintains a modest program to do so subsequent to deregulation). But if society desires to provide such subsidies, it can be argued that the most efficient way to do so is through broad-based general revenues, rather than through internal subsidization, which taxes one good (high-density service) heavily in order to provide the subsidy. Moreover, Posner (1971) has argued that cross-subsidization is a form of fraud, because it appears to be a means of taxation which the public might not tolerate if it had to pay it directly.

lessons can be learned regarding the U. S. experience that are important for other countries contemplating similar reforms?[19]

Perhaps the most important question regarding the effects of airline deregulation is its effect on fares. We therefore discuss that issue first. The next question which follows naturally relates to the extent of contestability in the industry, and that issue is pursued next. Other issues relate to service quality (including service to small communities) and safety. Those issues are considered next. Finally, there are possibly policy problems in the U. S. relative to air deregulation which are unresolved, either because policy has not yet dealt with anticipated difficulties, or because new and unanticipated difficulties have emerged.

A. Deregulation and fares

Of all the aspects of airline service which concerned advocates of air deregulation, fares were the most important. There was a sense that, overall, deregulation would reduce fares. If it increased them on low-density routes, it was expected to more than offset that effect by reducing them on medium- and high-density routes (this expectation was elaborated above).

There are at least two ways in which deregulation might affect plane fares: it can affect the level of fares (overall yield per passenger-mile) and the structure (fares on long hauls, short hauls, high- and low-density routes, and in first class versus economy service). We now consider available empirical evidence on each of these effects. In each case, the studies cited have attempted to measure deregulated fares against estimates of what the regulated fare would have been,[20] had regulation persisted, and

[19]This survey was written before I had a chance to see the excellent surveys of the same issues by Kenneth Button (1989a, b). In many areas, this survey arrives at the same conclusion as Button's, but there are areas of difference, as in mergers.

[20]Most of the studies cited, including Bailey, Graham, and Kaplan (1985), Call and Keeler (1985), and Meyer and Oster (1987) use the Standard Industry Fare Level for their estimates of the regulated fare for a given city pair. It was necessary for the CAB (and later, the DOT) to continue calculating this regulated fare as a function of miles for purposes of regulation of fares on international routes, such as U. S.-Canada. Morrison and Winston (1986), on the other hand, calculate their own estimates of what the regulated fare would have been. But the stories told are quite consistent.

though their methods differ, the basic thrust of their conclusions is quite consistent across studies.

The level of fares under deregulation. With the advent of deregulation in 1978, the evidence is strong that the overall level of fares declined, first slowly and then more substantially.

One study found that by 1980, revenue yield on the top 100 routes was 15 per cent below what it would otherwise have been under regulation, and the cheapest unrestricted fare on these routes was, on average, nearly 20 per cent below what the regulated fare would have been; by 1981, the cheapest unrestricted fare was only 75 per cent of what the regulated fare would have been.[21] Another study estimates that, by 1984, overall revenue yield was 25 per cent below what it would otherwise have been under regulation.[22]

Previous studies of plane fares have concentrated on relatively early years of deregulation, 1981-84. Although a thorough study of the effects of deregulation on the level and structure of plane fares is beyond the scope of this work, nevertheless, a modest amount of direct evidence on plane fares can tell us much about the effects of deregulation on fares, both past and present. In presenting this evidence, we do not attempt a complete counterfactual analysis as the cited studies have done, but we do convert nominal fares to real terms to get roughly accurate comparisons over time.

Table 1 presents evidence on the behavior of nominal and real plane fare levels (revenue per passenger-mile, often called revenue yield) over the 1968-87 period. Evidence is presented for economy passengers only (85-95 per cent of the total over the period) and for all passengers.

Nominal values are converted to real ones through deflation by the consumer price index. This admittedly crude procedure, perhaps not reliable for analyzing small or short-term fluctuations in fares, should nevertheless provide insight as to at least orders of magnitude of long-term changes.

Although airline deregulation officially occurred with the Airline Deregulation Act of 1978, it is in 1977 that it began to have its first effects on fares, with the

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[21] Call and Keeler (1985), p. 233. This comparison is based on the standard industry fare level, a current estimate of the regulated fare, which continues to be calculated for purposes of regulating international fares. It has some shortcomings, discussed below, but it is a handy and reasonably accurate basis for comparison.

[22] This result is from Morrison and Winston (1986), as summarized by Morrison and Winston (1989, p. 29).

appointment of Alfred Kahn and others sympathetic to deregulation to the Civil Aeronautics Board. So 1976 is the last year in which fares might be thought to be independent of deregulation.

The results shown in Table 1 are illuminating. Note that the real coach yield fell slightly from 1968-76, from 4.9 cents per mile to 4.4 cents. This is probably the result of the Domestic Passenger Fare Investigation, which reduced coach fares in order to eliminate an observed cross-subsidy to first class.

From 1976 to 1987, on the other hand, the real fare fell sharply, from 4.4 cents to 3.2 cents. Furthermore, it is worth noting that a large part of this decline in real fares took place between 1984, when the last detailed fare studies cited here occurred, and 1987, after many mergers were allowed (more about them below). This implies that the studies cited here may have missed much of the fare reductions from deregulation.

These estimates are very much in line with what proponents of deregulation predicted would occur. If anything, these results are better than were hoped for, in that the yields discussed here are for overall fares, combining high- and low-density routes, rather than the savings achieved on high-density routes alone.

Clearly, the effects of deregulation on the structure of plane fares, as well as the level, are relevant, and it is to that topic that we now turn.

Deregulation and the structure of plane fares. Regarding the structure of plane fares, there were two predictions which early advocates of air deregulation made: first, that fares on high-density routes would be reduced more than fares on low-density routes (indeed, fares on low-density routes might increase) and that first class fares could actually rise in response to deregulation, because there was evidence that, at least before the full effects of the Domestic Passenger Fare Investigation had worked their way through in 1976, coach passengers were cross-subsidizing first class.[23] A third matter of fare structure worth considering is that of changes in restricted discount fares versus changes in unrestricted (i.e., no advance purchase or length-of-stay requirement) fares. Although there were some predictions regarding this, namely that new entrants coming in under deregulation would cut fares on an unrestricted basis, nevertheless, there was some ambiguity as to the likely outcome.

We turn first to the issue of general availability of discount fares. The Air Transport Association publishes annual information about the use of these fares, shown

[23] For examples of both predictions (relating to fare class and fare restrictions), see Keeler, 1972.

in Table 1. These figures provide evidence on the per cent of total passengers traveling at a "discount" fare, and the average amount off the published full fare that an average discount passenger paid.

This evidence is striking indeed, indicating that the per cent of passengers traveling at a discount on major carriers rose from 71 per cent in 1981 to 91 per cent in 1987, and the average amount of the discount rose from 46 per cent off the regular fare in 1981 to 62 per cent off in 1987. Given the number of people using them, many of these "discount" fares must have very few restrictions, despite their label. They also include unrestricted fares which are marked down from the official unrestricted fare, but offered on a capacity-controlled basis. It should be clear from these figures that in our analysis of "discount" versus "non-discount" travelers, we should give strongest weight to evidence for discount travelers, because in the late 1980s, they constitute the overwhelming majority of all travelers, for business and pleasure alike. With that in mind, we now consider further evidence on the structure of fares by route type.

Consistent with the evidence in Table 1, a recent study (Meyer and Oster, 1987, pp. 111-118) indicates that as of 1984, all routes did enjoy discount fares, and, although high-density routes enjoyed somewhat greater discounts than did low- and medium-density routes, travelers able to plan their trips ahead and stay a minimum amount of time benefitted substantially on all routes.

On the other hand, the picture as to the effects of air deregulation was different as to unrestricted fares. Several studies indicate that unrestricted coach fares fell, in some cases substantially, on the top 50 or so routes in density.[24] On the other hand, for the next 100 or so routes, fares seemed to rise from the regulated level (6 per cent or so) subsequent to deregulation, and on a sample of lower-density routes, those fares rose slightly more, (8 per cent or so; see Meyer and Oster, 1987, pp. 112-113).

Of these unrestricted fares, three comments are necessary. First, the increases on low-density routes were quite small. Second, as we have seen, given that 91 per cent of all travelers on major carriers in 1987 went at discount fares, the behavior of full fares even on these routes may be of limited interest. Third, compared with the fares that prevailed under all but the last two or so years of regulation, even these fares are lower. The reason for this is that the CAB's Domestic Passenger Fare Investigation of 1971 (which took full effect only in 1976) reduced coach fares in real terms by 20 per cent, to

[24] See Call and Keeler (1985, pp. 240-243) and Meyer and Oster (1987, pp. 111-118).

eliminate a cross subsidy that seemed to have occurred from coach to first class before that time.[25] On this basis, it can even be argued that, compared with practically all the years of regulation, coach fares fell on even the lower-density routes.

Viewed in this perspective, the outcome of deregulation would appear to be in line with the optimistic expectations of those who favored it: the rewards have been considerable and the disappointments have been few.

If there is one aspect of air fares under deregulation which did not meet expectations, it is the extent of seemingly discriminatory discount fares. The original intrastate airlines reduced their fares on a uniform, unrestricted basis, and, while this has indeed happened on high-density routes, many of the fare reductions from deregulation are available on a discount basis, with demand elasticity seeming to play a substantial role.[26]

There are a number of possible reasons for this. It is possible, for example, that the discriminatory fares are something akin to Ramsey prices, resulting from scale economies in the provision of airline services (Robert Frank, 1983). This is especially plausible on lower-density routes, on which economies of density are not exhausted.

It is possible, as well, that each carrier has some small amount of market power (something akin to monopolistic competition) because most flights leave at different times, and each one will have some market power attached to it, to the extent that other flights are not substitutes.[27] Certainly, the existence of this elasticity-based discrimination casts doubt on the belief that the airline industry is perfectly competitive (more about that as relates to factor payments, however). But, as we have seen, many advocates of air deregulation (including Caves and Jordan, for example) did not claim perfect competitiveness: their most important hope was that market performance under deregulation would be better than under regulation, and that result seems to be the case as regards fares. This brings us to the important question as to whether airline markets

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[25] For a discussion of the Domestic Passenger Fare Investigation, see Douglas and Miller (1974).

[26] The costs of computer memory and storage have fallen dramatically since the late 1960s and early 1970s, and that, in and of itself, has probably played an important role in the dramatic and unforeseen increase in the airlines' use of very sophisticated capacity management and fare adjustment strategies under deregulation.

[27] Borenstein (1985) presents a model showing that free entry and atomistic competition can produce such a result. Shephard (1989) finds empirical evidence that this sort of behavior has occurred in retail gasoline sales in the U. S. Earlier, Panzar (1979) developed a model embodying similar market power for each carrier.

have proven to be contestable under deregulation.

Evidence on Contestability. Initially, some students of airline deregulation were optimistic that airline markets were contestable.[28] Others (including the present writer) have consistently been skeptical of the contestability hypothesis as relates to airlines, going back to the very beginning of airline deregulation.[29] Studies published by the present author as far back as 1981 have shown that there is a correlation between concentration (as measured by a Herfindahl index) and fares, and they have also shown that the entry of a new firm (even an established, "high-cost" carrier) has a downward effect on plane fares.[30] Other authors, starting in the mid-to-late 1980s, have published evidence giving cause to question the contestability hypothesis, as well, also based on the finding that there is a relationship between concentration and fares on various routes. These studies include Bailey, Graham, and Kaplan (1985),[31] Strassman (1986), Morrison and Winston (1987), Bailey and Williams (1988), Borenstein (1988) and Hurdle et. al. (1988).

Additionally, there have been other tests of the contestability hypothesis, one based on financial markets (Michael D. Whinston and Scott C. Collins, 1988) and another an indirect test based on two different models of oligopoly behavior (Reiss and Spiller, 1988). Of numerous studies done on the contestability hypothesis in the past five years, only the last-mentioned, based on very indirect evidence, has supported it. It is therefore not surprising that now the contestability hypothesis has been questioned by many students of air deregulation.[32]

Nevertheless, most students of air deregulation in the United States continue to believe that deregulation is worthwhile, despite the lack of perfect contestability. This is true for the following reasons.

First, despite the fact that the airline industry may be less than perfectly competitive or contestable, performance under competition seems better than under

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[28] See Bailey and Panzar (1981), and Bailey, Graham, and Kaplan (1985).

[29] Skepticism on this count was first presented in this writer's comments on Bailey and Panzar at a conference at Duke University in 1980, and were elaborated on in Call and Keeler (1985).

[30] See Keeler and Abrahams (1981) and Call and Keeler (1985).

[31] These authors believed, however, that the evidence against the contestability hypothesis was rather weak. See pp. 171-172.

[32] This shift in consensus is noted by Kahn (1988)

regulation (we have presented evidence of this regarding fares; we shall present evidence below regarding service, safety, and other variables).

Second, it remains clear that potential entry does play an important role in determining fares (Morrison and Winston, 1987), as predicted by contestability theory, and as deregulation's proponents originally predicted (see Keeler, 1978, Appendix).

Third, surface competition clearly plays an important role here. In the United States, that is especially true of the private automobile.[33] In Europe (and in the Northeast Corridor of the U. S.) rail transportation can play an important role here, also.[34]

Fourth, even if the industry is not perfectly contestable, the return on investment earned so far by the deregulated airlines is not, in the aggregate, substantially above most peoples' guesses of a competitive return (see the section on factor payments, below). This is consistent with evidence that before deregulation, service quality competition similarly eroded monopoly returns. Low or nonexistent monopoly rents are obviously suggestive of a workably competitive market.

Indeed, in practical terms, there may be very little distinction between a reasonably contestable market and a workably competitive oligopoly with low entry barriers and little collusive behavior. The oligopoly models estimated for airlines by Reiss and Spiller (1988) are consistent with both stories.

B. Deregulation and Air Service Quality

A number of those who proposed air deregulation felt that it would result in a decline in service quality. This was true for two reasons.

First, the high fares enforced by the Civil Aeronautics Board, along with service quality competition on the part of the airlines, kept load factors low, which made it easier for peak hour travelers to get reservations. Furthermore, Douglas and Miller believed that, given reasonable estimates of demand elasticities, CAB policies tended to

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[33]The substitutability between auto and air transportation is evident from what has happened to the relative shares of the two modes in U. S. passenger transport since 1978. Air share rose from 10.9 per cent in 1977 to 17.8 per cent in 1987, and auto fell from 87.2 per cent to 80.7 per cent in the same period. See Air Transport Association, Air Transport, 1988. More evidence of substitutability comes from Abrahams (1983) and Morrison and Winston (1985).

[34]or a discussion of the economic role of rail passenger transportation, see Keeler (1971b) and Meyer and Oster (1987).

set fares so as to maximize frequencies, so that a reduction in fares would also reduce frequencies (it must be noted, however, that even at that time, there was some skepticism of this conclusion, including some published comments by the present writer).[35]

Second, because regulation supposedly allowed for cross subsidization from high-density to low-density routes, there was a belief that service quality would be reduced for low-density routes.

In service, as in a number of other areas, initial expectations did not materialize. It is true that load factors rose, but flight frequencies also rose as a result of the lower fares.[36]

These higher frequencies, combined with an elaborate hub-and-spoke route system (which many airline began before deregulation, but which deregulation undoubtedly facilitated), produced much greater travel frequencies between most origins and destinations.[37] One study (Morrison and Winston, 1986) estimates the benefits of these service improvements at well over $1 billion, as of the mid-1980s. Whatever the value of these service improvements, it is clear that the fears some pessimists had about the effects of airline deregulation on service were unfounded. If anything, the problem was the opposite--congested facilities from increased service (discussed further in the next section).

Some travelers have said that there appears to be more crowding of aircraft and facilities than before, and, undoubtedly, there are service problems from this crowding (these problems are discussed below). But it is significant that the complaint rate (based on passenger complaints to the Civil Aeronautics Board and then the Department of Transportation) per passenger-mile has fallen substantially since 1978.[38] This is certainly not reflective of a severe deterioration in service.

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[35] For this argument, see Douglas and Miller (1974), and for a skeptical view, see the appendix to Keeler (1978).

[36] Morrison and Winston (1986, p. 33). This is consistent with the predictions in Keeler (1978, Appendix).

[37] See Keeler and Abrahams (1981), Bailey, Graham, and Kaplan (1985), and Morrison and Winston (1986).

[38] Not only was the complaint rate substantially lower in 1988 than in 1978, but it was also lower than 1978 for nine out of the ten years of deregulation. See Lublich (1989, p. 82).

As regards service to small communities, the outcome is also a favorable one, although it appears that in the early years of deregulation, service to small communities declined.[39] By 1984, however, there is evidence that, overall, service improved, with more frequent flights and more carriers serving smaller, nonhub airports.[40] In many cases, service increases for small communities have been achieved with smaller aircraft than were previously used, but that represents a better matching of aircraft and route. If there has been a decrease in service from airline deregulation, it might be in first class. This is not because the quality of first class food, seats, or the like have deteriorated, but rather, unlike the situation under regulation, first class compartments seem smaller on most aircraft, and the seats in them tend to be much fuller.[41] But it is difficult to believe that the large, empty first class sections which existed under regulation represented an efficient use of resources.

C. Safety

One of the primary concerns of opponents of airline deregulation was safety. Even though the Air Deregulation Act of 1978 did not deregulate safety (which remains under the control of the Federal Aviation Administration), one might have feared that with new entrants with less experience in airlines, with new financial pressures, and with existing safety inspectors stretched more thinly, safety could be a problem under deregulation. Yet it could also be argued that the marketplace would offer adequate incentives for safety, even in the absence of increased FAA inspections.[42]

Although there is some slight ambiguity in the results regarding air safety under deregulation, the overwhelming evidence so far is that it has not been a problem.

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[39]The initial decline in service to small communities may have been due to an increase in energy prices, combined with a recession, as well as by deregulation. See Bailey, Graham, and Kaplan (1985), chapter 6.

[40]Bailey, Graham, and Kaplan (1985), Chapter 6, and Meyer and Oster (1987), pp. 118-121. See also Morrison and Winston (1986), pp. 47-50.

[41]Consider, for example, load factors and configuration in first class, first well before deregulation had a chance to exert an influence, and then in the recent past. During 1971-2, the first class load factor averaged 37.6 per cent, and 24.6 per cent of total seat-miles offered were first class. By 1987-88, only 11.9 per cent of the seat-miles offered were first class, and the load factor was 51.9 per cent. These two-year averages were calculated from Air Carrier Traffic Statistics, Monthly, published before 1985 by the U. S. Civil Aeronautics Board, and after that by the U. S. Department of Transportation.

[42]For examples of such arguments, see Andrew Chalk (1987), Chance and Ferris (1987) and Morrison and Winston (1988).

There have been some studies (based on periods of regulation as well as deregulation) which indicate that less-experienced airlines tend to have higher accident rates than do more-experienced carriers (see, for example, Rose, 1988). Yet, when a very recent sample of incumbent and newly entrant carriers is used, the effect is too small and too fine to show up in an actual comparison of outcomes between established and newly-entrant carriers in the mid-1980s. The work of Kanafani and Keeler (1989) shows no difference over this period in accident rates or safety posture for new entrants versus established carriers.

Perhaps the most important question to ask regarding U. S. airline safety is what has happened to it, in terms of fatalities, as a result of deregulation? One study which has tried to answer that question directly is that of Kanafani and Keeler (1989) who examined monthly time series evidence on fatalities per passenger-mile in all domestic scheduled U. S. service. Their analysis takes full account of substitution of small commuter aircraft for larger jets, because it aggregates over all passengers using both types of aircraft during both periods.

Examination of time series evidence in this way cannot assure the measurement of a cause-effect relationship. Nevertheless, observing the behavior of the fatality rate on a month-by-month basis should provide some insight into the situation.

Kanafani and Keeler consider monthly evidence on the passenger fatality rate from 1966 through 1987. They find that the fatality rate decreased consistently at the same rate (.7 to .8 per cent per month) over the entire 1966-87 period both before and after deregulation. The difference in this trend before and after deregulation is very near zero, quite insignificant statistically, and the sign of the difference is itself dependent on when the effect of deregulation is assumed to start.[43] It is of course still impossible to determine for sure what would have happened had regulation continued, but this is very strong evidence that deregulation had no impact on overall safety.

D. Deregulation and the return to productive factors

The effects of deregulation on the returns to factors of production (capital and labor) are matters of considerable policy concern. Effects on wages and employment

[43] See Kanafani and Keeler (1989b). This study finds that the trend towards increased safety decelerated (insignificantly) if the 1979-80 transition period is included in the sample, and it accelerates slightly (but again insignificantly) if this transition period is excluded from the sample. This seems to be caused by the many fatalities caused by the crash of an American Airlines DC-10 in 1979, and it appears that this was caused by maintenance policies pursued under regulation, so it is not clear that it can be attributed to deregulation or to the transition.

have obvious impacts on labor relations, and effects on the return to capital have equally obvious impacts on the ability to finance capacity for expansion. We now consider each of these effects

Employment and wages. We consider each of these obviously interrelated variables in turn.

To the extent that deregulation increased the overall amount of service provided (because of lower fares and more attractive schedules), we should expect it to increase employment. Indeed, the most recent evidence indicates that air deregulation has increased employment in the industry. Specifically, Meyer and Oster (1987, p. 105) find that, during the first four years of airline deregulation, total employment in the industry would have been 3.7 per cent lower than it in fact was had CAB regulation continued[44]. Although this is not a strong effect, it indicates very clearly that airline deregulation at very least did not reduce employment in the industry.

As relates to wages, a number of studies (Moore, 1986, Card, 1986, Capelli, 1985, and Northrup, 1984) have suggested that the entry of nonunion airlines, plus revised agreements on the part of unionized carriers to stay competitive, have reduced wages overall in the industry. The most recent study, by Peoples (1987) indicates that as of 1984, deregulation did reduce airline wages, but not below average levels for equivalent skill levels in the U. S. economy. Peoples shows that before deregulation, airline wages were equivalent to the very highest for a given skill level in the U. S. economy, found only in the most concentrated and profitable industries. By 1984, they had fallen to a level very close to average for the entire U. S. economy. While this is certainly a decline, it is consistent with the workings of an efficient market, and it is also difficult to call it unfair, although some observers may judge it to be so.

Deregulation and airline financial performance. One of the concerns which were expressed before airline deregulation was that "ruinous competition" would make it impossible for most airlines to earn an adequate return on investment, and that would in turn make it difficult or impossible for the industry to finance new capacity or to replace obsolete equipment.

[44] Meyer and Oster (1987), p. 105.

Certainly, some airlines have gone bankrupt since deregulation; that happens in all industries in which the free market is allowed to work its way. On the other hand, overall evidence on the financial performance of the industry has been very favorable to deregulation.

Perhaps the most important indicator of the extent to which the financial markets favor the outcome is the way in which they have capitalized expected future profits as a result of deregulation. As Moore (1986) has pointed out, the financial markets have viewed airline deregulation very favorably in this light.

Furthermore, direct observation of airline profitability during deregulation has also supported the view that things have improved as a result of this change (see Morrison and Winston, 1986, Meyer and Oster, 1987, and below in the present paper). There is also evidence that the overall risk connected with investing in airlines has been reduced since 1978.[45]

As this was being written in the summer of 1989, all commercial aircraft manufacturers had record order backlogs (see Ramirez, 1989); if there was a difficulty, it was in getting the aircraft delivered that the airlines needed, rather than raising the capital needed to acquire them. This would provide further (if casual) evidence that deregulation has not impeded the financial performance and the ability to finance capital expansion of the U. S. domestic airline industry.

Given the evidence against contestability and suggesting oligopoly behavior, one might well ask whether airlines have gone too far under deregulation in the opposite direction: have their profits become excessive and monopolistic?

As in the case of fares, this is not the place for a detailed investigation of airline profitability. But, once again, direct examination of very basic empirical evidence can provide insight. Table 2 provides estimates of the return on invested capital (debt plus equity) for all U. S. carriers, as estimated by the Air Transport Association, for the period from 1966 through 1987. The figures indicate that returns have fluctuated widely over the years, not surprising for such a cyclical industry.

The results shown in Table 2 are striking in two ways: first, they show that the average return on investment was the same during the nine years after deregulation and

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[45] See McMullen (1985) and Meyer and Oster (1987). Also, in a very recent study, Cunningham, Slovin, West, and Zaima (1988) have found that airline deregulation actually reduced the amount of systematic risk associated with investment in airlines, at least for the sample of larger carriers analyzed in that study. This happened only after some time, however. The years of the transition to deregulation seemed initially to entail more systematic risk.

during the 23 years before deregulation: the average for both periods is 6.6 per cent. Second, that average return on investment is remarkably close to the average return on investment in the U. S. corporate sector. The recent work of Schmalensee finds a net, after-tax return on debt plus equity capital of 5.93 per cent for the U. S. corporate sector for the 1953-83 period.[46] Obviously, there are errors and comparability problems with accounting data such as this. Nevertheless, it is difficult to believe that the return on investment earned by the U. S. airline industry, either before or after deregulation, contains a very large monopoly rent component (if there is one at all). Such a return on investment is certainly consistent with a workably competitive market.

It is of course possible that some U. S. airlines do earn super-competitive rents. It is also possible that in 1988 and 1989, after mergers and with aircraft in short supply, returns on investment in the industry are higher. Although full data for 1988 were not ready as this was written, nevertheless, data for the most profitable large airlines from 1988 suggest that their return on investment is still below that of equivalently large firms in other parts of the unregulated economy.[47] Also, as Table 3 shows, 1988 was not an exceptionally profitable year for most large carriers compared with equivalent points in the business cycle over the past.

E. Productivity change

There have been several studies of the effects of airline deregulation on productivity in the industry, and they all suggest that deregulation has had a strong, salutary effect.[48] Perhaps the most revealing of these studies is that of Caves, Christensen, Tretheway, and Windle (1987). They provide the most theoretically elaborate study of productivity change in airlines to date, and they compare productivity improvement in the U. S. during the five years following deregulation with equivalent

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[46] Schmalensee (1989, p. 340). The figure of Schmalensee most nearly comparable to the Air Transport Association figures is labeled by him as r_3 in Table 1.

[47] In 1988, two of the most profitable large airlines, American and Delta, earned returns of 14.5 and 13.7 per cent on equity respectively (United's return in 1988 was distorted by the sale of the Westin Hotel chain). USAir and Northwest both earned returns below 10 per cent on equity. See Fortune 119 (June 5, 1989), pp. 382-383. It is worth noting that the average return for Fortune 500 firms in retail trade (generally thought of as a competitive industry not in need of regulation) in 1988 was 16.3 per cent, which was larger than that of either American or Delta.

[48] See Bailey, Graham, and Kaplan (1985) and Meyer and Oster (1987). Kahn (1988a) also provides some interesting evidence on this count.

productivity change in airlines of other countries during the same period. They conclude (1987, p. 299) that productivity among U. S. carriers occurred at a significantly faster rate than it did in foreign countries. If indeed this difference is due to deregulation in the U. S. (and there is good reason to believe that it is), then their results imply that factor productivity growth in U. S. airlines would have been only 1.8 per cent per year under regulation, rather than the 3.6 per cent number actually observed. Thus, the rate of productivity growth in U. S. airlines during the 1978-83 period may well have doubled as a result of airline deregulation. Independent evidence of these effects in productivity is found by Saunders (1987), who finds that the more flexible internal organizations of firms entering the airline market after deregulation allow for substantially lower costs and higher labor productivity than were previously feasible.

F. Deregulation and income distribution

There have been no precise studies of the effects of airline deregulation on income distribution in the U. S. economy, but a few (somewhat speculative) comments are possible.

First, we have already presented evidence that airline employees earning very high wages before deregulation may have lost something from it. On the other hand, it would appear that airline investors, so far, have fared reasonably well from airline deregulation.

Second, among travelers, it is possible that the most affluent business travelers (those going first class) may have lost from airline deregulation.

Third, it is very likely that lower-income travelers have gained from air deregulation. In the not-too-distant past, air travel was a distinctly luxury good, out of reach for many consumers.

To the extent that airline deregulation has reduced fares, it has brought air travel within the reach of many more people than was previously the case.[49]

For this reason, it is quite likely that airline deregulation has had a progressive effect on income distribution in the United States.

[49] As recently as 1971, half of all Americans had never flown. By 1988, only 25 per cent had never done so. Lublich (1989, p. 84).

V. Policy Problems Posed by U. S. Airline Deregulation

From the evidence presented so far, the reader might conclude that airline deregulation has had no adverse effects, and presents no current policy problems in the U. S. One might even conclude that if it were to be done again, the present writer would admit to no mistakes having been made, and would suggest that everything be done precisely the way it was.

Such inferences would be inaccurate. We now turn to some adverse effects of airline deregulation, and to some policy problems which have occurred, at least partially as a result of it.

Specifically, we consider three sets of problems: those relating to mergers, to competitive trade practices (i.e., travel agents, reservations systems, and frequent flyer programs), and to airport and airways capacity.

A. Mergers

In the years since air deregulation occurred, mergers have perhaps been a source of more controversy than any other aspect of public policy towards airlines. Proponents of contestability have argued that, in the absence of any artificial barriers to entry (such as limited airport slots), the threat of entry into airline markets should keep fares at efficient levels. Therefore, if mergers have any benefits (such as improved service through network integration), then they should be allowed.

Opponents of mergers have argued that airline markets are not contestable, that there is a positive correlation between concentration and fares in those markets, and that mergers which increase the control of hub by a particular airline will have especially serious effects by way of higher fares.

The U. S. Department of Transportation has approved a number of mergers, including some which, it is widely believed by many observers, have increased the market power of major carriers at some hubs (these mergers include TWA-Ozark and Northwest-Republic, in particular).

Given the arguments made in the present paper that airline markets fall well short of perfect contestability, it would seem to follow that the most desirable policy would be one of preventing mergers with any possible anticompetitive effects, except in

the cases of failing firms. The present author has indeed made arguments to exactly that effect, starting back in the early period of deregulation (Keeler and Abrahams, 1981). It would seem to follow from that, as well, that it was a mistake on the part of the U. S. Department of Transportation to have allowed mergers which increased concentration in some markets and in some hubs.

The appendix to this paper contains a more detailed summary and evaluation of U. S. airline merger policy since deregulation. We state only our broad conclusions here.

The permissive policies the U. S. government had towards airline mergers probably did have some adverse effects on market performance in airlines, but, as is argued in the appendix to this paper, such effects appear to be quite small. If this permissive policy was a mistake, it was not a large one.

On the other hand, it would appear to be an unwise idea to allow yet more mergers among large, healthy U. S. airlines. As the number of carriers operating in trunk airline markets in the U. S. has decreased from mergers over the past few years, it has become more important (in the opinion of this writer) that the trend towards further mergers be stopped.[50]

B. Anticompetitive practices

Reservations systems. A significant fraction of the total space reservations on U. S. airlines are booked through the systems of the dominant airlines, Sabre, owned by American, and Apollo, owned by United. Travel agents generally only subscribe to only one reservations system, a majority of travel agents subscribe to either Sabre or Apollo.

Rival airlines claim (with some evident justification) that there are biases in the systems which cause travel agents to give preference to the airline that owns their reservations system. This bias was originally thought to stem from the preferential listing that airline reservations systems gave to their own flights, but that problem has been eliminated.

Another problem stems with the difficulty travel agents have switching away from dominant airlines' systems: the contracts which the airlines require make switching very difficult and unprofitable.

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[50]This overall opinion is consistent with that expressed in Levine (1987) and Morrison and Winston (1988) though some of the reasoning behind it is different. See the appendix for an elaboration of this point.

The extent of the anticompetitive problem caused by airline reservations systems remains a subject of considerable debate, and it is difficult to provide a definitive conclusion, given that fact.

Nevertheless, it is reasonable to ask whether society gains in a significant way from the ownership of reservations systems by the largest airlines. If research clearly cannot document such gains, what (if any) good reasons are there not to require divestiture and separate ownership of reservations systems relative to airlines? If such gains cannot be documented clearly, society would seem to gain from the benefits in fare competition which such divestiture would allow.

Predatory practices. There are other competitive practices in the industry, the effects of which require more research. If a small airline enters a market, and a large firm sharply expands capacity against that small firm, forcing that small firm to leave, it could represent predatory behavior, even if it were not predatory pricing. But does predatory capacity-dumping exist in the airline industry? If so, are there antitrust policies which can prevent it without stifling market forces? No one to date has come up with strong proposals in this area, but it would seem to justify further research. Similarly, in the area of pricing, if an incumbent airline reduces its fares down below the fares of a new entrant, despite the fact that the incumbent has higher costs than does the new entrant, does that constitute predation? As Levine (1987) states, this is a serious problem, but there appear to be no policies yet devised to deal with that predation for which the cure is not worse than the disease. Research in this area would also appear to be justified.

Frequent flyer programs. Another market practice which large airlines use to impose entry barriers is the practice of frequent flyer programs. Incumbent airlines can generate brand loyalty through them, making frequent flyers reluctant to switch carriers for fear of giving up these benefits. And, though small airlines can certainly band together to form large route networks in these programs, nevertheless, large carriers with large route networks would seem to have an inherent advantage here.

To reduce these entry barriers, some observers, including Levine (1987), Borenstein (1988), and Morrison and Winston (1989) have suggested taxing frequent flyer benefits as income. There are problems with this, however.[51] Those travelers who build up frequent flyer miles for personal and pleasure travel should not be taxed on

[51] These problems are consistent with those cited by Levine (1987).

them, because for these travelers, frequent flyer miles represent a price cut (a quantity discount of a sort offered by many retailers), rather than increased income. It is only frequent flyer miles awarded for business travel which are arguably untaxed compensation from an employer, and separating the two for each tax return could pose practical problems. These problems become greater when one takes account of the fact that the reward structure of frequent flyer programs is nonlinear, so that for passengers who travel for both business and pleasure in a given year, it is difficult indeed to separate the benefits from the two types of travel. So it is not now clear that taxation of frequent flyer benefits represents a fair and viable policy alternative.

C. Airports and Airways

Advocates of airline deregulation in the U. S. failed to anticipate the effects of deregulation on the demand for air services. Indeed, some of the most important analysts of these issues in the 1970s thought that deregulation would reduce the number of flights provided, rather than increasing it.[52]

Partly as a result of that, but partly, as well, because of conflicting political goals and environmental concerns, capacity of the airport and airways program was not expanded to meet demand. The problem was compounded by President Reagan's 1981 decision to fire striking air traffic controllers, and compounded further by the budget deficits coming as a result of tax cuts in the early 1980s.[53]

The combination of growth of commercial aviation and limited capacity have produced air travel delays which have increased compared with the ones in the late 1970s, and, apparently, there are some who believe that this is a failing of deregulation.

For people who hold this view, however, it is easy to forget that there were also times during the long periods of regulation in which air traffic delays were a problem.

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[52] Douglas and Miller, 1974, pp. 176-177. Not all analysts agreed, however. Keeler, 1978, Appendix, argues that deregulation would very likely increase frequency, rather than decreasing it, as Douglas and Miller argue. And Kahn (comments included in Morrison and Winston, 1989, p. 120) notes that by 1978, he was, as Chair of the Civil Aeronautics Board, arguing strongly better pricing and investment policies for airport and airways capacity.

[53] Expenditures for projects (in airports and airways) is supported by the Federal ticket tax, and supposedly earmarked for use for airports and airways. However, administrative problems at the FAA, combined with a need for some expedient way of reducing the Federal deficit on the part of Congress, have caused the trust fund formed by this ticket tax to go largely unspent for a long period of time. See, for example, Morrison and Winston (1989).

Specifically, in the late 1960s and early 1970s, especially in the Northeast, delays represented a very serious problem.

As an example, in the early 1960s, the typical jet flight (to the extent they were operated) between New York (La Guardia) and Washington (National) was scheduled to take 45 minutes. By 1968, because of congestion delays, it took an hour or more. By 1971, the same flight took only 45 minutes, because the FAA improved the air traffic control system, and because private aircraft were discouraged from using large New York airports. Now, the typical New York-Washington flight is scheduled to take an hour (or slightly more) again, worse than 1971, but much the same as in 1968.[54] So travel delays may come about on a cyclical basis, more independent of deregulation than it might first seem.[55]

In addition to problems of delays, lack of airport capacity has posed problems for competition, especially at certain airports used to full capacity and facing restrictions on the number of takeoff and landing slots (such as La Guardia in New York and National in Washington). In these situations, it is difficult or impossible for new competitors to enter markets, though there has been some experimentation allowing airlines to sell landing slots to each other.

This problem is compounded when incumbent airlines hoard unused landing slots as a part of a strategy to exclude new entrants.[56] This is probably a reason why smaller, new-entrant airlines often develop service from satellite airports undeveloped by the majors (such as Midway from Midway Airport in Chicago, Southwest from Dallas Love, Houston Hobby, and Detroit City Airport, etc.) Satellite airports do not totally solve this sort of problem, but they clearly help competition in a slot-controlled area.[57]

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[54]These times are gleaned from the Official Airline Guides for the relevant years.

[55]Morrison and Winston (1989) rightly point out that if deregulation increased the number of flights it exacerbated the problem. But they may have overstated the amount by which that happened: they state that deregulation increased passengers by about 25 per cent, and base their estimates of the effects of deregulation on delays on that figures. But the number of passengers per plane went up quite substantially from deregulation (smaller first class compartments, higher-density coach seating, and higher load factors all played a role) so the assumption that the number of flights went up by 25 per cent may have exaggerated the effects of deregulation. Morrison and Winston may to some extent have compensated for this, however, because they believe that 25 per cent is a conservative estimate of the rise in traffic from deregulation.

[56]Levine (1987) provides a detailed discussion, both of this strategy and of anecdotal evidence of its use.

[57]Airlines in the United States have tried to use their bargaining power with airport authorities to prevent the development of satellite airports. The most blatant recent example involves USAir's condition of agreement relating to a new airport in the Pittsburgh area. USAir agreed to pay for gate space in a new airport only the airport authority would agree never to allow the old airport to be used by another carrier

It may be that airline deregulation, combined with the budgetary problems of the FAA and the firing of the striking controllers, have constituted poor management of the transition. But it is also worth pointing out that, even under a regulated environment, the industry experienced problems with bottlenecks and delays from time to time, and some observers would argue that the industry has done well to have as few problems as it has under deregulation.

This is not to deny that the situation could be improved considerably, first by proper pricing of airport capacity, and second, by construction of more airport capacity.[58] Indeed, the benefits of both alternatives appear to be substantial, and they would not have been negligible, even under regulation.[59] But, from the perspective of the present, it is difficult to see all the problems that would have occurred under regulation, at least if it were of the imperfect form which occurred in the U. S. before 1979.

VI. Conclusions and Lessons for Europe

Deregulated airline markets in the United States have worked exceedingly well in almost every dimension. Fares have fallen substantially in real terms for most travelers in most markets. Returns on investment have neither exceeded nor fallen short of competitive levels so far (on average over firms and time--certainly a sign of a workably competitive market). Service has improved, in the sense that frequencies and route networks provide increased convenience for most passengers, and the complaint rate has fallen. Productivity growth has accelerated. Safety has, so far, continued to improve along the same trends as before deregulation.

Academic observers may disagree as to whether to call airlines a competitive industry, a contestable oligopoly (in the aggregate, the return on investment is consistent with either of these), or a reasonably well-performing oligopoly with moderate entry barriers. The borders between these classifications are indeed not sharply drawn, and

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once the new one was opened. Research would be merited in appropriate legal and institutional policies to prevent this sort of behavior.

[58]The need for airport congestion pricing was well understood long before deregulation. See, for example, Levine (1969), Keeler (1970), Carlin and Park (1971), Morrison (1979, 1983), and, most recently, Morrison and Winston (1989). Morrison and Winston conclude that the potential benefits of airport pricing in the U. S. are in the range of over $2 billion per year. That is quite plausible.

[59]Morrison and Winston estimate that even under regulation, the benefits from proper airport pricing would be over $1 billion per year.

arguments can be made for each of them. But from the viewpoint of regulatory policy, the distinction is largely irrelevant. All three classifications suggest that competition is workable in airlines, and direct regulation of fares and firm entry is simply not necessary.

Intercity travel markets in Europe likely have even more competition than in the United States, in that many distances are shorter, and surface transportation (especially high-speed rail) may be more competitive in Europe with air than in the U. S.

Indeed, there is ample reason to conclude that airline deregulation in the United States has been a good experience. Whatever problems have occurred from it seem to be easily outweighed in benefits: fares are lower for the vast majority of all travelers. Service has, if anything, improved for most travelers, in that most people have more convenient schedules and connections to choose from than they would have had under regulation, and the complaint rate has fallen. Finally, at least under the first eleven years of deregulation, safety (as measured in fatalities per passenger-mile) not only did not deteriorate after deregulation, but it actually continued to improve along very nearly the same trend as under regulation.

Certainly, flights are somewhat more crowded than previously, and first class fares may have risen slightly. But these changes seem to reflect consumer preferences and the reality of the marketplace, rather than economic inefficiencies imposed by deregulation.

If (as has been argued here) the U. S. experience suggests that Europe, too, would be successful in deregulating airlines, it is reasonable to ask what lessons there might be to learn from the U. S. experience, to plan more effectively.

First, it makes sense to be cautious before approving mergers, especially mergers which grant airlines increased control of hubs.

Second, air deregulation is likely to increase the demand for airport and airways capacity, and plans to deal with that eventuality should be put in place.

Third, it appears that airline controls of reservations and ticketing systems can have a deleterious effect on competition, and there is much to be said for a policy under which ownership of reservations systems is separate from ownership of airlines.

Fourth, there is room for more research on the extent and appropriate policy towards predatory practices, whether they involve pricing or capacity expansion. Most observers in the United States presently believe that any possible remedies for this problem are worse than the problem itself, but more research would appear to be justified.

Fifth, it makes sense to expand safety inspections for new airlines and pilots, even as economic control over entry is reduced. This was advocated by proponents of deregulation in the United States and initially thwarted by budgetary stringency (an unwise way to save money). Whether it is because of market pressures (as was argued earlier in this paper) or good luck, the U. S. has had a good experience with safety under deregulation, but it is difficult to see this as an excuse for skimping on safety inspection expenditures.

Sixth, before deregulation is implemented, a systematic policy should be developed for opening up slot-controlled airports to new entrants (through some form of recontracting or selling, or perhaps through more stringent measures; these are worthy of research). At very least in this area, planners should explore options in cities with highly congested airports for development of satellite airports.

Seventh (related to six, above), airports should explore more peakload pricing strategies to eliminate the need for slot controls. Airport landing fees are often higher in Europe than in the U. S. already, and airport authorities may well have more latitude to pursue such rational strategies.

Some observers believe that a commission of experts could have smoothed the transition to deregulation compared to what has happened in the United States.[60] There is certainly something to be said for such policy in Europe, but the U. S. experience does not seem very encouraging to me on that count.

Indeed, to the extent that problems have occurred in the United States, I do not believe that they have occurred because of lack of expert advice. Rather, there are two reasons why mistakes were made.

First, in some cases, the experts were either wrong or at best divided on proper policies. For example, some experts would have said it unwise to expand airways capacity in the United States after deregulation because, as has already been stated, these advocates of deregulation believed that it would in fact reduce the number of flights overall, rather than increasing it, and they based their predictions on sophisticated economic models. Some economists disagreed with this viewpoint, but there was not a consensus (all economists would have presumably have favored more efficient airport pricing, though).

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[60] Morrison and Winston (1989) make such a proposal, though it is perhaps more elaborate than the one evaluated here.

Similarly, mergers were granted because judges were persuaded of the correctness of the contestability hypothesis advanced by economists, many of whom served as expert witnesses for airlines. Again, some observers disagreed with this viewpoint, but they may have been in a minority.

Other less-than-optimum decisions were made because political decision-makers overruled the advice which was given by advocates of air deregulation. This happened in the case of President Reagan's firing of the air traffic controllers, and quite likely in the case in which airport and airways funds were not spent as they should have been. It has also occurred in policies towards the construction of new airports: environmental interests have blocked construction of new airports in most metropolitan areas.

In short, planning certainly could have been better than it in fact was for U. S. airline deregulation, and a commission of experts might have been able to help things, especially if they were empowered to make quick shifts of policy. But some of these imperfections appear to be the inevitable result of imperfect information on the part of planners, as well as of the political process in a representative democracy. European planners can, however, learn much from the successes and failures of the U. S. case.

APPENDIX: SOME MORE DETAILED COMMENTS ABOUT AIRLINE MERGERS

Since airline deregulation occurred, numerous airline mergers have been proposed by firms, and a large number of them were allowed. These mergers came in essentially two waves, each of which we summarize briefly.

The first wave occurred fairly soon after deregulation, and were consummated in the late 1970s and early 1980s. They include Pan American-National (1979), North Central-Southern (1979), Republic Hughes Air West (1980), and Texas International-Continental (1981). While these mergers caused some controversy in terms of the potential for increase in market power, the concern around them was relatively minor, because their impact on market power on most routes was in most peoples' opinion minimal; this is partly because of a conscious attitude of caution towards mergers which might possibly harm market power on the part of the CAB and the Department of Justice.[61]

[61] Mergers such as Eastern-National and Continental-Western were initially and successfully blocked in the late 1970s, because of potential harm to competition.

Of considerably more controversy was a larger and more substantial wave of mergers which hit in the mid-1980s, including United's purchase of Pan American's Pacific routes (1985), Northwest-Republic (1986), TWA-Ozark (1986), Texas Air's purchase of Eastern and People Express (which had just purchased Frontier (1986)), Delta-Western (1986), USAir-Pacific Southwest (1987), American-Air California (1987), and USAir-Piedmont (1987).

Although some economists consistently questioned the desirability of large-scale airline mergers except for failing firms (eg., Keeler and Abrahams, 1981) many economists, early on, believed in the doctrine of contestability, and it played a role in the acceptance of mergers on the part the Department of Transportation judges responsible for the decisions.[62] As evidence has come in calling contestability into question, policy-makers have also retreated from a pro-merger stance.[63]

It is appropriate, therefore, to ask whether the mergers which were allowed were a mistake, and under what circumstances mergers in the airline industry might make sense. The economics of the situation would seem to suggest two directions of thought about mergers.

First, there is considerable evidence that the "natural" structure of the airline industry entails a finite number of integrated (with hubs and spokes) nationwide airlines, perhaps five or six.[64] Although there may be some room for smaller, more specialized carriers, as well, the amount of such room may be finite. As a result, it is possible that, for an orderly transition to a more efficient structure of the airline industry, mergers are necessary.

Second, there is also evidence (consistent in the data from 1977, when airlines were first given significant fare flexibility through the latest available data in the 1980s) that there is a relationship between concentration and fares on a given route.[65] There is also strong evidence that domination of a hub by an airline results in higher fares in

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[62] For an example of an economist's view highly supportive of the contestability hypothesis for domestic U. S. routes, plus a discussion of some of the earlier decisions, see, for example, Fisher (1987).

[63] For a summary of some of the views in Washington to the effect that competition is inadequate in the airline industry, see, for example, Lublich (1989).

[64] See, the above discussion on the airline industry, Keeler and Abrahams (1981), and Levine (1987).

[65] See Keeler and Abrahams (1981), Bailey, Graham, and Kaplan (1985), Call and Keeler (1985), Hurdle, et. al., (1987), Morrison and Winston (1987), and Borenstein (1987).

and out of that hub than would otherwise prevail.[66] So mergers which result in increased concentration on any route, or which allow one carrier to further dominate a hub, will likely have consequences of higher fares for at least some passengers.

What policies should be pursued as a result of these considerations? One possible solution would be to deny mergers unless one of the firms was failing (as evidenced by financial losses), or unless there were overwhelming cost-saving or service-quality benefits from the merger which could not be achieved by internal expansion, and which indisputably outweighed any costs of the merger to consumers in the form of market power. Such a policy would assure the benefits of competition, while at the same time allowing any mergers whose efficiency benefits were demonstrably strong enough to significantly outweigh costs.

By such a criterion, how might one evaluate the recent wave of mergers? The acquisitions by Texas Air (People Express and Frontier; Eastern) appear to be justifiable on a failing firm basis. What of the remaining mergers?

The most complete study to date (Morrison and Winston, 1989, p. 80) estimates that these mergers have given airlines the market power to charge higher fares, with a cost to consumers from reduced competition of $423 million per year. On the other hand, this study finds these and other costs to consumers outweighed by benefits exceeding costs by about $70 million, including better connecting service, the ease calling a single carrier for most service needs for customers living in hub cities, and, most importantly, enhanced frequent flyer benefits from using larger single-carrier route networks (elimination of net frequent flyer benefits would change the net benefits of the mergers from $70 million to -$335 million).

Morrison and Winston study may have overestimated the benefits of these mergers, especially as relates to frequent flyer programs.[67] But even if the benefits were

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[66] This result was evident in Bailey, Graham, and Kaplan, 1985. Bailey and Williams (1988) point out its full implications for market power.

[67] Morrison and Winston's argument is this: frequent flyers get relatively few benefits from small airlines, because they allow the traveller to go relatively few places when cashing in. A merged airline offers many more places to go and many more opportunities to build up mileage than an unmerged one. To measure these benefits, Morrison and Winston include a variable in their travel demand equation (estimated in 1983 when frequent flyer programs were new and relatively few carriers had them) reflective of whether an airline has a frequent flyer program, and of the number of cities served. They can then infer the value of extra cities served in a single program, and they use these estimates the measure the benefits of these programs to consumers. This interesting procedure has a problem which probably causes Morrison and Winston to overestimate the benefits of frequent flyer programs from mergers. This stems from the fact that during the year that they estimated the benefits from the programs for (1983), airlines operated in their frequent flyer programs on a solo basis, so that their system sizes did indeed reflect the value consumers were willing to

zero (including net benefits to frequent flyers), the costs of reduced competition, by these calculations, would be on the order of magnitude of only 1 per cent of total domestic U. S. scheduled airline revenues.[68] So, especially if these mergers have any benefits at all (and one would certainly expect them to have some benefits), their net cost to society was not very large.

These mergers, then, were not large policy mistakes, but rather, at most, small ones. This is true not only because of their small net cost to society, but also because, in some of the markets in which mergers have caused the worst fare increases, there has indeed been entry of new (and often low-cost) firms, in turn lowering fares.

Consider the St. Louis hub, which TWA dominates strongly as a result of its merger with Ozark. Southwest Airlines, a low-cost, low-fare carrier, has expanded its service in this hub over the past several years, and there is reason to believe that it will (perhaps rather slowly and quietly) continue to do so. Similarly, when USAir and American (traditionally high-fare oligopolists when their dominate routes) took over from PSA and AirCal (which had perhaps decaying traditions of charging low fares in California), the fare between Los Angeles and San Francisco rose significantly (though this fare increase is more the result of airline policies than of shifts in concentration). Recently, however, Southwest Airlines has entered that route at much lower fares, as well. As of this writing it was still too soon to tell whether Southwest would find it profitable to stay on this route, because other airlines have matched its fares, and some airlines seem to be expanding expand their capacity in hopes of chasing Southwest out. Nevertheless, it is clear that, despite the fact that mergers and bankruptcies have

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pay for larger systems. By 1986-87, however (the years of the mergers), however, most smaller airlines had joined much larger ones (or in consortia of smaller ones) in partnership for their frequent flyer programs, and, as a result, the benefits of using large airlines were much smaller than they were in 1983. To illustrate, let us take the example of Pacific Southwest Airlines, which was bought by USAir in 1987. PSA was a relatively small airline in 1987, and it would appear, based on Morrison and Winston's assumptions and simulations, that travellers on PSA would get significant benefits from PSA being taken over by USAir, which served many more cities in a different part of the U. S. from PSA. Yet by 1987, PSA had been a partner in TWA's frequent flyer program, with access to mileage and benefits for all the cities served by TWA and its partners. When the merger occurred, travellers were no longer able to take advantage of this TWA partnership. It is not clear in this case that PSA travellers gained much at all from the USAir-PSA merger, Morrison and Winston's calculations to the contrary. Similarly, before its merger with American, AirCal was partners with Northwest Orient Airlines and others. It may be that there is some benefit to shifting from Northwest and its partners to American in a frequent flyer program, but the incremental benefits would seem to be less than Morrison and Winston calculate.

[68] For the year ending June 30, 1988, total revenues from regularly-scheduled domestic U. S. air service were between $47 and $48 billion per year. See U. S. Department of Transportation, Monthly Report on Carrier Operating Statistics, June, 1988.

eliminated many potential carriers from U. S. routes over the past half dozen years, nevertheless, the possibility for entry of new routes by existing carriers is still there, and that should play a role in mitigating the anticompetitive effects of mergers which have been allowed.

In conclusion, there is much to be said for a "go slow" policy towards airline mergers in a deregulated environment, but it would appear that mergers, even on a level allowed so far in the United States, have come nowhere near eliminating the benefits of deregulation.

Table 1. Trends in Airfares, 1968-87

Year	Nominal values		Real values		Percent[a] Going at Discounts	Average Amount[a] of Discount
	Economy Yield (cents/mi.)	Total Yield	Economy Yield (1967 cents/mi.)	Total Yield	(Per cent)	
1968	5.1	5.6	4.9	5.4		
1969	5.3	5.8	4.8	5.3		
1970	5.5	6.0	4.7	5.2		
1971	5.8	6.3	4.8	5.2		
1972	5.9	6.4	4.7	5.1		
1973	6.1	6.6	4.6	5.0		
1974	6.9	7.5	4.7	5.1		
1975	7.1	7.7	4.4	4.8		
1976	7.5	8.2	4.4	4.8		
1977	7.7	8.4	4.2	4.6		
1978	7.8	8.5	4.0	4.4		
1979	8.3	8.9	3.8	4.1		
1980	10.8	11.5	4.4	4.7		
1981	12.2	12.8	4.5	4.7	71	46
1982	11.7	12.2	4.0	4.2	78	46
1983	11.4	12.0	3.8	4.0	82	48
1984	12.2	12.7	3.9	4.1	81	51
1985	11.3	12.2	3.5	3.8	85	56
1986	10.7	11.0	3.3	3.3	90	61
1987	11.0	11.3	3.2	3.3	91	62

[a] On major carriers.

Source: U. S. Air Transport Association: Air Transport, various years.

Table 2. Trends in Return on Investment, All U. S. Airlines

Year	Return on Invested Capital (Per cent)
1987	7.3
1986	4.9
1985	9.6
1984	9.9
1983	6.0
1982	2.1
1981	4.7
1980	5.3
1979	6.5
1978	13.3
1977	10.2
1976	8.0
1975	2.5
1974	6.4
1973	5.1
1972	4.9
1971	3.5
1970	1.2
1969	3.3
1968	4.9
1967	7.6
1966	11.0
Average,	
1979-87	6.3
1966-78	6.3

Source: Same as Table 1.

Table 3. Returns on Equity--Major Airlines, 1968-88 (Per cent)

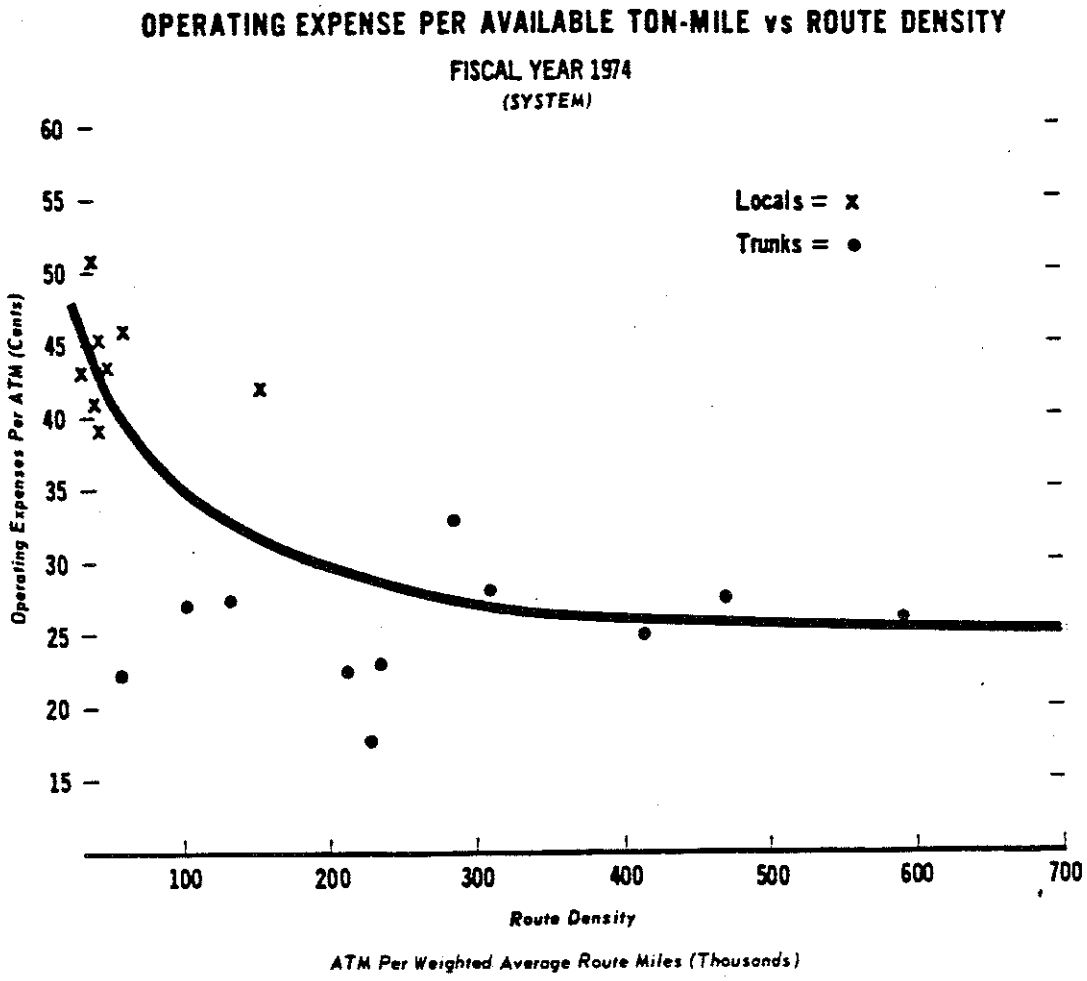
Year	American	Delta	Northwest	United	USAir
1988	14.5	13.9	8.3	91.7[a]	8.0
1987	7.4	13.6	6.8	-0.1	10.3
1986	11.2	3.6	7.0	0.5	9.3
1985	15.9	20.1	7.7	3.1	12.3
1984	15.5	16.8	9.7	15.9	16.6
1983	17.6	-9.7	5.9	10.2	13.2
1982	-2.4	-2.1	0.6	1.0	13.0
1981	2.3	14.0	1.3	-6.5	14.7
1980	-21.9	10.1	0.8	-1.8	27.0
1979	11.3	16.1	8.6	-6.4	19.9
1978	19.1	17.8	7.8	25.7	19.7
1977	10.2	14.8	12.4	10.1	18.8
1976	9.2	12.9	7.8	2.4	6.6
1975	-3.9	10.2	6.9	-0.7	-17.7
1974	3.6	20.5	11.0	12.7	0.7
1973	-8.9	18.1	9.7	7.1	8.8
1972	1.0	13.2	3.7	3.0	8.7
1971	0.5	10.6	4.4	-0.8	-5.9
1970	-7.2	17.1	9.5	-7.2	1.5
1969	9.7	17.2	12.2	7.7	-40.8
1968	9.5	18.5	16.3	7.4	-20.9
Average,					
1979-88	7.1	9.6	5.7	4.2	14.4
1968-78	3.9	15.5	9.2	6.1	-1.9

Results are for the holding companies controlling the airlines. For American and United, holding companies are involved in some additional businesses.'

[a]United's results are distorted by the sale of the Westin Hotel Chain in 1988.

Sources: Fortune 119 (June 5, 1989), pp. 382-383; Standard and Poor Stock Reports, 1988; Value Line, January 5, 1979.

FIGURE 1.



Source: Pulsifer, et. al. (1975, p. 105).

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