Airline Competition in Deregulated Markets: Theory, Firm Strategy, and Public Policy

Michael E. Levine

Follow this and additional works at: http://digitalcommons.law.yale.edu/yjreg
Part of the Law Commons

Recommended Citation
Available at: http://digitalcommons.law.yale.edu/yjreg/vol4/iss2/6

This Article is brought to you for free and open access by Yale Law School Legal Scholarship Repository. It has been accepted for inclusion in Yale Journal on Regulation by an authorized administrator of Yale Law School Legal Scholarship Repository. For more information, please contact julian.aiken@yale.edu.
Airline Competition in Deregulated Markets: Theory, Firm Strategy, and Public Policy

Michael E. Levine†

How airlines compete and the desirability of government intervention to control airline competition must be among the most studied of regulatory questions. Airlines were highly regulated by 1938 in response to political and economic forces that had produced regulation in many industries, including the skepticism about the efficacy of competitive markets that pervaded the Depression Era. The airline industry and its regulation almost immediately became the subject of substantial and continuing academic interest.

Regulation found some academic support in its early years and through the 1950's in the form of variations on the theme of "destructive

† William T. Dalessi Professor of Law, University of Southern California; after July, 1987, General George Rogers Clark Professor of Management Studies, Yale University. B.A. Reed College, 1962; LL.B. Yale, 1965. The author was General Director, International and Domestic Aviation, at the U.S. Civil Aeronautics Board, Executive Vice President, Marketing, at Continental Airlines, and President and Chief Executive Officer at New York Air. He is and has been a consultant to airlines and public bodies connected with aviation and is a member of the Aviation Safety Commission established pursuant to Pub. L. No. 95-504, 92 Stat. 1705 (codified at 49 U.S.C. app. § 1307 (1982)) to assess, among other things, the impact of airline deregulation on operations and safety. Nothing in this Article expresses a view on that impact and no airline or other organization has reviewed this Article. All of the opinions expressed here and the analysis, conclusions, and premises which underlie them are expressed in the author's personal capacity as a scholar, and none should be construed as in any way expressing, reflecting, or even being consistent with the views of any airline or public organization.

My U.S.C. colleagues Richard Craswell (who was especially generous with his time and reading priorities), Catharine Hantzis, Alan Schwartz, and Matthew Spitzer reviewed this Article and made valuable suggestions. None bears any responsibility for any remaining errors or infelicities. Early drafts of portions of this material were presented to the Western Economics Association, the Yale School of Organization and Management, and the Economics Department of the University of California at San Diego. The author gratefully acknowledges the support of the U.S.C. Law Center's Faculty Research Fund.


3. See, e.g., P. Cherington, Airline Price Policy, A Study of Domestic Airline Passenger Fares (1958); F. Gill & G. Bates, Airline Competition (1949); S. Richmond, Regula-
competition," but by 1949 the applicability of those theories to the airline industry had begun to come under skeptical examination by economists.⁴ Although academic controversy over the nature of airline competition continued to some extent into the 1960's, by the mid-1970's it was probably fair to say that no impartial academic observer of any standing doubted that the airline business, if unregulated, would reach something that more or less resembled a competitive equilibrium.⁵ That academic consensus, along with the observed performance of the less-regulated California and Texas markets, provided the principal justification for the deregulation of the domestic airline industry in 1978.

The Airline Deregulation Act of 1978,⁶ which to an unusual degree was the legislative embodiment of an academic consensus, did not diminish the attention given the airline industry by academic observers. On the contrary, the transformation of the domestic airline environment from highly regulated to largely deregulated has been studied extensively, both because it is a relatively rare "natural experiment" with which to evaluate the predictions of academics by observing the effects of an abrupt policy change, and because theoreticians and government authorities alike have used the industry as a prototype for other deregulations. The study of airline deregulation has become almost a cottage industry for economists.⁷

⁴ See, e.g., L. Keyes, Federal Control of Entry into Air Transportation (1951); Keyes, National Policy Toward Commercial Aviation—Some Basic Problems, 16 J. Air L. & Com. 280 (1949).
Airline Competition

Many results of deregulation seem inconsistent with the sort of competitive equilibrium predicted by those who theorized about airline competition. But public, industry, and governmental concern over these inconsistencies has been reflected only imperfectly in academic analysis of post-deregulation airline competition. Recent attempts to improve upon the pure competition approach have included the application of contestability theory. Until recently most analysts accepted contestability theory as a substantially, if not entirely, correct model of airline competition.

In the past few years, airline competition theory has moved somewhat in the direction of deregulated reality. Call and Keeler have expressed considerable skepticism about the use of contestability theory to analyze deregulated airline markets, as has Marius Schwartz. But, they have addressed only speculatively and very incompletely the mechanisms that might create the impediments to contestability that they observe in deregulated airline markets. Pavaux has expressed deep skepticism about the contestability of airline markets, emphasizing production indivisibilities and market segmentation, but his conclusions that competition is unworkable and that the U.S. experience is a failure do not comport with most observations.

Bailey, Graham and Kaplan, Call and Keeler, Moore, and Morrison and Winston have all noted that the econometric evidence is inconsistent with perfect contestability. Bailey and Williams, in a forthcoming paper, identify econometrically the existence of diverse rents inconsistent with contestability, and speculate about their sources.

But without a more complete conceptual account of the forces affecting the structure of these markets, it is difficult to know whether the generally favorable results achieved so far to date under deregulation can view from several experienced former airline executives, see M. Brenner, J. Leet & E. Schott, Airline Deregulation (1985).

8. Contestability theory argues that the benefits of pure competition can be achieved in a market without a large number of actual competitors. The threat of entry can provide an effective substitute for actual competition. The development and application of contestability theory will be described in more detail in Part I of this Article.

9. See supra note 7.


15. Econometric estimates of fare reductions vary, but there is no question that fares have been reduced substantially. See E. Bailey, D. Graham & B. Kaplan, supra note 7, at 60-66; S. Morrison & C. Winston, supra note 7, at 16-23, 28. Service and route systems have also improved. See S. Wheatcroft & G. Lipman, Air Transport in a Competitive European Market 87-89 (1986); U.S. Airports Accommodate Hub Expansion, Aviation Week & Space Tech., Nov. 11,
confidently be expected to continue, or to know how to fashion public policy toward the deregulated industry. Until we have such an explanation, even if academic analysts seem to be correct in their general conclusion that airline deregulation has been excellent public policy, they will be unable to offer satisfactory reassurances about any phenomena that may cause concern. It is difficult to be reassuring about the effects of phenomena that you did not predict and cannot explain.

I propose to analyze the behavior of deregulated airline markets by uncovering and classifying the strategies successfully used by firms, especially holdover firms, to generate rents. Because rents are generated by deviations from perfect contestability and because traditional industrial organization theory does not predict many such deviations for the airline industry, each successful strategy must represent the exploitation of an underlying market feature or features not readily explainable by standard industrial organization characterizations of the airline industry. Many such strategies, it turns out, may be explained by considering information costs, the response of rivals to the revealed conduct of the firm, the principal-agent problem, and firm-specific assets or transaction costs. Using a combination of observed real-world behavior and new industrial organization theory can point us toward a theory of airline competition that explains some of the ways in which deregulated airline markets have deviated from the ideal.

Part I of this Article examines the academic consensus, and in particular the models of perfect competition and perfect contestability, that led to the Airline Deregulation Act of 1978. Part II discusses some important features of the deregulated industry as it has emerged that differ sharply from academics' pre-deregulation predictions. Part III describes the new industrial organization theory's focus on transaction costs, the economics of information, and principal-agent relationships, all of which offer valuable insights into the behavior observed in the deregulated airline industry. Part IV uses the new industrial organization theory to examine some of deregulation's unpredicted results: mergers, vertical integration, hub and spoke domination, complicated fare structures and frequent flyer plans, the developing roles of travel agents and computerized reservation services, predation, and new entrant casualties. Part V discusses the possibilities

1985, at 141. Welfare gains to travelers from fare reductions and service improvements are estimated at six billion dollars per year. Airline efficiency has improved, and service has been better tailored to consumer needs. See S. MORRISON & C. WINSTON, supra note 7, at 2, 24-52, 57-59.

16. Holdover firms are those which possessed significant market presence prior to deregulation.

17. My strategy here is at once more theoretical and more anecdotal than that of E. BAILEY & J. WILLIAMS, supra note 14. I attempt to analyze in detail the theoretical features of deregulated markets that generate the rents they identify econometrically, and I attempt to describe in much greater detail the nature of the real-world activities generating those rents.
This Article is not intended to refute the work of those who have examined empirically the results of deregulation and found large welfare benefits from that policy. Evidence of impediments to contestability in air transport markets does not affect the policy conclusion that airline deregulation has been a very considerable improvement over the previous regulated regime. This Article uses outcomes of the individual firm's rent-seeking behavior as clues to the ways that acceptably performing markets still deviate substantially from perfect contestability. My conclusions are a long way from being either mathematically proved or solidly supported by competent econometric analysis. Nor are they substitutes for further econometric tracking of the deregulated industry to determine whether the benefits achieved so far persist in the environment created by the forces chronicled and explained here. Rather, I offer insights drawn from recent theory to formulate hypotheses about what is occurring in the deregulated industry. These hypotheses seem plausible and I think offer an improved account of what has happened since deregulation, but they will have to be tested elsewhere. Ultimately, such inquiries should help us to learn from a very important experiment in public policy and should assist in analyzing and predicting the outcome of other deregulations undertaken in the last decade.\footnote{18}

I. The Industry and the Theories: A History

Airlines in the United States were heavily influenced by government programs at least as early as 1925, when the Kelly Airmail Act\footnote{19} created a system of airmail contracts that became a vehicle for providing subsidy, without which passenger service was then almost impossible. The main outlines for the next fifty years of the largest route systems were limned in 1929 by the Postmaster General in a series of bid-rigging and market-dividing meetings in his office—denominated in the Senate hearings to which they led as the "spoils conferences"\footnote{20}. Government involvement

\footnote{18. Much of what is said here will of course be influenced by my own experiences as a policy maker regulating rent-seekers and as a rent-seeker observing and reacting to other rent-seekers. I use my experience more to influence the selection and characterization of the subjects of the analysis than its course. From time to time, the reader will encounter purely anecdotal speculation. Where she encounters it, the reader should feel free to use that speculation either as an indication of where better analysis is required or perhaps even as primary evidence of what the participants in the field think is happening.}


\footnote{20. Investigation of Air Mail and Ocean Mail Contracts: Hearings on S. Res. 349 before a Special Senate Comm. on Investigation of Air Mail and Ocean Mail Contracts, 72d Cong., 2d Sess. (1933).}
continued through the 1930's with the scheme created by the Airmail Act of 1934,21 which was a product of the 1933 Senate hearings.22 The industry was comprehensively regulated in the Civil Aeronautics Act of 1938,23 which led to an independent Civil Aeronautics Board24 (CAB) with powers over the industry closely patterned on those over trucking given to the Interstate Commerce Commission by the Motor Carrier Act of 1935.25 That statutory scheme survived for forty years before it was dramatically changed for the domestic industry by the Airline Deregulation Act of 1978.26

The advent of government regulation of airlines generated a considerable and increasing literature,27 which mostly supported airline regulation on grounds similar to those being advanced to support the suppression of competition elsewhere in the economy.28 The literature took this view into the 1960's.29 But even in 1949, with the industry and its regulatory arrangements in their early adolescence, Lucile Keyes argued that entry control regulation had been a mistake.30 This view, isolated as heresy at first, gained support as empirical evidence was collected. An industry study31 found many of the assumptions that had supported regulation to be inconsistent with observed data. Comparisons with alternative regulatory arrangements were also possible, because air transport markets operated under different regulatory schemes at the international, interstate and intrastate levels. A 1965 article32 used the dramatic differences in performance between the regulated interstate and largely unregulated California intrastate airlines, to start the modern movement in the academic literature favoring deregulation.

A new academic consensus emerged by the early 1970's. Empirical evidence of the superior performance of airline markets in California had been merged with a structural and theoretical characterization of the industry as naturally competitive to support the conclusion that the airline business ought to be freed of economic regulation.33 Remarkably enough, by 1980 that academic consensus had been translated into airline

22. See supra note 20.
24. Id. at § 201. The CAB was abolished by the Airline Deregulation Act of 1978, 92 Stat. 1705, § 1601 (codified at 49 U.S.C. app. § 1551 (1982)).
27. See supra note 2.
28. See supra note 1.
29. See supra note 3.
31. R. CAVES, supra note 5.
32. Levine, supra note 5.
33. See authorities cited supra note 5.
deregulation by legislation, international agreements, and regulatory practice. The domestic airline industry was almost completely deregulated. The international industry had been deregulated to degrees that varied by country and region, but in many areas, such as the North Atlantic and Europe-Southeast Asia, it operated with freedom that was startling compared with the systems that had existed only a few years before.

Needless to say, scholars were quick to find occupation in examining the results of these dramatic changes in regulatory structure, and another outpouring of literature resulted. Most of this literature has tended to assess the overall performance of the entire industry or a sector of it, in order to see whether deregulation has produced improvement of the sort predicted by academic critics of regulation. And virtually all of the commentators taking that approach have concluded that a substantial degree of improvement in efficiency and consumer welfare has occurred.

For the most part, this recent literature retains the theoretical and descriptive framework that characterized the earlier debates. That framework used neoclassical economic analysis to describe airline markets, first as "competitive" using the model of perfect competition, and later as "contestable" using a more general model of market competition developed recently. Where improvements in efficiency have been found, they have been taken as evidence that those characterizations were essentially correct. Deviations in degree or kind from theoretical predictions have either been justified by applying somewhat more elaborate forms of price theory or by relating them to standard market structure variations, such as the number of competing firms. At least one study found that the identity of the competitors in deregulated markets is a relevant factor in market performance—a result not easily accounted for with standard models—but


36. See authorities cited supra note 7.

37. See, e.g., S. Morrison & C. Winston, supra note 7.


39. See Call & Keeler, supra note 7, at 223-25; see infra Part I-C.

was unable to offer a satisfactory theoretical explanation of this phenomenon.  

A. Theory of Perfect Competition

The economic theory used by early deregulation literature characterized the airline business and airline markets somewhat ambiguously, but in ways that suggested that performance without regulatory intervention would approximate perfect competition. Even when analysts recognized that small numbers of competitors were characteristic of airline markets, a feature which conventionally suggested imperfect competition, they tended to predict competitive performance. Much was made of both the nature of the inputs to airline service and the observed performance of deregulated markets. These analysts concentrated on the nature of the inputs to airline service and the observed performance of deregulated markets.

In discussing the nature of the inputs used in airline service, analysts emphasized most strongly their contribution to ease of entry and exit. Aircraft were obviously mobile, and airlines used publicly provided airports, airways, and communications facilities rather than constructing their own. At the same time, industry studies emphasized the ability of airlines to purchase inputs from others—for example, by leasing aircraft or contracting for maintenance and ground services, or even by contracting for reservations services—asserting or implying that this conduct would allow entry and exit without substantial sunk costs. Aircraft could be acquired for market entry by reassigning them from a less attractive market or by acquiring them from a firm which was using them less profitably. These aircraft could then be operated using public airports and airways, while airlines organized or rented the necessary ground services. If commercial results did not justify continued operations by a particular firm in a particular market, aircraft could be reassigned elsewhere, returned to lessors, leased elsewhere, or sold as the situation required. Ground services could easily be dismantled, with the actual facilities being made available to other firms or remaining the responsibility of some other entity, such as a municipal airport. Exit from a market would then occur with a minimum of losses from sunk costs.

Related to the absence of sunk costs was the fact that investigators found equal access to technology and no significant economies of scale in airline operations. The studies that established these propositions again

41. See S. Morrison & C. Winston, supra note 7, at 60-66.
42. See, e.g., Levine, supra note 5, at 1440-42.
43. See, e.g., R. Caves, supra note 5.
44. See id. at 56; M. Strasheim, THE INTERNATIONAL AIRLINE INDUSTRY 90-101 (1969);
tended to focus on standard measures of output costs (typically, unit costs per available seat mile), the general strategy being to look at a variety of airlines and to note that, beyond a very small fleet size threshold of five to ten aircraft, unit costs did not seem to decline with increasing fleet size. In fact, the evidence seemed to suggest that, after a broad range of airline sizes exhibiting constant costs per available seat mile, unit costs actually rose for the largest airlines. Explanations for the lack of scale economies tended to focus on the fact that all firms had access to the same sorts of aircraft, and that inputs such as heavy overhaul or engine maintenance which might have required substantial size to amortize were available by contract from other airlines or specialist firms.46

B. Evidence from Intrastate and Other Less-Regulated Markets

The “perfect competition” analysis of the likely behavior of unregulated airline markets appeared to be buttressed by the performance observed in the relatively few real-world markets that were regulated more lightly than scheduled interstate service. California and Texas were two states large enough to have sizeable intrastate markets. California did not control entry at all until 196546 and the Texas Aeronautics Commission permitted entry by intrastate airlines to compete with CAB-certificate airlines.47 In those states, efficient “new entrant” operators, such as PSA and Southwest, competed successfully with CAB-certificate incumbents by using higher load factors and their lower costs to offer prices dramatically lower than those prevailing under CAB regulation.

In California, a large number of firms entered the market in the late 1940’s and a few firms entered sporadically after that.48 Most went out of business without harm to the public, leaving in their wake a few intrastate airlines competing in rapidly growing large markets with older, CAB-certificate carriers. In Texas, Southwest succeeded in entering against the CAB-certificate incumbents, with the resulting competition producing explosive market growth. The growth in both the California and Texas markets was fueled by fares which were about half the levels found under CAB regulation. The fare structures used were simple, with variations attributable to peak/off-peak pricing.


45. See sources cited id.
48. For a detailed history of the California intrastate market, see W. JORDAN, supra note 5.
These results were consistent with those obtained in other markets where competition was less regulated or, in the case of charters, where new and differently regulated competition had been allowed by the CAB or foreign aeronautical authorities. The non-scheduled carriers, "non-skeds," more or less invented aircoach transportation as a more spartan, lower cost alternative to the service then provided by established carriers in high-density transcontinental and north-south markets. They flourished briefly in the early 1950's, but were put out of business by the CAB because they presented too much of a competitive threat to the certificated carriers. Charter airlines provided low-cost alternatives to scheduled service in international and high-volume domestic leisure markets. And in Europe, where the degree of regulation in many ways exceeded that found in the U.S., a very large charter market, tied increasingly loosely to holiday package deals, developed as a high-volume, low-cost alternative to scheduled services in leisure markets.

Regulation stringently limited the use of pricing and product strategies designed to cope with or take advantage of joint product production and indivisibilities, so pricing in domestic regulated markets was relatively simple. Product differentiation, network effects, and other apparent impediments to simple, cost-based pricing were not significant features of the short-haul intrastate or long-haul charter markets which were the principal exceptions to Federal regulation. The result was that before the early stages of airline deregulation academic commentators did not focus extensively on the price structure, as distinguished from the price level, that could be expected under deregulation. On the other hand, because the only examples of markets not subject to CAB entry and price regulation were the intrastate and charter markets, the political process that led to deregulation tended to focus on the favorable performance of those markets. Since simple, low fares were among the most attractive features of these markets, it was natural to associate deregulated, competitive airline markets with simple, low prices and to criticize more complicated price

49. Or, Large Irregular Air Carriers, as they were styled by the CAB.
50. Investigation, Large Irregular Air Carrier, 22 C.A.B. 838 (1955) (docket 5132) (establishing class of supplemental air carrier with definite and defined areas of operations); Large Irregular Air Carrier Investigation, 28 C.A.B. 224 (1959) (docket 5132) (eliminating Large Irregular Air Carrier class and awarding certificates to some of those carriers).
51. European markets have historically been characterized by capacity controls, often by pooling (which can range from agreed revenue sharing formulas to virtual joint ventures between nominal competitors), rigid price regulation with each competitor having a virtual veto power over the others' fares, and entry even more restricted than in the United States (typically one carrier for each route designated by each country). Partly as a result of deregulation in the United States, there has been a move toward liberalization in Europe, with virtual deregulation, for example, between the United Kingdom and the Netherlands. For a discussion of airline regulation in Europe, see S. Wheatcroft & G. Lipman, supra note 15.
structures as discriminatory and *prima facie* evidence of restrictions on competition.

All these factors—ease of entry and exit, lack of economies of scale, lower prices, and less excess capacity in those deregulated markets that existed—led to predictions that price, output and, by implication, firm selection behavior in deregulated airline markets would generally approximate that of perfect competition.\(^5\) Perfect competition implied cost-based pricing, survival of low-cost producers, disappearance of service competition generated by regulated prices fixed at too-high levels and, because there were apparently few fixed or sunk costs, an absence of opportunity for successful predation. All these characteristics, individually or in combination, were among the predictions of the academics who analyzed the prospect of deregulated airline markets.\(^5\)

The literature was generally silent on the number of firms in airline markets and its relation to perfect competition, sometimes noting that airline markets were characterized by small numbers of firms, but glossing over that awkward fact with the observation that entry was easy and therefore market power should be absent.\(^4\)

C. *Contestability Theory*

In the late 1970's and early 1980's, William Baumol, John Panzar, and Robert Willig attempted to formalize the conditions under which natural monopolies could be expected to reach efficient equilibria without regulation.\(^5\) Developing and formalizing an idea put forward by Harold Demsetz,\(^5\) they argued that optimal price and output conditions would be achieved in *any* market having certain characteristics which made it "perfectly contestable." They finally formulated a general theory of contestability in 1982.\(^7\)

---

52. See, e.g., G. Douglas & J. Miller, supra note 5, at 178.
53. See, e.g., G. Douglas & J. Miller, supra note 5; Levine, supra note 5 (demonstrating success of deregulation in the Los Angeles-San Francisco market).
54. Keyes, supra note 4, used the then-fashionable model of monopolistic competition to characterize airline markets, but predicted behavior that was competitive. Levine, supra note 5, noted that airline markets were characterized by only a few firms, but beyond noting that ease of entry would keep prices down, did not address systematically the implicit tension between his predictions that deregulated airline markets would have only two or three competitors and his use of the perfect competition model. Since both works predated both the Demsetz and Baumol, Panzar & Willig variants of contestability theory, see infra notes 56-58, this ambiguity was perhaps to be expected.
55. AT&T, which sponsored this work, was a multi-product company attempting to develop a posture toward the interest in entry and pricing deregulation that by then pervaded the literature on regulation of transportation and communications. See Panzar & Willig, *Free Entry and the Sustainability of Natural Monopoly*, 8 Bell. J. Econ. 1 (1977).
Although this theory was originally developed to deal with single-firm utility-type industries, interest in applying it elsewhere was immediate. Airline markets, which appeared even when unregulated to involve the presence of relatively few airlines in any given airport-pair market, seemed naturally to invite analysis using contestability theory rather than "orthodox" competition theory. In studying airline markets, Elizabeth Bailey, David Graham, and David Kaplan were inclined to accept predictions that unregulated airline markets would achieve competitive results; however, they used contestability theory to justify these predictions, since under no circumstances was it likely that the number of firms in a given airline market would be very, let alone infinitely, large. Unlike perfect competition theory, the theory of market contestability did not require that a number of firms compete in any given market in order to achieve efficient performance. The theory assumed instead that non-participating producers can be such perfect potential entrants that they can offer a supply response when monopolists charge higher than competitive prices and produce lower than competitive output; this supply response would force monopolists to produce the optimal output and price characteristics of competitive markets.

The conditions for contestability, as they have emerged in the literature, are: (1) equal access to economies of scale and to technology, whether expressed as access to competitive levels of unit cost or as equivalent access to product quality; (2) no sunk costs, a firm can enter and exit without entry and exit costs, including operating losses resulting from predation; and (3) price sustainability, there is a set of prices that can occur after the entry of at least one firm which will support profitable operation.

60. Note that contestability theory, unlike the theory of perfect competition, allows for economies of scale. Economies of scale reflect indivisibilities which limit the number of firms that can serve a market at efficient scale. An indivisibility in general is created when it is physically or, more often, practically impossible to produce a good or service in units of a particular quantity. For example, it may be physically impossible to produce legs of lamb in odd numbers and practically impossible to produce, ship, and sell one paper clip. Technically, an indivisibility is a discontinuity in the production function.

For our purposes, we will consider several kinds of indivisibilities. For example, if aircraft are not produced in an infinite range of sizes and the smallest aircraft that can provide the transportation characteristics preferred by consumers (such as jet power and unit costs that will permit competition with other transportation alternatives) has one hundred seats, then production of aircraft departures for scheduling purposes must be in units of at least one hundred seats. This is one kind of indivisibility. It produces an economy of scale, namely, that unit cost per seat for departures of fewer than one hundred seats will be unacceptably high.

61. If a firm can enter and exit costlessly and more or less instantaneously, it need not produce any units while market prices are below cost.
Spence has pointed out that these conditions can be collapsed into costless entry and exit at efficient scale, which is the formulation that Demsetz used originally.

Contestability theory is an interesting starting place to discuss the performance of deregulated airline markets. It leaves in place the predictions of the structure and performance of airline markets that were developed before deregulation using vaguer, and probably inapplicable, forms of the theory of perfect competition. It has the virtue, moreover, of focusing relatively precisely on the conditions necessary to achieve competitive performance from markets with few sellers. It is easily testable. And it turns out to be wrong as a predictor of the behavior of deregulated airline markets.

D. Failure of Contestability Theory

How can we be so sure? We can, as has been done elsewhere, test econometrically the fare levels in deregulated airline markets and show that they are sensitive to factors which are inconsistent with contestability, such as the number of competing firms. But this process is laborious, and each test is open to challenge on technical or interpretive grounds.

A direct inference demonstrates beyond doubt that airline markets cannot be modelled by any reasonably pure version of contestability theory. Consider the central concept of contestability: potential entry by new firms serves to discipline the behavior of participants in real-world markets where a small number of firms participate. This concept implies that firms actually operating in a given market will necessarily reduce their prices to levels consistent with the costs of their potential entrant rivals. Otherwise, entry will occur and they will be replaced. Fortunately, airline deregulation provides an excellent natural experiment testing this proposition.

Airlines did not enter the deregulated era adapted to a world of free competition. Many of them had—and most still have—labor costs higher than those of new entrants. Virtually all had route structures that were artifacts of regulation and were not adapted to the needs of customers free

63. See, e.g., E. Bailey & J. Williams, supra note 14 (showing how pursuit of stable rent patterns leads to more concentrated industry); S. Morrison & C. Winston, supra note 7, at 60 (finding that perfect contestability is not present in the airline industry because carriers require time and must absorb sunk costs to obtain gate space and establish patronage); Call & Keeler, supra note 7, at 244 (finding higher concentration and higher fares inconsistent with contestability hypothesis).
64. See, e.g., Jensen, Europe from the American Airlines Perspective, 38 ITA MAGAZINE 7 (1986) (describing high labor and fuel costs, mismatched aircraft and air routes, work stoppages, and fare wars in existence at time of deregulation).
to choose in unregulated markets. And virtually all had been forced, or helped, by regulation to pursue pricing policies different from those demanded by the marketplace and very different from those predicted for unregulated markets by scholars who had studied the industry.\footnote{See Levine, supra note 5, at 1444.} Suboptimal route and pricing policies had led as well to the acquisition of capital equipment—for example, an excess of widebodied aircraft—that was inefficient in a deregulated environment. If airline markets were highly contestable, these firms would have had no survival advantages over new firms formed and adapted for the purpose of competing in deregulated markets.

Contractual commitments of various kinds, including such items as unproductive and expensive labor arrangements, purchase debts, or long-term leases of unsuitable equipment built in costs for holdover airlines higher than those experienced by new entrants. If committed costs, information lags, transaction costs, firm-specific investments, and sheer human inertia\footnote{Perhaps best modelled as the time lags and costs of effecting changes in attitude and work practices.} play a role in the behavior of real-world airlines, holdover firms should have been at a disadvantage in comparison to the new entrants. This disadvantage should have resulted in the holdover firms’ being replaced by new entrants, or at least transforming themselves into carriers with new-entrant costs.

As deregulation began, many observers inside and outside the industry made such predictions.\footnote{See E. Bailey, D. Graham & D. Kaplan, supra note 7, at 91-110; Keeler, supra note 5; see also the author’s previous work, Levine, Financial Implications of Regulatory Change in the Airline Industry 49 S. Cal. L.R. 645, 655-57 (1976).} Much was heard about the possibility that high costs and obsolete attitudes had made holdover firms overweight, possibly arthritic, dinosaurs, threatened by nimble, lean, and aggressive new-entrant carriers. The predicted consequences of extinction obviously depended on whether the observer’s well-being was tied to the dinosaurs as employee, shareholder, or lender of a holdover airline, or tied to the emerging family of mammals as a supplier of input factors to new entrants, a deregulator, or a consumer. But the intellectual framework in which such assessments occurred was one that implied a high degree of contestability.

As events transpired, some of these “disadvantaged” firms have adapted to the deregulation of the airline industry so well that they are virtually the only survivors of any size. All of the ten largest domestic airlines in 1986 held CAB certificates in 1950.\footnote{The ten largest firms controlled 94.6% of industry passenger miles in 1986. See U.S. Industry Market Share, Aviation Daily, Jan. 30, 1987, at 153. (A revenue passenger mile is the principal} To be sure, many holdover firms
were unsuccessful in surviving absorption or worse. Being a previous CAB licensee was not a sufficient condition to ensure survival as one of the biggest firms in the deregulated market. Strikingly enough, though, it turns out to have been a necessary one.

Of course, the survivors have adapted substantially. They have acquired large fleets of smaller narrow-bodied DC-9's and Boeing 737's, sold their large 747's, and substituted narrow-bodied aircraft or smaller Boeing 767's for larger wide-bodied aircraft on many non-hub long-haul flights. They have renegotiated their labor contracts and reduced their labor costs, with varying degrees of success. But with the exception of Continental Airlines' well-publicized cost transformation using the bankruptcy laws, no holdover carrier has lowered its unit costs to new-entrant levels. American's use of "two-tier" labor arrangements gives it incremental costs at or very near new-entrant levels, but it has a substantial but declining burden of "old-era" costs at its core. Holdover airline unit operating costs per available seat mile range from USAir's 8.6 cents to Continental's 5.4 cents, and average 7.2 cents. New entrant airline unit costs are substantially below that, from New York Air's 8.2 cents to Transtar's 4.8 cents, and average 6.2 cents. The only way to prosper or to survive for any length of time with above-market costs is to earn rents. Depending on

standard measure of industry output and consists of one passenger carried one mile. Other possible measures are available seat miles, which is the amount of capacity offered, and total revenues. While use of one of the other measures might change the percentages slightly, none would change the identity of the ten largest carriers or change the essential point.)

Holdover firms which were unsuccessful in surviving absorption include National, Western, Airwest, and Republic, along with a number of smaller airlines. In one case (Braniff), a holdover achieved spectacular disappearance and modest resurrection. And many of those which survived (although, interestingly, not United, American, Delta, and Northwest, the two biggest and four of the six biggest pre-deregulation firms) have undergone very substantial management changes in the course of surviving.


70. Devised by American Airlines in 1983, the two-tiered salary plan allows the firm to hire new employees at lower wages while current employees retain job security and receive no pay cuts. As older employees retire and new workers are hired at market rates, the firm's costs decline.

71. Department of Transportation Form 41, Schedules P-1, T-2, (American (AA), USAir (AL), Continental (CO), Delta (DL), Eastern (EA), Northwest (NW), Pan American Domestic (FN), Piedmont (PI), Republic (RC), TWA (TW), United (UA), Western (WA)) taken from electronic data supplied by J. P. Sharp Associates (on file with author).

72. Id. (American West (HP), Midway (ML), New York Air (NY), Jet America (SI), People Express (PE), Muse Air (MA)).

73. Continued existence over a period of time may not necessarily be evidence of a successful adaptation strategy. The firm could have substantial unrealized asset profits which it turns into cash to cover operating losses. This is common among poorly-adapted deregulated firms. Perhaps the most spectacular case is Pan American, which has used gains from the sale of property, subsidiaries, and the franchise value of routes to cover operating losses since deregulation. By doing so, Pan American
the degree to which costs are above market or on the sheer magnitude of potential rents, pursuit of rents may hold forth the promise of above-market returns to shareholders of some surviving firms. For other firms left with pre-deregulation costs and capital endowments at non-competitive levels, searching out rents literally has been a matter of survival. Such firms must generate rents to service their above-competitive costs in order to yield a normal market return.

Holdover airlines have learned to compensate for above-market costs by successfully pursuing revenue-earning strategies that generate rents and have not—and perhaps cannot—be duplicated by smaller new-entrant firms with lower production costs. They have learned as well to use their holdover position and size advantages to impose costs on these rivals, thus narrowing the production cost differences. Important clues to the nature of competition in deregulated markets lie in the successful adaptive strategies pursued by initially ill-adapted holdover firms (hereinafter called "survival strategies"), and the difficulties these strategies have created for competitors, especially new entrants advantaged in ways that theoretically should have led to success in unregulated markets.

II. Anomalies in the Post-Deregulation Airline Industry

Academic curiosity about the outcome of a great change in regime and persistent policy concerns about airline deregulation have combined to continue the exceptional degree of academic and policy interest in the performance of airline markets and the factors that most influence that performance. Recent studies have generally supported the prediction that a deregulated airline industry would be more efficient but interesting deviations from pure competition or perfect contestability have been observed. These deviations—mergers, vertical integration, hub domination, complex fare structures and frequent flyer programs, the role of travel agents, the use made of computer reservations systems, the use of limited airport slots and gates, predation, and new entrant fatalities—cannot adequately be explained by the traditional models of airline competition.

has stayed in existence as an airline, albeit one that is worth less to its shareholders with each sale. This sort of survival by realizing rents in non-operating transactions should not be mistaken for that described in the text, in which rents are earned and dissipated in operations to allow accounting profits or breakeven despite above-market costs.

74. See sources cited supra note 15.

75. The list of outcomes reflecting impediments to contestability examined in detail in this Article is not meant to be exhaustive. This Article is principally concerned with those phenomena of deregulated airline competition which are best understood in terms of the "new industrial organization." Of course, there are also impediments to contestability which are not related to phenomena addressed by industrial organization theory old or new, but rather to such "old-fashioned" artifacts of political economy as poorly designed government policies which create rents. One example is in the area of allocation of landing slots and gates at congested airports. See infra Part IV-H.
A. Mergers and Consolidation

Most academic theorists who have examined production costs in the airline industry have not found significant economies of scale, and consequently have concluded that there should be no tendency toward large-firm oligopoly or monopoly. Pre-deregulation mergers could be understood as the purchase and potentially synergistic combination of valuable franchise rights. But there have been at least two periods since deregulation—1979-81 and 1985-86—during which a considerable number of major consolidations were attempted and consummated.

Some mergers, particularly those involving common hubs or involving gates and slots at congested airports, have generated considerable controversy and apprehension about the performance of deregulated markets. Since the airline industry involves neither economies of scale nor natural barriers to entry, traditional concepts of industrial organization suggest that mergers should be scrutinized for acceptability principally by looking for special barriers to entry. So far, the only special barriers to entry given serious consideration in analyzing mergers have been those created by combining leases on scarce terminal gates and “owned” portfolios of scarce landing slots.

Beyond these limited aspects, the most widely held view of the contestability of airline markets neither generates any basis for opposition to

Another important example is in the area of local noise regulation by airport proprietors, where airport operators have frequently resolved conflicting political pressures from noise-sensitive communities on the one hand and major airline users of particular airports on the other by inventing noise-control schemes which place greater practical burdens on new entrants than on existing airlines. For example, an airport might “grandfather” a substantial level of noisy operations by incumbents, while requiring both new entrants and expanded operations by incumbents to use quieter aircraft. The incumbent retains great flexibility in aircraft selection because trades are allowed within the grandfathered base, while the new entrant must use only new, expensive, quiet aircraft whose cost characteristics may not be as well adapted to the particular routes it wishes to serve. The effect of such policies is obviously to impede the contestability of markets involving that airport, creating rents for incumbent operators.

76. See, e.g., R. Caves, supra note 5, at 56-61.
77. The CAB disapproved the first Continental-Western merger proposal in 1979. It approved, among others, North Central-Southern (1979), Republic-Airwest (1980), Pan American-National (1980), and Texas Air-Continental (1982). The CAB also approved unconsummated mergers between Texas International and National (1979) and Continental and Western (1981). The Department of Transportation has approved virtually every merger proposed to it. Among major and large regional airlines, these include People Express-Frontier (1985), Piedmont-Empire (1985), Southwest-Muse (1985), Alaska-Jet America (1986), Delta-Western (1986), and Texas Air-People Express (1986). DOT approved other important mergers over the objections of the Justice Department, including Republic-Northwest (1986), Pan American-United Pacific Route Transfer (1985), and TWA-Ozark (1986). The Texas Air-Eastern (1986) and United-Frontier (1986) mergers were conditioned by the parties after the Justice Department objected, and were approved after the parties addressed the objections by divesting themselves of gates and/or landing slots. In addition, numerous buyouts of regional airlines by major or national carriers have been approved. For a partial listing, see Aviation Daily, Dec. 12, 1986, at 385. As of May, 1987, two more important mergers, American-AirCalifornia and USAir-PSA, were in the final stages of approval, and USAir-Piedmont was pending.
these mergers nor easily explains many of them. Yet the mergers persist, as does Congressional, governmental, media and public suspicion. What features of airline competition under deregulation account for this wave of mergers? If entry is so easy that no supracompetitive rents can be created by a merger, why should firms merge to expand?

B. Vertical Integration

Deregulated airline markets have exhibited a degree of vertical, as well as horizontal, integration that has surprised many. Very few, if any, production economies explain the inexorable pressures to combine by consolidation or contract the international and domestic long-haul, domestic short- and medium-haul, and local feeder segments of the industry. In fact, for many years, it was something of an accepted fact in the industry and among scholars78 that such combinations were inefficient because they imposed the overhead and labor costs of the higher-density, longer-haul modes on the shorter-haul, lower-density operations. Deregulation's proponents thought that its many advantages would include a reallocation of resources from firms that had proved inadequately profitable under regulation toward a proliferation of independent specialized carriers with suitable cost structures. These carriers would be found in high-density short-haul markets such as those served by PSA (Los Angeles-San Francisco) and Southwest (Dallas-Houston-San Antonio) and those entered after deregulation by such firms as Midway, New York Air, and many others. Specialized carriers were also expected to serve in very low-density or short-haul markets like those served by the “Part 298” commuter carriers79 and perhaps other, somewhat larger markets that had been inappropriately served by CAB-certificated carriers. The new specialists, it was expected, would when necessary transfer passengers to international or longer-haul domestic services through interline transfer arrangements.

Expectations were confirmed initially, especially in the substitution of smaller carriers (once called “commuters” and now called “regional” airlines) flying smaller aircraft in short-haul, low-density markets. But in recent years a strong trend has emerged toward the integration of international, domestic trunkline, and/or feeder services, often by ownership but frequently through contractual agreements between major or national

78. See G. Eads, The Local Service Airline Experiment 31-74 (1972).
79. “Part 298” commuter carriers were airlines exempted from price and entry regulation under 14 C.F.R. § 298 (1986). The “Part 298” exemption required that they operate aircraft below a certain size (which was increased over the years from 12,500 pounds maximum gross weight to 18,000 pounds maximum payload capacity or sixty seats). 14 C.F.R. § 298.31 (1986). It was hoped that they would provide a lower-cost alternative to the CAB-certificated local service carriers in providing service to small communities and on very short haul routes.
Airline Competition

carriers and regionals that involve codesharing,\textsuperscript{80} coordinated scheduling, and shared marketing identity.

A few short-to-medium-haul, high density specialists like Midway and Southwest remain independent. Some jet operators that are regional specialists, like America West and Florida Express, also operate without a high degree of vertical integration, although even America West, a carrier of substantial size,\textsuperscript{81} found it beneficial to enter into a codesharing arrangement with Northwest which Northwest terminated when it merged with Republic. Many others, of course, have gone out of business. Most of those survivors which have not been bought by major airlines have formed contractual alliances with them and have virtually ceased to market their output independently.\textsuperscript{82} While more efficient labor arrangements have made possible some vertical integration without sacrifice of efficiency, the operation even of wholly-owned regional airlines as separate subsidiaries suggests that the principal advantages of vertical integration in the airline industry still do not lie in production efficiencies. What then accounts for this trend?

C. Hub and Spoke Systems

Yet another striking feature of deregulated airline markets has been the nearly universal emergence of the "hub and spoke" system as the route structure of choice for deregulated airlines.\textsuperscript{83} Nothing in the academic literature on the basic economics of the airline business addressed route structure or suggested that it was a consequence of some other important feature of airline markets. In fact, the intrastate airlines used explicitly or implicitly by both academicians and politicians as models of the deregulated future all had linear route structures, as did most CAB-regulated airlines, but this characteristic went unremarked.

In contrast, deregulated airlines have used hub and spoke systems almost exclusively. Such route structures were certainly not unknown under regulation; Delta operated a hub at Atlanta and Frontier operated one at Denver. But they were not characteristic of the pre-deregulation airlines.

\textsuperscript{80} Codesharing allows flights operated by a regional airline to be identified by a national airline's two-letter code in the Official Airline Guide. See D. Pickrell & C. Oster, A Study of the Regional Airline Industry: The Impact of Marketing Alliances 2 (1986).

\textsuperscript{81} As of March, 1987, America West operated forty-eight Boeing 737 aircraft, and had six Boeing 757 aircraft on order. See Smith, America West Continues Expansion With Transcontinental 757 Service, Aviation Week & Space Tech., March 2, 1987, at 42.

\textsuperscript{82} PSA, AirCal, Provincetown-Boston, Britt, Rocky Mountain, and many others have been purchased by major airlines. Air Wisconsin and Presidential are among the many smaller carriers that have formed contractual relationships with major airlines.

\textsuperscript{83} "Hub and spoke" systems concentrate most of an airline's operations at one or a very few "hub" cities, serving virtually every other city on the system nonstop from the hub and providing predominantly one-stop or connecting service through the hub between cities on the "spokes".
For example, Dallas and Chicago accounted for only 25.0 percent of America's departures in 1977 before deregulation—if an airline operated a system that was entirely hub and spoke, the hub cities would account for fifty percent of departures—Denver and Chicago 19.6 percent of United's departures, and St. Louis 11.3 percent of TWA's domestic departures. By 1985, seven years after deregulation, hubbing at those cities had raised their shares of domestic departures for American, United, and TWA to 38.0, 30.6, and 34.6 percent respectively.84

The emergence of hub and spoke systems has reassured airlines concerned about survival and has worried competition-oriented analysts for the same reason. Hub and spoke systems seem to provide some protection from new entry and hence some market power at the hub city, power which is enhanced when the hubbing airline also operates the dominant computer reservation system at the hub. At a "strong" hub—one where one or two airlines have large connecting complexes which account for a large proportion of departures—any new entry that does occur ordinarily seems to be limited to service to and from other airlines' strong hubs. The new entrants do not appear to compete on the hubbing airline's spoke segments to other non-hub cities. Infrequently, an attempt will be made to establish a competing hub structure at another airline's strong hub85 or a struggle will develop among several airlines attempting to establish a hub where none existed before. But the contests that occur are usually treated by contestants and observers alike as battles for the survival of only one or two carriers, who are expected to earn rents at the hub once the smoke clears and the dead and wounded are carted away.86

84. Department of Transportation Form 41, Schedule T-3 (I.P. Sharp Associates, data on file with author).
85. After deregulation, American built a very strong hub in Dallas in competition with Braniff, which attempted to do the same. While American and Braniff were engaged in a competitive struggle, Delta announced its intention to build a Dallas hub, and proceeded to do so during and after Braniff's demise. Delta's operation at Dallas, although large, is still considerably smaller than American's. Delta has announced that it intends to continue expanding. For a somewhat sensational and occasionally inaccurate account of the struggle between American and Braniff, see J. NANCE, A SPLASH OF COLORS (1984).
86. New York Air announced its intention to create a substantial hub at Dulles in Washington in 1985, at about the same time that Presidential, a new entrant carrier, raised money to start a Dulles hub operation. Shortly thereafter, United announced its intention to build a hub complex at Dulles. See United Airlines Increases Flights at Washington Dulles, AVIATION WEEK & SPACE TECH., Jan. 26, 1987, at 49. As of April, 1987, New York Air (which had been a Texas Air Corp. subsidiary) was merged into Continental, another Texas Air Corp. subsidiary, so that its Dulles hub was being operated under the Continental trademark. United's hub continued to expand. Presidential had withdrawn from competition with Continental and agreed to operate under Continental's name and identifier as a "Continental Commuter," feeding Continental's Dulles hub from cities not served by Continental. See Presidential to Become Continental Express at Washington Dulles, AVIATION DAILY, Jan. 13, 1987, at 58.
The word "hub" is virtually absent from pre-deregulation theoretical comment on the industry. Its dramatic emergence is certainly not accounted for by analysis of production costs, physical entry barriers, and firm scale economies. What features of deregulated airline competition account for the dominance of hub and spoke route structures in post-deregulation airline markets? What, if any, are the policy implications of that dominance?

D. Complex Fare Structures

The immensely complicated fare structure that has emerged since deregulation is yet another phenomenon not easily explained by recourse to the pre-deregulation analytical literature or to post-deregulation analysis based on the assumption that the airline industry is perfectly competitive or contestable. Regulation imposed an extremely simple fare structure on the domestic industry. The principal issues under that structure were characterized in regulatory terms as "discrimination" and were represented by such proposals as restricted excursion fares, night coach fares, and very low but simple fares which new-entrant "cream-skimmers" wanted to offer the traveling public. Pre-deregulation analysis looked at the rigid fare structure imposed by the Domestic Passenger Fare Investigation (DPFI) and concluded that its hostility to peak/off-peak pricing and to low unrestricted fares that undermined cross-subsidies impeded the efficient matching of fares to costs. Restricted excursion fares were regarded as an artifact of discriminatory market power buttressed by entry controls.

Examination of pricing in intrastate Texas, California, and charter markets suggested that deregulated coach fares would be relatively simple and unrestricted, although more peak/off-peak pricing would

87. For a discussion of discriminatory pricing, see F. Scherer, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 14-15 (1980).
88. These proposals involved offers to provide transportation on the densest routes at low fares. The airlines which proposed them expected to keep costs low and to fill up airplanes at low fares.
89. The DPFI was a monumental effort which substituted a comprehensive uniform fare structure for the patchwork system of ad hoc rate approvals that had ultimately been challenged and found unlawful in Moss v. Civil Aeronautics Bd., 430 F.2d 891 (D.C. Cir. 1970) (holding that rate increases granted by CAB violated Board's rate-making authority). It was undertaken in nine separate concurrent phases under different administrative law judges and prescribed all the elements (service standards, distance taper, permissible discounts, etc.) necessary to specify completely fares in any market, justified under a sort of collective public utility theory of average industry cost ratemaking. CIVIL AERONAUTICS BOARD, DOMESTIC PASSENGER FARE INVESTIGATION: JANUARY 1970 TO DECEMBER 1974 (1976) [hereinafter DPFI].
90. The most complete account of the deregulation critique of the DPFI standards and, by implication, virtually all historic CAB passenger ratemaking, can be found in the deregulationist CAB document that dismantled the DPFI. CAB Policy Statement PS-80, 43 Fed. Reg. 39535, codified at 14 C.F.R. Pts. 399.31, 399.33 (1978).
be observed. The airlines' initial pricing reaction to deregulation—unrestricted low fares undermining unsophisticated attempts to implement price discrimination—seemed to bear out these predictions. When restricted discount fares began to proliferate rather than disappear, there was a tendency to regard them as part of the tatonnement process while residual market power in the system was competed away. The persistence of these fares has engendered public ridicule, if not official concern, over the effects of deregulation, and requires further explanation.

E. Frequent Flyer Programs

Frequent flyer programs have assumed an unexpected importance in deregulated airline competition. When first introduced by American Airlines in 1980, the frequent flyer program seemed to many observers in and outside the airline industry, and perhaps to American itself, to be a marketing "gimmick" of only peripheral importance. It is now apparent that frequent flyer programs are very important keys to competitive viability. They have been adopted by virtually every carrier of any size. Even airlines whose hub systems give them relatively large proportions of monopoly routes, like Piedmont and USAir, have been forced to offer them after initial resistance, as have new entrants such as People Express, America West, and Midway, which had expected that their low and relatively non-discriminatory fare structures would make bonuses unnecessary.

F. Role of Travel Agents

The role of travel agents in the distribution system was expected to decline after deregulation as airlines experimented and ultimately adopted methods of distribution not sanctioned by regulation. It appears that the opposite has occurred.

91. See {Kennedy Hearings, supra} note 5, at 35, 52 (testimony of Thomas E. Kauper, Antitrust Division, Department of Justice).
92. Tatonnement denotes the process through which buyers and sellers mutually adjust prices over time to equilibria, sometimes displaying irregular changes in prices. {H. Varian, MICROECONOMIC ANALYSIS} 245-49 (1984).
93. Airlines with frequent flyer programs credit travellers for miles flown and offer free or reduced-cost airline tickets or upgrades in class after a certain number of miles are flown. Often these plans also offer credits for use of related services, such as rental cars and hotels.
94. As of February 1, 1987, the lone holdouts among major U.S. carriers were Southwest and its wholly-owned subsidiary, Transtar.
95. Travel agents are estimated by the Air Transport Association of America using commission expenses reported on DOT Form 41 and average commission rates provided by the Airlines Reporting Corporation to have issued 56% of all tickets (domestic and international) in 1977, the last full year before deregulation, and are calculated on the same basis to have issued 86.4% of all tickets in
The relationships between airlines, travel agents, travel agent incentives, commission override programs, and airline computer reservations systems used by travel agents, when addressed at all in the context of deregulation, were discussed as a byproduct of the CAB-sanctioned system. In this system, entry-controlled airline-accredited travel agents issued tickets for fares fixed by the CAB at above-cost levels and were compensated by means of CAB fixed commission rates. Although overrides became common once commission rates were deregulated, it was assumed, incorrectly, that they would disappear once competition drove fares to cost, freer entry into the agency business eliminated excessive commissions, and alternative distribution systems freed both airline and customer from heavy reliance on travel agents.

G. Computerized Travel Agent Reservation Systems

The central role played by computerized travel agent reservation systems (CRSs) is another unanticipated phenomenon of the deregulated environment which requires further explanation. A travel agency uses a CRS provided by an airline to get flight and fare information for its customers, issue tickets and boarding passes, and provide ancillary services such as rental car and hotel reservations. Either because of economies of scale or because of contractual terms, an agency usually uses only one system. The six largest domestic airline systems all own CRSs (Northwest and TWA jointly own PARS, so there are five systems). The CRSs owned by two airlines, United and American, are used by seventy percent of travel agencies; of all airline tickets sold, fifty-seven percent are sold through CRSs.

CRSs have been used to distort information received by travel agents and consumers about the service offerings of rival airlines. Travel agents have benefited from the proliferation of fares, airlines, and services by gaining a tight hold on the retail distribution system. Overrides have

1985, after seven years of deregulation. While there is some doubt as to whether this data is correct in absolute terms, there is little doubt that the proportion of domestic tickets issued by travel agents has increased substantially since deregulation. (Private communication by author with David Swirenga, Air Transport Association of America).

96. "Commission override" denotes incentives in the form of special services or extra commissions given to encourage travel agents to sell seats on a particular airline.

97. The relationships were controlled by industry agreements in the form of Air Traffic Conference resolutions sanctioned by the CAB. After a CAB investigation, the antitrust exemption for these agreements was ended in 1984. See CAB INVESTIGATION INTO THE COMPETITIVE MARKETING OF AIR TRANSPORTATION, ORDER 82-12-85; [hereinafter COMPETITIVE MARKETING]. For a description of the agreement, see Ass'n of Retail Travel Agents, Ltd. v. Air Transport Ass'n of America, 623 F.Supp. 893 (D.D.C. 1985).

98. United Airlines v. Civil Aeronautics Bd., 766 F.2d 1107, 1109 (7th Cir. 1985).

99. Id. at 1110 (1985).
proliferated in a domestic market in which they were previously illegal and almost unknown.\textsuperscript{100} Airlines with a large volume and variety of flights at a city—"presence" in industry marketing jargon—can create more effective override programs than can their competitors. Airlines that combine both market presence and precise information about competitors' activities provided by having the bookings of competitors made on their own CRSs can employ incentive programs very effectively indeed.

Since deregulation, these unexplained phenomena have generated a major CAB rulemaking,\textsuperscript{101} a further Department of Transportation (DOT) investigation,\textsuperscript{102} at least three private antitrust suits which have been consolidated into a multi-district litigation,\textsuperscript{103} and calls for laws or rules requiring divestiture of computer reservations systems by their airline owners.\textsuperscript{104}

H. Slots and Gates

Airport slots and gates were identified relatively early by those interested in deregulation as important to the functioning of a competitive airline system.\textsuperscript{105} Concern has largely focused on mechanisms to avoid slot and gate waste, thus freeing these often very scarce resources to flow to their most valuable use. Concerns have also arisen about the availability of slots and gates and whether new entrants or expanding airlines could acquire them on competitive terms.

These concerns are important in their own right and resolving them successfully is a necessary condition for contestability to produce an equilibrium resembling that of competition. But the obsession to acquire and hold slot and gate portfolios, exhibited both by holders of gates and slots and those who wish to acquire them, requires further explanation. Such

\textsuperscript{100} Overrides have always been common, though not always legal, in international markets.


\textsuperscript{102} DOT Opens Computer Reservations System Investigation, AVIATION DAILY, Feb. 3, 1987, at 1.


\textsuperscript{105} D. GRETHER, R. ISAAC & C. PLOTT, ALTERNATIVE METHODS OF ALLOCATING AIRPORT SLOTS: PERFORMANCE AND EVALUATION (1979) (Study prepared for the Civil Aeronautics Board by Polinomics Research Laboratories, Inc., Pasadena, Calif.); Levine, supra note 5, at 1417.
behavior may be a risk-averse response by firms to an area of uncertain and often wrongheaded government policy; it may also amount to creative exploitation of inept Federal Aviation Administration (FAA) policy in addressing the slot problem. But these answers are not entirely satisfactory; the problem could be better understood by further theoretical analysis of deregulated airline competition.

I. Predation

Virtually every modern analysis of airline competition has focused on the mobility of airline capital equipment and the lack of production economies of scale at the firm level, concluding that predation should not be a matter of concern.\textsuperscript{106} The standard analysis presumes that an airline targeted as a victim of predation can simply withdraw its capacity from the market, refusing to operate below cost, then reenter once the predator raises fares to compensatory levels. Yet apparent predation attempts have been plentiful:\textsuperscript{107} a higher-cost incumbent may lower fares to a level apparently lower than cost and, on occasion, lower than those introduced by a lower-cost new entrant, and then refuse to match increases proposed by the new entrant until the new entrant is financially exhausted or withdraws from the route. Many such gambits seem to have been sufficiently successful to require a reexamination of airline competition to find a theoretical basis for what is being observed.

Of course, explaining why predation might be attempted or even successful in the deregulated industry does not necessarily imply that there is a policy cure for this phenomenon which is better than the disease. But intelligent policy cannot be made without an examination and explanation of the disease to set the stage for further consideration of the efficacy and safety of proposed cures.

J. New Entrant Casualties

The casualty rate among new entrants has puzzled many analysts who favored deregulation and has generated concern about the nature of competition in deregulated airline markets. Holdover firms entered the deregulated era with a variety of handicaps stemming from their previously-regulated status, including high labor costs, inefficient route systems, inefficient equipment mixes and internal organizations poorly adapted to open competition. Physical entry by new low-cost firms

\textsuperscript{106} See, e.g., \textit{Kennedy Hearings}, supra note 5; Levine, supra note 5, at 1417; Snow, \textit{Aviation Regulation: A Time For Change}, 41 J. AIR L. & COM. 637, 663 (1975).

\textsuperscript{107} For accounts of aggressive pricing, see \textit{Fare Wars are Becoming a Way of Life}, BUS. WEEK, Jan. 13, 1986, at 102; \textit{The Airlines' Dangerous Games with Fares}, BUS. WEEK, Mar. 5, 1984, at 33.
specially adapted to the deregulated environment is easy because of the mobility of capital equipment, availability of a highly mobile skilled labor costs, and the availability of many indivisible factors of production on a contract basis.

Then why have so few new entrants survived and even fewer prospered in competing with the holdovers? Of the truly new entrants spawned by deregulation, 108 none at this writing has shown consistent profitability and only a very few can be said to be assured of survival. With the merger of People Express into Continental, none of the new entrant survivors generates more than one percent of total industry revenues.109 Most of those which started in the immediate post-deregulation era have already failed, and virtually all—alive and dead—have been forced to change route or marketing strategies dramatically in the course of their respective corporate histories.

III. The "New Industrial Organization" and Airline Competition

The evidence in Part II demonstrates that much that has occurred in the airline industry since deregulation cannot adequately be described using contestability models. At least seven factors, mainly drawn from recent theory which is often labelled the "new industrial organization theory", can help us explain these deviations from contestability and the direction of development of the U.S. domestic airline system since deregulation. The relationship between these factors, which limit contestability, and are responsible for the phenomenon described in Part II, and will be explained in detail in Part IV. The purpose of this Part is to isolate factors affecting the domestic airline business that make contestability an inadequate model, and to describe the new industrial organization theory that takes these factors into account.

First, the industry has been profoundly affected by the costs of developing and communicating information about routes, schedules, seat availability, service features, and prices to consumers of air transportation.110 These costs have contributed to the competitive significance of computer reservations systems, the practice of contractual vertical integration and codesharing between airlines, the development of hubs, airline consolida-

108. I exclude airlines like Southwest, Aircal, and PSA which had been in business as scheduled jet airlines for some years before they were let out of their intrastate cages.
110. Although the idea has earlier roots, the first modern article addressing this question is Stigler, The Economics of Information, 69 J. POL. ECON. 213 (1961).
tion to achieve "presence" and, perhaps surprisingly, to the possibility of successful predation even though airline capital is mobile.

Second, there are costs and economies of scope\textsuperscript{111} associated with generating a reputation (a form of information) for fierce competitive behavior among a firm’s actual or potential competitors.\textsuperscript{112} In an industry in which firms compete against one another in various combinations in a very large number of city-pair markets, these economies create advantages for large firms willing to invest through operating losses in deterring smaller rivals from entry or price competition.

Third, costs are involved in the task of monitoring (generating information about and influencing) the behavior of parties to transactions, such as travelling employees and travel agents, whose interests differ from the parties on whose behalf they act. This problem is not specific to air transport, and has become known in the literature as the "principal-agent" problem.\textsuperscript{118} These costs have contributed to the development and success of frequent flyer programs, complex fare structures, incentive payments to travel agents by airlines to book business on that carrier, the role of CRSs in attaining competitive dominance, the use by established airlines of airport facilities leases to raise rivals’ costs through gate use agreements tied to ground handling contracts, the relevance of firm size and balance sheet equity to "riding out" cyclical variations or predatory competitive tactics, and the success of hub strategies.

\textsuperscript{111} Economies of scale refer to any advantages resulting from the gross size of the airline in number of planes or flights or some other convenient measure. Economies of scope refer to any advantages accruing from the number of cities or consumer submarkets served. Because passengers demand trips for many purposes between many pairs of cities, an airline that serves both business and leisure markets in many city-pairs can take advantage of information efficiencies and efficiencies in exploiting principal-agent effects that an equally scale-efficient airline serving fewer cities cannot.


\textsuperscript{113} For an excellent general survey of the principal-agent literature as it is most widely discussed by economists, see Rees, The Theory of Principal and Agent (pis. 1 & 2), 37 BULL. ECON. RES. 3 (1985), 37 BULL. ECON. RES. 75 (1985), and the references therein. The problem was identified by Knight as early as 1921. See F. Knight, Risk, Uncertainty and Profit ch. 10 (1921). The modern literature tends to treat the principal-agent problem as one of game theory, in which the principal attempts to structure the incentives of the agent to achieve the desired behavior in the face of necessarily imperfect (because costly) information about the agent’s behavior, or else constructs strategies designed to defend against undesired behavior. The seminal article for this treatment of the problem is Ross, The Economic Theory of Agency: The Principal’s Problem, 63 AM. ECON. REV. 134 (1973). In an extremely interesting article which predated the game theoretic literature, Alchian & Demsetz focused on the monitoring cost and joint (team) production aspects of the principal-agent problem, relating it directly to the theory of the firm. This article made analytic use of both views of the problem. Alchian & Demsetz, Production, Information Costs, and Economic Organization, 62 AM. ECON. REV. 777 (1972).
Fourth, there are production indivisibilities in providing information to travel agents and in providing competitively successful service to specific air transport city-pair markets, or at certain times of the day or week, as distinguished from production indivisibilities faced by an airline with respect to its total output. These indivisibilities have contributed to the importance of CRSs, the dominance of a few CRS systems, the dominance of the hub strategy, the industry’s current preoccupation with firm size for size’s sake, the prevalence of mergers, and the complicated fare structures that have been characteristic of deregulated markets.

Fifth, certain transaction and information costs influence access to capital in the face of uncertainty. Coupled with vast inequalities among firms in the amount of capital accumulated during the regulated era, these costs have contributed greatly to consolidation and to the drive for large size. They have also enhanced the success of predatory tactics and threats of predatory tactics and have greatly limited the time and freedom available to some, but not other, firms in the search for successful marketing strategies.

Sixth, some airline behavior is designed to raise rivals’ costs or handicap their ability to generate revenue. Such behavior usually involves some out of pocket or opportunity cost to the firm employing the strategy, but sometimes coincides with a need to deal with the problem of “transaction-specific” assets. This behavior at least partially explains the industry preoccupation with tying up more terminal facilities and slots than necessary to their current or even projected future operations. It explains as well some of the rigidities of the CRS contracts with travel agents and the trend toward vertical integration of feeder routes.

Seventh, there is the need to take what Oliver Williamson has called “hostages” to protect investments in transaction-specific expenditures. This form of economic behavior occurs when parties in ongoing business relationships find that their mutual interests cannot be reduced to a complete set of obligations which can be enforced in a way that completely reimburses parties for any breaches. Business relationships like those between airline marketing partners or airlines and travel agents, which involve the exchange of multifaceted services and investments which, once made, are valuable only in the context of the relationships, can impose

116. However, incomplete property rights and markets in these necessary factors of production may also play an important role in motivating this behavior. See infra Part IV-H.
117. If hostages are not sufficient protection, integration of ownership may be necessary to eliminate the incentive to breach. O. WILLIAMSON, supra note 115, at 163-89.
Airline Competition

costs of poor performance and vulnerability to holdup by the party which
has less to lose from breach. These costs are difficult to avoid.

In such circumstances, parties attempt to protect themselves by agreeing
to long term, expensive, and visible mutual commitments which will be
lost in the event of termination, and to liquidated damages in the event of
breach. Travel agency CRS contracts are undoubtedly influenced by these
factors, as are the joint marketing arrangements between major and
smaller airlines or between domestic and international airlines. These fac-
tors may explain as well the trend toward vertical integration in the in-
dustry even though production economies are either negligible or negative.

Most of these factors have not been identified or emphasized by tradi-
tional industrial organization analysis, which focuses on physical barriers
to entry, capital mobility and setup costs, indivisibilities of factor inputs,
and production economies of scale in determining the structure of
markets.¹¹⁸ Even modern contestability theory focuses on these elements,
modifying traditional competition theory only by generalizing away from
competition theory's focus on the number of firms actually in a market
(which presumably all meet the requirements for entry) to a broader cen-
sus that includes in the competitive structure of the market firms which
are not actually in the market but can enter very cheaply.

In principle, the production costs of information could be added to the
production function of the firm and analyzed in this way, but in practice
they have not been, and the peculiar cost characteristics of information,
especially its quasi-public-good character¹¹⁹ can greatly affect competi-
tion.¹²⁰ This is especially true in an industry like air transportation,
where an enormous and perishable mass of information about fares,
schedules, product features, and the very presence of a firm in a market
must be produced, inventoried and transmitted for use by a large group of
consumers, many of whom are physically remote from the market for
which they need information, and use a tiny fraction of the informa-
tion being produced on only an occasional basis.

Focusing on the principal-agent problem adds still another set of influ-
ences on competition between firms. At least in the airline industry, ex-
ploration of principal-agent effects by firms seeking to attract business by
influencing the choices of agents—both employees traveling on tickets paid
for by their employers and travel agents arranging trips for customers—is
subject to economies which are similar in effect to economies of scale and

¹¹⁸ See, e.g., F. Scherer, supra note 87, at 81-118.
¹¹⁹ Once produced, information may be supplied at little or no incremental cost for additional
uses.
¹²⁰ See O. Williamson, supra note 115, at 293; Stigler, supra note 110, at 220, 224.
scope. And since the principal-agent problem is generated by the cost to the principal of monitoring the agent, the complex information problems presented by air travel arrangements greatly complicate the monitoring task of the employers and customers of those using and booking air travel. Although the principal-agent and information impacts are mainly focused on the revenue (demand) side rather than on the cost side of the firm's accounts, they reward an airline disproportionately with respect to the amount and location of its output, thereby affecting the optimum size and range of offerings of the firm.

The other effects referred to above are similarly absent from conventional discussions of airline competition. They have in common an emphasis on the nature of transactions and focus on the strengths and weaknesses of the firm as an administrative substitute for market transactions and on the terms introduced into transactions to cope with impediments to efficient outcomes. This tradition finds its roots in the work of Frank Knight, was developed by Ronald Coase and has been elaborated in a contemporary context by Oliver Williamson. These concepts, as well as those involving information costs and the principal-agent problem, explain a great deal about otherwise puzzling aspects of airline competition.

As will become apparent, most of the characteristic features of deregulated airline competition seem to be affected by more than one of the seven influences I have outlined. Most of the influences seem as well to affect more than one feature. The next section of this Article will analyze the characteristic and unexplained features of deregulated airline competition in light of the concepts sketched above, attempting for each to provide both plausible theoretical underpinnings and some anecdotal support.

Explanations like the ones offered here are not neat mathematical proofs that will allow the adept to inevitably generate the hub and spoke solution once airline route systems are modeled in a certain way, although I believe it may be possible for others to do just that once they are pointed in the right direction. I have not measured the effects of these influences econometrically, although others have begun to do so without being in a position to explain very completely what they have detected. Those who follow may be able construct with greater specificity the necessary models for testing my hypotheses empirically. My task here is to infuse the

121. F. Knight, The Economic Organization (1951); F. Knight, supra note 113.
123. O. Williamson, supra note 115.
124. E. Bailey & J. Williams, supra note 14; S. Morrison & C. Winston, supra note 7; Call & Keeler, supra note 7.
Airline Competition

literature about airline competition with plausible hypotheses constructed with the help of modern industrial organization theory.

IV. Evidence from Deregulated Airline Markets

Large holdover airlines have been able to survive and earn profits despite having higher aggregate unit costs than their new-entrant challengers. We have seen in Part II, a number of developments in deregulated airline markets which seem inconsistent with perfect contestability.

These surprising outcomes were identified as: (1) a wave of mergers and consolidations; (2) a higher than expected degree of vertical integration in the industry, especially as demonstrated at the level of commuter airlines; (3) the dominance of hub and spoke systems; (4) the surprisingly complicated fare structure which has become characteristic of deregulated markets; (5) the importance of frequent flyer programs; (6) the significance of travel agents and the proliferation of incentive payments to them; (7) the role of CRSs; (8) the emphasis in firm strategy on gaining and keeping control of airport slots and gates; (9) the apparent persistence, despite physically easy entry and exit, of predation; and, as a consequence of all these factors, (10) the high casualty rate among new entrants. This Part will consider these developments and offer an explanation for each which makes use of one or more of the new industrial organization hypotheses discussed in the previous section. In brief, these unanticipated effects of deregulation seem to stem from the economics of information and from related economies of scope and scale, and from production indivisibilities (such as the problems of providing frequent and convenient service in city-pair markets with small traffic flows) which earlier analysis had ignored. Frequent flyer programs, the importance of travel agents and travel agent incentive programs, computer reservations systems, and hub and spoke systems all are techniques of utilizing economies of scale and scope to take best advantage both of the costs of communicating a complex web of services and service attributes to consumers and of the costs to principals of monitoring the use by their agents of this network and its related facilities. The information and transaction costs are real, and to the extent that they are reduced through these devices, the unanticipated developments we will examine represent a real efficiency benefit of deregulation. On the other hand, exploitation of the divergencies of interest between principal and agent adds nothing to efficiency and the techniques which reduce information costs and production indivisibilities for large firms also increase both the minimum scale and scope, and hence the risk, which a potential entrant must undertake in order to enter airline...
markets. They also make it possible to successfully pursue predatory tactics against smaller new entrants.

Before we go on to consider in detail the ways in which airline markets have proved in theory and practice to be limited in contestability, we should place this inquiry in context from a policy perspective. Some of the strategies which have been used to generate rents have come to be considered, correctly I think, such successful obstacles to contestability that they have generated actual or proposed government intervention in otherwise deregulated airline markets. These include: (1) the use of computer reservations systems to control information;125 (2) imposition of handicaps in attracting passengers or of higher costs on rivals126 by control of computer reservations systems and airport access; (3) control of airport access to exclude rivals entirely;127 and perhaps (4) certain mergers allowing total domination of hub airports.128 Other strategies, such as predation, frequent flyer programs, and travel agent “incentive” compensation may merit close examination from this perspective, although it appears that the currently-known cures for each of these is worse than the disease, which would seem an excellent reason to leave matters alone.

When these strategies have been attacked as anticompetitive, they have been defended by many on the grounds that, since capital is mobile and there are no production economies of scale, the industry is perfectly contestable. Since there are no government impediments to entry, the defenders conclude that strategies adopted by airlines ought not to be of concern to policymakers or the public. This defense may be wrong, or at least much too facile. But when we consider whether to address impediments to contestability in deregulated airline markets, we need to keep attention focused on the level of performance attainable from feasible alternatives in an uncertain and imperfect world, rather than on comparisons of the performance of alternative perfect theoretical models.

Comparing perfect competition with perfect regulation is sterile. Both are perfect and by hypothesis, achieve perfect results. Similarly, comparing hypothesized perfect regulation with real-world imperfect competition and vice versa is misleading, since the hypothesized perfect regimes will always dominate the always-imperfect real-world regimes. Sensible policy is made by comparing imperfect competition as it has revealed itself with the imperfect regulation we had and inevitably would have if regulation were reinstated. Only from that perspective can effective public policy

125. See supra note 101.
126. See Salop & Scheffman, supra note 114.
127. See infra Part IV-H.
128. See infra Part V.
implications be drawn when we consider the impact of airline market imperfections exploited, or created, by airlines. And from this perspective, we shall see that few of the market imperfections discussed here would be ameliorated by regulatory intervention, and none justifies returning to a regime of price and entry regulation.

A. Mergers and Consolidations

The recent U.S. airline mergers and consolidations find their genesis in (1) economies of scale in conveying information to consumers concerning service offerings available in the marketplace; (2) economies of scope in exploiting principal-agent conflicts; (3) the relationship of production indivisibilities in city-pair markets to the control of discount pricing; (4) the hope of raising rivals' costs by combining key facilities in a way that makes access difficult; and (5) offensive and defensive responses to predatory possibilities. These individual factors will be discussed in detail in this Part.

1. Information Costs

Competing in airline markets involves conveying information to potential customers. The regulatory scheme adopted by the CAB under the Civil Aeronautics Act of 1938 obscured the degree to which generation and dissemination of this information was a problem, and inhibited the opportunities of firms to take advantage by expansion of the economies of scale and scope inherent in information production.

The regulatory scheme obscured the importance of information in several ways: First of all, no new domestic trunklines were certificated between 1938 and 1978. This meant that as the industry grew several hundredfold, the number of new names introduced into the system was small. While new classes of airlines like the local service carriers were created, they were typically assigned niches, often monopolies, in which they could eventually establish their names.\footnote{For example, Allegheny, Bonanza, Central, Frontier, Lake Central, Mohawk, North Central, Pacific, Piedmont, Southern, Trans-Texas, and West Coast.} When an airline failed, it was taken over by another airline with whom its brand recognition was merged, at least in its monopoly markets. This process reinforced the value of the surviving names and shielded consumers from the consequences of airline failure. Second, mergers were approved only where one of the companies was failing, and the CAB pursued route award policies designed to increase the size of the smaller trunklines, which inhibited the expansion of
the larger ones. This prevented observation of whatever information advantages might accrue from airline size and scope.

The airline names that this process created were introduced to the marketplace in temporal waves, giving an advantage to those introduced earliest. The first wave included those grandfather airlines operating systems of substantial size at the time entry regulation was imposed. These were the "Big Four"—American, United, TWA, and Eastern. Notably, these four are among the largest surviving "names" today.

The second wave was created by the expansion in massive regional CAB route cases from 1946 to 1966, of those grandfather airlines that had not been among the Big Four. Surviving names that expanded in this manner include Continental, Delta, Northwest, and Braniff (which survives in name as a much smaller airline than the others). National and Western have disappeared. When the CAB introduced names from this group into particular city-pair markets, they entered as monopolists (as nonstop service was expanded with the growth of air travel) or as duopolists introduced to compete with Big Four airlines at a rate so slow as to make each such introduction an "event" easily communicated to the public in a relatively quiet marketplace.

Did all this matter? It is a striking fact that all of the ten largest branded airlines which have emerged from deregulation's period of consolidation have brand names used by domestic airlines before deregulation, including those used by the four biggest carriers in the industry since 1934. The seven largest have the oldest brands, names used by domestic trunklines for many years. Of the remaining three, two are accounted for by expansions of CAB-certificated regional airlines (Piedmont and USAir). The remaining carrier is Pan Am, a special case which was not allowed to fly domestically before deregulation, but which has had a marketing presence in most large U.S. cities for about as long as there has been commercial aviation in the U.S.

130. American, Continental, Delta, Eastern, Northwest, TWA, and United. For the purposes of discussing pressures toward consolidation, I am treating Texas Air's Eastern unit as separate from its Continental unit. Although there has been some coordination of activities—most importantly the combination of the two airlines' computer systems in a third, separate subsidiary, the coordination of their frequent flyer programs, and the rationalization of their facilities use at Newark—the airlines continue to be separately run and generate information for the public under separate identities.

131. Formerly Allegheny.

132. The brand names involved are attached to airlines that vary considerably in cost levels, ownership history, and degree of congruity between their pre-deregulation and post-deregulation sizes. But there is a substantial degree of congruity between the locations of the post-deregulation hubs of these airlines and their historic regions of operations. And with minor exceptions, nonstop transcontinental service between major east and west coast points (the largest aggregation of non-hub revenue passenger miles remaining in the industry) is offered by the three carriers which have been in those markets for as long as they have existed, plus Pan Am, which uses the service to connect major international gateways where it has been operating for forty years.
What could account for this striking phenomenon? One might regard the recent wave of consolidations in the industry as the extension of old, widely distributed brand names into newer or more narrowly distributed lines of business. The central problem of airline marketing is that of making consumers in many places aware of a complex set of service and price offerings. Consumers must be made aware that an airline exists at all, alerted to those features that generally characterize its output, and informed of its schedules and prices. Each contact with the customer is cumulative, creating memory and awareness. The repetition of communication over time serves as reassurance of reliability and durability in a business where the customer generally pays before delivery. The investment in communication is highly brand-specific, so that advertising by one airline does not significantly benefit another.

Of course, any consumer product requires investment in brand recognition to succeed in the marketplace. New brands are hard to establish and old brands are worth buying. But in airline markets, each firm sells under the same brand many products (such as different fare and service types in many different city-pair markets) in many locations to many customers, many of whom also are customers for similar but not identical products. This makes brands especially valuable and creates significant economies of scale and scope in the production and use of product and brand information. Since academic models of airline markets have tended to concentrate on the production of seat-miles, schedules and frequency, and prices, it is not surprising that information effects have largely been ignored. Yet the airline industry since deregulation has been affected by these forces, and by management response to them, to a striking degree.

In effect, the CAB operated a controlled cartel, not only for the production of airline output, for which deregulation demonstrated that substitute
production could be easily arranged—just as academic analysts had predicted—but also for the production of information about an exceptionally complex consumer service. Regulatory rules and incentives had forced airlines to offer almost identical price/quality characteristics, defining a standard industry product which a consumer could expect to get from any trunk airline permitted by the CAB to offer service to the public. The legacy of this forty-year regulatory period was to create public awareness of certain names and to generate and repeatedly confirm public assumptions about what constituted an acceptable standard product. This standard product included a great many bundled attributes, ranging from presumed safety to a certain level of “free” amenities. The nature and existence of this bundle of attributes was communicated or reinforced during that forty years every time an airline with a recognizable name advertised its existence or a particular service. An airline new to a particular market could depend on wide public awareness of its name if it was a Big Four airline, on forced trial due to limited entry, or at worst on a public understanding that all airlines were about the same because the government regulated them.

Even with the help of restricted consumer choices and product standardization imposed by regulation, the later expanded airlines (such as Continental and Delta) experienced in the 1950’s and 1960’s some difficulty in establishing themselves in the public mind as the equivalent of the Big Four. With the exception of some regional specialists operating in their own regions, those airlines which were not standard products never did succeed in creating substantial public association of their names with broadly acceptable service—what advertising people call “equity.” Strong evidence for this seemingly dogmatic statement can be found in the fact that only one “local service” name (Piedmont) survived to 1987, and it will be extinguished if USAir’s merger proposal is approved by the government. Piedmont has concentrated as a matter of corporate strategy on creating hubs at secondary airports to service near-monopoly traffic flows. The two other large airlines created from this airline population, USAir and Republic, both found it desirable to change names in order to expand in the deregulated environment. Only one, USAir, has so far survived the consolidation wave—in part by itself acquiring PSA and proposing to acquire Piedmont—and its future remains the subject of speculation among industry observers.

In much the same way, airline efforts to offer a non-standard product have repeatedly experienced difficulty. Just as the largest airlines in the industry have names that represent longstanding and widespread investments, they produce a physical product which greatly resembles the product marketed under regulation, although here the record is somewhat
mixed. Some airlines, Southwest and America West for example, successfully produce variants of the short-haul specialist product, featuring one-class flights with attenuated onboard service, that was pioneered by the local service and intrastate airlines. But as the industry has moved through phases of consolidation, the dispersion of the product mix has been reduced substantially. The cost of generating information about non-standard product features and of reassuring consumers that products non-standard in some respects are still standard in others such as safety and reliability, has been a major influence on this standardization.

Production of the information summarized in these brand names is subject to economies of scale and, perhaps more importantly, economies of scope. The basic unit of air transport production is the seat-mile or departure in an individual city-pair market. Producing seat-miles does not exhibit significant economies of scale, but putting them into particular city-pair markets involves the substantial indivisibilities which create hubs, as we shall see in our discussion of hub systems, Part IV-C infra. Filling these seats requires communicating with customers. The basic unit of air transport communication is a message sent to groups of customers reachable through a common medium, but requiring transportation under a variety of circumstances to and from a variety of places. These customers are located in an airline's hub cities and in spoke cities across the country.

The indivisibilities associated with the most efficient public media—large metropolitan newspapers and television—make it dramatically more efficient to offer more than one airline product to a large number of people, and to offer them to audiences which are dispersed geographically in a way that matches the indivisibilities of the communications medium. In addition, the peculiar economics of information make it cheaper for the airline to offer more than one airline product to a person once it has paid to find and reach her (“fly Brand Airlines to Chicago and the East”), and for the consumer to economize on search costs by using the airline for more than one service once she has become familiar with it.

137. People Express, Midway Metrolink, and Regent, the boldest efforts to produce products which differed substantially from the norm, are no longer in operation. Piedmont has abandoned the ranks of the one-class operators, as has Southwest's Transtar subsidiary, leaving USAir (except for some long-haul flights), AirCal (soon to be absorbed by American), America West, and Southwest as the only remaining one-class operators of any size. No one offers an unbundled product (charging for food and baggage handling, for example) as People Express once did. All these carriers except Southwest interline baggage and all accept interline tickets. All have evolved complex fare structures, which will be discussed infra Part IV-D.

138. For a description of capacity measures, see supra note 68.

139. It is wasteful to use network television to reach only certain locations nationally, or a metropolitan newspaper to advertise only to certain sections of a city.
Much of the market power of a hub airline in attracting traffic originating at its hub flows from these peculiar economics of information. Even if promotional expenditures are simply proportional to total revenue in a market, Dallas travelers will be exposed to a great concentration of information about American and Delta, the largest hub airlines there. Once such travelers have become acquainted through advertising and trial with American’s services on one route, they already possess most of the information they need—reliability, service quality, reservations phone number, location of ticket offices and gates, check-in, and boarding procedures—to choose American on other routes originating in Dallas. And it is much cheaper in information terms for a traveler in Dallas who needs transportation to Milwaukee to call American, which provides over three hundred departures a day on an airline with which she is familiar and trusts from a safety and market durability standpoint, than to research the problem or even to rely on a travel agent’s advice in choosing an airline. Finally, when American adds service to a new city from Dallas, it can inform already-informed Dallas travelers about the new service more cheaply than could a new entrant because it needs only to pass along one new piece of information—“we also have service to Detroit.”

The same logic explains why it is advantageous to an airline to offer service to a wide variety of market segments, for example, business and leisure. Doing so reduces unit information costs by creating a large customer base which can be informed of other service at relatively small incremental expenditure. The business traveler who has been using American on business trips to Cleveland and Detroit can be easily informed when it is vacation time of American’s service to Europe or Hawaii.

These information effects are responsible for a significant portion of the pressures for consolidation on firms in the deregulated airline industry. Firms reduce consumer uncertainty by offering a relatively standard product under a well recognized brand name. Once this name has been established in a market, it can be extended efficiently by offering service to other markets from the same points (economies of scope) and by expanding the size and geographic reach of the total marketing effort to use the economies of scale inherent in mass media. Much the same economies of scope and scale affect national and metropolitan communication with travel agents through sales forces, specialized media, and travel agent incentive programs.

This is not to say that only widely distributed old national brands can survive in the deregulated airline industry. Where regional communications submarkets and regional traffic flows are large enough to allow op-

140. Using an old name reinforces product and market durability expectations.
Airline Competition

operations at an efficient communications scale and scope, it may be possible to operate successfully at less than national scale. But the firm in such cases would still have to deal with the principal-agent economies discussed infra at Part IV-A-2. This approach, along with some product differentiation, has allowed America West, Southwest, Midway, and—briefly—New York Air to prosper. It may also be possible to operate on a contract basis with seats being sold by an entity with a wider distribution network, such as a tour operator, but what we know from “old” industrial organization analysis of insignificant production economies of scale and high capital mobility suggests that this is not a strategy that can generate rents for the airline producing the seats without the information attached to them, however well the owner of the information network which is filling them might do.

A third strategy might be to invent a product concept that is adapted to information or communications “niches,” and has low costs of communication, and few information economies of scale and scope. It is difficult to predict how fruitful any of these three strategies might prove to be over the long term, but it seems fairly certain at this point that any profitable strategy must cope with the problems identified here and that, so far, the most successful adaptation seems to be the use of an old national brand name on a large scale.

While some of the efficiencies on which we are focusing here could be gained through cooperative marketing by several firms, it can readily be seen that any cooperative effort to exploit them can be accomplished far more efficiently using a common brand name. Since the product involved is very complex, it will prove costly to monitor the use of the brand and services offered under it to counteract interfirm principal-agent and free rider problems. The information assets being produced are firm-specific and long-lasting, and preventing opportunistic behavior by one or more of the firms after the others are committed to the transaction appears to be difficult. Joint ventures to exploit economies of scope may be indistinguishable from horizontal division of markets and so may violate antitrust laws, and the effects of information interdependency may be so long-lasting that the joint effort must be more or less permanent. Under these circumstances, consolidation may be the only way to realize

141. The degree to which New York Air’s slot-protected corridor markets, Midway’s locational differentiation, and Southwest’s monopoly at Dallas’ Love Field account for their results is difficult to determine without access to proprietary information of these firms. America West’s single Phoenix hub position has been maintained without significant competition from the sorts of national brands discussed here; its principal competitors have been Southwest and PSA.
142. See O. WILLIAMSON, supra note 115.
revenue-generating benefits that appear to be even more important to survival than, for example, fully competitive production costs.

The brief explosion between 1978 and 1984 of new entry by firms without established brands offering products which were in many respects non-standard has had the paradoxical result of reinforcing the information effects described here. A period of very intense news coverage of airline deregulation created information about the presumed advantages of new entrant airlines that was not firm-specific. New entrant airlines, through their advertising and the publicity they received, linked their brand offerings to this flood of non-firm-specific information. This generated a great deal of initial trial. Many new airlines offered new services at new fares.

Unfortunately, the resulting marketplace confusion ultimately placed a premium on efficient brand-specific communication. Consumers found it difficult to search through the available possibilities and were hampered in their searches by travel agents biased by incentive programs and dependent upon biased CRSs for information. Established brands with extensive route networks and standard products had less new information to communicate and could take advantage of the economies we have discussed by communicating it over broader scale and scope. They also had incentive programs and often CRSs of their own, or they could at least deal with the CRS owners on more favorable terms than the new entrants could. And the failure of many new airlines with new product concepts, costing customers money and disrupting travel plans, created a kind of negative external effect on other novel brands and a real goodwill premium in the older brands offering a standard product.

2. Principal-Agent Effects

Economies of scope in exploiting principal-agent problems have produced incentives for consolidation and have played a key role in firm strategies to generate rents in deregulated airline markets. The principal-agent problems which have been exploited by airlines are those that exist between the business traveler (agent) and her employer (principal) and between the travel agency (agent) and its traveling customers (principal). Both have been made the focus of airline marketing programs designed to reward the agent for directing business to the airline at the expense of the principal paying for the tickets.

These issues interest the analyst trying to understand the trend toward consolidation because both frequent flyer programs and travel agent incentive programs exhibit economies of scope which can be exploited most
Airline Competition

easily by large national firms. Put simply, reward structures to agents can be designed to present them with economies of scale and scope. Most frequent flyer programs and travel agent incentive programs have non-linear reward structures. This somewhat artificial economy of scale to the flyer makes it possible for the airline to benefit from economies of scope. The more destinations an airline offers a frequent flyer, or the higher proportion of total traffic volume from a city susceptible to being switched by a travel agent to the airline offering the incentives, the easier it is to earn the more desirable travel awards or higher percentage override commission payments. In addition, of course, the larger the portfolio of destinations offered to frequent flyers, the more likely it is that the frequent flyer will find a reward destination that attracts her.

Consider the plight of an airline specializing in transportation between two or three industrial cities, and competing for business at one of them with a national brand hubbing at that city. Such an airline would have to match the incentives offered by the national brand airline to both the traveler and the travel agent. A traveler on the specializing airline would have to fly very frequently between the few cities served by the specialist to earn enough mileage to matter—and then can use it only to take another trip between those cities! Rather than use the specialist, she clearly would prefer to concentrate her travel on an airline serving those cities and many others, including a few exotic ones.

The specializing airline would be at an equal disadvantage in providing incentives to a travel agent. Incentive programs for travel agencies are constructed to pay extra commissions both for increased market share in particular city-pairs and for increased total business or total market share of tickets generated by the agency. To equal the impact of the additional commission revenue that the hubbing airline would pay on its total business for incremental business in this market, the specialist would have to pay a prohibitively high commission rate for incremental business on its own routes. While it might be possible to negotiate with other small airlines at the city to offer jointly commission bonuses on all business booked by travel agents on any of them, such arrangements would be very costly transactions to arrange and maintain. A consolidation into a firm with

143. See, e.g., the explanation for the AirCal-American merger offered by AirCal's President, David Banmiller, in Chandler, When East Eats West, FREQUENT FLYER, March 1987, at 82.
144. Frequent flyer programs increase the reward per mile flown, as the total miles flown on the airline increases. This non-linear reward structure creates incentives to concentrate travel on a single or limited number of airlines. Frequent flyer programs are discussed in detail infra Part IV-E.
145. The small airlines attempting to coordinate would incur as a minimum the costs of arranging the consortium, free-rider problems which could be imposed on the other members by carriers doing more business at lower margins or by special incentive programs in response to a particular competitive threat, problems of joint financial responsibility for commission payments if one of the consortium

433
a national frequent flyer network and a substantial volume of commissionable business at the city in question is a natural way to overcome this competitive disability, and is likely to outweigh any production cost advantages that the smaller firm might have.

3. Production Indivisibilities

While there may not be significant production indivisibilities in producing aggregate capacity at the level of the firm, serving traffic flows between particular pairs of cities does involve substantial indivisibilities. Because these indivisibilities exist, it is necessary to sell the joint city-pair transportation products produced by a single flight connecting to a hub in a number of markets at different prices. An airline's success in generating rents depends upon its ability to extract the highest possible revenue from the segmented traffic markets it mixes on the same aircraft. Hub size helps do this in ways we will discuss infra Part IV-C. But consolidations at a hub, and consolidations to create multiple hubs, can do this as well.

To see how, consider two different airline and seat allocation problems. First, consider two airlines providing competitive service from their hubs, say at Minneapolis/St. Paul, to a relatively small spoke city, say Bismarck, North Dakota. The number of high-priced travelers needing transportation from Bismarck at any given time could be accommodated at all but peak periods in one aircraft, but in order to compete for business passengers with diverse and uncertain travel needs, each airline must offer several evenly spaced departures per day to the hub. Passenger preferences given the existing technology require that each airline must use jet aircraft with approximately one hundred seats in order to gain market acceptance in competition with other jet aircraft. The result of these schedule and equipment indivisibilities will be a very substantial number of seats not required by time-sensitive business travelers, which will have to be made available at a discount in the Bismarck-Minneapolis market.

members went out of business, and the problems of reorganizing the group when airlines entered or left particular city-pair markets or left the city entirely. In addition, the small airline consortium would have difficulty communicating with travel agents, who would find keeping track of the consortium members and their routes a lot more expensive than simply participating in the incentive program of the biggest airline in town, an information expense that would have to be compensated for in the consortium's commission rates.

146. See infra Part IV-C.

147. Airlines "layer" traffic on their flights. The highest prices are charged to those over whom the airline has market power or those who are thought to value schedule convenience and other "premium" product features the most. At certain times of the day or week (Friday afternoon, for example) planes can be filled in many markets with such travelers. At other times of the day or week, however, the airline will have seats left over to sell at lower prices. It does so through an elaborate system of multiple fares and restrictive seat allocations. See infra Part IV-G.
In order to maximize revenue from submarkets of different price sensitivity (for example, business and leisure), each competitor must offer discount seats. The actual number of such seats offered per flight and the prices at which they are offered will vary from day to day and flight to flight through computer allocations of capacity to different fare levels. Such discounts are much less visible to the competitor than are the full-fare seats which are limited only by the capacity of the aircraft. This tends to destabilize the duopoly. Since the antitrust laws prevent stabilizing it by agreeing to limit the number of discount seats available and the terms on which they are offered, each airline will find it in its interest to merge with its competitor, reduce the number of excess seats available for sale in the local market to avoid "diversion" from one price category to another, and dump the reduced excess capacity in the already-competitive (because of service from Bismarck to other hubs) connecting markets beyond Minneapolis.

The second problem is related, but doesn't involve local monopoly. Consider an airline that wishes to participate in the highly competitive market for traffic between Burbank and the East Coast. Burbank is served by all but one of the national airlines with nonstop flights to one of their hubs. These flights provide one-stop connections over their respective hubs, but the Burbank-East Coast markets are served nonstop by no one. If an airline serves Burbank from only one hub, it can offer only as many departure times per day to the East Coast as can be maintained with the support of local Burbank-hub and hub-East Coast traffic. But if it provides a choice of one-stop service over two hubs, say Chicago and Dallas, it can combine Burbank-East Coast traffic with two different sets of local and flow traffic to offer a wider choice of departure times. In this way, using two hubs reduces the impact of the production indivisibilities in the Burbank-Chicago and Burbank-Dallas markets on its ability to compete for traffic moving between Burbank and points east of Chicago and Dallas.\footnote{These are called "flow" markets in industry jargon.} This can be important in denser markets like Boston-Phoenix as well, where the opportunity to use two big hubs can provide nearly continuous one-stop service throughout the day.

So both the local hub airline and the large national airline face production indivisibilities which can be alleviated by consolidation. The local hub airline maximizes the rent-earning value of its hub in local markets which exhibit indivisibilities. The airline participating in many flow markets maximizes the choice it can offer to those markets by coordinating flows over more than one hub. It may, of course, build such a hub, as Delta is trying to do at Cincinnati. But it may find better opportunities by adding
a fully developed hub, as Delta has by acquiring Western and its Salt Lake City hub and appropriating Western's already developed local information advantages into Delta's already developed national information economies of scale and scope.

4. *Raising Rivals' Costs*

The last advantages of size which have motivated consolidations involve competitive tactics designed to damage rivals. We will consider infra at Part IV-H the use of facilities leases at constrained airports to raise rivals' costs. Obviously, there will be cases where combining the facilities of two airlines at an airport can make additional entry or expansion by a would-be rival much more expensive than would be the case if the owner of one set of facilities was prepared to lease them to an entrant whose competitive focus was on the other.

5. *Responses to Predatory Practices*

The second advantage is more general in character. We will consider infra at Part IV-I the fact that sunk, firm-specific information costs appear to make predatory tactics viable in the airline industry despite the fact that the principal capital investment is highly mobile and actual production costs in a market are therefore highly variable. It is now widely believed in the airline industry that considerable "mass," which can be interpreted more formally as a large revenue base diversified by geographic markets, is necessary to signal rivals that predation in any particular subset of markets would be unlikely to result in the demise of the rival.

For this belief to be true, the transaction and information costs of diverting (borrowing) internally generated funds must be considerably lower than the cost of borrowing outside the firm. The airline business is risky and cyclical. Lenders have only a limited understanding of how airlines compete in a still-evolving competitive market and so find it difficult to assess risk.149 Their task is complicated by the principal-agent hazards involved in assessing the condition of a borrower airline and controlling its behavior after it receives the loan. These factors make it entirely plausible that a firm facing predation without self-generated funds from other markets may find it difficult to survive in the face of a predatory threat. A

149. This hypothesis is supported by the post-deregulation domination of the airline lending market by transactions secured by assets, in contrast to the pre-deregulation practice of making loans secured by the general earning power of the corporation. See, e.g., Renton, *Big Bucks, Small Returns*, AIRLINE BUS., Dec. 1985, at 22; *Japanese Aircraft Financing Boom to Continue*, AIRLINE DAILY, Apr. 30, 1987, at 175.
diversified portfolio of markets, then, can generate funds to cover temporary losses, provide funds for "offensive" predatory activity, and make such activity much less likely by raising the stakes to those required to fund a national campaign of attack. If the airline is big enough, its size alone will ensure diversification, and big airlines are most quickly created by consolidation.

We are now in a position to understand better the tendency toward consolidation exhibited by the deregulated airline industry. It is striking that only the production indivisibilities motivation for mergers and multiple hubs is tractable using the analytic tools of the "old" industrial organization, and it was overlooked because previous analysts focused on the aggregate production function of the firm, rather than on city-pair traffic flows. The theories generated in the last fifteen years supply the hypotheses set out here to explain the most noteworthy behavior of the airline business in the eight years since deregulation.

B. Vertical Network Integration and Codesharing

Deregulation has produced a trend toward vertical network integration. Conserving and coordinating by contract or ownership services on routes whose density and length typically require quite different kinds of flight equipment, infrastructure, and even administrative organization has since deregulation become the dominant form of relationship between airlines that feed traffic to one another. These relationships are controlled by and identified with the larger, longer-haul airlines. Before deregulation, some integration was permitted between international and domestic air transport, but after the middle 1950's there was very little integration between domestic trunkline service and service to small communities. The integration that did exist between trunkline and local service—for example, Northwest's "high line" service across North Dakota and Montana or United's service to Elko and Ely, Nevada—involved service to cities on odd remnants of routes pioneered by primitive mail planes, which

150. See, e.g., G. DOUGLAS & J. MILLER, supra note 5; Douglas & Miller, The CAB's Domestic Passenger Fare Investigation, 5 BELL. J. ECON. 205 (1974).

151. I use "vertical network integration" here in a sense related to, but somewhat different from, the classical use of the term "vertical integration." Traditionally, vertical integration refers to the common administration by ownership or contract of different stages of production or distribution of a product, e.g., oil production, refining, pipeline transportation, and retail sales. Here, I mean it to describe the transportation of an airline passenger from a small town thorough a connecting hub to another destination, whether a large domestic city, another small town, or an international destination. The technical and administrative means used to accomplish the different stages of this transportation are quite varied, and the passenger may be thought of as being "processed" through each stage of her journey and passed along to the next stage.

152. However, the country's biggest international airline under regulation, Pan American, was prevented by CAB policy from operating domestic routes.

437
for one reason or another, usually political, continued to receive service. More integration between levels existed on the systems of the “local service” airlines, by 1978 operating twinjets and pressurized twin turboprops on medium-density routes as well as to small cities, but they were subsidized for their service to small towns. Notwithstanding this, operating larger equipment on denser routes had so changed the locals’ organization, character, and costs that most had for over a decade been losing money on much of their subsidized service. To the extent permitted by the CAB, which balanced administration and congressional pressures to end subsidy with congressional pressure to retain “large aircraft” service, the local service airlines frequently dropped service to the smallest towns and allowed that service to be taken over by unrelated commuters operating small, mostly unpressurized aircraft.

The prototype of post-deregulation integration was a form of vertical integration by contract invented by Allegheny Airlines (now USAir) to secure political permission for the abandonment of unprofitable subsidized service. In this arrangement, called the “Allegheny Commuter” program, Allegheny retained the point in question on its route map and provided flight numbers, reservation service and in many cases ground handling and gate space at a connecting point on Allegheny’s system to an independently owned operator of smaller aircraft. The independent operator then provided the actual service between the connecting point and the city in question. This service was provided in aircraft painted in a version of Allegheny’s colors, was listed in Allegheny’s timetables, and was identified as an Allegheny commuter flight in consolidated flight schedules such as the Official Airline Guide and later in CRSs. The commuter operators were typically non-union, low-overhead, bare-bones operations. They had much lower costs than Allegheny and staffed the stations at the subsidized point.

At the time, the enforced separation between levels of operation, combined with the CAB’s DPFI fare formula, which deliberately undercharged short-haul passengers and overcharged long-haul ones, encouraged airlines to eliminate as much short-haul, low-density flying as possible. And in fact, at the beginning of the deregulation period there was a rush by many airlines to reduce such flying. At this point the game changed. Fares were free to find market levels. Airline route systems were

153. This integration did not eliminate suspicion of the “local service” airline, as can be attested to by anyone who can remember from the regulated era the reaction of big-city travelers to the news that they would be flying Allegheny, Ozark, Trans-Texas, or the like. “Is that one of those ‘puddle-jumper’ airlines?”; “Do they have real planes?”; and “Do they serve food?” are all questions that have as their unstated premise the definition of a standard airline product and have as their obvious corollaries the suspicion of unfamiliar airline names.
reorganized into hubs. It soon became clear that the passengers boarded at or destined for small towns typically flew the short-haul leg as part of a much longer journey. Since the incremental cost of adding the passenger to an already operating hub system was low, these passengers were a valuable source of incremental revenue. CRSs became the dominant form of information access to the deregulated system. These systems displayed online connections before they displayed interline connections, and travel agents tended to book connections which were displayed first. The displays were organized that way in part because passengers preferred to have one airline responsible for ticketing, baggage (including tracing and delivering lost bags), coordinating their connections (and perhaps delaying one flight to allow passengers to connect from another delayed flight), and minimizing terminal distances between transfers. Frequent flyer programs became an important tool to ensure the loyalty of the highest-paying customers. Since there was typically little or no competition for the short-haul portion of the flight and passengers preferred easy connections to the longer-haul portion, it rapidly became clear that the airline capturing passengers for the short-haul leg was likely to carry them for the entire length of their trips.

As a result, the same economies of scale and scope that produced the trend toward horizontal consolidation also produced a scramble for commuter level vertical partners among major airlines. The customer could find out about service to a small town much more easily if it was identified in information sources as being on the system of one of the large airlines. The idea that she was flying under the brand of one airline for the entire trip was attractive, even if the degree of apparent integration sometimes proved disappointing in practice. The customer would be further encouraged to fly the long-haul portion on the large airline if she could credit the short-haul connection to her frequent flyer program. The travel agent would be induced to book her on the national brand for the long-haul portion of the trip if the short-haul segment also counted toward override commissions.

The costs of serving these small towns by larger airlines, even those made more efficient by deregulation, still were well above those of the specialized commuter airlines. So the first arrangements used by the larger airlines involved joint marketing, joint frequent flyer programs, and flight number codesharing, but other integration was limited in an effort to preserve economies of specialization. The commuter airline retained separate identity and considerable control over its operation. Problems emerged:

The use of large airlines' codes was a powerful form of information and signalled to passengers a great many product attributes which were not in fact present. Some differences between large and small airlines, such as the use of smaller aircraft by the latter, were unavoidable; but others, like unfamiliarity of commuter airline personnel with the larger airline's system and very different standards for passenger handling, were avoidable and had negative effects on the goodwill communicated by the larger airline's trademark.

The next step was to arrange a much closer form of contractual integration resembling the Allegheny Commuter network. Aircraft were repainted in the larger airlines' colors, standards of passenger handling and operations were imposed by the larger airline, and an overall attempt was made to have the commuter portion of the trip resemble travel on the larger airline as much as the differences in flight equipment permitted. This form of integration is in wide use, and is attractive because it exploits more effectively the information and marketing economies of scope and scale identified above. But it has proved difficult to fashion contracts which adequately address the problems of continual changes under uncertainty and the degree of impact on one party of acts taken by the other. Long-term commitments and the giving up by the commuter of its public marketing identity are a form of the hostage-taking that modern theory would predict in a situation like this.

The degree of control required for coordination has often been very great indeed, sometimes including such drastic measures as moving the entire commuter airline from one set of routes to another, destroying whatever local goodwill the smaller airline had created on its own. And the risk, and the costs, of disruption of the relationships has been very great. Pan Am bought Ransome, a Delta Commuter with a short-term contract, and changed it to a Pan Am operation, leaving Delta without feed in the Northeast to support service patterns that had been arranged on the assumption that the feed would be available. Even a long-term contract may not be sufficient protection for the larger airline. Presidential bought Colgan, a Dulles-based commuter with a long-term contractual commitment to a competitor, New York Air, whose trademark it was using. New York Air found itself committed to sharing sensitive information, such as future route plans and connecting passenger volumes, with an airline owned by a competitor. New York Air also became vulnerable to damage to its goodwill from a commuter-agent whose interests were very different from its airline principal.

155. See O. Williamson, supra note 115.
This maneuvering points out yet another source of motivation and pressure for vertical integration. The maintenance of a complex, highly interdependent hub and spoke network depends upon combining in aggregate enough feed traffic to support service to spokes which do not generate much business in any individual city-pair market. Each spoke contributes to the viability of the whole, and there is a sort of geometric expansion of the number of city-pair markets an airline can serve as spokes are added to its hub system. This means that taking away or preempting feed from smaller airlines can have a substantial impact on the ability of a rival to maintain a competitive hub and spoke system, either at the same location as the acquiring firm's own hub or at a hub positioned so that it serves the same traffic flows. Some vertical integration can probably be seen as a form of raising rival's costs, or perhaps analogously as preempting the revenues needed to cover indivisible costs, an extension of the concept identified by Salop and Scheffman.¹⁵⁶

One result of the need for long-term commitments on one hand, and protection from the sorts of risks described here on the other, has been a wave of commuter acquisitions by Continental, United, Delta, Piedmont, and others. Another result has been an escalation in the value of the hostages taken in contractual relationships. The net result: a Department of Transportation study¹⁵⁷ has found that virtually all the major commuter airlines are now tightly tied to one national brand or another, producing a major and surprising change in the structure of the industry. Again, this development can better be explained by recourse to new industrial organization theory than by looking, for example, to reductions in production unit costs from vertical integration.

C. **Hub and Spoke Route Systems**

Deregulation transformed airline route maps from multistop linear arrangements to hub and spoke systems. The hub and spoke route system is an ingenious and socially useful technique of overcoming production indivisibilities so as to allow frequent jet service in many city-pair markets whose traffic density would not otherwise support it. At least two or three flights a day must be offered by any airline in a market in order to achieve market acceptance, and more frequent service often confers a competitive advantage as customers economize on search efforts while accommodating the constraints of their travel schedules. At the same time, eighty to one hundred seat twin engine jets represent a threshold of acceptability for many customers. It is possible to meet these requirements

¹⁵⁶. See supra note 114.
¹⁵⁷. D. Pickrell & C. Oster, supra note 80.
in many city-pair markets only by combining traffic to and from many points in a hub and spoke system on the same flight. Hub and spoke systems also have the privately useful characteristic of creating market power and the possibility of rents for the hubbing airline in the markets radiating from the city serving as the hub of the system. The market power flows from the information costs, information economies of scope and scale, and principal-agent factors we have found to pervade airline markets, along with the production indivisibilities that create the need for hubs in the first place.

1. Operation of Hub and Spoke Systems

Passengers use an air transport network involving hundreds of points which can be connected in thousands of combinations. While large numbers of travelers wish to journey daily between some of the pairs of points in the system (La Guardia to Washington National airports, for example), service between other pairs (Syracuse, N.Y. to San Francisco, for example) will only be desired by a few passengers each day. These passengers value their time in the air and on the ground, so schedule convenience, elapsed journey time, and airport location (at cities with more than one airport) are all factors that go into choosing flights and choosing airlines. This means that fewer still will wish to leave Syracuse for San Francisco at any particular time of day, and some of those will prefer to travel to Oakland or San Jose. Any of the large national airlines offers service to well over one hundred cities, which means that it offers service in thousands of airport-pair markets. In order to be competitive, an airline must offer this service in each of these markets several times per day.

In markets like La Guardia to Washington National, there is enough traffic to support nonstop service on more than one airline many times each day. Unless an airline offers frequent nonstop service, it will not be able to compete effectively in such a market. In most airport-pair combinations, however, there are not enough passengers to pay for any nonstop flights in the one hundred-or-more-seat jet aircraft which most passengers prefer. *A fortiori*, there are not enough passengers to offer a

158. The number of markets in which online service is offered is less than the mathematically derived number of possible combinations of cities on a system because some of the combinations—for example, New York to Philadelphia via a Dallas hub—are not useful. In addition, the schedule patterns over a hub may be constructed in such a way that some city-pair combinations are only accessible by inconvenient connections that produce uncompetitive total journey times. But for any airline of considerable size, the number of city-pair combinations in which the airline offers useful travel options is very large.

159. An airline might be able to attract a small proportion of travelers who are particularly price-sensitive by offering a few flights at reduced fares as Western does between La Guardia and Boston.
choice of flight times. In a few airport-pair combinations, there might be
enough passengers to support one nonstop flight per day, but passengers
sufficiently prefer a choice of departure times or airports that in most such
situations some of them will give up nonstop service to use one-stop or
connecting service at a more convenient time or to a more convenient air-
port. This reduces the number of passengers available for nonstop service
and so makes the indivisibility problem worse.

The hub and spoke system overcomes these production indivisibilities in
two ways: First, (using a Chicago hub as an example) it combines one-
stop traffic between Syracuse and many destinations with nonstop traffic
between Syracuse and Chicago, making it possible to offer nonstop service
between Syracuse and Chicago which would not otherwise be possible.
Second, that same combination of nonstop and one-stop traffic is assem-
bled at many cities and converges at the hub, permitting one-stop service
(usually involving a connection at the Chicago hub) between Syracuse and
a wide variety of cities with which Syracuse may exchange only a few
passengers a day. Thus passengers will start in Boston, Syracuse, Phila-
delphia, and other cities; they will be combined with other passengers
from the same city destined for the hub and many other cities beyond to
make up a planeload of passengers from the origin city to the hub; they
will travel to the hub and combine with passengers from other origin cities
plus those who begin their journeys at the hub to make up enough traffic
to fill a plane from the hub to their destinations.

Except in relatively large markets, nonstop service between cities will
typically be offered only by airlines which operate hubs at one end or the
other. Only these can combine local market passengers with connecting
passengers to get enough traffic to enough departures to provide a compet-
tive choice of nonstop flights in the market. In part, this is because pas-
sengers, especially those willing to pay higher fares for convenience, prefer
to fly airlines with a wide choice of departure times in a market. This
preference reflects several factors: (1) travelers economize on search and
are more likely to remember and to call an airline which can accommo-
date all their travel needs, rather than one which is likely to require a
second call to arrange part of their transportation needs; (2) passengers
participating in frequent flyer programs (and travel agents "steering"
their passengers to one airline rather than another in response to incentive
commission programs) tend to prefer to concentrate their flying on a few
airlines in order to reap benefits from reward programs which are struc-
tured to exhibit economies of scale; (3) passengers who are likely to
change plans will often find it easier to rebook on the same airline (in
order to get the benefit of a round-trip fare, for example), rather than to
change airlines, so they will tend to choose airlines whose schedules offer
a wide choice of alternatives; and (4) physical factors, like the location of parked vehicles, will make a passenger prefer to go and return on the same airline, producing advantages of scale and scope for airlines scheduling in a market.

On the other hand, a city of even medium size will generate enough total traffic to support a number of “spoke” flights on a number of different hub systems. Syracuse may only generate a few passengers a day for each of many cities, but the total number of passengers generated daily will be enough to fill flights to several hubs where passengers can be combined with passengers starting their journeys at other cities to fill planes for a large number of destination cities. So the same characteristics of passenger demand, production indivisibilities, and demand-driven economies of scope and scale that create monopolies or duopolies on nonstop service to and from hubs allow dramatic reductions in the effects of production indivisibilities on small traffic flows served one-stop via the hub. The result is that our Syracuse passenger can choose among only one or two airlines on nonstop trips to hubs at Atlanta, Chicago, Detroit, Newark, Pittsburgh, and St. Louis, but could choose to fly one-stop via a selection of these hubs on a wide choice of airlines to many destinations in the country.

The information economies and principal-agent effects described above continue to operate in hub and spoke systems. Therefore, to compete effectively in one-stop markets from a city, one must operate a hub of sufficient size to offer a wide choice of one-stop service. In fact, most major national airlines now perceive a need to operate several hubs, so as to be capable of offering a passenger in Syracuse one-stop service to the widest possible choice of cities. Convenient north-south one-stop service might be offered through one hub while convenient east-west service is provided through another. In addition, attracting high-yield traffic means that frequent flights can be supported with fewer passengers, and that permits airlines to charge lower fares that attract more price-sensitive passengers. Because these results help reduce the effects of indivisibilities, it is very important for a successful hub operation to be efficient in exploiting principal-agent problems.

2. Barriers to Contestability

The factors described above make airline markets less contestable. The need to operate a hub and spoke system to remain competitive in many city-pair markets requires that an airline enter at sufficient scale and scope to serve smaller traffic flows as well as larger ones, and one-stop flows across the hub as well as nonstop flows to and from it. An airline
large enough to exhaust production indivisibilities at even a medium-sized city hub is already a pretty big airline.\footnote{160}

None of the approximately twenty-five cites being used as a hub at this writing supports more than two such airlines,\footnote{161} and most support only one. A would-be entrant at a hub city must therefore be prepared to displace an incumbent. At the other end of the scale, the same situation is created with respect to entry into a spoke market large enough to support only one airline offering the minimum level of service in jet aircraft of minimum size for any given set of traffic flows.\footnote{162} An entrant in such markets must completely displace the incumbent.

Contrary to the assumptions of the perfect contestability model, such displacement cannot occur instantaneously or costlessly. Consumer markets in airline services do not permit non-competitors to bid without actually entering for the right to supply the entire market. Rather, an airline seeking to offer service to the public must commit non-recoverable resources in the form of the aircraft time necessary to operate for a trial period as well as advertising and other marketing costs to make the public aware of its existence. The rents attracting entry can be made to disappear temporarily as a result of price cuts and capacity increases, the impacts of which fall particularly heavily on the new entrant whose services are not as well known to the public as those of the incumbent.\footnote{163} Both firms incur losses which can only be stopped by the exit of one of them. A large, better known, multi-hub incumbent can attract more traffic at any given price level than the new entrant. Moreover, the incumbent experiences an economy of scope in the value of reputation for fierceness as a deterrent to other entrants in other markets or in the future. This gives the incumbent more to gain than victory in the instant battle from an investment in its reputation as an expensive firm to displace.\footnote{164} The result is that the would-be entrant, anticipating a particularly expensive battle

\footnote{160}{America West, a regional airline based in Phoenix, uses about fifty aircraft and does about half a billion dollars of business per year at its single hub. Even this activity has apparently not exhausted the airline's possibilities, since it has more aircraft on order and no apparent plans to create a new hub. A large hub operated by a national brand airline can involve more than three hundred departures per day and occupy well over one hundred aircraft.}

\footnote{161}{Six airports serve as hubs for two airlines: Atlanta, Chicago, Dallas, Denver, Phoenix, and Washington Dulles.}

\footnote{162}{The city may actually have more than one carrier, but one may be accommodating flows to cities west of the point in question while the other carries traffic for points east of the city. Of course, even here some contestability is likely to be maintained since many cities will be nearly as accessible via one hub as the other and as particularly price-sensitive passengers accept circuitous routings offered by the "wrong" carrier. Still, the limits to contestability inherent in such small-city situations explain the success of Piedmont and USAir in operating as relatively high-cost airlines (especially USAir) without many of the marketing advantages of their larger competitors.}

\footnote{163}{See supra Part IV-C-1.}

\footnote{164}{See authorities cited supra note 112.}
for market control, is deterred from entry, and the incumbent earns rents. Individual markets involving a hub are best entered either by another airline already hubbing at the same city (in the relatively few cases when there is one) or by an airline hubbing at the city at the other end, which gives it a mirror image of the scope and scale advantages possessed by its competitor.

The story is different for competition for one-stop traffic flows over a hub, except in the special situation of the very small spoke. If traffic flows are not large enough to support nonstop service or are not destined for a hub, the efficiency of hub and spoke systems in combatting the effects of indivisibilities means that entry at a spoke can be accomplished relatively easily by any airline whose hub system is large enough to generate the transactional economies of scope and scale that affect air transportation. Since all airlines need these flows to make their hub systems operate at viable scale levels, competition for these overhub flows should be quite intense.165

The effects of the hub and spoke systems, then, are somewhat counterintuitive. Larger traffic flows to and from hubs tend to be less amenable to entry and competition than smaller flows that cannot be served nonstop. Travelers at hub cities benefit from the availability of much more nonstop service than the city would otherwise receive, offered on terms that reflect the market power of the hubbing airline. Travelers at non-hub cities have less nonstop service than they might have in an environment without hubbing, because the wide choice of one-stop departure times through hubs diverts traffic which might otherwise have been available to the indivisible nonstop service. These travelers benefit, however, from a wider variety of departure times, and from far more competition than would be available in a regulated non-hub environment.

D. The Complex Fare Structure

Deregulation has caused the replacement of the simple two-tier fare system by a complex array of fares. The complex fare system allows airlines to optimize simultaneous service to price-sensitive and insensitive portions of the market. The complex fare system also creates economies of scale in developing optimizing capabilities and increases the ease with which new entrants can be tested.

165. The competition may not be easily observable to a researcher without access to airline reservations inventories. Much of it may occur by making discount seats more readily available to price-sensitive travelers in these markets, while competition for travelers who are not price-sensitive (and hence are likely to be travelling on tickets paid for by a client or employer) will be rewarded through extra frequent flyer benefits.
Regulation had imposed on the U.S. industry an extremely simple mileage-based fare structure. That structure contained a substantial amount of deliberate cross-subsidy of passengers on shorter-haul, less dense routes by passengers on longer-haul, higher-density routes. There were some night coach and excursion fares, but in general very few discount or off-peak fares were approved by the CAB as “cost-justified.”

Since deregulated markets were predicted to exhibit perfect contestability, economists tended to assume that the deregulated fare structure would tend to eliminate excursion fares, which were seen as discriminatory and hence non-sustainable in a competitive environment. Pricing would feature unrestricted low fares at levels reflecting the costs of new entrant airlines operating free of practices and costs left over from the regulated era. Discounts from these levels would be tied to use of unavoidable surplus capacity (such as flights in off-peak periods or flights on “tag-end” and “positioning” segments) and would otherwise be offered free of restrictions. This behavior would tend to produce a basically simple fare structure with cost-driven variations, without the inefficient artificial uniformity imposed by pooled average cost rate regulation. This model was based on the assumption that low-cost new entrant airlines would attack the market with simple low fares reflecting their more productive labor arrangements, fresh management styles, marketing techniques adapted to the new era, and more efficient fleet mix of aircraft acquired with deregulated route structures in mind. Holdover airlines would attempt for a period to hold on to their high-paying business customers, while somehow appealing to price-sensitive travelers otherwise attracted to new entrant airlines, by offering discount fares with complex restrictions. This complex structure would be eroded over time by the availability of unrestricted low fares, and the holdover airlines would inexorably be forced to lower their costs, simplify, and lower their fare structures, or die. This model was based

166. See DPFI, supra notes 89-90.
167. A “tag-end” segment is operated without expectation of a fully-allocated profit. It positions the aircraft for another, more valuable flight or combines traffic flows on the same trip. For example, a Washington-Los Angeles flight might go on to San Diego, allowing the joint provision of nonstop Washington-Los Angeles and one-stop Washington-San Diego service on the same flight. The Los Angeles-San Diego flight would be a tag-end segment, and since the aircraft remained the same size after the Washington-Los Angeles passengers got off, it would have available extra Los Angeles-San Diego seats that would be assigned an incremental cost of near zero. If that same aircraft were brought back to Los Angeles from San Diego at an unpopular hour in order to be in position for a valuable Los Angeles-originating flight, the San Diego-Los Angeles leg would be called a “positioning” segment and would also be a prime candidate for reduced-rate service, since the airline was already committed to the cost of flying that segment as part of supplying capacity to the Los Angeles-originating flight.
168. See Frank, supra note 40, at 240.
169. Call and Keeler made such predictions using the Fudenberg-Tirole “fat cat model.” See Call & Keeler, supra note 7, at 245. For a description of the Fudenberg-Tirole model, see Fudenberg &
also on market assumptions underlying perfect competition, including the
notion that capital mobility meant that airline markets weren't affected by
economies of scale (implying no fixed costs) and implicitly the assumption
that airline seats produced in any given market were a single product,
produced without common costs.1

For a while, this analysis seemed correct. Holdover airlines found it
difficult to maintain segmentation in their markets. The excess capacity of
the 1980-1982 recession created acute pressure to keep seats filled. Fare
wars abounded and holdover airlines lost money. Unrestricted peak/off-
peak fares at rock bottom levels, the seeming harbingers of the simplified
fare structure predicted by analysts, were common for a while, and People
Express, the embodiment of deregulation economists' pricing predictions,
grew rapidly by offering them. But the holdover airlines became sophisti-
cated managers of an information-intensive competitive environment.
They developed frequent flyer programs and tied the most attractive re-
wards to the use of less-discounted fares. They used computers to develop
elaborate inventory management programs which divided aircraft capaci-
ties into subunits to be sold on different terms to different market seg-
ments. They exploited economies of information to match fare levels, but
not fare conditions of their new entrant competitors, and demonstrated
that they were capable of selling seats to price-sensitive leisure travelers
on more restrictive terms than those airlines which were unable to com-
municate as efficiently in the marketplace.

The simplified fares were inexorably replaced by a spectacularly com-
plicated fare structure involving multiple levels of excursion fares with
different conditions, different fare types in different markets, apparently
unrestricted fares limited in availability by hidden capacity controls, and
wild divergences between fares actually charged in markets of similar dis-
tances and often of similar densities. The new fare structure arose because
the production indivisibilities in city-pair markets discussed in our analy-
sis disadvantage firms which confine their attention to a single market,
and because principal-agent effects and information costs facilitate com-
bining on the same flight service in several markets at different prices, or

Tirole. The Fat-Cat Effect, The Puppy Dog Ploy, and the Lean and Hungry Look, 74 AM. ECON.
170. The question of common costs had produced great regulatory complexity when it came time
to price first-class service in the DPFI. Since first-class service was produced on board the same
aircraft as coach, how should it be priced? If first-class passengers paid less per square foot of aircraft
space than did coach passengers, would they be subsidized by coach passengers? Or did the fact that
the planes were frequently not full mean that any contribution in excess of the coach fare on first-class
seats was "cost"-justified? See DPFI, supra note 89, at 820-23. Carriage of traffic on tickets carrying
different restrictions, or even traffic which will make connections to different destinations, presents
exactly the same analytical problem.
Airline Competition

traffic in the same market with different demand characteristics and different flexibility needs. Business travelers will pay for frequency and convenience, but most leisure travelers will not. In effect, airline production in the face of indivisibilities resembles the joint product production of different cuts of meat along with hides from a single animal. The previously existing regulatory scheme suppressed the segmentation of these markets by forcing airlines to offer a very simple fare structure and by severely restricting leisure-market pricing alternatives. It required airlines to perform the equivalent of cutting animal carcasses into “equal” one-pound chunks to be sold at a single price per pound.

In the deregulated U.S. market, an airline is free to pursue both top-of-the-market business traffic and bottom-of-the-market leisure traffic on the same flights. It also combines traffic flows to and from the hub with more competitive traffic flows across the hub, offering the seats to the different markets on different terms. The airline supports the high-frequency schedule desired by business travelers by offering fares with no restrictions to those passengers who wish to maximize flexibility and choice.

Deregulated U.S. airlines have pursued advanced-purchase and other fill-up fares with enthusiasm and increasing sophistication in order to fill planes that remain—frustratingly—the same size whether they carry twenty-five high-yield passengers on a flight offered to ensure the business customer a full choice of departure times (which allows her to economize on search and maximize her principal-agent benefits by concentrating her business on one airline) or carrying one hundred and fifty at 5:00 on a Friday afternoon. Since demand varies flight by flight, day by day, and season by season, a simple two or three-level peak/off-peak fare structure has proved insufficiently sensitive in many markets. And unless there are restrictions on the flexibility of discount fares, customers who value choice will not be required to pay for the stand-by capacity that provides it.\textsuperscript{171} In the same way, the carrier uses the lower fares charged to passengers in more competitive across-hub markets to support levels of frequency and capacity to and from the hub which are higher than those warranted by purely local traffic. This “excess” service at the hub facilitates the exploitation at the hub of economies of information, making entry by a non-hub airline very difficult or impossible.

So what has evolved is a less than transparent system of multiple fares with hidden capacity controls. Only a few fares will be of significance on any given flight, but a flight with weak demand might be topped up with the deepest discount excursion fare, while a lesser discount excursion might be the predominant fill-up fare on a “shoulder” flight. And

\textsuperscript{171} See Frank, \textit{supra} note 40.
customers pay for the capacity required to provide flexibility by facing a continuum of fares and restrictions in which fares with the lowest degree of flexibility cost the least. In fact, even apparently unrestricted fares can be and are capacity-controlled to allow for peak/off-peak effects and to charge for the costs of maintaining choice.\footnote{172}

The airlines that attempted to use very simple fare structures as a competitive tool have all been forced to abandon them. This is true even of Southwest, whose Texas intrastate history was marked by low, simple peak/off-peak fares that mesmerized the analysts who theorized about deregulation. Complicated fare structures have dominated because they allow airlines to achieve higher total revenue while pricing fewer passengers out of the market. If an airline gets a disproportionately large contribution toward capacity costs from those passengers most willing to pay for flexibility, it can charge passengers unwilling to pay for flexibility lower fares and still cover the costs of the flight. An airline unable to “fence out” high demand passengers who want flexibility and choice from using deep discount fares is forced to recover some of its capacity costs from low demand passengers by charging fares which reflect the costs of flexibility which the low demand passengers do not value, and which are therefore uncompetitively high. An airline able to segment effectively its markets can respond to entry or competitive pricing very rapidly in order to hold onto price-sensitive passengers, while using such tools as frequent flyer programs to keep the loyalty of higher-yield segments without price matching.\footnote{178}

\footnote{172. This analysis is an extension of that offered by Frank, supra note 40.}

\footnote{173. A reader familiar with the new industrial organization literature, especially the literature on the performance of markets for complex purchases where there is imperfect information, might object that the mere complexity of the airline network and price structure should not be enough to allow airlines to generate rents. The market should contain at least some repeat customers, the volume of whose purchases gives them an incentive to invest in expertise in searching out lower and less discriminatory fares. This search process should reward the airlines offering such fares, giving them a competitive advantage. This, in turn, should induce other firms to offer such fares in order to avoid losing this business, and the equilibrium fare structure should produce “normal” profits with no discrimination which cannot be supported by costs. See Schwartz & Wilde, Intervening in Markets on the Basis of Imperfect Information: A Legal and Economic Analysis, 127 U. Pa. L. Rev. 630 (1979).

Several factors combine to make this analysis, however correct it might be in general, inapplicable to the airline industry: First, due to the diverse nature of the necessary information on many routes and fares, it is expensive to acquire the information necessary for optimal purchase of air travel. Such information is also highly perishable because of fare and schedule changes. Therefore, it is difficult to justify the investment necessary to become and stay expert, because it is unlikely that any investment will remain valuable long enough to allow it to be amortized.

Second, the model that underlies this analysis assumes that firms cannot easily distinguish between expert and non-expert purchasers and so will be forced to offer favorable terms to non-expert purchasers in order not to lose the business of the experts. But here the purchasers most likely to be expert are the frequent flyers, who are given very strong incentives to identify themselves, thus greatly improving the ability of the airlines to price discriminate.

Third, these same purchasers generally are travelling on tickets paid for by others, and are rewarded by the airlines through frequent flyer programs for purchasing relatively expensive tickets at
The joint product pricing that supports such a fare system is very information-intensive. It requires market segmentation and computerized inventory controls. Operating these controls requires a substantial information history and real-time monitoring capabilities. These information capabilities involve economies of scale and scope. The processing capability and much of the programming can be purchased by users too small to take advantage of these economies. But information is a public good made private by copyrights which permit value of service pricing, or by secrecy on the part of those who generate it. For many years it was difficult for a user without economies of scale and scope to purchase the software and operating capabilities for inventory management on terms as advantageous as its larger competitors, although such software and operating capabilities are more widely available now. The interface between the inventory management system and the airline, which must remain proprietary to the airline for competitive reasons, itself exhibits economies of scope and scale. Finally, segmentation can be accomplished most effectively when it uses principal-agent divergencies to gain the cooperation of those who are “forced” to purchase high priced seats by rewarding them through frequent flyer programs.

The forces underlying this price structure constitute a major impediment to the contestability of airline markets. They make rapid price response by incumbents to new entry relatively fast and cheap, for several reasons. The incumbent’s price information is communicated to a user group that is otherwise educated about the airline and inclined to economize on search by using it, while the new entrant shoulders the much more difficult communications burden of making consumers aware of its offering and inducing trial. Since price discriminating incumbents can limit price matching to the more price-sensitive segments of the market, and price can be communicated much more quickly than other product attributes, an incumbent can match a new entrant’s prices on only a portion of the incumbent’s traffic, giving the incumbent a revenue advantage which may negate partially or entirely the new entrant’s cost advantage and affect its staying power.

In addition, incumbents operating hub systems can use the complex pricing system to limit further the impact of any cost advantages new the expense of their principals. While frequent flyers might be expected to be expert at buying vacation tickets with their own funds, such purchases would represent a relatively small percentage of the leisure tickets sold. In many cases, airlines have effectively removed their frequent flyers from the leisure market anyway, because program awards permit frequent flyers to do most or all of their vacation travelling on “free” tickets purchased at the expense of principals.

Taken together, these special features of airline markets reduce or eliminate the pressures which are thought to make many markets efficient even in the face of uncertain information.
entrants might have. Since a large percentage of the traffic on any given flight will connect at the hub to or from somewhere other than the cities on the spoke where the new entry has occurred, a substantial amount of the revenue on each flight operated by the incumbent will not be subject to the price competition produced by the new entry. Coupled with the production indivisibilities which affect each flight in most markets, the hub system makes it relatively easier for the incumbent than it is for the non-hubbing new entrant to maintain the total revenue necessary to sustain frequent flights in the face of vigorous price competition, and to use that frequency to attract passengers.

The ability of an incumbent to respond rapidly and cheaply to the prices and output of new entrants contradicts perhaps the most critical assumption of contestability theory. These same forces, coupled with the production indivisibilities described above, also make it a virtual necessity for successful entry in all but the largest markets that a new entrant enter each new segment as part of a hub and spoke system to preserve frequency and reduce vulnerability to predation. This seems to violate another of the critical conditions of perfect contestability, equal access to technology, expressed here as equal access to the production and information scale and scope needed to create the demand characteristics which will support entry.

E. Frequent Flyer Programs

The frequent flyer program was invented to impede contestability. It can function as a quantity discount when the entity paying for the mileage accumulation and the entity getting the benefit of the travel are the same. But the essence of its attractiveness in the marketplace is that it rewards business travel on behalf of a principal with free travel which will most frequently be used by the agent. Its effect is to use the principal-agent problem to create a demand/revenue analog to economies of scale and scope in deregulated airline markets. It does so in several ways, many of which have already been discussed.

174. Indeed, incumbents can perhaps respond more rapidly and cheaply than even the new entrant, if “response” is defined as communicating prices, product attributes, and schedules to prospective customers in the face of nonlinear information costs.
176. The situation where an incumbent exposes less of his revenues to price competition than does a new entrant reverses the conditions which supported McGee’s famous conclusion that predation could not be successful, in part because it cost the bigger predator more than the smaller predaree. See McGee, Predatory Price Cutting: The Standard Oil (N.J.) Case, 1 J.L. & ECON. 137 (1958). It also reverses the “judo economics” argument of Gelman and Salop described in Gelman & Salop, Judo Economics: Capacity Limitations and Coupon Competition, 14 BELL J. ECON. 315 (1980).
177. See Spence, supra note 62.
First, the frequent flyer plan ties customers to incumbents by rewarding them in non-linear ways. This creates something akin to an economy of scale on the demand side for the customer. The customer maximizes his benefits by concentrating his flying on a single airline. This means that a new entrant will have difficulty in competing with a price-matching incumbent, who will tend to retain passengers who are accumulating rewards in the incumbent's frequent flyer program. The flexibility of the airline in constructing rewards permits, for example, incumbents to award large bonuses on segments which have been subjected to new entry. These bonuses can be made available even before the new entrant starts service, since the information costs of entry ordinarily make it necessary for a new entrant to announce entry before starting service in order to attract business. This tends to tie passengers to the incumbent and give them, due to the non-linear nature of rewards, a significant incentive to continue to accumulate miles on the incumbent at the principal's expense rather than use the services of the new entrant.

Second, a frequent flyer plan creates economies of scope, since choosing an airline with a wider variety of destinations from a city will make it easier for business travelers to earn rewards, because they can be earned on trips to more destinations. The choice of a larger airline also will make the rewards more valuable, because a large portfolio of attractive leisure destinations makes it more likely that a business traveler will find a particular reward that especially suits her taste. In addition, just as in any other portfolio, diversification reduces the chances of an unfavorable outcome in the face of uncertainty over which destinations will be required for business travel or over which reward destination is desired. Here, diversification is achieved at no cost, since the economy of scope means that a traveler in a sense pays nothing for the destinations which are available but left unused.

Third, a frequent flyer plan gives an airline successfully employing it a particularly large share of that traffic which pays the highest fares. Agents traveling on behalf of principals are less price-conscious, in part because the very complexity in the price structure that the program exploits both increases their search costs and makes it harder to confirm that their journeys will qualify for the lowest fares. Airlines give better frequent flyer awards to passengers paying higher fares. Although the principal would prefer the agent to buy the lowest fare possible, determining whether a low fare available on discriminatory terms and capacity-controlled by the

178. See infra Part IV-1 (Predatory Practices).
179. Entry can be announced, for example, by making the flight schedule and seat inventory available to travel agents and, closer to the time entry occurs, by advertising to the public.
airline was in fact available and suitable for the employee's travel plans can be very difficult and also intrusive in a way that is costly to morale. Obtaining a larger share of high yield traffic can provide a large incumbent with a revenue advantage that offsets a new entrant's cost advantages. In addition, it allows the firm to match a new entrant's prices on a discriminatory basis, thus reducing the cost of waiting out the new firm. Finally, it allows easier development of new spokes to a hub, by allowing profitable operation with fewer passengers.

The frequent flyer program presents a problem for even a large national airline attempting to start service on a route between cities where it does not already have a major "presence" and hence an inventory of frequent flyer program members. It means that entry at another airline's hub will ordinarily only be attempted by an airline extending service from its own hub. For a new entrant operating on a scale smaller than the incumbent, the frequent flyer program is a major obstacle rather than a mere marketing detail.

F. Travel Agents and Incentive Commissions

Deregulation has enhanced the role of the travel agent. In the years prior to deregulation there was considerable speculation over the future role of travel agents and their commissions. Travel agents issue tickets on behalf of airlines. They are compensated through commissions based on the gross value of the tickets they sell. Before deregulation, the CAB regulated the commission rate at which travel agents were compensated and made it illegal to rebate such commissions to customers. This regulation served to eliminate competition among airlines for travel agent services, in return for which the travel agents got the benefit of the CAB's services as a referee in their continuing tug of war with airlines about the level of commissions. The CAB regime also protected small travel agents from big ones. The regulated commission rate served as a minimum and was set at a level which allowed small agents to stay in business. The uniform rate also functioned as a maximum, preventing airlines from paying some travel agents more than others, and the anti-rebating provisions prevented large agencies from competing with small ones by passing some of their commissions along to customers.

The CAB also supervised travel agent accreditation, allowing the airline trade association (Air Transport Association or ATA) to select the agents with whom they would deal. In this way, the airlines could protect

180. Of course, some of the cost in morale comes from the fact that the monitoring makes it harder for the agent to exploit the principal!
themselves from travel agents who might allow ticket stock to be stolen, or
who might collect fares and abscond with them, leaving tickets in the
hands of the public with no corresponding payments in the hands of the
airlines. As the price for travel agent political cooperation in these
arrangements, the ATA limited entry into the travel agent business to a
greater extent than was probably necessary for security purposes, thus
creating some value in a travel agent franchise.

The travel agent market place that the combination of airline and
agency regulation created was a very orderly one. Regulated fares were
simple and easy for agents to deal with, so no travel agent could attract
business through superior assistance with fare search. Since only one or
two airlines served most routes and there was little likelihood of further
entry, and since the CAB regulated prices, airlines behaved as duo-
polists and oligopolists in soliciting travel agent preferences, offering as
their principal inducements sales visits, receptions, brochures, aircraft
models, and assistance finding seats during peak travel periods. Travel
agents functioned largely as impartial and universal ticket outlets. They
combatted indivisibilities by providing many more locations for purchase
of tickets than airlines could afford to provide in single-airline sales of-
ices. In large cities, travel agents competed with airline sales offices by
providing tickets on many airlines in one place, credit and delivery ser-
vices, and other services the airlines couldn't or didn't provide. Location
selection, a minimum of cost control, and customer relations were the
skills necessary to succeed in the business. As in any business with mini-
mum rates set at levels designed to protect small producers, small and
independently-owned locations proliferated.

Deregulation changed the rules and the marketplace. In the early stages
of deregulation, commission rates were deregulated, the “exclusivity”
rules requiring ATA airlines and travel agents to deal only with each
other were eliminated, entry into the agency business was restructured,
and the anti-rebating rules were scrapped. An orderly marketplace with
few airlines and regulated fares blossomed (or exploded, depending on
one's point of view) into a confused bazaar of new entrant airlines and the
complex fare structure discussed above. Agencies were free to engage in
price competition for clients through rebates, so efficiencies of scale on
both the buying and selling sides of the market could be reflected in rates.

181. There was no likelihood of sudden entry, since CAB route cases took years to complete. See
REPORT OF THE CIVIL AERONAUTICS BOARD ADVISORY COMMITTEE ON PROCEDURAL REFORM
(1975).
182. The section regulating commissions for sales of air transportation, 14 C.F.R. § 253 (1977),
183. COMPETITIVE MARKETING, supra note 97.
Airlines were free to use outlets other than travel agents to distribute tickets, and experimented with everything from event ticket brokers to the United States Postal Service.

Much industry soul-searching about the future of the travel agent industry ensued. If airlines were free to deal with the public directly through other entities, would they abandon agents for electronic ticket delivery, or for department stores and banks? Would agents become dealers of one or a few airlines to the exclusion of others? If customers could deal with agents located on or near airports, would they stop dealing directly with airlines? Would any agencies be left? Would there be consolidation in the travel agency business of the sort which has taken place in the airline business? What function did travel agents perform anyway?

The answer that emerged was a bit surprising. Unlike the past, where travel agents in an orderly marketplace served principally as ticket vendors, the confused marketplace of deregulation allowed agents to sell information to customers. Deregulation increased the value to consumers of having an expert search for them, since it was more likely that a good agent could find a new airline service or a fare that the customer couldn't find herself. It also created new profit opportunities for travel agents, because it was very costly for customers to monitor the search process and agents were compensated according to the value of the ticket, so that the more expensive the ticket sold, the higher the commission. In effect, this system rewarded an agent skilled enough and willing enough to find low fares or new-entrant airlines so that the customer could not detect shirking and would not take her business elsewhere, yet not so conscientious in doing so that tickets would be sold at the lowest possible prices, thus minimizing commissions.

Both agents and airlines quickly perceived the possibilities in this system. If search costs were significant for the customer and the agency could shirk in dealing with the traveler, airlines could earn incremental revenue by sharing with the agency the value of business the travel agency directed to it. Obviously, this possibility did not exist for all traffic. If a customer was tied to an airline by product loyalty, a frequent flyer program or an enforced company policy regarding airline and fare selection, the agency could do little to redirect the customer’s business and the airline

184. Doing so would negate the value of using the agent in the first place.
185. Once airlines became sophisticated about the use of the complex fare structure and the frequent flyer program to counteract new-entrant pricing, the national brand airlines matched new-entrant pricing for most price-sensitive travelers, leaving the travel agent with some power to redirect the price-sensitive traveler. For the important high-yield traveler, the power of the frequent flyer program reduced somewhat the travel agent's power to steer business to an airline other than the ones in which the traveler was accumulating miles.
would wish to pay only the normal commission for such tickets. The system rewarded airlines that were particularly adept at paying high incentive commissions\textsuperscript{186} for business that was truly incremental and successfully distinguishing such business from business that would have come to the airline anyway. This required a highly developed capability for monitoring the total market, so as to deal with the principal-agent problems inherent in the airline-travel agent relationship.\textsuperscript{187} This need for monitoring dramatically rewards airlines which can induce travel agencies to use CRSs controlled by the airline, an aspect of deregulated airline marketing we will explore in Part IV G infra.

Just as frequent flyer programs can introduce economies of scope and scale into the reward structure faced by travelers (agents) choosing their travel at the expense of the employer/client (principal), so can incentive commission programs introduce the same sorts of economies into the reward structure of travel agents (agent) choosing routings and fares at the expense of their customers (principals). It is far less costly for a travel agent to participate in an incentive program operated by the airline offering the most service from its city (perhaps because it has a hub there) than it is to search among that airline’s route-by-route competitors for an equally rewarding combination of incentive programs. An airline with a large presence at a city can arrange its incentives so that extra commissions earned by attracting traffic on particular routes can be applied to traffic on other routes. When incentives are arranged this way, the more routes an airline serves from a city and the more flights it has, the more rewarding travel agent participation in an incentive program can be. When these programs influence ticket sales, they introduce economies of scope and scale into deregulated airline markets.\textsuperscript{188}

As the airline population has declined and route systems have reorganized around hubs, the travel agency system’s value to the customer has become based on the complexity of the fare structure, although smaller

\textsuperscript{186} Incentive commissions, or “overrides,” are commissions above the base level paid to travel agents on the basis of volume, market share, or special promotions (“book ten clients on our new service to Florida, and we’ll give you an extra commission, or a free ticket you can sell, or a premium”).

\textsuperscript{187} Curiously enough, the system examined here generates principal-agent problems at three levels: first, between customer and travel agent; second, between the airline and the travel agent who is supposed to be making an extra effort to sell its services in return for incentive commissions; and third, between the travel agency and the individual travel agent who does not own the agency and who, without supervision or special incentives, will influence travelers to buy tickets on those airlines willing to reward him directly with merchandise, amusing sales visits, free trips, etc., rather than the airline which best rewards the agency. Airlines attempt to assist agencies signing incentive contracts with them by devising ways to monitor or reward individual agents so that this problem is minimized.

\textsuperscript{188} While it might be thought that smaller airlines could combat this problem by combining their travel agent incentive programs, transaction costs make this extremely difficult. See supra note 145.
travel agencies whose perceptions are rooted in the past tend to see this complexity as a cause of increased search and ticket issuing costs.\textsuperscript{189} Deregulation has tended to reward large travel agents who can advertise their information processing capability to customers, take maximum advantage of incentive commissions, and achieve economies of scale which permit them to offer rebates.\textsuperscript{190} As multiple location travel agents have expanded, they have also benefitted somewhat from information (advertising) economies of scale and scope in reaching customers.

G. Computer Reservation Systems

The role of information management in the deregulated airline market must now be apparent. Some conduit is needed to give customers access to the enormously complicated inventory from which they make their travel choices. Customers wish to choose from seats available in many thousands of city-pair markets sold in a mind-boggling number of combinations on thousands of connecting flights every day for up to a year in advance. Each seat has associated with it several to many fare possibilities which vary depending on the rest of the customer’s itinerary and other customer characteristics designed to facilitate segmentation. This information was once made available in a telephone book-sized document detailing for travel agents and customers the schedules and fares available. But schedules now change quickly and connecting possibilities have mushroomed, making such a document difficult to use even for trip planning. The fares available are so numerous and change so quickly that they can no longer even be listed; the flights on which they are available and the quantities of seats on each flight to which they apply are changed daily. Electronic assistance in making a frequently updated data base available to customers through travel agents is a necessity in this environment.

The airlines themselves need to manage these complex, layered inventories of seats available to different segments of the market on different terms. The more sophisticated airlines track the purchase habits of their customers, especially their most frequent flyers, so they can obtain information which can be used to segment markets, in part by fashioning awards which will present customers with the scope and scale incentives

\textsuperscript{189} Travel agents also, of course, provide valuable services related to ticket printing and delivery and credit, but these services are increasingly obtainable through other channels, such as ticket-by-mail and the use of credit cards. The “one-source” aspect of these activities is, of course, a significant information and transaction economy.

\textsuperscript{190} Ironically, one service that travel agencies have offered to large customers is assistance in tracking employee travel selection behavior so as to reduce the cost to employers of frequent flyer principal-agent effects. In fact, some large travel agents offer software to help their customer firms reduce the costs of monitoring the decisions of their travelling employees. See, e.g., Advertisement, “Announcing Air Planner Plus—A Thomas Cook Exclusive,” Frequent Flyer, Apr. 1987, at 1.
necessary to ensure loyalty. While they use information to monitor the
effects of their efforts to exploit principal-agent conflicts between travelers
and their employers, airlines also need to monitor their efforts to induce
travel agents, through incentive commission programs, to exploit the
divergences between their own interests and those of their customer prin-
cipals. These incentive commission efforts create yet another set of
principal-agent relationships, this time between airlines wishing to reward
only incremental business diverted from competitors by travel agents, and
travel agents seeking extra commissions from business that would have
been placed on that airline anyway, thereby reducing the risk to the
agency of customer dissatisfaction. This conflict forces airlines to maintain
the monitoring capability necessary to police their relationship with travel
agents.

CRSs are the key to meeting all these information needs. Airlines built
such systems for internal use in the 1960's and 1970's, and enhanced them
dramatically after deregulation to manage the much more complicated
database arising from fare complexity and frequent route and schedule
changes. These systems themselves exhibit economies of scale and scope,191
and it became common for some airlines to sell the use of their internal
systems to others, saving them the cost of developing systems of their own.
Enough vendors of such services existed to make their supply to other
airlines competitive and various hostage-taking devices were invented to
deal with the relationship-specific commitments required. In this role,
CRSs were production tools, rather than systems of demand enhancement;
they presented few opportunities for exploitation of principal-agent rela-
tionships because employees of the customer airline generally did their
own booking and inventory management using the system hardware and
software provided by the vendor.

Interest in travel agent computerization initially centered on reducing
the cost of issuing a ticket by automating the booking and ticket writing
functions. At first this was seen as an information production and process-
|ing problem similar to the initial creation of in-house CRSs and the initial
|provision of computer services between airlines. There was much discus-
sion of the possibility of an industry-wide "neutral" booking system
|through which all travel agents would have access to the inventory of all
|airlines on the same terms. Free-rider problems and uncertainties about
|the necessary degree of automation prevented this neutral system from

191. Algorithms used to solve problems for one city-pair and date can easily be used for another
city-pair. The schedule and seat inventory of a customer airline can be added to the host airline's
computer as an extension of its own inventory, kept separate from its own inventory by an electronic
partition, and can be managed more or less in the same way as the host airline's own inventory data
base.
coming into being. By the late 1970's, with the growing complexity of the system, travel agents needed computer assistance simply to gain access to airline prices, schedules, and seat inventories, as did the airlines themselves. At the same time, the "new industrial organization" factors outlined above attracted attention from several of the largest airlines. As inventory complexity made obtaining schedule information, pricing, and booking more difficult, the possibility of influencing traveler choices by biasing the information provided to travel agents became evident. American, United, and TWA invested in systems which provided automation functions for travel agents, thus reducing their unit costs for booking and issuing tickets. These systems were deliberately biased in their presentation of schedules and fares so it would be much easier for a travel agent to find and use services of the system-owning airline rather than those of its competitors.

While systems independent of individual airlines could certainly have answered the needs of travel agents, and at least one such system was offered, airline-owned systems quickly dominated the industry. An independently-owned system had only two sources of revenue: It could charge airlines to offer their inventory to the public, and it could charge travel agents using the service. But airlines would not pay for inclusion unless the system had already achieved market penetration with travel agents; to do that would have required a substantial cash investment. An airline-owned system, on the other hand, had a third source of revenue: the extra sales coming from customers directed to the airline not by selection of its offering after neutral comparison in the marketplace, but instead by travel agents choosing from biased schedule and fare information presented on the computer screen, and biased further in their recommendations by commission incentive programs efficiently monitored by the very same computer on which the bookings were made. This source of revenue impelled airlines to offer their CRSs to travel agents at little or no cost in return for a long-term agency commitment. A travel agency would choose this low priced alternative because it could get customers facing high monitoring costs in a complex marketplace to accept biased choice unknowingly, could make extra revenue from these biased choices through participation in special incentive commission programs offered only to CRS subscribers, and could overcome bias by further search effort where customers insisted on other choices.

In short, airline-owned systems distorted the travel agency's incentives through a kind of information externality: The agency enjoyed the benefits of automation at prices deliberately kept low by the system provider, in

192. The non-airline-owned system was called MARS-plus.
return for which the agency passed the costs of more restricted choice on to its customers. As deregulation made the market environment more complex, both the benefits to the agency of automation and the costs to the traveler of monitoring her travel agent’s choices rose. Airline-provided CRSs became enormously popular with travel agents and with the three airlines whose systems were most widely used.

As the market became more complex and the role of information costs became clearer, the usefulness of CRSs to their airline owners grew. Placing its CRS in a travel agency for the agency’s use in booking all its business gave significant information advantages to the airline owning the CRS. These advantages fell into two principal categories: market intelligence and the ability to manipulate market signals on the one hand and, on the other, the airline’s ability to monitor its own agents in exploiting their relationships with other principals.

An airline which controls the system on which travel agents make bookings on itself and its competitors gains market intelligence because it receives real-time information about market preferences and the success of marketing initiatives. An airline without access to the information generated by such a system knows only the travel patterns of those who buy its tickets. Older market data is available from the Department of Transportation, but this data is deliberately delayed by nine months to minimize the disclosure of competitively sensitive—that is, immediately useful—information. Alternatively, the airline can have employees count passengers boarding or deplaning at rivals’ airport gates, but such observation is expensive and doesn’t provide any of the most valuable information. “Counting” flights at a hub does not reveal the true origins and destinations of those boarding a plane, nor does counting at a spoke. Class of service cannot be observed this way, nor can price and discount categories for tickets. In an era of hub and spoke route systems and complex fare structures, it is extremely difficult to estimate the revenue a rival’s flights generate by looking at passenger counts. For the same reasons, it is difficult to discern the success or failure of a fare initiative, advertising program, or service change without better data than can be obtained by crude observation.

In contrast, an airline whose CRS is used by travel agents has access to a very accurate picture of both its own and its rivals’ business patterns. Through the CRS an airline can track the effect of price changes, see roughly how much of a rival’s seat inventory is assigned to a given discount fare classification, measure how much full-fare business it attracts compared to rivals, and track changes in shares of city-pair traffic flows and of market demand subsegments. It can even see how loyal its own frequent flyers are. A CRS owner can then use this information to distort
market signals to its rivals, leading them to make incorrect decisions. When a CRS owner sees travel agents making bookings on a rival airline's flights, it can intervene through targeted secret incentive programs in an attempt to switch business. By responding selectively, it can temporarily distort signals the market sends to competitors, in order to persuade the rival to abandon fares, schedules, or even routes where, absent these secret interventions, its offerings would be preferred by customers.

This power of observation assists the CRS owner in its own efforts to distort principal-agent relationships. In a sense, the computer system gives its owner a technological advantage over rival principals in monitoring the behavior of agents for whose allegiance they compete. A travel agent has two sets of principals: the travelers who use his services and the airlines whose tickets he sells. Incentive commission programs attempt to induce the agent to breach his responsibility to travelers in favor of a particular airline. Without a CRS on which an agent makes all his bookings, it is difficult for an airline which has signed an incentive commission agreement with an agent to know what effect the program has had or even whether the agent is complying with its terms. In an industry of considerable fluctuation and uncertainty, it is easy for a travel agent to claim falsely that disappointing results should be attributed to slow business at that location, or that the disappointing revenue he gives the airline in question represents the required percentage of his total bookings. In fact, it is not difficult for an agency to find a way to participate in the incentive programs of several competing rivals, making it an agent for multiple principals, all of whom it is shirking. Data from CRSs obviously facilitate monitoring by airlines. If a travel agency makes all its bookings on an airline's system, rewards can be constructed based on actual performance, and "cheating" by the agent is difficult indeed. An absence of cheating presents competitors with fewer opportunities to contest markets.

Both the market intelligence and the monitoring capability provided by CRSs placed in travel agencies depend on the agency making all its bookings, including those on rival airlines, on one airline's system. As a result, it should come as no surprise that these systems are placed in travel agencies under contracts whose terms strongly reward exclusivity of use. If an airline owning a system hopes to make much of its revenue from the system in the form of increased profits on its own airline, it can offer the system to travel agents at very low prices. Since installing the system in an agency is expensive and involves substantial non-recoverable costs in equipment and training, the airline will insist on a commitment from the agency to use the system on a long-term basis. Before they were made
unlawful by the Department of Transportation's CRS rulemaking, excludivitiy provisions were common, justified by the need of the CRS supplier to ensure that this expensive investment would in fact be used by the agency. These provisions can be explained in Williamson's terms as a form of hostage-like commitment on the part of the agency to induce the airline to supply expensive transaction-specific facilities which are only valuable if used. However, they also are occasioned by a compensation system for the CRS-owning airline that relies on the value of information and principal-agent distortions for recovering the airline's investment, rather than on fees to the travel agency for the valuable services provided to it by the system.

Many of these effects were addressed as part of a rulemaking undertaken by the CAB in response to pressure from the Department of Justice and airlines other than United, American, and TWA, which then owned the largest travel agent CRS systems. Complaints about the uses to which these systems have been put are also the subject of a pending private antitrust action. The rulemaking reduced or eliminated some of the more obvious distortions of marketplace information and impediments to contestability by ruling out the more blatant forms of screen bias in the presentations of schedules and fares, eliminating the discriminatory provision of services such as automated boarding passes, eliminating explicitly forced exclusivity, and mandating access by other airlines to marketing "reports" generated from CRS data.

But the rulemaking by no means eliminated the preferential access to information and greatly enhanced ease of monitoring that CRSs provide. CRS owners still have advantages both from immediacy of availability and from the difficulty to non-owners of gaining access to information not in reports. Notwithstanding the rulemaking, airlines still struggle to induce travel agents to use their CRSs, even paying them to switch from other systems. This behavior strongly suggests that substantial rents accrue to airlines owning CRSs when agencies use their systems. The

193. 14 C.F.R. § 255.6 (1986).
197. CRS owners supply other airlines with raw data tapes on a slightly delayed basis. Aside from the delay, the receiving airline has to duplicate software already in existence in order to extract information from the raw data tapes. This cost is a constant, and the CRS owners do not supply the software. Extracting the data is thus costly to any airline, but to smaller airlines it represents the handicap of yet another information economy of scale.
existence of these rents is also deducible from the failure of the only non-airline-owned travel agency computer system (MARS-plus) to penetrate the market. Among its difficulties has been the need to rely on payments from travel agents, rather than rents generated for airline operations, to fund the system.

Particular airlines' CRSs seem to dominate the geographic areas centered on hubs dominated by the airlines that own them. This occurs because CRSs aid in the exploitation of economies of scale and scope in information and in shaping principal-agent relationships, and the principal compensation received by the owning airline is the rents generated on the associated airline. Geographic computer domination is worth more to an airline that has many flights originating in that region for which the computer system can enhance revenue. And the complementary character of the economies of scope and scale involved in hub and spoke systems, frequent flyer programs, and travel agent incentive commission programs finds parallels in and is enhanced by the economic characteristics of these systems.

H. Control of Slots and Facilities

Among the most remarked-upon impediments to contestability in the deregulated airline industry has been the “shortage” of terminal facilities, especially gate space, at a number of important airports and the difficulty of obtaining landing slots at the four airports subject to the Federal Aviation Administration's High Density Airport rule. It seems intuitively obvious that airlines serving airports where these factors of production are in particularly short supply enjoy some protection from entry and earn economic rents.

Since it is a commonplace that any economic resource is scarce, scarcity alone cannot be an impediment to contestability. In fact, the principal contribution which contestability theory makes to competition theory is its demonstration that an efficient equilibrium can be achieved even where technology constrains market structure so that only one firm may serve the

198. See Call & Keeler, supra note 7, at 221, 223 (arguing that deregulation will not necessarily lower fares, due to product differentiation); E. Bailey & J. Williams, supra note 14, at 11 (arguing that despite deregulation, larger trunks continue to have stable rents).

199. "Slots" are time periods during which airlines have landing or takeoff rights. Prior to deregulation the CAB approved agreements allowing carriers in certain congested airports to form scheduling committees to allocate among themselves limited slots. The certificated carrier approval was first granted in CAB Order 68-12-11, Dec. 3, 1968, and the commuter carrier in CAB Order 69-2-52, Feb. 12, 1969. Access to ground facilities and slots are currently controlled by airport authorities. This control has been unsuccessfully challenged. See Pacific Southwest Airlines v. County of Orange, CA-81-3248 (C.D.Cal.). Local control is subject to FAA control of airspace. See High Density Traffic Airports, 14 C.F.R. §§ 93.121-133 (1986). See also E. Bailey, D. Graham & D. Kaplan, supra note 7, at 180-84, 190-93.
market at any given time. And the existence of an efficient equilibrium does not imply the absence of rents. A unique factor of production which costs less to produce than its market-clearing price can, indeed must, earn rents when supply and demand are balanced in an efficient equilibrium. We should not let vertical integration between the owner of the rent-producing factors (here, the slot owner) and the firm that employs them in production (here, the airline using the slot) confuse us about the source of rents that such an integrated firm might earn. Scarcity rents are inevitable whenever there exists a discontinuity in the production function and are not an indication of impediments to contestability. Only rents earned from market power, that is from the artificial restriction of output below what is technologically possible at market-clearing prices in the face of scarcity, can be attributed to problems with contestability in the airline industry.

By this test, it can readily be seen that the fact that fares are higher on routes involving slotted airports is not evidence of either problems with market contestability or the existence of rents from market power. If the market must charge $750,000 for the indefinite right to a La Guardia arrival and departure in order to equilibrate demand and supply, that will be reflected in cost-based fares for transportation using the slot, and is very good news for a slot owner who has paid less than that for its slot. But it is not prima facie evidence that the airline using the slot (which, confusingly, is usually its owner) is any better off as an airline than it would be at an unslotted airport. In the language of contestability theory, the existence of market power will depend upon the ability of a new entrant to buy access to the airport on terms competitive with other airlines, as distinguished from slot owners.

In theory, even the vertical integration between airline owners and slot owners ought not to operate as an impediment to entry. If the slot is worth more to another airline than it is to its present user, the first airline ought to be able to pay the present user to give it up. The conditions under which this is true—costless entry and exit, no obstacle to entry at efficient scale, no problem in coordinating the complementary factors of production—resemble very closely the conditions required for contestability. So our search for special impediments to airline market contestability related to slots cannot start with their scarcity, but instead must be related to the sorts of factors that we have considered throughout this section. The question becomes not, “Are slots and gates scarce?” but rather, “Is there

200. R. BORK, THE ANTITRUST PARADOX 228-31, 240-42 (1978) (vertically integrated firm maximizes overall profit by setting output at each level as though units independent of each other; vertical integration for the purpose of blocking entry incurs diseconomies).
anything about airline competition that allows scarcity of slots and gates to be leveraged into market power?"

The evidence from deregulated markets is ambiguous. The fact that airlines hold on to ticket counter, gate, ramp, and hangar space that they are not using and often avoid making that space available to other airlines seems to suggest that airline managements regard possession of slots and gates as giving their owners advantages that go beyond mere possession of the right to earn scarcity rents. But this evidence is clouded by the various restraints imposed by regulators and airport operators that impede or prevent converting scarce airport assets into cash and create uncertainties about the possibility of ever replacing those assets should they be needed. For example, the buying and selling of slots was prohibited for much of the recent past, although it was legal for a brief period in 1983 and has been legal since April 1, 1986. This history of prohibition made it difficult to turn slots into cash, and created uncertainty about the future existence of a market that would allow repurchase of slots should they be required again. It is difficult to separate an airline's reluctance to release unused assets, even for cash, based on the belief that those assets confer market power beyond scarcity value from an airline's reluctance to release these assets due to concern that airport operators, the DOT, or others will impose or continue rules that will make it hard to acquire airport assets in the future.

201. That evidence is not to be found in the intensity of the scramble to acquire and keep slots when they were initially created and before they could be bought and sold. The scramble might well have occurred without the possibility of future monopoly rents simply because the slots conferred scarcity rents on their owners, but instead were acquired "free" through non-market mechanisms. They were allocated by scheduling committees to their historical users, with occasional realignment to new entrants by government-required lottery or by government fiat. For a long time, slots were only exchangeable by barter, which created artificial value as "trade bait" even for slots for which many of the contestants had no directly profitable use. Later, the slots could be converted into cash, which did at least reduce their unprofitable use, but certainly did not reduce the incentive to be the initial owner.


203. The subject of airport facilities arrangements and their effects on airport access is complicated enough to merit separate treatment, and cannot be addressed in detail here. But the arrangements now in force have clearly shaped—in fact, have distorted—the market for airport facilities in a variety of inefficient ways. Consider the effect of lease terms: Suppose an airline has a great deal of excess gate capacity at an airport which was once an important station for it but which now functions as a significant spoke in a hub system created since deregulation and centered elsewhere. The airline controls these gates nearly absolutely under a typical long-term lease at a rate that amortizes historic construction costs, which it may very well have underwritten by guaranteeing airport bonds fifteen years ago when deregulation was not even a cloud on the horizon and route systems would last forever. If it wishes to consider releasing this space to free its capital for other uses, the airline often finds that the terms of the lease inhibit taking the "real estate" profit inherent in reselling occupancy rights to an asset (the lease) which has appreciated with inflation and new demand.

Concurrently, the airline often finds that if it releases these gates, its future capacity needs at this airport will have to be satisfied at current market rates and, more importantly, will only be available on terms that give the airline much less control of the gate and hence much less assurance that it can run the kind of operation it needs at that airport, such as short-term leases, "preferential-use"
Airline Competition

Given the murkiness and even perversity of the incentives created by government regulations, airport policies, and lease provisions facing airlines controlling substantial airport assets, it is difficult to infer from airline obsession with acquiring and keeping such assets much about the degree to which airport assets confer market power on airlines that own them. But there is some reason to believe that this may be the case. Even the fact that some mergers or buyouts have seemed to have as one major motive the acquisition of facilities204 that in theory should be purchaseable separately doesn’t tell us much, since once again it is not clear to what degree this represents a transaction cost saving in the face of formidable leasing and regulatory obstacles to a cash sale of facilities or the need to acquire “trade bait” for facilities needed elsewhere.205

Since this Article does not undertake to investigate the degree to which these impediments to the realization of scarcity rents account entirely for the reluctance of airlines to release unused or underused airport assets, it cannot resolve the question of whether control of scarce facilities constitutes an impediment to contestability as well as a source of scarcity rents. If there were no theoretical basis to support suspicions that such an impediment might exist, we might abandon the investigation at this point. But the economies of scale and scope we have described, along with other influences best explained by resort to recent theory, suggest theoretically

arrangements or assigned-use arrangements. These new terms may well be a justified response by airport operators, perhaps at the urging of a CAB or DOT eager to preserve new entrant access to airports, to problems that long-term leases have posed for airport flexibility in a deregulated environment. The new terms may even be desirable for these reasons from a public policy standpoint, but they often have unintended incentive effects which give operators a choice structured so that a concourse full of gates at historic lease costs can be maintained at a cost equal to or only slightly greater than the cost of an uncertain right to be accommodated “adequately” (in the airport operator’s judgment) after the space is released. Even this might be attractive if the airline could realize in cash the capitalized value of the historic-cost lease, but, as noted above, the original lease often contains provisions designed to keep the airline from profiting “excessively” from the sublease of public property (the gates), and political constraints prevent a large lump-sum buyout by the airport of the airline’s long-term lease rights.

Under such circumstances, an airline often elects to keep control of the underused facilities it holds under long-term lease. The lease ensures the airline’s access to facilities if it elects to expand again at the airport in question. And the lease enhances the airline’s bargaining position in future negotiations with airport authorities who may want the space to accommodate another airline. Perhaps more importantly, given the institutional constraints on the operation of markets for airport assets, airlines use these assets as “bargaining chips” in negotiations with carriers controlling facilities elsewhere. This is possible because impediments to sale or market price subleases do not forbid subleases that pass through historic costs. It is as if the restraints on alienation operate to make airport leases a special barter currency which airlines must use to effect changes in their facilities holdings at many congested airports. And these idiosyncratic benefits of holding and adding facilities which are not currently needed can be achieved at little or no out-of-pocket cost and often, for the reasons described above, at no realizable opportunity cost.

Incentives as powerful as these to hold airport assets are difficult to separate from any advantages these assets might generate for an airline vis-a-vis its competitors.

205. See supra note 201.
sound but as yet untested hypotheses about ways in which the observed inclination of airlines to hoard airport assets might impede contestability of airline markets as well as constitute a sensible defensive response to defects in the market for airport assets. (The two are not, after all, mutually exclusive.) Those hypotheses are presented here not as assertions of fact, but rather as an agenda for further investigation.

The principal effect on contestability of controlling large amounts of "scarce" airport assets may be to reduce the possibility of certain types of successful entry by making it difficult for a competitor to enter on a large scale or to coordinate small-scale entry so its value to the rest of an airline's network is maximized. As we have seen, air transportation is characterized by network effects which appear both as economies of scope and as revenue returns to scope, information economies of scale, and production indivisibilities for individual city-pair traffic flows. These effects suggest, among other things, that successful entry at a given city is possible in one of only three possible modes: First, the entrant airline may create a new hub centered on the entered city which is large enough to make the entrant an effective competitor in the market for information and in the exploitation of principal-agent effects, and large enough to overcome production indivisibilities in the city-pair traffic flows which must be accommodated on a one-stop basis across the hub. Second, the entrant might add the city as a spoke to a hub system centered at another city of large enough scope and scale to overcome production indivisibilities. Third, the entry may be part of a specialized geographic or customer service market niche, of which there have been only a few relatively successful examples so far despite many attempts: high-frequency service in very large closely-related corridor markets, budget transportation sold on relatively unrestricted terms at output levels low enough to make competitive response unprofitable for major airlines, and near-monopoly service at a satellite airport.

The incumbent's control of a significant proportion of the facilities (and slots, at the four slot-controlled airports\textsuperscript{206}), can make it extremely difficult for a prospective entrant to organize a new hub without making transaction-specific commitments with long lead times. New hub entry always requires, as we shall see below\textsuperscript{207} substantial firm- and transaction-specific investments in advertising and initial operations and often requires substantial facilities investments as well, for example, to

\textsuperscript{206} John F. Kennedy International and La Guardia in New York, O'Hare International in Chicago, and Washington National Airport.

\textsuperscript{207} See infra Part IV-I.
assemble enough gates for an efficiently-sized hub.\textsuperscript{208} But there may be enough unused space to permit hub entry at many airports, particularly those that served as significant centers of operation before deregulation but which have experienced large changes in service patterns. Use of this space would reduce both the lead time and the required size of the sunk investment necessary to begin operating the hub. Controlling substantial amounts of unused space can make entry more difficult, expensive, and risky by making already-constructed facilities unavailable to the new entrant.

Similarly, controlling large units of facilities and slots can make entry as a corridor-type niche operator difficult. Such operations are also subject to considerable indivisibilities. For example, it is necessary for operators to assemble hourly departure and arrival slots at both Washington National and La Guardia airports, as well as three gates and parking room for backup aircraft, in order to mount a competitive shuttle service between the two airports. Similar facilities requirements for the hourly service necessary to be minimally competitive in the Los Angeles-San Francisco market make control of gate capacity at those airports important to entry control.

Finally, network interdependencies or production indivisibilities can make facilities control important in influencing the outcome of even a spoke entry by an airline hubbing elsewhere. This sort of entry can be arranged at virtually all airports, which is why one-stop traffic flows over competing hubs remain the part of the deregulated system which most nearly displays the contestability that underlay predictions of how deregulated airline markets would behave.\textsuperscript{209} But facilities control can reduce the revenue-generating power even of spoke entry, by interfering with network economies. In effect, an incumbent airline at a city can reduce its new entrant rival's ability to attract traffic to its service by forcing it to accommodate its schedule to the availability of a gate, thus disrupting its connections at its distant hub.\textsuperscript{210} The incumbent can also force the new entrant to use a less desirably located gate than would be necessary if it could make use of underused facilities already under lease, or to share a gate with other dispossessed airlines, which imposes complicated transactions or rigid use-allocations on their efforts to maximize the value of their own networks.

\textsuperscript{208} On the other hand, the very characteristics which make hub entry risky protect the rewards of such entry if the hub is successful. \textit{See supra} Part IV-C and \textit{infra} Part IV-I.

\textsuperscript{209} These traffic flows are a very substantial part of the system, since one-stop routings over hubs also offer substantial competition for the low-fare component of nonstop service from hubs.

\textsuperscript{210} This is functionally equivalent to raising the entrant’s costs. \textit{See} Salop & Scheffman, \textit{supra} note 114, at 267.
A particularly stark form of this effect can be found at the smallest airports, where, as a result of production indivisibilities, one airline controls the only terminal facilities. In such a case, the incumbent can raise the cost of entry for a potential rival airline by forcing the construction of new facilities or by requiring the use of makeshift facilities exposed to the elements, while the existing facility stands idle alongside.

Many of these impositions on new entrants can be seen as efforts to raise rivals' costs. Subleases of unused gate space can be priced at levels designed to extract most or all of the value of entry by a new entrant, rather than the very low opportunity cost to the lessor or other prospective users. Where lease provisions control the prices at which gates can be sublet, it is common to require that the new entrant contract with the incumbent not only for the use of the gate, but for ground handling.211 Such arrangements are commonly solicited on a non-monopoly basis when an airline with only one or a few flights a day serves an airport where it would not pay to establish a station. But a holdover incumbent with a lease on excess facilities can impose substantial costs on a new entrant rival by tying these services to gate use.

First, ground handling contract charges can negate any labor cost advantages that the new entrant might possess in performing these functions and, through large markups on even the incumbent holdover's higher costs, can be a vehicle for negating other cost advantages as well. Second, customer contact people supplied by a competitor can monitor the new entrant's operation and learn who is traveling on the new airline, often even attempting to convert them to flying on the competitor in the event that circumstances necessitate a change in travel plans. Third, it is at best unlikely that airline employees will do as good a job working the flights of a direct or indirect competitor which is a threat to their job security as they will in working the flights of their own employer. At worst, they may attempt to hamper the success of the new entrant by offering poor service. For example, frequent and perhaps unnecessary gate changes at the last minute may confuse passengers and those waiting to meet incoming flights, while conveying the impression that the new entrant is poorly organized.

The potential success of all these tactics is greatly facilitated by the existence of numerous principal-agent effects. The operation of an airline requires the coordination of many necessarily unsupervised tasks which change rapidly and require constant redefinition in the face of uncertainty

211. "Ground handling" consists of two sets of activities which can be supplied together or separately: ramp services, such as baggage handling, tow-in and pushback, and refueling; and passenger services, such as ticketing, baggage check-in, and gate checking.
and changing circumstances. It is difficult enough for a firm to monitor and control its own employees as they undertake their jobs. It is prohibitively expensive to monitor the employees of others who have particularly strong incentives not to perform in a manner which will further the interests of the new entrant airline required to use them as a condition of gate access. And although many leases between prime tenants and airport owners require the tenants to make unused space available by sublease on "reasonable terms," the complexity of airline operations and the lack of ability to supervise them effectively make the airport operators particularly ineffective at supervising the terms of subleases, especially when they are tied to ground handling contracts.

Precisely for the reasons just described in connection with principal-agent effects, it is difficult for an outside observer to know how much of the interest that airlines exhibit in holding on to gates and slots is attributable to the leverage possibilities they create. But there is a sound theoretical basis for believing that such possibilities exist, and at least some anecdotal evidence\textsuperscript{212} to support it.

In all these cases, scale and network effects mean that the potential for disrupting rival entrants' plans goes well beyond the costs immediately visible from looking at the local boardings on an individual flight considered apart from the system. In effect, the airline controlling the scarce resource gains access not only to the rents implicit in the market-clearing price for the facility in question, but also to the surplus available from using the facility as part of a larger operation. The effect is very similar to problems of assembling real estate parcels in a large city. Holdouts can gain more than the scarcity rent for their properties by tapping into the development potential of the land, while large developers can thwart rivals by controlling strategically placed parcels in the middle of otherwise prime parcels. Fortunately for real estate development, even the most sought-after urban real estate has more substitutes than do gates in the only existing terminals at a city's only airport.

\textsuperscript{212} For example, when New York Air started operations at La Guardia, it was required to lease unused gate space from United. United was so aggressive in using some of the tactics described here that, in an unprecedented move, the Port Authority of New York and New Jersey, which owns La Guardia, actually removed some of the gates from United's control and gave them to New York Air. The Port found it much easier to do this than might otherwise have been the case, because United's original twenty-five year lease had expired and was up for renegotiation. In a similar way, New York Air's entry into Washington National Airport was tied first to a ground handling contract exacted by Northwest for use of its unused gates and later to ground handling by American for use of its unused gates.
I. Predatory Practices

Looking at airline competition with the help of new industrial organization theory helps us understand the otherwise puzzling persistence of apparently predatory behavior in deregulated airline markets. As noted above, economists committed to a high degree of airline market contestability have historically maintained that predation is doomed to failure and is therefore unlikely because the capital assets involved in airline production are mobile. This mobility means that an airline is never physically committed to providing transportation in a particular market and is free to commit its capital elsewhere if a rival’s behavior makes results unsatisfactory. It follows that an airline willing to price below cost to drive a competitor from the market can achieve only temporary success. As the price level drops below that which is remunerative, the “victim” moves its aircraft and serves another market. When its departure permits the predator to reduce output and raise prices to the supracompetitive levels necessary to recoup its investment in predatory operations, the former victim or a new-entrant replacement reenters the market, bringing prices and output back to competitive equilibrium.

This contestability analysis is unfortunately inconsistent with much observed behavior since deregulation. Many new-entrant airlines, such as People Express (for example in Newark-Minneapolis), Muse Air (on its routes to Texas, Oklahoma, and Louisiana points out of Love Field and Hobby), Pacific Express (in Los Angeles-San Francisco), and others, have been pressed and helped out of business through aggressive pricing by incumbent rivals. Sometimes the “aggressive” pricing has consisted only of matching low fares that were below cost for the incumbent, behavior that is indistinguishable from contestability in action, and therefore is difficult to characterize as predation, however unhappy the result for the new entrant.

But in many cases, questionable pricing behavior has consisted of incumbents refusing to match increases in prices which were below cost for the incumbent, behavior that is indistinguishable from contestability in action, and therefore is difficult to characterize as predation, however unhappy the result for the new entrant.

This contestability analysis is unfortunately inconsistent with much observed behavior since deregulation. Many new-entrant airlines, such as People Express (for example in Newark-Minneapolis), Muse Air (on its routes to Texas, Oklahoma, and Louisiana points out of Love Field and Hobby), Pacific Express (in Los Angeles-San Francisco), and others, have been pressed and helped out of business through aggressive pricing by incumbent rivals. Sometimes the “aggressive” pricing has consisted only of matching low fares that were below cost for the incumbent, behavior that is indistinguishable from contestability in action, and therefore is difficult to characterize as predation, however unhappy the result for the new entrant.

But in many cases, questionable pricing behavior has consisted of incumbents refusing to match increases in prices which were below cost for the incumbent, behavior that is indistinguishable from contestability in action, and therefore is difficult to characterize as predation, however unhappy the result for the new entrant.

213. See supra Part II-I.
214. The fact that consumers prefer large airlines with hub and spoke systems and information advantages at equivalent prices means that consumers value these product characteristics; this causes price matching to work to the advantage of the holdover incumbent and against the new-entrant airline. In this respect, some of the problems of new-entrant airlines may resemble those of local snack bars in competing against franchise fast food chains. Problems of this kind resemble closely those explored by Schmalensee in his analysis of the ReaLemon case. Schmalensee, On the Use of Economic Models in Antitrust: The ReaLemon Case, 127 U. Pa. L. Rev. 994 (1979).
215. Northwest, for example, countered People Express’s entry into the Newark-Minneapolis market with a lower fare, and Southwest likewise countered Muse Air’s entry into the Love Field...
Airline Competition

Airline is holding the market fare level below the costs of the lower-cost airlines. This is behavior much more like that commonly called "predation" in the antitrust literature.\textsuperscript{216}

The conventional view of airline capital mobility ignores the impact of information impediments to reaching customers, frequent flyer programs and travel agent incentives, complex fare structures with capacity controls, and hub and spoke route systems. These factors complicate airline operations considerably, creating lags in market responses, causing indivisibilities, and imposing firm-specific, non-recoverable costs on airline operations.

For example, the costs required to inform consumers of new service force a new entrant into a market to incur promotional expenses, such as advertising costs, which will be lost if the service is abandoned. Even worse, airline service is valued for such product dimensions as punctuality, reliability, level of amenities, and even continued operation in the market. A would-be customer can satisfy herself about these dimensions only by direct or vicarious experience—either investing in trial, talking to someone who has done so, or observing longevity in the marketplace directly. Passenger travel schedule and amenity requirements also mean that effective competition for business travelers requires providing competitive frequency of service in aircraft with a minimum capacity of around one hundred seats. New service therefore entails a substantial period of large-scale operation at low load factors, during which customers become aware of and familiar with the service. During this period, the airline incurs costs which appear variable in the accounting sense but which are fixed and sunk by indivisibilities and time.

Not all airlines are equally vulnerable in this respect. These non-recoverable costs themselves are subject to economies of scope and scale. An incumbent airline operating a hub at a city can add a spoke at a much lower non-recoverable cost in route-specific advertising and empty seats offered over time than can a new point-to-point entrant. The hubbing incumbent enters a large number of new markets simultaneously by operating a few new flights a day. The new spoke represents entry in the nonstop market to the spoke city from the hub city. At the hub city, the experience characteristics of the hubbing airline's product are already known to the public and are transferable to the new market operations at virtually zero incremental cost. Its continuing advertising presence in the hub market allows the hubbing airline to combine information about the existence of the new service with information useful for promoting its

\textsuperscript{216} See, e.g., R. Bork, supra note 200, at 144.
other activities, including simply keeping its name before the public. The hubbing airline can induce trial by travel agents and frequent flyers by including the new service in its incentive commission and mileage bonus programs. These advantages shorten the time during which traffic builds to long-term levels, thus reducing the firm-specific non-recoverable entry cost.

In addition, adding a spoke to a hub means that one-stop traffic to and from many of the other spokes in the hub is added to the new nonstop service at very low Incremental cost. Communication of the new service to the spoke cities is proportionately more expensive than at the hub, since the spoke city only partially realizes the economies of scope and scale characteristic of the hub and spoke system; but in any event, the incremental production costs, and hence the start-up indivisibilities for the one-stop traffic, are nearly zero. The old spoke is already connected to the hub and only if traffic to the new city displaces traffic already being carried on the "old" spoke will it cause any incremental costs at all on that part of the system. The contribution of one-stop over-hub traffic at very low non-recoverable costs substantially reduces the magnitude of startup costs as a proportion of expected traffic.

All this means that large holdover incumbents are not easily susceptible to predation, but smaller new entrants are. The large firms enjoy advantages over new entrants which operate both offensively and defensively to reduce the discipline which can be exerted by the prospective entry of a smaller new entrant. These advantages represent real efficiencies and may even enhance contestability between large firms by reducing and perhaps eliminating the advantages of predatory competition between them. But they also mean that new entrants are very vulnerable both to predation and to aggressive price competition between holdover incumbents and new entrants.

When deregulation first allowed new entry, established airlines initially did not understand how to compete with new entrants and had not fully developed the techniques for generating rents we have discussed. Incumbent airlines on point-to-point route systems responded to new competition in ways which seemed to validate the traditional view of the problem. When a low-cost new entrant appeared on the scene offering low prices, established incumbents thought they had only two alternatives.

The incumbent's first alternative was to engage in a price war, matching or undercutting the new entrant's fares for all capacity on the routes. This behavior removed any price advantage for the new entrant, but often created valuable publicity for the new competitor's services as news media covered the event. The information costs of breaking into a new market meant that a new entrant would tend to fly empty at the commencement
of service. If stage-managed correctly by the new entrant, the initial price would be shockingly and unsustainably low, but highly newsworthy. The seats to which the price applied would otherwise have gone empty, making the giveaway price a way to invest in public information at the lowest opportunity cost. The low price would make the firm-specific, non-recoverable cost of the initial empty capacity do double duty as a firm-specific, non-recoverable investment in price advertising provided by the media free of charge. Since it had lower unit costs than its incumbent competitor, the entrant would, as it became known in the market, gradually raise prices from levels unsustainably low for both airlines to levels unsustainably low only for the incumbent.

For the incumbent, on the other hand, the new price was applied to traffic it already carried, and it did not need the publicity. Hence, the new entry would create a necessity for operating far below cost in the short run and below cost for the longer run. In effect, this made price matching an involuntary predatory strategy whose out-of-pocket costs were substantial and varied in proportion to the incumbent’s market share. This result was suggested in John S. McGee’s classic analysis and as McGee would have predicted, incumbent airlines abandoned that strategy.

An incumbent’s second alternative was to rely on its market share and momentum (themselves containing the seeds of refutation of contestability theory) and allow the new entrant to operate until the share of the market taken became unacceptable, at which point the incumbent would switch to price-matching. This strategy is also unattractive to incumbents. It preserves some short-term profits and avoids short-term out-of-pocket losses, but it concedes the new entrant the use of a unique price as a very efficient way of overcoming information disadvantages, allows the new entrant an opportunity to develop a reputation for longevity, reliability, and adequate service, and minimizes the uncertainty that serves as the most important obstacle to new-entrant financing of initial operating losses. When an incumbent pursues this strategy, it also signals new entrants facing these problems that its routes are less expensive to enter than are routes flown by incumbents pursuing a more aggressive strategy.

217. McGee, supra note 176.
218. Id. at 143.
219. Call and Keeler articulate this choice in a thorough, if slightly puzzled, account of incumbent strategy in the face of new entry which attempts to explain observed market behavior by a hybrid of contestability theory and ad hoc impediments to contestability theory. The account is optimistic about the contestability of airline markets over the long run. See Call & and Keeler, supra note 7, at 223-25.
220. Communicating a price advantage to the public is particularly cheap and easy, and at least a portion of the public is highly receptive to the message.
Clearly, incumbents needed an alternative to these two unattractive responses to low-cost entry. The answer developed from the economics of hub entry, the exploitation of principal-agent effects, and the use of complex multi-layered fare structures with computer-operated capacity controls on availability. The essence of the strategy is simple. Match, or better yet beat, the new entrant’s lowest fare with a low fare restricted to confine its attractiveness to the leisure-oriented, price-sensitive sector of the market.\textsuperscript{221} Match business-oriented fares and offer extra benefits to retain the loyalties of travel agents and frequent flyers. Add frequency where possible, to “sandwich” the new entrant’s departures between one’s own departures. Make sure enough seats are available on your flights in the market to accommodate increases in traffic caused by the fare war. In short, leave no traveler with either a price or a schedule incentive to fly the new entrant.

The incumbent will not operate profitably under such conditions, especially if, as is usually the case, it is a higher-cost airline than its competitor. Its losses will, however, be cushioned by the hub traffic not subject to the new entrant’s price competition, and its information and principal-agent advantages will tend to keep passengers as long as there is price parity. If the new entrant raises prices, the incumbent’s choice will be dictated by its strengths. If it has a particularly strong appeal to business travelers and effective travel agent and CRS programs, the incumbent allows the price to rise and the market to shrink, emptying the new entrant disproportionately. The business travelers stick with their frequent flyer rewards and their favorable experience with the incumbent; the leisure travelers have no price incentive to fly the new entrant and are encouraged by travel agents monitored by CRSs to fly the incumbent. If the incumbent lacks these advantages, it may refuse to raise prices.

If the new entrant attempts to lower prices, either to find a price the incumbent will not match or to generate so much demand that traffic growth will spill over into its seats, the incumbent matches, no matter how low the fare. The object is to reduce trial and to subject the new entrant to a prolonged period of operation at low load factors. This strategy saps the entrant’s working capital while inhibiting trials that would disseminate favorable information about the new entrant. If the new entrant attempts to reduce capacity, it will suffer from reduced schedule convenience and will reach the indivisibility “floor” of frequency required to maintain presence. If the new entrant ceases service in the market, its investment in information, including the information it generates by actu-

\textsuperscript{221} Restrictions that would accomplish this purpose include limitation to advance purchase, requirement of a Saturday night stay, and imposition of a penalty for cancellation or change.
ally operating, will largely be lost and reentry will be almost as expensive as initial penetration. While some residual familiarity with the airline’s name and service may persist, the public perception that the airline cannot be relied on to keep operating—a disadvantage created by the newcomer’s attempt to defend itself from these predatory tactics—could offset the benefits of temporarily ceasing operations.

The complex fare structures with computerized capacity controls which have come to dominate the industry play an important role in these competitive tactics. If several fares exist at varying levels, including some very low fares available on a restricted basis, the airline can vary its actual average selling price dramatically and nearly invisibly. With availability of seats at each fare level controlled by capacity limitations internal to the airline’s reservations system, an airline can always advertise fares that meet or beat those of the competition, deciding whether to undercut, match, or exceed the competition’s prevailing fare levels by varying the number of seats allocated to different fares on a flight-by-flight basis. An incumbent can thus preserve its basic fare structure in the face of new low-fare entry by adjusting the level of its lowest fares, offering an additional fare or fares at low levels, including levels moderately above the lowest prevailing fares, with few or no restrictions other than capacity controls. The airline can then offer an inquiring passenger the combination of fare levels and restrictions which will best preserve its revenue while neutralizing the price advertising of the new entrant. If circumstances (including the financial condition of the new entrant) warrant, the incumbent can flood the market with low-priced seats, withdrawing them almost invisibly at peak times or as competitive conditions allow.

Economies of scope and perhaps of scale in these tactics allow large incumbents to use them more effectively than smaller, newer airlines. The economies of scope are easily seen. An incumbent who uses such tactics a few times quickly develops a reputation for fierce response to entry. This reputational information is firm-specific and not route-specific and, like all information, has the public good characteristic of low or zero incremental cost per additional user. Although these tactics are expensive on any individual route, the more routes on which an airline operates—the wider the scope of its operation—the more widely the information created by the predatory investment in deterrence can be spread, and hence the lower the unit cost of deterrence. The benefits of deterrence can also be realized at low incremental cost on the other routes flown by the larger incumbent, so that the cost-benefit ratio of investing in survival on a new-entrant route is distinctly in favor of the large incumbent.

222. See Williamson, supra note 112, at 1185-86; Schmalensee, supra note 112, at 647-51.
The arguments for economies of scale conferring advantages which encourage predatory behavior are more speculative, but are simple enough in concept. They are based on the supposition that firms facing a predatory battle in uncertain, volatile industries are more willing to lend themselves money for the fight than outsiders such as banks or new equity investors would be, because the outcomes of such wars are difficult for outsiders to predict. The airline business, with its substantial investment in long-lived flight equipment and its substantial "book" of tickets paid for but not yet used, generates very substantial cash flows. These cash flows are almost directly proportional to the scale of operations. The smaller the route on which the predatory war takes place as a percentage of the total operations of the airline, the more staying power the airline will have as cash is lost in operations which do not cover incremental costs. In effect, the airline lends itself money out of accounting reserves to fight a war which drains cash. If the new entrant cannot find a source of capital which will accept the information that the temporary losses are a worthwhile investment, it will not be able to sustain losses for as long a time as will the large-scale incumbent.

J. New Entrant Survival Problems

At this point, the reader can easily visualize the difficulties faced by new entrants, especially the low-fare, low-cost, keep-it-simple airlines which many analysts expected to follow Southwest and PSA through the golden doors of deregulation. With the demise of People Express, no large national new entrant is still in operation. Most new entrants who have survived this process have found a specialized niche, which has included an "information niche" as well as product or market specialization. Without a national or regional brand which can be efficiently promoted, an extensive route system or access to one for its frequent flyer and travel-agent incentive programs, access to sufficient cash to operate unprofitably for an extended period of time, and an adequate presence at a viable hub, an airline without such a niche will founder even if its production costs are lower than those of incumbents. And these prerequisites do not guar-

223. An "information" niche can be thought of as a production, geographic, or customer group subunit to which specialized, smaller-scale communication can be directed by a firm at unit costs competitive with or superior to reaching them as an extension of more general information markets. These subunits exhibit discontinuities with respect to the commercial audience as a whole. A simple example might be an ethnic and linguistic subgroup which can be as or more efficiently reached through their own information media and community word of mouth than through general media; in fact, such subgroups are targeted in the international air travel market through the use of specialized travel agencies. But such subgroups might be more subtle and difficult to distinguish—for example, a relatively homogenous group of lawyers, business people, and bureaucrats traveling between New York and Washington.
antee survival, they merely permit it. Carriers meeting these criteria, including incumbents, who have high costs, ineffective personnel and marketing programs, poorly thought out route and product strategies—all the basics which any successful consumer service business needs to master—along with the ability to coordinate the millions of details which are at the core of the problem of running a large airline satisfactorily, are still in jeopardy.

Few new entrants have met these criteria, and all have been regional in focus (which may provide an information niche) or have found specialized niches.  

The course of the deregulated airline industry has proved difficult to predict and we cannot be certain that the configuration which is emerging will be stable. It would be foolish to predict confidently that, over time, no new entrant will find a new niche or assemble the formidable resources necessary to attempt entry at the scope and scale required to be competitive in the market for information that we have seen is a critical component of airline competition. But it has become clear that entry by such an airline will be a rare, and not routine, event.

New entry by an airline prepared to operate at the scale necessary to avoid the disadvantages we have observed is more likely to occur by successful selection of a new hub city than by finding room at an existing one. The airlines which have come to dominate the industry have hubs at virtually all the cities which are largest sources of local traffic, and a new entrant will need the help of a substantial amount of traffic over which it has local market power in order to match the revenue advantages of its established competitors. It will be difficult to find or develop such a hub. Past experience suggests that it might be easier to overcome some of the information obstacles if the traffic flows served by the new hub are largely regional in character.

Successfully entering an existing hub as a second hub carrier will also be very difficult. It will require finding a hub whose local traffic, along with a share of the competitive flow traffic, will support two hubbing carriers and has only one. Even if one is found, strategic response to entry remains a problem. It will help if the carrier located at the hub lacks the internal resources to fund a long predatory war and if the new entrant is sufficiently well financed to withstand a competitive battle of almost indefinite duration, and this capability is visible and credible to the incumbent. It will help further if at some existing hubs there are facilities lying idle as the product of some earlier competitive struggle.

224. The largest of these new entrants, America West, has built an extensive regional hub-and-spoke system centered on Phoenix in competition with Southwest, and is only now attempting expansion which will put it into competition with national brands. See supra note 160.
Paradoxically, this realization may help an airline attempting new entry in the “post-shakeout” era of airline deregulation. The welter of new entries, route system realignments, and fare experimentation that has characterized the post-deregulation era has made it very expensive for a new entrant to make its presence known. For the first few years following the dramatic reversal of forty years of government-suppressed competition, new entry was intensely interesting to the media. New entrants used such tactics as mass giveaways of tickets at impossibly low introductory prices to maximize their attractiveness to the media and the value of media attention to them. Consequently, the first new entrants to spring up around the country received a great deal of free publicity and consumer trial. This attention, along with the inexperience of incumbents in dealing with new entry, reinforced the mistaken impression of many that it was the incumbents, not the new entrants, whose survival was in doubt.

After this early period, marketplace confusion and the growing sophistication of holdover airlines in dealing with upstart competition created a climate in which information burdens became considerably greater, while costs of operating long enough to overcome them increased as well. We are now emerging from this period and its concomitant industry consolidation. The recent considerable reduction in the number of competing brands, along with the media attention that has been given the consolidation phase, may reduce the information burden of a future new entrant by once again making its appearance the subject of a great deal of public and media attention. But at this point, it is still much more likely that any new entry into the industry will come from firms that find and exploit production, product, and information niches.

V. Policy Implications

What should government response be to the fact that deregulated airline markets apparently exhibit substantial impediments to contestability? Does this daunting litany of “market imperfections” mean that deregulation is a policy failure? An unreflective observer, especially one whose interests had not been advanced by deregulation, might be tempted by the following line of reasoning: (1) Airline deregulation was justified by the academic conclusion that airline markets were nearly perfectly contestable; (2) Experience with deregulated markets suggests that impediments to contestability are far more significant than any academic observer predicted; (3) Therefore, airline deregulation was a mistake and the industry should be reregulated. This syllogism may seem plausible, but it addresses the wrong question—“Are deregulated airline markets as contestable as predicted?”—and thus reaches the wrong answer.
While deregulation was indeed promoted because it was believed that perfectly contestable markets would result, the contestable markets themselves were not the ultimate goal; they were instruments expected to produce public benefits. These public benefits, not the economic instruments devised to achieve them, are the ultimate objectives of airline regulatory policy.\footnote{225} Even if deregulated airline markets are not as contestable as predicted, that only begins, rather than ends, the inquiry as to whether deregulation has been good public policy and whether reregulation of some kind would be desirable.

What is the right question? In the abstract, it asks: "Do deregulated imperfect airline markets work better than imperfectly regulated ones?" Put concretely, it becomes: "Do we know of any government interventions which would make airline markets work better for the public than they do under current arrangements?" Notably, the word "contestability" does not appear in this question, although it may well be part of the answer. Contestable markets are desirable because they cheaply, effectively, and continuously create incentives that force producers to produce efficiently and to satisfy consumers. The principal goal of any government intervention into airline markets ought to be the same.\footnote{226}

To spare the reader suspense, let me here state my conclusions about policy changes. Many deregulated city-pair markets, especially those in which the principal service is one-stop over competing hubs, are workably contestable and are thus achieving public objectives. Their performance is very unlikely to be improved by intervention. These markets are producing in great quantity many of the benefits forecast by analysts who favored airline deregulation. They are producing as well many others which were not predicted, such as easily identified online one-stop service to virtually any point in the country. In many other markets, and especially at hubs, airline deregulation has yielded substantial benefits despite, and sometimes because of, the impediments to contestability we have

\footnote{225}{Of course, economic institutions like markets or regulatory schemes can have characteristics which are thought to be intrinsically desirable as a matter of political philosophy and so can be created or promoted because they are thought to be fair processes for resolving competing claims on resources. See generally M. Friedman, Capitalism and Freedom (1961). Whether this represents instrumental or ultimate justification is well beyond the scope of this Article. It is clear that whatever public considerations—as distinct from private gains sought to be captured through public intervention—motivated the political economic arrangements governing airline competition were focused on transportation benefits, rather than the construction of a just state. Private gains that might have been sought through airline deregulation or that might be sought through reregulation are not the subject of this Article. See Levine, supra note 1, at 180.}

\footnote{226}{We know from experience with airline regulation, farm price supports, oil and natural gas price regulation, and many other programs that additional public purposes, such as achieving whatever social benefits are thought to flow from the availability of transportation services to small communities, ought to be pursued specifically and cost-effectively, rather than through interference with efficient production arrangements.}
examined. Here, too, the present state of the regulatory art does not suggest any general interventions that would improve the situation. In summary, then, airline deregulation has undoubtedly proven beneficial and ought not to be undone.\textsuperscript{227}

A few impediments to contestability could, however, be alleviated by government intervention. The most promising strategy probably would be to take actions designed to reduce the ease with which agents can act in ways at variance with the interests of their principals. The main justification for such intervention would not be to regulate or improve the relationship between principal and agent, but rather to limit the degree to which principal-agent problems act as a filter between airlines and those who ultimately pay for tickets. This should improve the ability of airlines, especially smaller ones, to compete using strategies (like lower prices for business travelers) which do not exhibit economies of scope and scale. Probably the most important of these interventions would be the forced divestiture of travel agency CRSs from airline ownership.

I will suggest a few other specific and limited interventions that might also be beneficial. But many of the major impediments to contestability described here stem from forces that produce real economic benefits to the public. To eliminate them in the name of enhancing "contestability" would do the public more harm than good. And another important impediment to contestability—the profitability of predatory practices—is a disease common to many markets in which information is important, and for which there is no known treatment with acceptable side effects.

Several important impediments to contestability identified and analyzed in Part IV arise because information is costly and is especially important to consumers in dealing with a complicated network service like airline transportation. Further, information has unusual characteristics which have been recognized at least since the invention of the public patent, trademark, and copyright concepts. The development of hub and spoke systems operated by large carriers, and the consolidations through which many of these large systems have been assembled, represent responses both to the consumers' need for market information and to the economies of scope and scale in producing the information. This market information includes not only the presence of an airline in a city-pair market, but reputation and service information which is subtle and difficult for individuals to accumulate and assimilate. Once assimilated, this information is

\textsuperscript{227} The most careful aggregate analysis available suggests that the public benefits of deregulation averaged six billion dollars per year (airlines benefitted by another $2.5 billion) through 1983. Since four billion dollars per year of those public benefits came from improved route structures and flight frequency, there is no reason to doubt that they have persisted, as the industry has continued to grow despite consolidation. \textit{See} S. Morrison \& C. Winston, \textit{supra} note 7, at 11-52.
Airline Competition

more efficiently extended to a new purchase, such as one's connecting flight, or one's next trip to another destination, than acquired anew for each succeeding purchase.

If information about airline markets is costly and exhibits economies of scale and scope in its production and use, savings in search costs are as real to the consumer as savings in fares. A policy allowing consumers to economize on search at the cost of some rents created by dominant positions at hubs may well be more beneficial than a policy which maximizes static benefits from competition while forcing information inefficiencies on the public. Consumers seem to prefer to choose in ways that economize on search costs, and not only in the airline industry. The consumer's need to economize on search supports department stores and specialized boutiques, and helps explain why a relatively few large trademarks have significant market shares in such industries as hotels and rental cars where the widespread existence of franchise arrangements suggests the presence of few production economies of scale.

The relief from production indivisibilities represented by hubs is also real. Hubs have made it easier to connect most points in the network, thus producing real benefits in travel time and transaction costs. By reducing the impact of production indivisibilities, hubs have brought fierce competition for relatively small traffic flows that were barely served under regulation. Hub and spoke networks have reduced the impact of indivisibilities at hubs as well by making available to travelers at those hubs nonstop service that would otherwise not be possible.

Those very same hubbing indivisibilities mean that there will almost never be more than two airlines hubbing at a given point, and there will often be no more than one. From the perspective of a firm, it makes more sense to set up a hub at the place with the largest yet-unerved local market which is well located to serve the targeted flow markets than to share with a competitor the local traffic originating at and destined for the hub which must be combined with the flow traffic to minimize indivisibilities. The unserved local market targeted by the airline setting up the hub could be much of the traffic at a new smaller hub, or it could be a smaller share of the total traffic at an "underserved" existing hub. Whichever the airline chooses, the new hub city will benefit, either in lower fares, if it is already a hub, or in vastly improved nonstop service, if it is not.

Fifty years of government-designed route structures have taught us that it is impossible to regulate this choice well. First, the likely traffic response will be uncertain both to new service at a new hub and to price competition at an existing one. Beyond that uncertainty, it is difficult to see what social benefits weighting function could tell a regulator, for example, to give the public at a large existing hub lower prices stemming
from the entry of a new hub competitor rather than giving a major improvement in nonstop service at higher prices to a smaller city that is not yet a hub. In considering whether there is any rational way for a public agency to make this choice, we must also face the fact that a new monopoly hub may give nonhub passengers a wider choice of routings as well.

Would the traveler going to and from American’s new hub at Raleigh/Durham be better off if American had been forced instead to set up a competing hub at Charlotte? Would the passengers who will flow over the new hub benefit more from choice of routings and frequency by using the untouched traffic flows at Raleigh/Durham? Does anyone really think that an agency trying to minimize monopoly rents will ultimately produce more public benefits from air transport route structures than will rent-seeking private carriers “exploiting” their hubs with better service at higher prices?

It would be a mistake to impede the formation of systems large enough to communicate effectively with customers in the name of preserving atomistic competition. Leaving aside whether it is now too late even to contemplate such a move, a policy barring further mergers, or the rearrangements which may well follow the mergers that have already taken place, could not eliminate the forces that have brought the system where it is. Rather, anti-merger regulation would simply hold those forces in check, leaving those airlines which have already fully adapted to this need of the marketplace at an advantage, while placing at a disadvantage those which had not already found the right partners before the music stopped. In the short term, such a policy might eliminate some profits earned by enhancing market power. In the longer term, it is likely to produce the perceived need for an elaborate regulatory handicapping system designed to equalize competition between those carriers which had attained the market advantages of size and those which had not.

In any event, the only way to achieve at hubs the static benefits that multiple-firm competition can bring to airline markets would be to regulate hub markets in a way designed to ensure that some specified number of firms competed in each city-pair market. Since most markets are subject to severe production indivisibilities, this could not be done without specifying the entire air transport network and regulating the degree of competition in the rest of it. This task was difficult enough with the relatively unintegrated route systems created between 1930 and 1978. It would be impossible with the integrated and comprehensive route systems that have

228. See E. Bailey & J. Williams, supra note 14, at 3-10; E. Bailey, D. Graham & D. Kaplan, supra note 7, at 27-37.
been constructed since deregulation. Such a policy would lead us back to the world of the Civil Aeronautics Act of 1938, which we have already fully explored and in which we have no reason to believe there are undiscovered treasures. It may be ironic, considering fears of system fragmentation expressed in contemplation of deregulation here and in Europe, that the search for rents from information indivisibilities and from production indivisibilities at hubs has produced a far more integrated system today in the United States than was present under regulation.

We should, therefore, accept as desirable the formation by growth of any hub and spoke system efficient enough to survive in competition with others for flow traffic, even when market power at the hub is a byproduct. We should also accept as desirable consolidations formed by airlines with different hubs that leave in place adequate competition for flow traffic. This does not mean that absolutely every consolidation proposed between hub competitors, or between competitors for the same flow traffic, should be hailed as the triumph of market forces working for the benefit of the traveling public. While many, perhaps most, such arrangements represent a search for information and marketing efficiencies that are worth giving up some competitive pressure to achieve, some represent the search for rents earned in a more old-fashioned way—through the elimination of competition without significant compensating benefit. The problem is to figure out how to identify and prevent these unnecessary losses of rivalry without imposing the grave risk of regulatory rigidity or mistake.

In principle, the job is not difficult to understand. In a world where one could make precisely calibrated measurements and predictions of economic effects, one would simply ask an expert agency, perhaps assisted by expert academics, to measure and compare the benefits of consolidation in producing and marketing online transportation with the costs to the public of fare and service competition foregone. But we had forty years of experience with an expert agency applying such standards to the airline industry, creating a route system and fare structure whose features were shown to be wholly inappropriate to public needs as soon as airlines were freed to respond to customer demand. And this Article has examined the results of the eight years in which we have been able to observe the degree to which academics can predict with the microspecificity required the outcome of particular market arrangements. In short, this approach does not seem promising as a way to deal with the negative effects of airline concentration.

229. In fact, that is more or less the test imposed by the present statute, see 49 U.S.C. § 1159 (West Supp. 1986).
Where does this leave merger policy in this imperfect deregulated world? It does mean that an attempt at a fine-tuned policy is likely to do more harm than good, since most mergers seem to represent attempts to form firms which can function effectively in the world that airline deregulation has revealed. But some mergers are still likely to do more harm to the public than good. Three sorts of mergers ought to be suspect: those which combine healthy hub operations at the same city; mergers which have a significant effect on the degree of competition for a significant amount of overhub traffic flow; and mergers which give the combined carriers control of facilities that could be used for non-hub entry.

Airlines operating profitable hubs at the same airport are probably realizing most of the public advantages possible from eliminating production indivisibilities and information economies of scale and scope. Under those circumstances, the principal benefit to the airlines from a merger is likely to be rents from the elimination of competition with one another, with few offsetting benefits to the travelling public.

Mergers not involving a failing carrier which significantly impact competition for overhub flow traffic jeopardize the principal competitive, as opposed to structural or informational, benefits from deregulation. At the national level, as long as five or six competing national brands exist, it is hard to imagine significant impediments to competition for flow traffic at cities large enough to be served as spokes on several hubs. If national competitors were to be reduced to some smaller number, perhaps four or fewer, it would be hard not to become more concerned about the contestability of overhub flows, since tacit coordination would become easier (although concealed "cheating" through the increased provision of discount seats would be hard to detect and would act as a force for instability). It is not clear at all what would be the appropriate policy response to such a reduction if it occurred through successive carrier failures. The principal question to be raised about such a competitive reduction would be whether the national market might then become attractive to a major new hubbing entrant.

It is also possible to imagine loss of overhub competition in a particular geographic region from a merger by carriers serving spoke cities so small that the merger would eliminate the principal alternative routing for many traffic flows, where the combined facilities at the airports involved would make new entry inconvenient, and where each individual city would contribute so little traffic that it would only be attractive for entry

---

230. These mergers between profitable hubs must be distinguished from mergers between profitable airlines which have hubs in the same city, but where one of the hubs cannot be made profitable. The latter category of merger should normally be approved.
by a carrier with relatively small (eighty to one hundred-seat) aircraft combined in relatively large hubs.

Finally, mergers affecting very limited essential facilities or slots in some corridor markets which can support non-hub service are proper subjects for concern and might call for partial slot or facilities divestiture.

It should be emphasized that this is a very limited case for merger intervention. On this analysis, there is no reason to be concerned about the incremental impact of the “wave of mergers” in the airline industry that has so fascinated the media and Congress. Most of the mergers proposed or consummated, including several which have occasioned a great deal of public soul-searching about the course of airline deregulation, do not fall into any of the above categories. Once we free ourselves of the expectation that the industry can approach the perfect contestability we once expected of it, we can narrow our merger focus considerably to the mergers which eliminate viable competition that can be preserved without other losses.

Significantly, this analysis implies that mergers which create viable hubs by combining airline hubs not previously viable should be accepted for all the reasons described above, no matter what the carrier count at the hub is and almost regardless of the facility situation. It is unlikely that any rational airport will deliberately keep enough gate space idle to make possible instant startup of a major hub, and relatively unlikely that such entry will occur where a hub or hubs already exist. This is not likely to discourage any firm actually planning a major new hub entry, since any carrier planning to do so is not likely to depend upon surprise for success. And it is very unlikely that any merged firm would control facilities so completely that it would be impossible to enter the hub city with a spoke from another hub.

If we can’t increase competition at hubs through structural regulation, why not just regulate hub prices to keep the benefits of hubs while controlling the impact on the public of the impediments to contestability that they represent? Consider the problem: As we have seen, airline hub flights are a joint product on which many categories of traffic are carried at many fares. It is no more possible to know the “cost” of carrying any particular passenger across a hub than it is to know the cost of producing a pound of steak from a carcass that yields many salable products. To make things worse, different airline hubs generate different mixes of local and overhub traffic, leisure and business traffic, and peak and off-peak traffic. To cope, airlines vary the capacity available at any given fare level day by day and flight by flight. It would be pointless to regulate any fares without regulating all fares and their capacity allocation. An attempt to regulate total revenue, yield, or just the basic coach fare from the hub would place airlines competing for flow traffic in very different situations,
necessitating complete reregulation to compensate for the resulting distortions of competition. Holding down the price of steak does not benefit hamburger eaters.

CRSs are in a different category from mergers. Their value to airline owners, as opposed to travel agencies or consumers, is principally a product of their ability to distort choices, either by distorting information or by facilitating the distortion of incentives through the exploitation of principal-agent effects involving travel agents. While it is easy to see why these systems are valuable as sources of information in a deregulated marketplace, that same usefulness makes it difficult to believe that travel agents would not demand them and firms supply them if airlines were not allowed to own them. Explicit prices for their rentals to travel agents would go up, but not because the true cost of providing the service would be affected. Rather, this price rise would represent the lower bound of the amount of additional revenue which distorted choice now provides the airlines owning the systems over and above the revenue that they would be able to earn in an open marketplace. This revenue may be considered the minimum measure of the welfare loss that these systems impose on customers.

The advantages that CRS systems confer on their vendors are very subtle and hard to control. The CAB, and now the DOT, have already attempted to regulate these systems. While the regulations may have improved the displays, it would take far more intrusive regulation to make the systems unbiased sources of information and to avoid their use to distort passenger choices. To use just one example, interest has recently resurfaced in the contracts under which the systems are provided to travel agents. These contracts allegedly contain onerous obstacles to switching from one system to another, including, among other things, liquidated damages clauses obligating a cancelling agency to pay the vendor eighty percent of the fees the vendor might have expected to receive over the remaining life of the contract. A student of Professor Williamson's work might wonder whether the liquidated damage clause represents the creation of a legitimate "hostage" to protect a firm-specific investment not recovered in the initial installation fee. A skeptic might point out that it is not the much smaller reliance interest (installation cost) which is used in these contracts as the measure of damages, but rather the very large expectation interest (fees foregone).

233. O. Williamson, supra note 115.
The important point is not to resolve that dispute, but the very fact that resolving it and many other subtle and complex issues like it would be the regulatory task facing an agency responsible for removing inefficiencies created by these systems. A proposed bill involving fee arbitrations,234 a major lawsuit opening the possibility of regulation by antitrust settlement,235 and pressure for further DOT regulation all contain enormous potential for government mischief. A good case could be made for the proposition that the method of resolving the issue with the least potential for damage through misplaced government intervention is simply to require divestiture of the CRSs by the airlines and accept whatever level of contestability is exhibited by the divested market, reassured by the knowledge that whatever distortions still exist will not taint the operation of the far larger airline market. Requiring airlines to divest themselves of CRSs would also impede somewhat their ability to monitor travel agent incentive programs and, to a much lesser extent, frequent flyer programs.

In an ideal regulatory world, programs such as these would be limited, modified or eliminated in order to minimize the divergence of interest between principal and agent, since this divergence can be and is exploited in ways that impede contestability. In a world in which it is difficult to eliminate rents produced by impediments to contestability without losing the efficiency gains simultaneously created by those same practices, government should proceed very cautiously. But, it is difficult to defend as efficient those practices which reward undisclosed distortion of choices by agents at the externalized expense of principals. The principal risk is intervening to control them in a way that does more harm than good. Regulating these programs in detail would entangle the regulatory agency in a morass of complicated marketing decisions about which it possesses little information (for example, real time knowledge of unsold seat inventories which might be worth selling on concessionary terms) and less expertise. Worse, many of the most effective regulatory devices, such as requiring the disclosure by airlines to employers of employees' frequent flyer accounts, would entail invasions of privacy which most of us would find unacceptable as a means of achieving more contestable airline markets.

Paying travel agents for their sales efforts is legal, and ought to remain so. Giving a discount to regular customers is an unexceptionable (except to the few devotees of the Robinson-Patman Act) practice. Giving the discount in the form of free travel is a particularly efficient way to reward these customers because it uses as payment seats which have a high

probability of going unsold (in part because of limitations on devising discriminatory fares to fill them), creating a medium of reward which has high value to customers at low cost to airlines. Undisclosed payments which, unknown to the traveler, affect the travel agent’s advice to her, and rewards to travelers (concealed from their employers by airline policy) which affect their choices of airlines, fares and routings in ways which raise the costs of trips to those paying for the tickets or the traveler’s time but are too costly to monitor represent a problem which can be addressed at an acceptable cost.

Given the size of the incentive to firms to control their travel costs, it might seem likely that the market should reward efforts to reduce through technology the cost of monitoring the travel plans of employees.236 We certainly shouldn’t rule out the possibility for progress in this respect, but the problem is likely to remain as long as there are frequent flyer programs. The principal obstacle to the use of technology to improve monitoring is the difficulty of specifying rules for and monitoring choices in response to uncertainties (such as the need to change travel plans because the location, time, or duration of a meeting changes) which are resolved only after the initial ticket has been booked. Eliminating employee discretion in such circumstances is nearly impossible, and frequent flyer programs make the rewards for “opportunistic” behavior high. And, as mentioned above, concern for personal privacy would seem to suggest that requiring airlines to report their frequent flyer accounts to their employers would be objectionable on non-economic grounds.

It is difficult to be sanguine about the efficacy of legislating honesty in an imperfect world, even when the legislation’s purpose is as worthy as enhancing the efficiency of deregulated airline markets. And it is difficult to claim that the two measures proposed below will have a great deal of effect. Nevertheless, there are two interventions designed to limit the rewards to agents of misleading principals which would cost very little and might do some good.

First, travel agents should be required to disclose to ticket purchasers the existence of commission overrides on tickets sold. This measure is a bit more complicated than it may sound. Some incentives, particularly those monitored by CRSs, are paid at a variable rate depending on performance, so the agent does not know at the time the ticket is delivered to the customer just how large the extra commission will be. An acceptable form of disclosure might somehow alert the customer to the existence of the program and require disclosure on demand of the terms of current incentive programs in effect. If customers don’t care to inquire further, little

236. See supra note 190.
Airline Competition

purpose would seem to be served by forcing the information on them. However, the need to disclose the existence of a program in use by an airline on which a traveler is booked might limit the degree to which the programs could subvert the choices of customers who actually care. Disclosure to customers, and hence to competitors, might also reduce the attractiveness of overrides as a competitive tool and direct selling effort toward those actually paying for the tickets.

Second, travelers who receive frequent flyer benefits on tickets they did not pay for should be required to report the bonuses as a taxable benefit of employment. This proposal comports with standard tax policy, and would limit somewhat the agent’s benefit from choosing flights on the basis of frequent flyer programs. Again, certain complications will arise, including the difficulty of valuing a benefit which is limited in the periods during which it can be used and has a value which depends on the destination chosen and the fare structure in effect. And the impact on the agent’s choice would take place only at the margin, leaving in place much of the agent’s incentive to choose airlines at the principal’s expense based on considerations other than price and schedule.

The fact that predatory tactics appear to be feasible, and perhaps even common, in the deregulated industry may seem to require a response, particularly since predation seems to act as an important impediment to entry by new or relatively small firms. Of course, many of the difficulties experienced by smaller new entrant airlines in competing with larger ones flow from the information and network advantages which accrue to consumers as a result of the forces which have been the principal subject of this Article. But there are predatory tactics which go beyond merely using real marketplace advantages. Regrettably, no response to them seems available which will do more good than harm, other than perhaps the use of Section 2 of the Sherman Act[237] for the most blatant “smoking gun” cases. The difficulties of devising a method for identifying and remedying predation in any industry are legendary among economists, but they are magnified almost beyond imagining in an airline hub, in which virtually all costs are joint and virtually all prices in some sense arbitrary.

To deal with predatory pricing in an airline hub and spoke system with flexible pricing, the regulator must be able to answer at least the following questions: What is the short-run variable cost of a seat between two cities receiving connecting service over a hub, when the two spokes involved provide service to literally hundreds of city-pairs? For that matter, what is the short-run cost of a seat on either spoke, when the other

seats on the plane are available for use by passengers connecting from virtually every other city in the hub complex? At what level is a price response "predatory" which matches or even undercuts new entry, when seats on the airplanes used to compete with the new entrant are empty and tickets in many markets at many different fare levels are used by other passengers on the plane? How much traffic on a plane has to pay a particular fare before an analyst is prepared to allocate joint short-run incremental costs to it to determine whether the fare is compensatory? If an airline has to keep in existence for some significant period of time ("quasi-permanently," as Baumol has proposed\(^\text{238}\)) a fare it has introduced as a response to new entry, how many seats per flight must it sell at this fare? Must it displace flow traffic moving on the same plane in some other, unrelated, city-pair market willing to pay a higher (or lower) fare in order to offer some percentage of output at the required fare?

To the person who believes that all economic grievances can be redressed, the above list of questions may seem captious, but a moment's reflection will confirm that they are serious. Time-sensitive, capacity-controlled pricing is as necessary to avoid misallocations of resources in the deregulated airline industry as the use of different prices for different cuts of meat is to avoid misallocations in the livestock industry. In each case, the object is to achieve a marginal revenue for each production unit which will cover its marginal cost, even though indivisibilities mean that the units of production contain subunits for which there is different demand. To interfere with the prices of one of the units is to interfere with the production of all of them, so the impact of mistakes is considerable.

Conclusion

The world of deregulated airlines is much more complex than imagined by deregulation's original proponents, current defenders, original opponents or current doubters. It can be difficult to make sensible public policy in complex situations, but we ought not to lose our focus on certain key propositions.

Airline deregulation has brought very substantial benefits to the traveling public, to airlines willing to make the effort to adapt to it, to a national economy which now more than ever needs efficient industries and to those members of the labor force who are willing to work at competitive

wages. There is no reason whatever to believe that deregulated markets will not, on balance, continue to provide these benefits.

Deregulation has not, as previously predicted, brought about its benefits because deregulated markets work flawlessly or approximate the results of perfect competition or perfect contestability. Some benefits have occurred because there appears to be a workable degree of competition in the system taken as a whole, even if substantial rents are being taken in certain sub-markets. Other benefits have come about in spite of impediments to contestability brought about by customer preferences for market practices and product features that incidentally inhibit competition. Eliminating those inhibitions, for example by forcing firms to forego the competitive benefits of information economies of scale and scope, would deprive the public of the benefits of easy access to a complicated network of deregulated airline service.

Public response to this state of affairs ought not to be simpleminded. We should not attempt to scourge the industry by antitrust fire and storm in order to create the utopian world of perfect competition many of us hoped for. Such an effort would cost the public many benefits, freeze the industry in a posture that might seem attractive for a moment, but might well prove unsuitable as transportation and information markets evolve further. This sort of government intervention would be vulnerable to political pressures not focused around either efficiency or competition, and would suppress the dynamic forces which have produced so much unexpected change since the industry’s previous shackles were removed. Nor should we attempt to construct, or return to, a nostalgically imagined regulatory regime which will somehow preserve all the benefits of deregulated airline markets while curing their defects. No such regime can be established or operated with known or presently-imagined regulatory techniques.

We need not, however, accept the existing airline world exactly as it is, or approve all industry-proposed changes—a merger between American and United, for example—just because deregulated markets are deregulated and hence either perfectly contestable or as good as we can get. A sensible response to the deregulated world would accept generally that deregulation has made the airline system very much better, in particular ways which have surprised us all, while also recognizing that those improvements have been bought at the expense of a new set of problems, at least a few of which may be amenable to correction.

But what we have learned certainly tells us that any further tinkering with what the deregulated market has wrought ought to be undertaken very cautiously indeed, and with very limited objectives. We are unlikely to achieve by public intervention an airline system markedly more com-
petitive than the system of, say, mid-1985, although it is always possible that market forces or innovations might achieve that for us, for example in the area of public access to information. And turning the clock back even to mid-1985 would be a mistake, since many changes that have taken place since then have, on balance, benefited the public.

We should be particularly careful to consider only changes in the regulatory environment that do not give a public agency continuing domestic regulatory responsibilities or require a series of ongoing judgments about which offerings to the public are or are not in the public interest. Rather than trying to decide on a continuing basis whether price levels or discount seat availabilities at a particular hub reflect undue market power, we should, for example, consider how we may restructure business incentives—perhaps by forcing divestiture of computer reservations systems or forcing disclosure to customers of override commissions to travel agents—to minimize the principal-agent problems which have distorted the information available to the public and have institutionalized practices which in other contexts might be considered to approach commercial bribery. We should continue through academic research—*not* legislation—the probably doomed quest to find ways to identify and cure predatory practices that are not worse than the disease. We should be willing to consider using the antitrust laws to block mergers between airlines with strong hubs in the same location, with combined monopoly over traffic flows to smaller cities, or to force airlines to free essential facilities at congested airports which can be used for non-hub service. Although we should be very cautious about taking such action, consolidation might at some point reduce the number of firms competing for flow traffic over their own hubs to a level where it would be sensible to consider antitrust intervention.

We must also continue to try to understand better as scholars and policymakers the very complex institutions that deregulated airline markets turn out to be. In doing so, we will continue to find that here, as in virtually every area of regulation, an imperfect world will produce imperfect results. But we should not let recognition of those imperfections seduce us into demanding more of this system than any real-world system is likely to deliver. Just as it would be folly to forego feasible, demonstrable improvements because they represent “government regulation,” it would be folly to let recitals of inevitable imperfections create a mandate to return to a world of regulation and intervention that we know will be far more imperfect and rigid than the one we have now.