Computer Reservation Systems, Creative Destruction, and Consumer Welfare: Some Unsettled Issues

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I. INTRODUCTION

Airline computer reservation systems (CRS) present new challenges and opportunities for both the travel industry and policy analysts. Travel agents used to book passengers through a time-consuming combination of telephone calls and paper transfers. Now, U.S. travel agents can book passengers quickly by using one of five computer systems that list information about a variety of airlines, hotels, rental car companies, and other complementary services. Many authors credit CRS for allowing travel agents to keep track of the explosion of new fare and service options that accompanied deregulation.[1] For example, in 1985, the industry-leading Sabre system listed 330 days of flight information for 590 different carriers, or approximately 44,000 flights per day.[2] This innovation touches most airline passengers because travel agents sell approximately 80% of all airline tickets.[3]

1. Levine, *Airline Competition in Deregulated Markets: Theory, Firm Strategy, and Public Policy*, 4 YALE J. REG. 393 (1987); and Ehlers, *Computerized Reservation Systems in the Air Transport Industry* 47 (1988).

2. Note *on Airline Reservation Systems 8*, HARV. BUS. SCH. CASE STUDY NO. 9-184-009 (1985).

3. R. Rose & J. Dahl, *Aborted Takeoffs*, Wall St. J. July 19, 1989 at A16 col. 3 (eastern ed.).

CRS are also one of several factors spurring a reassessment of the economic theories once thought to explain airline behavior. The Airline Deregulation Act of 1978 eliminated federal control over entry and ticket prices. Economists favoring deregulation often touted airlines as an example of contestable market theory in action, since highly mobile capital meant that the sunk costs of entering individual city-pair markets were quite low. However, recent research has suggested that not all airline markets are perfectly contestable.[4]

Dempsey,[5] Saunders,[6] Thornton,[7] Borenstein,[8] Levine,[9] and Morrison and Winston[10] cite CRS as one of several factors that give the airlines which own them an advantage over others. Unless other airlines can have their flights listed on the computer screens at nondiscriminatory fees and terms, airlines owning the reservation systems can create a competitive disadvantage. Of course, even if airlines owning the systems do not discriminate, they can exact a supra-competitive price for access to the reservation system if the market for the systems is not competitive.

Clearly, CRS bring both benefits and costs to society. Policy analysis, however, is complicated by the fact that CRS surely qualify as an exemplar of Schumpeterian "creative destruction"—a technology so revolutionary that few who decline to make use of it can afford to compete.[11] A full analysis of CRS, therefore, faces the challenge of incorporating the effects of innovation and creativity. Theories of entrepreneurship and innovation can provide a framework for analyzing the full impact of CRS and evaluating alternative rules for dealing with them.

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4. Ayres, *Determinants of Airline Carrier Conduct*, 8 INT'L J. L. & ECON. 187 (1988); E. BAILEY, D. GRAHAM, AND O. KAPLAN, DEREGULATING THE AIRLINES (1985); Graham, Kaplan, and Sibley, *Efficiency and Competition in the Airline Industry*, BELL J. ECON. 118 (1983); Moore, *U.S. Airline Deregulation: Its Effects on Passengers, Capital, and Labor*, 29 J. L. & ECON. 1 (1986); Morrison and Winston, *Empirical Implications and Tests of the Contestability Hypothesis*, 30 J. L. & ECON. 53 (1987); S. MORRISON AND C. WINSTON, THE ECONOMIC EFFECTS OF AIRLINE DEREGULATION (1986).

5. Dempsey, *The Empirical Results of Deregulation: A Decade Later, and the Band Played On*, 17 TRANSP. L.J. 53 (1988); P. DEMPSEY, FLYING BLIND: THE FAILURE OF AIRLINE DEREGULATION (1990).

6. Saunders, *The Antitrust Implications of Computer Reservation Systems (CRS)*, 51 J. AIR L. & COM. 157 (1985).

7. Thornton, *Airlines and Agents: Conflict and the Public Welfare*, 52 J. AIR L. & COM. 383 (1986).

8. Borenstein, *Hubs and High Fares: Dominance and Market Power in the U.S. Airline Industry*, 20 RAND J. ECON. 344 (1989).

9. Levine, *supra* note 1, at 416.

10. S. Morrison & C. Winston, *supra* note 4, at 59.

11. J. SCHUMPETER, CAPITALISM, SOCIALISM, AND DEMOCRACY, 83 (2d ed. 1947) (using the term "creative destruction").

II. THE CRS INDUSTRY

Efforts toward developing CRS in the United States date from 1967 when 21 airlines signed a memorandum of understanding to jointly develop an industry-wide system. Antitrust challenges and financing difficulties doomed this and several other attempts. In 1976, United Air Lines and American Airlines announced plans to develop and market their own systems.[12]

Today, there are five CRS, all of which are wholly or partially owned by airlines or airlines' parent companies. American Air Lines who owns Sabre, is the industry leader. Covia Partnership, owned half by United Air Lines and half by six other airlines, owns the Apollo CRS. Texas Air owns System One, Delta owns Datas II, and Northwest and TWA jointly own Pars.[13]

A CRS generates three principal streams of revenue:

- *Incremental Revenues*. Airlines owning the systems can use them to increase ticket sales at the expense of competitors. Initially, airlines biased screen displays to show their flights first, even when other airlines' flights may have been less expensive or more convenient. The Civil Aeronautics Board (CAB) banned such bias in 1984, but observers suspect that travel agents still give preference to flights offered by the airline that owns their reservation system. Complaints of other biases also abound.
- *Booking Fees*. All airlines pay the CRS's owner a fee for each flight segment booked on that system.[14]
- *Installation/Operation Fees*. Travel agents pay fees for installation and use of terminals and other equipment in their offices.

By many conventional criteria, CRS providers may appear to possess market power. Table 1 reveals that two systems, Sabre and Apollo, account for approximately 60% of the national market. Concentration is even more pronounced in many major city markets, as Table 2 shows. Furthermore, only 6.5% of travel agents subscribed to more than one computer reservation system in 1986, which means a passenger usually must switch travel agents if he wants to use a different reservation system.[15]

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12. MCSHANE, COMPUTER RESERVATION SYSTEMS: A STUDY OF THEIR IMPACT ON COMPETITION IN THE UNITED STATES AIRLINE INDUSTRY, 15-16 (1987) (offers a concise history).

13. In February 1990, the Pars System, owned by Northwest Air Lines and TWA, and the Datas II system, owned by Delta, completed a merger. *See* DOT; AIRLINE MARKETING PRACTICES, 47 (1990).

14. Morrison and Winston, *supra* note 4, at 64-65, suggests, United Air Lines and American Airlines may be able to set such excessive access charges for their service as to discourage other carriers from participation in their systems, thus giving United Air Lines and American Airlines the legal authority to institute total bias against these carriers.

15. DOT, STUDY OF AIRLINE COMPUTER RESERVATION SYSTEMS (May 1988) (DOT-P-37-88-2) as found in: *Airline Computer Reservation Systems*; *Hearings Before the Subcomm. on Aviation of the Comm. on Public Works and Transp.*, H.R., 100th Cong., 2nd Sess. 397 (1988).

TABLE 1: CRS MARKET SHARE, 1988

CRS Vendor	% Agency Locations	% Flights Booked	% Terminals	% Revenues
Sabre	35.3	43.1	39.5	38.8
Apollo	23.8	27.9	21.3	27.6
SystemOne	21.7	13.9	19.5	16.6
Pars	11.6	9.4	11.4	11.1
Datas II	7.6	5.7	8.3	5.9

Source: DOT, *supra* note 13, at 51.

TABLE 2: 1988 REGIONAL SHARES OF BOOKINGS

	Sabre	Apollo	SystemOne	Pars	Datas II
Atlanta	21.7	16.7	26.1	0.1	35.4
Boston	59.6	15.6	11.4	8.8	4.5
Charlotte	25.2	15.5	54.2	0.1	5.0
Chicago	40.3	46.8	4.2	5.4	3.3
Cincinnati	67.5	5.0	0.8	2.9	23.7
Dallas	87.3	3.7	1.4	0.6	7.0
Dayton	34.2	21.3	0.8	16.4	27.3
Denver	21.2	56.9	17.2	2.7	1.9
Detroit	47.7	35.9	5.3	4.9	6.2
El Paso	89.1	1.5	2.5	0.8	6.1
Honolulu	34.6	60.4	3.4	0.8	0.8
Houston	42.0	10.6	41.6	2.3	3.5
Kansas City	14.4	13.9	30.6	39.6	1.5
Las Vegas	22.3	23.3	16.2	34.1	4.1
Los Angeles	42.2	38.0	3.9	13.7	2.2
Memphis	45.0	9.0	1.7	17.9	26.4
Miami	12.0	1.6	79.7	1.2	5.5
Minneapolis	48.7	15.5	14.1	20.3	1.4
Nashville	85.0	1.0	9.5	1.5	3.0
New York	54.6	13.0	19.7	10.7	2.0
Orlando	15.7	17.3	42.7	0.7	23.5
Philadelphia	20.7	44.9	20.0	13.0	1.4
Phoenix	58.5	15.6	10.8	12.2	2.9
Pittsburgh	17.7	40.1	15.5	24.0	2.7
Raleigh-Durham	37.5	26.8	23.6	0.5	11.7
Salt Lake City	23.2	37.4	4.0	3.9	31.5
San Diego	51.7	36.3	2.5	6.7	2.8
San Francisco	37.8	44.9	2.5	10.3	4.5
Seattle	24.8	60.1	7.2	3.3	4.6
St. Louis	25.3	3.2	4.2	66.1	1.2
Tampa	17.6	13.9	48.6	3.2	16.8
Washington	56.4	29.3	8.9	4.0	1.4

Source: DOT, *supra* note 13, at 99.

There is also evidence of barriers to entry. The costs of developing computer systems and software may be sunk, especially for a non-airline company, since such a company does not already have an internal computer system for tracking its own flights. Department of Transportation (DOT) also found evidence of economies of scale, economies of scope, and learning curve effects, although economists disagree on whether these phenomena constitute barriers to entry.[16]

In addition, travel agents and reservation system owners sign contracts for up to five years. Rollover contractual provisions have required travel agents to renew all of their contracts with a vendor whenever that vendor installs new equipment.[17] Minimum-use provisions often require the travel agent to book 50% of its flights on a given CRS. The contracts also typically contain liquidated-damages provisions that discourage a travel agent from switching systems before the contract expires.[18] Not only have these clauses generated a flood of litigation but many airlines and travel agents charge that rollover and minimum use provisions create exclusive dealing relationships. In addition, they argue that the liquidated damages provisions do far more than compensate reservation system vendors for losses incurred when travel agents break the contract.[19]

None of these contractual provisions would lead to monopolistic pricing if the contracting process itself is competitive, and Demsetz[20] demonstrated as much in his discussion of contracting as an alternative to public utility regulation. However, the fairly small number of system vendors, coupled with the presence of sunk costs, suggests that system vendors may indeed possess some market power, allowing them to extract contract terms that deter economically efficient entry.

Critics of CRS usually point to fairly high profits to clinch the argument. A variety of private studies have disputed the profitability of reservation systems, but most of them have examined accounting profits.[21]

16. *See id.* at 24-27. For a discussion of whether these phenomena constitute barriers to entry, *see* G. STIGLER, THE ORGANIZATION OF INDUSTRY, 67-70 (1983); and Demsetz, *Barriers to Entry*, 72 AM. ECON. REV. 47 (1982).

17. However, Covia Partnership, which owns the Apollo CRS, claims that it discontinued use of such rollovers in 1987, and it is not aware that any other CRS vendors still use them. DOT Comments of Covia Partnership, Doc. No. 46494 (Nov. 20, 1989).

18. An internal United Air Lines memo dated April 29, 1985 notes, "The liquidated damages provisions in all of the new contracts will make conversions of Apollo very unattractive to United's competitors." An AMR Corp. memo on "Account Retention," dated August 21, 1985, states, "The primary intent of the liquidated damages clause was to ensure subscribers do not easily convert to a competitive system." The memos can be found as attachments B and C to Comments of Delta Air Lines, DOT Doc. No. 46494 (Nov. 20, 1989).

19. DOT, *supra* note 15, at 130-31.

20. *Why Regulate Utilities?*, 11 J. L. & ECON. 55 (1968).

21. *See* DOT, *supra* note 15, at 18-19, for citations and a review of these studies, most of which were sponsored by CRS vendors or their critics.

The DOT, on the other hand, estimated the systems' "internal" or "economic" rate of return— the discount rate which equates the present value of cash flows with the amount invested to create the system. Employing assumptions used in many industry-sponsored studies, DOT concluded that the three largest systems earn rates of return exceeding 100%.[22]

III. The Status of CRS Policy

Despite this evidence, courts have declined to find CRS vendors guilty of antitrust violations. In *United Air Lines v. Austin Travel Corp.*,[23] the court awarded United Air Lines $408,375 in liquidated damages when Austin Travel Corp., a Long Island travel agent, terminated its Apollo leases and installed Texas Air's SystemOne. Austin had countered United's suit by accusing United of monopolization, attempted monopolization, and unreasonable restraint of trade. The court found United innocent of monopolization because Apollo accounted for only 8% of revenues generated by CRS bookings in the Long Island area. It suggested that only Sabre, the leading system, might possess monopoly power. The court also declared that there was no evidence that Apollo might have succeeded in attempted monopolization. Finally, the court denied that Apollo's rollover, minimum use, and liquidated-damages provisions constituted unreasonable restraints of trade. In general, the court noted, "Austin relied upon inadmissable hearsay from irrelevant governmental publications, testimony of witnesses without first-hand knowledge of any facts relating to United's practices or to the relevant Long Island market, and speculative assertions unaccompanied by specific direct evidence."[24]

In a later set of cases, the same court essentially declared the CRS market competitive on the grounds that travel agents have alternatives to the dominant CRS. It stated, "The presence or absence of substitutes to which buyers may turn negates an inference of market power. This suggests that United cannot control price or exclude competition."[25] In December 1989, a California jury decided that neither Sabre nor Apollo possesses monopoly power.[26]

At the same time, even though a particular practice may not consti-

22. DOT calculated rates of return from actual data in 1984 and 1986 and from projected cash flows and investments for 1992. See DOT *supra* note 15, at 39-89.

23. United Air Lines. Inc v. Austin Travel Corp. 867 F.2d 737 (2nd Cir. 1989), 681 F. Supp. 176 (SDNY 1988).

24. 681 F. Supp. at 180.

25. In re "Apollo" Airline Passenger Computerized Reservation System, 720 F. Supp. 1061, 1079 (SDNY 1989).

26. In re Air Passenger Computer Reservation Systems Antitrust Litigation, MDL 667-ER (C.D. CA).

tute an antitrust violation, Section 411 of the Federal Aviation Act gives the (CAB) and its successor in airline regulation, the DOT, authority to regulate such airline business practices. In 1984, the CAB issued regulations prohibiting CRS display bias, discriminatory booking fees, tie-ins, and exclusive use contracts. It also imposed a five-year limit on CRS contracts and required CRS vendors to make enhanced features available on a non-discriminatory basis.[27] In upholding the regulations, Judge Richard Posner noted that Section 411 empowers the CAB to regulate "unfair and deceptive" business practices and "unfair" methods of competition. "We know from many decisions, under both that section [411] and its progenitor, section 5 of the Federal Trade Commission Act, that the Board can forbid anticompetitive practices before they become serious enough to violate the Sherman Act."[28]

The question of competition in the CRS market, therefore, is still very much a live policy issue. Since the CAB's 1984 regulations originally expired on December 31, 1990, DOT initiated a rulemaking to establish new regulations. Its notice of proposed rulemaking stated, "Commentors should be aware that the Department's position is that the CRS rules should be extended and that revisions related to further limiting the term of CRS contracts, prohibiting mandatory rollovers, and establishing a quantitative or qualitative standard on minimum use clauses may be warranted."[29] DOT has since extended the original regulations through 1991 as it continues to grapple with the task of writing new regulations.

More extreme proposals also abound. One would force airlines to divest CRS, removing the system vendors' and travel agents' incentives to steer customers toward flights on reservation-system-owning airlines.[30] Another would limit the booking fees that system vendors could charge.[31] The Department of Justice (DOJ), meanwhile, has called for a rule requiring a direct pass-through of booking fees to travel agents or passengers,

27. 14 C.F.R. Parts 255, 256.

28. United Air Lines, Inc., v. Civil Aeronautics Board, 766 F.2d 1107, 1114 (1985).

29. 54 Fed. Reg. 38,873.

30. *See* Midwest Express Airlines, Inc., Comments on the ANPR, DOT Doc. No. 46494, at 3 (Nov. 20, 1989). Even the president of Continental Airlines, whose parent Texas Air owns SystemOne, has called for divestiture. *See* Wash. Post (March 20, 1985).

31. Northwest and TWA proposed submitting fee increases to arbitrators charged with fixing "fair and reasonable" fees. They also sought permission to assess discriminatorily high fees against airlines that raised their own CRS fees. *See* Comments of Northwest Airlines, Inc., and Trans World Airlines, Inc., DOT Doc. No. 46494, at 17-18 (Nov. 20, 1989). The Orient Airline Association called for a cap on fees at current levels, with increases permitted only if "justified." *See* Comments of the Orient Airline Association, DOT Doc. No. 46494 (Nov. 20, 1989), at 46. *See also* Midwest Express Airlines, Inc., Comments on the ANPR, DOT Doc. No. 46494, 8 (Nov. 22, 1989).

rather than having airlines pay the booking fees to the CRS vendors.[32]

What policy response, if any, is justified by economic analysis? A careful look at the peculiar nature of CRS reveals that Congress, courts, and regulatory agencies must first take into account the economics of entrepreneurship and innovation if they seek to design CRS rules that maximize consumer welfare.[33]

IV. Computer Reservation Systems as Creative Destruction

CRS are a cost-reducing innovation that might also convey market power. As a result, CRS policymakers confront a conflict between two forms of economic efficiency: "allocative efficiency" and "productive efficiency."

Allocative efficiency occurs when each unit of each resource is employed in the use that consumers value most highly. When allocative efficiency is maximized, the result is "Pareto-efficient;" no re-allocation of resources can make one consumer better off without making someone else worse off. In such a state, business firms earn only "competitive" profits just sufficient to cover their cost of capital. As used by many economists, the term "economic efficiency" frequently refers only to allocative efficiency. Economists have demonstrated that under the stringent assumptions necessary for perfectly competitive equilibrium, an unhampered marketplace maximizes allocative efficiency.[34] Critics of developments in deregulated transportation markets, in turn, have faulted deregulation precisely because it has not produced a perfectly competitive result.[35]

A public policy that seeks to prevent firms from earning above-competitive profits would not necessarily maximize consumer welfare because such a policy could hamper productive efficiency. Productive efficiency occurs when firms discover new ways to lower costs, produce new products that better satisfy consumer desires, and find better ways of informing consumers about the options available to them. Firms become efficient in a quest for profits—profits greater than those that they would earn if the market were in a continual state of perfect competition. A market in which firms are earning above-competitive profits by enhancing productive efficiency cannot simultaneously be a perfectly competitive

32. Comments of the United States Department of Justice, DOT Doc. No. 46494, 3 (Nov. 22, 1989).

33. P. Dempsey, *supra* note 5, at 35-36, argues that regulation ought to serve goals other than economic efficiency. This article does not dispute that point. The argument here is merely that most previous discussions of CRS have offered an incomplete economic analysis.

34. *See*, F. Scherer, Industrial Market Structure and Economic Performance, 11-12 (1980); M. Waterson, Economic Theory of the Industry 5 (1984).

35. *See, e.g.*, P. Dempsey, *supra* note 5, at 35.

market in which allocative efficiency is maximized. Such logic stands behind Bork's observation that "A determined attempt to remake the American economy into a replica of the textbook model of [perfect] competition would have roughly the same effect on national wealth as several dozen strategically placed nuclear explosions."[36] It also stands behind the realization among public utility analysts that rate-of-return regulation may actually harm consumer interests by stunting the regulated firm's incentives to innovate.[37]

In striking a balance between allocative and productive efficiency, the "Williamson Tradeoff"[38] might seem to be the most sensible way to evaluate CRS. Williamson developed the model to evaluate the welfare effects of a large merger which created market power while lowering costs, and Bork[39] champions this model as a heuristic device for implementing antitrust policy. A look at Figure 1, however, suggests that this model may not be very appropriate for analyzing radical innovations.

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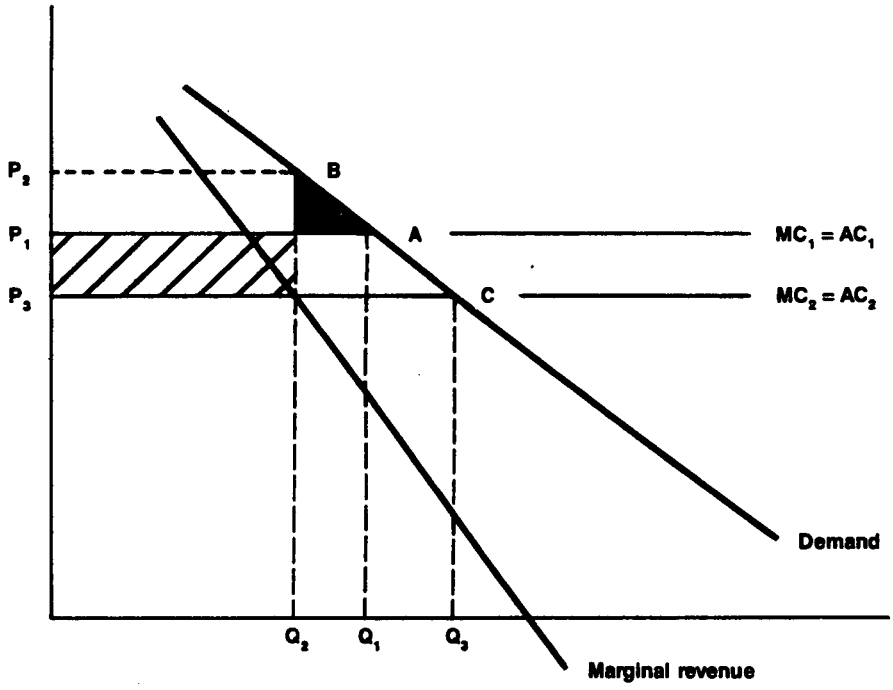
36. R. BORK, THE ANTITRUST PARADOX 92 (1978). For critiques of Bork that suggest that he has not fully recognized the incompatibility of allocative and productive efficiency, see Fink, *General and Partial Equilibrium Theory in Bork's Antitrust Analysis*, 3 CONTEMP. POL'Y ISS. 12 (1984-85); and High, *Bork's Paradox: Static vs. Dynamic Efficiency in Antitrust Analysis*, 3 CONTEMP. POL'Y ISS. 23 (1984-85).

37. For a recent symposium on alternatives to rate-of-return regulation, see 20 RAND J. OF ECON. (1989).

38. Williamson, *Economies as an Antitrust Defense: The Welfare Tradeoffs*, 58 AM. ECON. REV. 18 (1968).

39. R. BORK, *supra* note 36, at 107-15.

Figure 1: Conventional Williamson Tradeoff



In the conventional Williamson framework, the initial cost curve under perfect competition is AC_1, and price-taking firms produce a total output of Q_1 to be sold at a competitive price P_1. A merger or other market change then occurs which lowers the cost curve to AC_2 but also allows a single firm to capture the entire market. Price rises to P_2, and quantity falls to Q_2. In deciding whether to challenge the merger or other practice, policymakers must weigh the rectangle-shaped increase in producer surplus against the triangle-shaped loss in consumer surplus.

In contrast to this model, CRS seem to have swept the travel industry not just because they increased airlines' profits, but also because they lowered the costs that CRS customers—travel agents and non-CRS-owning airlines—pay when they book passengers. Several pieces of evidence point in this direction.

First of all, a 1981 Harris survey indicates that the systems raised travel agents' productivity by an average of 41%.[40] In fact, "One travel agent estimated that his employees could make a reservation using a

40. Martindale, *New Reservations about Airline Computers*, FREQUENT FLYER 45-50 (Dec. 1982).

CRS in one-third the time it would take to look up schedules in a book and make reservations over the telephone."[41] United Air Lines estimates that the Apollo system's booking fee is less than the cost of making a reservation by calling the airline's own reservation staff.[42]

Indeed, despite complaints about the way CRS have been managed, 95% of all travel agents now subscribe to at least one system,[43] even though they have the option of returning to pre-automation technology. The fact that they do not suggests that reservation systems vendors are charging prices *lower* than the cost of alternative technologies, and so travel agents' costs are most likely lower with the systems than without them.[44] When the CAB issued its CRS regulations in 1984, it "concluded that, because the systems were so much more efficient than other tools, almost all travel agents used CRS to determine what airline services and fares are available, to make bookings, and to issue tickets."[45] Similarly, the DOJ has asserted, "For most carriers, alternative distribution methods are not acceptable substitutes for being listed in a CRS."[46]

Finally, not even the most ardent critics propose to ban CRS; they seek only to regulate them.[47] If the reservation systems raised ticket prices above what they would be if travel agents were not automated, one would expect critics to call for abolition of the systems themselves.

For these reasons CRS seem an ideal example of "Schumpeterian" innovation. Schumpeter stressed the importance of competition which "commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of existing firms but at their foundations and their very lives."[48] Figure 2 shows the effects of such an innovation. The cost curve for provision of reservation services falls from AC_1 to AC_2, a large enough drop that price falls and the quantity of reservation services purchased expands. Both consumer surplus and profits rise, even though the firm produces at point B, which is the "monopoly"

41. *Supra* note 2, at 3.

42. Comments of United Air Lines, DOT Doc. No. 46494, 9 (Nov. 20, 1989).

43. DOT, *supra* note 15, at 10.

44. MORRISON AND WINSTON, *supra* note 4, at 70, suggest that travelers' welfare may also be higher with computer reservation systems than without them: "In some if not most cases, given travelers' lack of expertise in collecting flight information, even a biased CRS can be an improvement over independent search."

45. Advance Notice of Proposed Rulemaking on the Computer Reservations System Regulations, 54 Federal Register 38,871 (1989).

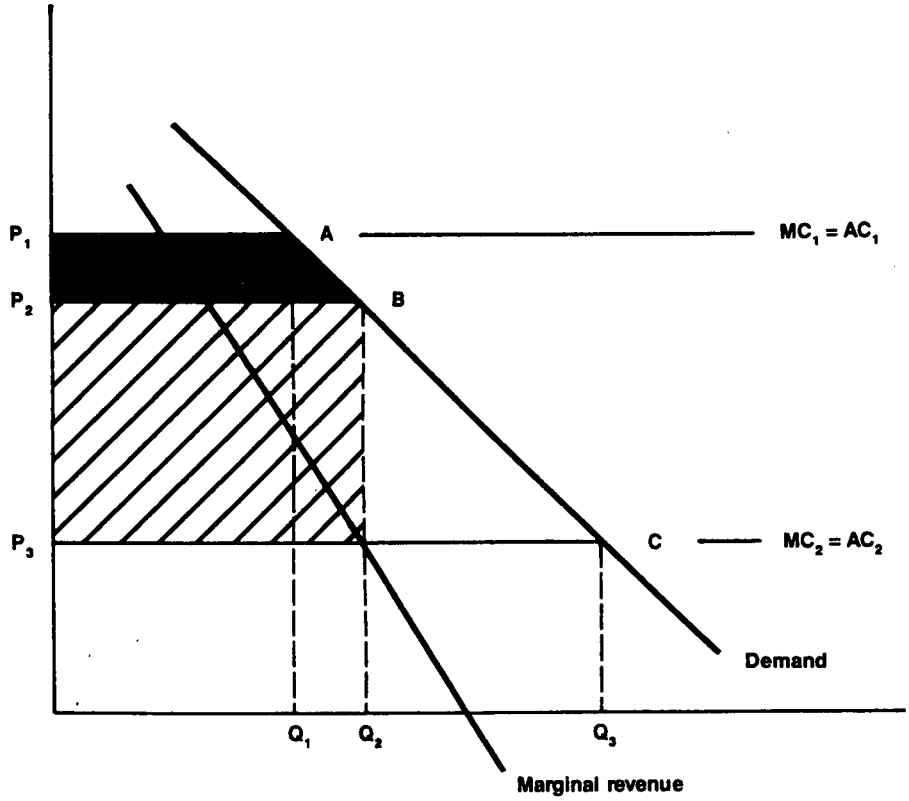
46. Comments of the United States Department of Justice, DOT Doc. No. 46494, 10 (Nov. 22, 1989).

47. A long assortment of CRS critics have called for divestiture, rate regulations or self help. *See* Levine, *supra* note 1; Midwest Express Airlines, Inc,., and Wash. Post *supra* note 30; Comments of Northwest Airlines and Comments of the Orient Airline Assoc., *supra* note 31.

48. J. SCHUMPETER, *supra* note 11, at 84.

price and quantity, given the new cost curve.[49]

Figure 2: Schumpeterian Innovation



Clearly, the move from point A to point B is "Pareto-superior." Schumpeterian innovations, defined as in Figure 2, will always expand output. Therefore, they will always pass Posner's "output test," another proposed test for evaluating the effect of an industry practice on consumer welfare.[50]

All of this analysis will be of little comfort to anyone who observes point C in Figure 2. A relevant policy question is whether the firm could do even better. If the computer reservation service vendor were forced to

49. Such innovation has also been termed "drastic" by Arrow, *Economic Welfare and the Allocation of Resources for Inventions*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY (R. Nelson ed., 1962) and "major" by M. KAMIEN AND N. SCHWARTZ, MARKET STRUCTURE AND INNOVATION 38 (1982).

50. Posner, *The Rule of Reason and the Economic Approach: Reflections on the Sylvania Decision*, 45 U. CHI. L. REV. 19 (1977).

price its product competitively, quantity would expand still further to Q_3, and price would fall to P_3. Proposals to change CRS business practices are best understood as attempts to effect such a switch.

If moving to point C were costless, the choice would be clear. However, such a move may entail very real costs because the potential to employ seemingly monopolistic business practices no doubt provided airlines with a powerful incentive to develop CRS in the first place. It is possible that the systems would not have been developed had airlines known that display bias would be prohibited, contract lengths would be limited, and other contractual terms would be restricted. Judge Posner even speculated in 1985, "Maybe biasing of computerized reservation systems can be defended as a method by which airlines that spent hundreds of millions of dollars to develop computerized reservation systems, at considerable risk of failure, can recoup their investment with a profit commensurate with the amount of the investment, the length of time it has been outstanding, and the risk of loss."[51] Posner's remark echoes Schumpeter's commentary on innovative firms that employ seemingly monopolistic practices to safeguard their innovations:

> As we have seen, such concerns are aggressors by nature and wield the really effective weapon of competition. Their intrusion can only in the rarest of cases fail to improve total output. But these aggressors are so circumstanced as to require, for purposes of attack and defense, also pieces of armor other than price and quality of their produce which, moreover, must be strategically manipulated all along so that at any point in time they seem to be doing nothing but restricting their output and keeping prices high.[52]

In other words, even if various CRS business practices generate high rates of return, the high rates of return constitute monopoly rents only from the static perspective of one who observes the industry after the CRS has been invented and marketed. From the perspective of earlier periods, when the CRS was just an untested idea, the high profits are just a residual reward to the companies that first recognized the potential of CRS and aggressively developed and marketed them. Therefore, even if CRS vendors possess market power, it is not clear that eliminating such market power maximizes consumer welfare.[53,54]

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51. United Air Lines, Inc. v. Civil Aeronautics Board, 766 F.2d at 1113.

52. J. SCHUMPETER *supra* note 11, at 89. *See also* M. KAMIEN AND N. SCHWARTZ, *supra* note 48.

53. This general theoretical argument can be found in I. KIRZNER, COMPETITION AND ENTREPRENEURSHIP, 133-34 (1973).

54. It is crucial to distinguish this discussion from the voluminous literature, largely inspired by Schumpeter, that examines the impact of market structure on innovation. This literature typically asks questions like, "Are monopolies or large firms more innovative than competitive or small firms?" The argument here is not that possession of market power encourages innovation, but that the prospective opportunity of possessing market power encourages innovation. M.

Of course, CRS will not disappear now if the government merely constrains their profits. In that sense, they are like a capital investment whose quasi-rents are ever available to be expropriated. But just as a public policy that expropriates quasi-rents discourages the investments that generate quasi-rents, so too do public policies that expropriate entrepreneurial rents discourage entrepreneurial discovery.[55]

The economics literature on innovation contains extensive discussions of the importance of "appropriability"—the innovator's ability to capture rents from his innovation.[56] Because imitation may erode these rents, the government awards patents, and innovative firms adopt an assortment of business strategies to differentiate their products and prevent imitation. In the CRS case, the policies at issue are ones that would actually impinge upon appropriability, rather than enhance it. Tighter regulation of CRS, therefore, could discourage further innovation in the CRS industry. It could also discourage innovation elsewhere in the economy if entrepreneurs in general assume that they too might have to forfeit their innovation-induced profits.

Kamien and Schwartz[57] note that there currently exists no precise way to calculate the ideal departure from perfect competition that encourages the optimal amount of innovation. However, economic theories of entrepreneurship suggest general principles that can be applied to show how various policy proposals would affect incentives to innovate.

By its very nature, innovation involves dealing with the uncertain fu-

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KAMIEN AND N. SCHWARTZ, *supra* note 48, at 27-31, provide a careful discussion of this distinction and a wealth of citations to relevant literature.

55. M. KAMIEN AND N. SCHWARTZ, *supra* note 48, at 106, comment,

Short-run allocative efficiency is incompatible with technical advance because the former is identified with perfect competition, and perfect competition in innovation means there are enough potential innovators that the return to this activity equals the return to any other activity. It further suggests immediate imitation after introduction of the innovation, assuring that the innovator will not have a monopoly and thereby preventing misallocation of resources after the innovation. This also discourages the quest to innovate.

B. Loasby, in CHOICE, COMPLEXITY, AND IGNORANCE (1976) at 191-92, offers a broader critique of the perfectly competitive norm and its relation to innovation:

It is not as a means of achieving the uniformity of behavior of the perfectly competitive models that competition is valuable. The virtue of competition lies not in constraining all similar agents to the same action, but in encouraging them to behave differently. Pareto optimality focusses our attention on the requirement of consistency; but a competitive system should not be too coherent. In a world where we are inevitably ignorant about some of the past and present, let alone the future, the co-ordination of activities is less important than the perception of new problems and opportunities, and adaptation to them. *See also* J. Schumpeter, *supra* note 11, at 83.

56. For surveys that include discussions of the appropriability literature, see W. Cohen and R. Levin, *Empirical Studies of Innovation and Market Structure*, in HANDBOOK OF INDUSTRIAL ORGANIZATION, Vol. II (Schmalensee and Willig, eds., 1989), and Dosi, *Sources, Procedures, and Microeconomic Effects of Innovation*, 26 J. ECON. LIT. 1120 (1988).

57. M. KAMIEN AND N. SCHWARTZ, *supra* note 48, at 212.

ture. An entrepreneur pays certain prices for resources in the hope that he can produce and later sell a product for a price that more than covers its cost. His residual profit contains "an element of calculation and an element of luck."[58] CRS policy rules consistent with maximal incentives to innovate would, at a minimum, have to avoid confiscating those calculated profits that motivated airline entrepreneurs to undertake the innovation.

Of course, in practice, it is difficult if not impossible to ascertain precisely what level or probability distribution of anticipated profits motivated airlines to develop and introduce the CRS. Even if such a calculation were possible—for example, by examining internal documents that show how airlines decided the investment was worth the risk—it might miss an important aspect of the entrepreneurial process. Dosi argues that innovators face a form of "strong uncertainty" that prevents them from even listing all of the possible results of their innovations.[59] An innovative firm may thus form some estimate of anticipated profits from an innovation, but it also expects that the innovation will generate additional profit opportunities whose precise magnitude and nature it cannot yet foresee. These vaguely-perceived profit opportunities can also encourage innovation. These profits are not simply outcomes to which the innovator assigned a low probability. They might more aptly be termed "pleasant surprises." The innovator expects that such surprises will occur, but he does not know enough about them to include them in his calculations of expected returns:

> What switches on the entrepreneurial antennae appears to be the potential entrepreneur's awareness that the situation holds unknown possibilities unconstrained by known constraints. It is the entrepreneur's awareness of the *open-endedness* of the decision context that appears to stimulate the qualities of self-reliance, initiative, and discovery.[60]

When an entrepreneur contemplates making an innovation, he may be able to imagine some set of possible outcomes and assign subjective probabilities to them. But in addition to these outcomes, there may also be a set of outcomes that the innovator is simply unaware of, or that he

58. F. KNIGHT, RISK, UNCERTAINTY, AND PROFIT, at 277 (1921).

59. Dosi, *supra* note 55, at 1134. Dosi suggests, "In general, the uncertainty associated with innovative activities is much stronger than that with which familiar economic models deal. It involves not only lack of knowledge of the precise cost and outcomes of different alternatives, often also lack of knowledge of what the alternatives are. . . In fact, let us distinguish between (a) the notion of uncertainty familiar to economic analysis defined in terms of imperfect information about the occurrence of a *known list of events* and (b) what we could call *strong uncertainty* whereby the list of possible events is unknown." Dosi's "strong uncertainty" is, of course, equivalent to Frank Knight's "true" uncertainty—a risk which is uninsurable "because there is no objective measure of the probability of gain or loss." *Supra* note 57, at 119-20. For a concise explication of Knight's theory, *see* HEBERT AND LINK, THE ENTREPRENEUR, at 69-72 (1982).

60. I. KIRZNER, DISCOVERY AND THE CAPITALIST PROCESS 109 (1985).

has insufficient knowledge of to assign a subjective probability. Nevertheless, the dim realization that an innovation may be much more profitable than predicted is itself an important incentive. Therefore, preserving the "open-endedness of the decision context" may be as important as allowing the innovator to keep some amount of profit that he actually anticipated receiving.[61]

In the CRS context, this theory suggests that regulators should tread lightly when they seek to restrain CRS business practices, because any diminution of CRS profits may reduce incentives for innovation. In some cases, a reduction in such incentives may be worth bearing. For example, some of the profit the CRS owner with market power earns may stem from its ability to mislead travel agents or air passengers. As Judge Posner noted, the opportunity to deceive may indeed encourage innovation. Nevertheless, it is doubtful that the benefits of such incentives exceed the costs that deception imposes on society. Levine's comment seems persuasive: "It is difficult to defend as efficient those practices which reward undisciplined distortion of choices by agents at the externalized expense of principals."[62] The agents, in Levine's view, are airline CRS owners who claim that their systems are unbiased, or fail to disclose the extent of the bias. The principals are the airline passengers who count on CRS as a source of unbiased information.

Focusing on the prevention of deception provides a clear-cut standard for evaluating CRS policy proposals. To the extent that a policy prevents deception, it offers a clear and visible benefit to balance against the diminution in entrepreneurial incentives. To the extent that a policy merely diminishes CRS profits without deterring deception, the effect on consumer welfare is much more problematic. Such a policy constrains entrepreneurial incentives in the hope that consumers will gain more from lower ticket prices than they lose in benefits from increased innovation.

V. Policy Options

Major CRS policies and policy proposals generally regulate one of four things: bias, prices, other contract terms, and industry structure. Some of these policies control deception, while others merely control profits. Consider each category in turn.

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61. Similarly, J. Schumpeter suggests, "Spectacular prizes much greater than would have been necessary to call forth the particular effort are thrown to a small minority of winners, thus propelling much more efficaciously than more equal and more "just" distribution would, the activity of that large majority of businessmen who receive in return very modest compensation or nothing or less than nothing, and yet do their utmost because they have the big prizes before their eyes and overrate their chances of doing equally well." *Supra* note 11, at 73-74. *See also* F. Knight, *supra* note 57, at 283-84.

62. Levine, *supra* note 1, at 489.

A. BIAS

CRS bias comes in several forms, and it is important to distinguish between them. The most obvious is display bias, which the CAB outlawed in 1984.

Initially, some airlines freely admitted that their CRS displays were biased. In particular, American Airlines' 1982 annual report said that the Sabre system was profitable in part because it permitted American to give its flights preferential display.[63] Richard Fahy, American's associate general counsel, commented, "Vendors viewed display preference as nothing more than putting the vendors' product on a higher shelf in the display so that it will be at eye level for the consumer. In the grocery business, such competition for shelf space is a normal part of the marketing game."[64] However, since most terminals are located in travel agents' offices, only the travel agent, and not the customer, can see all of the shelves. Travel agents can take advantage of this fact by booking passengers on more expensive flights in order to collect incentive commissions from CRS-owning airlines.[65]

Some airlines, such as Delta, have claimed that their CRS's are unbiased, but such claims are difficult for consumers to evaluate, given the complexity of the information involved. Others have simply failed to disclose the existence or extent of bias.[66] Even if all such information is disclosed, consumers would have a hard time preventing bias. Given the high market shares of the top CRS vendor in many major cities, it may be difficult for consumers to shop travel agents using competing CRS's, and the long-term contracts binding travel agents to specific CRS vendors make it difficult for newer, unbiased CRS vendors to enter the market. In short, display bias seems a prime candidate for regulation on the basis of preventing deception.

Since the CAB prohibited display bias, CRS-owning airlines have continued to earn substantial incremental revenues. The DOT's 1988 study postulated that these revenues are the result of a "halo effect" that encourages travel agents to book flights on the CRS-owning airline.[67] Some U.S. airlines claim that this effect results from "functional bias," which occurs when a CRS contains less timely or less accurate information for some airlines than for others.[68] Such bias may occur because the

63. AMERICAN AIRLINES INC. ANNUAL REPORT 13-14 (1982).

64. Fahy, *Regulation of Computerized Reservation Systems in the United States and Europe*, 11 AIR L. 232, at 234 (1986).

65. Levine, *supra* note 1, at 60.

66. 48 Fed. Reg. at 32,588.

67. DOT *supra* note 15, at 116-21.

68. Comments of System One Direct Access, Inc., Continental Airlines, Inc., and Eastern Air Lines, Inc., DOT Doc. No. 46,494 13-16 (Nov. 22, 1989).

CRS lets travel agents access the vendor's own internal computer system, while information on competing airlines' flights must be loaded into the CRS. American Airlines, on the other hand, claims that the halo effect is merely the result of good business relationships with travel agents.[69] The DOT, meanwhile, has suggested that functional or "architectural" bias, to the extent that it exists, is mainly the result of the state of technology, and that it is diminishing over time.[70]

This type of bias poses a more difficult problem, because current technology may simply make it less expensive to access information about the vendor airline in a timely manner. Regulation in this area might enhance consumer welfare, but this result would be certain only if regulation can be implemented without eliminating those economies of scope that stem simply from well-developed business relationships.

B. Prices

In 1984, the CAB explicitly declined to impose ceilings on CRS booking fees. Its rationale fits well with the notion of the CRS as a Schumpeterian innovation, for the CAB stated that its refusal to set fees would help preserve "the legitimate competitive advantages the CRS vendors have gained because of their innovations."[71] Nevertheless, the CAB did impose limited regulation on fees by prohibiting discrimination not justified by cost differences: "[W]e anticipate that the bargaining power of some participating carriers, combined with a non-discrimination requirement, will generally hold fees close to reasonable levels."[72]

This decision is a good example of a regulation that ostensibly permits CRS vendors to cover their costs while simultaneously diminishing their entrepreneurial incentives. Under the anti-discrimination regulation, CRS vendors should be able to earn a profit, as long as they can cover their costs by charging all participating carriers the same fee.[73] Nevertheless, the systems are less profitable than if price discrimination were permitted. While such a regulation is understandable in light of the well-established antitrust aversion to price discrimination, the elimination of discrimination is not costless, since that which diminishes profits diminishes entrepreneurial incentives.

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69. Reply Comments of American Airlines, Inc., DOT Doc. No. 46,494 at 17 (Jan. 16, 1990). *See also* Decision Technologies, Review of Halo Effect as Defined in the DOT Computerized Reservation System Study (Sept. 1988).

70. DOT *supra* note 13, at 70.

71. 54 Fed. Reg. at 32,542.

72. 54 Fed. Reg. at 32,552.

73. The regulation creates additional problems if CRS vendors can only cover their costs by practicing price discrimination. Given the profit records of CRS systems, it is doubtful that differential pricing is necessary, at least for the larger systems.

C. OTHER CONTRACT PROVISIONS

Other CRS contract provisions most clearly exemplify the types of "armor" that Schumpeter suggested innovative firms may need when taking entrepreneurial risks. Indeed, since Schumpeter, it is a well-established point in the scholarly economics literature that long-term contracts, liquidated damages provisions, minimum-use requirements, and similar restrictions can all encourage businesses to invest in sunk capital assets with low resale value.[74]

When the CAB decided to limit contracts to five years, it essentially ignored this point. The CAB justified the limit by stating, "we will intervene to eliminate only those contract terms clearly designed to prevent travel agents from switching systems. We have found no other business justification for the lengthy contracts."[75] In fact, the CAB agreed to five years, rather than a shorter period, only because American Airlines argued that shorter contract terms would prevent airlines from taking advantage of investment tax credits. There is no doubt that long-term contracts discourage travel agents from switching to another CRS; that is the purpose of a long-term contract. In limiting contract terms, the CAB either assumed away the problem of sunk costs, or it assumed, without offering proof, that airlines can recover their sunk investments within five years.

The CAB's decision not to regulate liquidated damages displays a greater appreciation of their potentially efficiency-enhancing role. The agency left adjudication of liquidated damages to the courts, "because they can tailor a decree to the particular circumstances."[76] Courts, meanwhile, have generally upheld liquidated damages clauses as a reasonable way for CRS owners to protect their investment.[77]

Finally, such practices as automatic rollovers, which renew the travel agent's contract for all of its CRS equipment when it receives one new piece of equipment, and tie-in sales are less defensible as means of protecting sunk capital. Nevertheless, since they are non-deceptive means of expanding CRS profits, Schumpeterian analysis suggests that prohibiting them may well make consumers worse off by diminishing the incentives to innovate.

D. STRUCTURE

The CAB and DOT have declined to call for divestiture of airline-

74. *See*, e.g., O. WILLIAMSON, THE ECONOMIC INSTITUTIONS OF CAPITALISM (1985).
75. 49 Fed. Reg. at 32,556.
76. 49 Fed. Reg. at 32,556.
77. United Air Lines, Inc. v. Austin Travel Corp., 867 F.2d at 740.

owned CRS's, but others have felt free to champion divestiture. Levine[78] makes the case for divestiture in a careful and straightforward manner. In his view, airlines owning CRS's have an incentive to bias their CRS operations against competitors. The mere outlawing of display bias is not a sufficient remedy, as the persistence of substantial incremental revenues shows. Therefore, divestiture is the only effective way to prevent bias.

It is important to note that this argument does not claim that divestiture would completely eliminate market power. After all, if ownership of a CRS can generate a stream of monopoly profits, the airline can capture those profits in the sale price of the CRS. However, the airline could not capture bias-induced incremental revenues by selling its CRS to a non-airline company, because a non-airline has no way of using the CRS to earn incremental revenues.[79] Therefore, while divestiture may not eliminate market power, it can eliminate bias.

A significant problem with this solution is that in the absence of display bias, observed incremental revenues may be due either to other forms of bias or to the existence of good business relationships. Divestiture would certainly eliminate incentives to develop new, hidden forms of bias, but it would also diminish CRS-owning airlines' incentives to invest in developing good business relationships. The wisdom of divestiture on this count will have to await further empirical research on the origins of remaining incremental revenues.

Of course, divestiture creates another, more obvious threat to entrepreneurial incentives; it would prevent airlines from exploiting economies of scope in the joint provision of air travel and CRS services. To the extent that innovators are motivated by a desire to capture economies of scope, divestiture would quash this incentive. The CAB made essentially this point in rejecting divestiture.[80]

VI. Conclusion

The legal and economic debate over CRS has frequently overlooked the peculiar economics of innovation and entrepreneurship. In so doing, scholars and regulators have spotlighted the benefits of certain forms of regulation without adequately considering the costs. Incorporating a Schumpeterian theory of innovation into CRS analysis makes existing and proposed regulation of prices, contract terms, and industry structure much less attractive from the perspective of consumer welfare. Regulation designed to prevent bias, however, still seems to be efficiency-en-

78. Levine, *supra* note 1.

79. Unless, of course, the non-airline company were a car rental firm or other company that also has its products listed on the CRS.

80. 49 Fed. Reg. at 32,560.

hancing because the reduction in entrepreneurial incentives is balanced by the benefits of preventing deception.

Interestingly, this approach to the CRS problem finds a close parallel in Judge Posner's economic analysis of the CAB's 1984 regulations. Posner's decision upholding the regulations notes that prevention of bias clearly stems from the CAB's mandate to prevent "unfair and deceptive" practices. However, he questioned the CAB's finding that CRS vendors possess market power. Ultimately, the court upheld the CAB's ban on price discrimination only because Section 411 of the Federal Aviation Act gave the CAB power to regulate competitive practices even when they do not constitute antitrust violations.[81]

Given this analysis, an important caveat from Schumpeter himself is in order. After defending many monopolistic practices on the grounds that they encourage innovation, he notes, "our argument does not amount to a case against state regulation. It does show that there is no general case for . . . the prosecution of everything that qualifies as a restraint of trade."[82] The possibility of employing various non-fraudulent but currently controversial CRS business practices may have motivated airlines to develop and market these systems. Consumers may, however, be willing to give up some degree of innovation in exchange for a degree of protection from the innovator's market power. Nevertheless, before policymakers can make such a tradeoff in the CRS industry, they must first recognize that it exists. Thus far, few have.

81. *See* United Air Lines, Inc. v. Civil Aeronautics Board, 766 F.2d at 1107.
82. D.O.T. *supra* note 13, at 89.