Demand and Consumer Welfare Impacts of International Airline Liberalization: The Case of the North Atlantic

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--Abstract--

Impacts of international airline bilateral liberalization on demand, fares, accessibility, and consumer welfare in the North Atlantic are studied, based on data for markets between the United States and five European countries. A demand model, estimated at the country-pair level, suggests that demand is slightly fare inelastic ($\varepsilon \cong -0.9$), and that demand has responded positively, though inelastically ($\varepsilon \cong 0.2$), to changes in accessibility (a measure of how much non-stop service is available). A yield model is estimated to assess the impact of bilateral liberalization status on fares, and it is found that liberal bilaterals have resulted in fare reductions of approximately 40 per cent. A similar analysis concerning accessibility reveals that liberalization increased this variable 55 per cent. In the case of both yield and accessibility, liberalization of a bilateral with one country was found to produce impacts on neighboring countries with restrictive bilaterals, suggesting that fear of traffic diversion influenced regulatory policy. Combining the estimated demand elasticities with the estimated impacts of liberalization on yields and accessibility, we estimate that, in the year 1989, passenger traffic between the U.S. and the five countries studied is 40-60 per cent greater as a result of liberalization, and that liberalization has produced consumer welfare increases of $3-5 billion, or $400-600 per traveler.

1. Introduction

The late 1970s have come to be known as the deregulatory era in the United States. Substantial easing of economic regulation occurred in many sectors--railroads, trucking, intercity bus, banking, telecommunications, household goods moving, and--last but hardly least--air transport. Among these industries, air transportation is unique in its strong coupling between domestic and international systems, for the relative size and strength of U.S. firms compared to their foreign counterparts, and for the restrictiveness of regulation in the international system. Consequently, of all the types of deregulation listed above, that of domestic air transport has had the strongest international ramifications.

The most direct of these spillover effects was a series of liberal bilateral agreements between the U.S. and some 20 nations around the globe, signed between 1978 and 1982 (Haanappel, 1984). While many of these--those involving Papua New Guinea, Finland, and El Salvador, for example--may have had little substantive impact, those with West Germany, Belgium, and the Netherlands led to dramatic changes in pricing and service in the North Atlantic market. The liberal bilateral agreements prohibited either country from restricting airlines of the other country with respect to capacity or fares, allowed each country to designate more than one airline to serve routes to the other, and increased the number of authorized routes and gateways between the two countries. Furthermore, as intended by U.S. policy makers, the initial set of agreements, by threatening other European countries with a diversion of traffic away from their tightly regulated routes, gave rise to further liberalization. Great Britain, after an initial reactionary period of tighter regulation, agreed to an easing of fare and capacity restrictions in 1979-80. In 1982, a liberal fare agreement between the U.S. and all ECAC countries, including Great Britain, France, and Italy, was signed. As of 1990, Italy was the only major European country that did not have a liberal capacity agreement with the U.S. as well.

While the impacts of U.S. domestic airline deregulation have been extensively analyzed, comparatively little is known concerning the impacts of regulatory reform in international air transport. It has been nearly a decade since Morrison and Winston (1986) estimated that U.S. deregulation yielded welfare gains of about $6 billion to passengers (pp. 1, 35) and profit gains to carriers of $2.5 billion (pp. 2, 40)[1], yet there are still no analogous estimates available for the international sector. Studies by Dresner and Windle (1991) and Dresner and Trethaway (1991), among others, reveal that liberalization resulted in increased passenger traffic and lower fares. However, neither the impact of liberalization on the number of routes and gateways nor its aggergate welfare impacts has been considered in prior work.

[1]The results are for the year 1977, prior to deregulation, and are based on estimates of how fares, service quality, and industry financial results would have differed in deregulation had been in effect.

There are several reasons for this lack of attention to international liberalization as compared with U.S. deregulation of air transport. Most importantly, whereas there is an abundance of data for the U.S. domestic airline industry, international data are considerably more limited. Further, U.S. domestic deregulation, by virtually terminating government involvement in airline economic matters represents a sharper policy change than international liberalization, which leaves governments largely in control of market entry and route structure decisions. Finally, state interests in international transport often appear, rightly or wrongly, to transcend the economic efficiency concerns to which economic welfare criteria are relevant.

Nonetheless, the economic assessment of international liberalization is of considerable importance. First, it is of obvious relevance to ongoing debates on the comparative virtues of protectionism and free trade, both in air transport and in other sectors. Second, despite continued government involvement, international liberalization in the North Atlantic is arguably a more dramatic change than U.S. domestic deregulation, because prior to the change the North Atlantic routes--cartelized through the International Air Transport Association faresetting mechanism, and protected from intermodal competition by miles of ocean--were far less competitive.

This paper estimates the demand and consumer welfare impacts of liberalizing economic regulation of the North Atlantic air routes. Our approach is to first estimate demand functions for North Atlantic air travel. Unlike prior demand studies, our demand models incorporate service accessibility, based on the number of gateways from which service is available, along with price as supply-side variables. Next, we determine the impact of liberalization on fare and service accessibility. Combining these results, we are able to estimate how liberalization has affected the "generalized cost"--in this context, a function of monetary cost and service accessibility--of North Atlantic Air travel, and the resulting change in consumer surplus.

This paper does not consider the other side of the coin--how liberalization has affected airline profit levels, wage rates, or other supply-side interests. This is not to suggest that such impacts are unimportant--they clearly must be addressed in order to arrive at a definitive assessment. On the other hand, it is equally clear that U.S. domestic deregulation, as well as the international liberalization that is spawned, were intended primarily to benefit consumers. In the words of CAB Chairman Alfred Kahn, writing in 1978, (quoted in de Murias, 1988, p. 154)

> The cornerstone of the altered approach to international aviation that we have been following in the past year--some of the most striking manifestations of which have been our letting Sabena into Atlanta, offering the Dutch access to Los Angeles and their choice of another city, and looking the other way when someone complains about their competitive

> aggressiveness in picking up fifth and sixth freedom traffic--is our belief that the function of economic policy is to serve consumers rather than protect producers, and that the best way to do this is by promoting competition at home and abroad, rather than by cartelization

Thus the analysis presented here, incomplete though it is, evaluates liberalization against the stated objectives of its founders

The balance of this paper is organized as follows Section 2 overviews our approach Section 3 presents our demand models for air transport in the North Atlantic Section 4 assesses how liberalization has affected supply-side variables on these routes Section 5 brings together the results of the previous sections to estimate how liberalization has affected traffic in the North Atlantic, and Section 6 presents estimates of consumer welfare gains from liberalization Conclusions are offered in Section 7

2. Approach

Consider the impact of liberalization in a single country-pair market Let the demand function in that market be $Q = g(p,\vec{s},\vec{z})$ where p is the (single) air fare in the market, $\vec{s}$ is a vector of service attributes in the market, and $\vec{z}$ is a vector of exogenous demand-side variables Let the supply side of the system be characterized by a price function, $p = f(\vec{l},\vec{x})$, and a service attribute function, $\vec{s} = \vec{h}(\vec{l},\vec{x})$, where $\vec{l}$ is a vector characterizing the liberalization status of the market and $\vec{x}$ is a vector of exogenous variables affecting supply-side behavior The impact of a change in liberalization status from $\vec{l}_1$ to $\vec{l}_2$ on the quantity of travel in the market can be estimated as

$$\Delta Q = g(f(\vec{l}_2,\vec{x}),\vec{h}(\vec{l}_2,\vec{x}),\vec{z}) - g(f(\vec{l}_1,\vec{x}),\vec{h}(\vec{l}_1,\vec{x}),\vec{z}) \quad (1)$$

The impact of the change of liberalization on any other function of p, $\vec{s}$, and $\vec{z}$ can be calculated in a similar fashion In particular, since consumer surplus is such a function, changes in consumer surplus from a change in liberalization can be calculated in this way

It is more correct to view the North Atlantic markets as a set of interdependent ones The interaction derives mainly from substitution possibilities for example, if fares to France are high, more passengers can be expected to fly to Netherlands (and perhaps on to France) As noted above, the potential for such diversion is believed to have allowed the U S to obtain liberal bilaterals with otherwise reluctant countries by first establishing them with more willing neighbors. The single-market framework may be extended to the case of multiple interacting markets by making all variables in (1) vectors of dimension n, where n is the number of markets Thus we have

$$\vec{Q} = \vec{g}(\vec{p},\bar{\vec{s}},\bar{\vec{z}}) \quad (2)$$

$$\vec{p} = \vec{f}(\bar{\vec{l}},\bar{\vec{x}}) \quad (3)$$

$$\bar{\bar{s}} = \bar{\bar{h}}(\bar{\bar{l}},\bar{\bar{x}}) \tag{4}$$

$$\Delta\bar{Q} = \bar{g}(\bar{f}(\bar{\bar{l}}_2,\bar{\bar{x}}),\bar{\bar{h}}(\bar{\bar{l}}_2,\bar{\bar{x}}),\bar{\bar{z}}) - \bar{g}(f(\bar{\bar{l}}_1,\bar{\bar{x}}),\bar{\bar{h}}(\bar{\bar{l}}_1,\bar{\bar{x}}),\bar{\bar{z}}), \tag{5}$$

where we use the notation $\bar{y}$ to indicate an n-dimensional vector containing the value of scalar variable y for each market, and $\bar{\bar{y}}$ to indicate the nk-dimensional vector containing the values of k-dimensional vector y for each market Unfortunately, the data do not support implementation of the full multi-market approach defined by (2)-(5) Some variables, such as market-specific price variables, are missing entirely Moreover, specification of the above equations would require a large number of parameters, which we lack sufficient data to estimate

We are therefore forced to retreat to the isolated market approach Although far from ideal, this simplification is not so egregious as it may initially seem The reason is that for the most part, supply variables in markets with high levels of substitutability have moved together To see why this makes the isolated market approach more appropriate, consider two markets in which demand is characterized by constant own-price and cross-elasticities Suppose an exogenous event produces price changes in both markets The demand increase in market 1 will thus be

$$\frac{\Delta Q_1}{Q_1} = \varepsilon_{11}\frac{\Delta P_1}{P_1} + \varepsilon_{12}\frac{\Delta P_2}{P_2} = (\varepsilon_{11} + \varepsilon_{12})\frac{\Delta P}{P}, \tag{6}$$

where the second equality assumes that the proportional changes in prices caused by the event in the two markets are equal Thus, insofar as this latter assumption holds, the impact of the event depends only on the sum of the own-price and cross-elasticities Furthermore, if a series of events produces a series of uniform proportional price changes, the sum of the elasticities can estimated using

$$\log(Q_1) = (\varepsilon_{11} + \varepsilon_{12})\log(P_1) \tag{7}$$

In other words, so long as price changes are uniform accross markets, the demand impact of an exogenous event giving rise to a price change can be inferred from a model that "naively" assumes isolated markets and thus relates demand in a market to price in that market only Furthermore, the average price over all the markets can be used instead of the market-specific price under these circumstances The same argument also applies to any other supply variable for which there are direct and cross-elasticities of demand

Of course, the actual data do not completely conform to the assumption of uniform price (or other supply variable) changes across markets. Indeed, in the models presented later, the impact of liberalization on fare and service attributes is inferred by comparing the evolution of fares and service attributes across markets with different liberalization status. However, the results of these models indicate strong spillover effects whereby fares and service attributes to a country are affected by liberalization of the bilateral with a neighboring country. Since it is the cross-elasticities among markets to neighboring countries that are likely to be important, these results imply that when ε_{12} in (6) is large, the uniform change assumption is fairly accurate. Furthermore, liberalization occured over a fairly short period in the early 1980s, while our demand model is based on data covering a 20-year period. For both these reasons, the non-uniformity in fare and service attribute changes across markets, while crucial to estimating the impact of liberalization on supply-side behavior, is not expected to significantly distort our demand function.

Finally, implementation of this approach requires that service attributes be defined. In this research, we consider just one such attribute: accessibility. Loosely speaking, accessibility refers to the extent to which non-stop service is available in the market, and we measure it based on the set of U.S. gateways with such service. Non-stop service is considerably more convenient than service requiring connections or stops. Moreover, since even liberal bilateral agreements require government permission to establish gateways, accessibility can be treated as an exogenous variable. Other service attributes, such as frequency and load factor, also affect service quality and thus may influence demand to some degree. However, the magnitude of their effect is considerably less (for example, Hansen (1988) estimates that in the U.S. domestic market the incremental utility from the introduction of non-stop service is equivalent to that from an eight-fold increase in service frequency) and they are not exogenous, but rather simultaneously related to demand. We therefore decided to omit these other service attributes from consideration.

3. Demand for North Atlantic Air Travel

We modeled aggregate demand for both U.S. and non-U.S. citizens between the United States and five European countries: the U.K., France, West Germany, Netherlands, and Italy. We used a log-linear model with the specification

$$\begin{aligned}\log\left(PAX_{Cy}\right) = {} & \alpha + \beta_1 \log\left(YLD_{N\,Atl}\right) + \beta_2 \log(USENP) + \beta_3 \log\left(ACC_{Cy}\right) \\ & + \beta_4 \log\left(TRD_{Cy}\right) + \beta_5 \log(DOL) + \beta_6\, D86 + \bar{\theta}_{Cy}\, \overline{DCY}_{Cy} + \varepsilon\end{aligned} \tag{8}$$

Where

PAX_{Cy} is the annual passengers--U S citizens, non-U S citizens, or total--leaving the U S for country *CY*, where *CY* is one of the five countries listed above These data are reported by the U S Immigration and Naturalization Service

$YLD_{N\,Atl}$ is the average fare per mile, in 1989 $, for passengers flying in coach or economy class, for U S carriers The yield data were obtained from the Form 41 Traffic and Revenue Tables, provided on CD ROM from Data Base Products, Inc

USENP is the total annual domestic enplanements at U S airports, as obtained from the Federal Aviation Administration *Airport Activity Statistics*

ACC_{Cy} is the "accessibility" of service to country *Cy* from the U S , measured as the total annual domestic enplanements at U S airports that are gateways to this country (i e which have non-stop service to it) divided by *USENP*

TRD_{Cy} is the sum of annual exports and imports, in 1989 $, between the U.S and country *CY*

DOL is an index of the value of the U.S $ against a basket of foreign currencies, weighted according to the GDP of each country

D86 is a dummy variable equal to 1 when the year is 1986 and 0 otherwise.

$\overline{DCY}_{Cy}$ is a vector of country dummy variables used to capture unobserved factors that affect demand on a country-specific basis

The supply-side variables, $YLD_{N\,Atl}$ and ACC_{Cy}, are of primary interest in this model. The yield variable is, unfortunately, available only for the North Atlantic as a whole, and only for U.S carriers While it is unlikely that U S and foreign carriers would have significantly different yields in the same market, yield variation among countries is expected, particularly during the period of transition from restrictive to liberal bilaterals The resulting error-in-variables bias is expected to result in underestimates of the fare elasticities Potentially, there is a simultaneity problem as well, because higher traffic, by virtue of economies of density (Caves et al , 1985), results in lower average costs[2] However, because we are dealing with aggregate demand, the relation between traffic level and traffic density is considerably less pronounced, and we therefore treated yield as exogenous

The accessibility variable is included in the model because the disutility associated with changing planes, as well as the additional travel time resulting from stopovers, adds to the generalized cost of air travel The variable provides a rough measure of the probability that an air traveler can avoid these costs by having access to non-stop service Other dimensions of

[2] The effect of the simultaneity would be to upwardly bias the estimated fare elasticity Thus the simultaneity bias tends to offset the error-in-variables bias

service quality, particularly frequency of service, might also be considered, but we excluded them in order to avoid the problem of simultaneity bias resulting from the quantity of traffic affecting the quantity of flights Simultaneity is not considered a problem in the case of the accessibility variable, because in this case regulatory action, not traffic, is the determining factor

Equation (8) reflects the maintained hypothesis that the fare and accessibility elasticities of demand are the same for all five countries in the sample In the case of fare elasticities, this assumption is appropriate because of the use of an aggregate fare variable While one could, in principle, allow the fare elasticity to vary by country, interpretation of the results would be clouded by the question of whether elasticity differences derive from differences in demand functions, or (unobserved) differences in fare evolution in the different countries Since country-specific accessibility data are available, country-specific demand elasticities can be estimated for this variable This is done in Maillebiau (1993), and interesting differences in accessibility elasticities are in fact found However, since we find below that consumer benefit estimates are relatively insensitive to the accessibility elasticity, and since country-specific elasticity estimates have considerably larger standard errors, we employ the simpler single-elasticity model in this paper

The remaining variables in the model represent demand-side effects *USENP* is a measure of the propensity to travel by air in the U S The trade variable reflects the level of economic interaction between the U S and the different European countries Both of these are expected to exert a positive effect on demand *DOL* measures the strength of the U S dollar In periods when *DOL* is high, the cost of travel abroad is less for U.S citizens, while the cost of travel in the U S is higher for foreigners Thus the impact of *DOL* is expected to be opposite for the two types of passenger traffic considered in this analysis The *D86* variable represents the negative impact of the Chernobyl catastrophe and terrorist activity on U S travel to Europe in 1986

By including country dummy variables in the model, we are treating systematic country-to-country variation as fixed effects Some of the fixed effect may reflect long run impacts of other variables in the model (Abrahams, 1980) For example, the consistently higher levels of traffic to the U K may be partly a result of the consistently larger set of U S gateways to that country When such long-run effects are absorbed by the dummy variables, the impact of other variables may be underestimated This is clearly not a problem for the yield variable, because it is not country-specific While potentially a problem for the accessibility variable, we believe that it is not an very serious one, because traffic levels from new gateways seem to stabilize fairy quickly

The model was estimated using data for the years 1969-1989, which, with five country observations per year, provides 105 observations Statistically significant autocorrelation was observed when OLS was applied, and this was corrected using the Yule-Walker method The resulting estimates are shown in Table 1 The coefficient on yield is the fare elasticity estimate. It falls in the 0 8-0 9 range for U S , European, and total passengers This is toward the low end of the range of estimates, -0 8 to -2 0, cited in the recent survey by Oum, Waters, and Young (1992), perhaps reflecting a downward bias resulting from the error-in-variables problem discussed above The coefficient on accessibility may also be read as an elasticity--the percentage increase in traffic to a country resulting from a 1 per cent increase in the combined domestic market share of U S gateways to that country The estimated elasticity--again roughly the same for U S and European passengers--is 0 17, indicating that passengers are considerably less sensitive to accessibility than they are to fare

The estimated coefficients on the demand-side variables show greater differences between the U S and European market for North Atlantic travel Trade volume has a significant impact on European travel to the U.S , but not on travel from the U S to Europe Perhaps the dearth of trade-oriented travel on the U S side implied by this result indicates why the U S balance of trade fell during this period! The value of the dollar, as expected, correlates positively with European travel of U.S citizens and negatively with foreign travel in the U S , but the latter effect is much stronger Finally, the demand-suppressing impacts of the events of 1986 on U S -to-Europe travel are strongly evident

4. The Impact of Liberalization on Fares and Accessibility

We now turn to the question of how liberalization has affected the supply-side variables fares and accessibility We hypothesize that liberalization reduced fares both by increasing the level of fare competition and by introducing more efficient U.S domestic carriers into the North Atlantic market Further, we hypothesize that liberalization increased service accessibility in two ways--by expanding the sets of gateways specified in the bilateral agreements, and by encouraging airlines to serve new gateways as a competitive strategy

Yield Model

In assessing the impact of liberalization on yields in the North Atlantic, we face several obstacles The first is how to measure yield In the demand model, we used revenue per passenger-mile as reported by U.S airlines for their North Atlantic operations Such a measure is not adequate for the present purpose, because it does not allow comparisons between countries On the other hand, it is difficult to work with published fares because of the many different fare classes available, and the lack of a fixed relationship between any of these and the average fare While there is no completely satisfactory way out of this problem, we propose the discount fare as a reasonable proxy for average fare Our reasoning rests on the fact that as of 1989, 80 per cent of North Atlantic travelers flew on a discount fare, and that as of the late 1980s, average fares for non-discount passengers were 25-40 per cent higher than those for discount passengers These figures imply that at least 75 per cent of airline passenger revenue comes from discount fares With this in mind, consider how a percentage change in the discount fare would effect the average fare on a percentage basis First, if the change were part of a uniform percentage adjustment in all fares, then the change in discount fare is obviously an appropriate measure Second, if the discount fare increased while other fares were kept constant, the average fare increase would be 75 per cent of the discount increase assuming no change in the distribution of passengers among fare classes In fact, the experience in international markets has been that as discount fares have decreased relative to other fares, the proportion of passengers flying on these fares has increased [3] Thus the average fare would probably increase more than 75 per cent under the second scenario The remaining possibility, in which a discount fare increase is accompanied by a decrease in other fares, is the one in which the discount fare works least well as a proxy On the other hand, airlines have limited latitude to make such changes, in light of the low initial percentage difference alluded to above

Even within the discount category, several different fares may be published When this was the case, we chose the median discount fare for use in our analysis Since the range of discount fares is comparatively narrow, this is far less critical to our results

A second problem is defining liberalization in a sufficiently crisp way to be able to assess its effects econometrically To characterize the liberalness of the bilaterals, we focused on the clauses pertaining to fares and capacity Although other aspects of these agreements--for example, those pertaining to market entry, airline designation, and fifth freedom rights--can be more or less permissive, we considered them less critical determinants of competitive behavior, and also highly correlated, in terms of liberalness, with the fares and capacity clauses With respect to fares, an agreement is termed liberal if tariffs can only be invalidated with the concurrence of both countries, semi-liberal if the country-of-origin (but not the destination country) can do this unilaterally, and restrictive otherwise Capacity provisions are considered liberal if airline decisions in this regard are left outside government control, semi-liberal if control is limited to *a posteriori* response when an airline of one country does something to which the other country objects, and restrictive otherwise

[3] This may seem self-evident, but it must be remembered that the distribution of passengers among fare classes is partly under the control of the airline, who can limit the seats available in different fare classes

According to economic theory, true freedom in a market requires that firms be able to set both prices and quantity Thus, it is likely that the *combination* of fare and capacity liberalization will have a much greater impact than either one will separately We therefore defined a third liberalization variable intended to reflect whether the bilateral, taken as a whole, is liberal We defined a bilateral to be liberal when either (1) both the capacity and the fare clauses are liberal, or (2) one of the clauses is liberal while the other is semi-liberal We label this variable *LIBC* Hereafter, we will use the term "liberal" to describe a bilateral for which *LIBC*=1, or a country with which the U S has such a bilateral

Lastly, the logic of the diversion theory suggests that the "liberalness" of the bilateral between the U S and one European county may effect market conditions on routes to neighbors of that country Thus, one further liberalization variable was defined This variable, labeled *LIBN*, indicates whether a country that itself has a restrictive bilateral has a neighbor, defined as a country with a major airport within 500 miles of a major airport in the first country, with whom the U S has a liberal bilateral

Figure 1 shows the liberalization status of the U S bilaterals with the five European countries considered in this study With the exception of Italy, all the bilaterals shifted from a restrictive status to a liberal status (in the sense that *LIBC*=1) within a five-year period between 1978 and 1983 This creates a second potential problem Since the period of liberalization is so compressed, it may be difficult to separate liberalization impacts from the impacts of other events that may have influenced fares within this time period This creates a dilemma We can control for the time of observation by including dummy variables indicating the time of observation in the model To do so ensures that any factors other than liberalization influencing yields during this period are not absorbed into the liberalization coefficients On the other hand, we could forgo such controls, and thereby face the obverse benefits and risks

We therefore estimated two yield models, both log-linear, one with time dummies and one without, with the respective specifications

$$\begin{aligned}\log(YLD_{Rt\ Al}) &= \beta_0 + \beta_1 \log(DIST_{Rt}) + (\bar{\beta}_2 + \bar{\beta}_3\ DORG_{Rt})\ \overline{LIB}_{Cy} \\ &+ \beta_5\ DTYPEEU_{Al} + \beta_6\ DTYPEFF_{Al,Rt} + \beta_7\ DORG_{Rt} + \bar{\delta}_{Cy}\ \overline{DCY}_{Cy} + \bar{\gamma}\ \overline{DYEAR} + \varepsilon_1\end{aligned} \tag{9}$$

and

$$\begin{aligned}\log(YLD_{Rt,Al}) &= \beta_0 + \beta_1 \log(DIST_{Rt}) + (\bar{\beta}_2 + \bar{\beta}_3\ DORG_{Rt})\ \overline{LIB}_{Cy} + \beta_4 \log(FINDEX\ ) \\ &+ \beta_5\ DTYPEEU_{Al} + \beta_6\ DTYPEFF_{Al,Rt} + \beta_7\ DORG_{Rt} + \bar{\delta}_{Cy}\ \overline{DCY}_{Cy} + \varepsilon_2\end{aligned} \tag{10}$$

where.

$YLD_{Al\,Rt}$	is the median discount fare per mile, in 1989 \$, either westbound or eastbound, offered on route Rt by airline Al The fares were obtained from the Official Airline Guide, Worldwide Edition
$DIST_{Rt}$	is the great circle distance of the route, in miles
$\overline{LIB}_{Cy}$	is a vector containing the variables *LIBC* and *LIBN*
$DORG_{Rt}$	is a dummy variable set to 1 if the fare is for travel originating in the U S and 0 if the fare is for travel originating in Europe
FINDEX	is an index of inflation-adjusted yield for airlines belonging to the International Air Transport Association
$DTYPEEU_{Al}$	is a dummy variable set to 1 if airline Al is European and 0 otherwise
$DTYPEFF_{Al\,Rt}$	is a dummy variable set to 1 if airline Al is a fifth freedom carrier on Rt and 0 otherwise
$\overline{DCY}_{Cy}$	is a vector of dummy variables, corresponding to the five nations considered in our study, indicating the European destination of the route
$\overline{DYEAR}$	is a vector of dummy variables indicating the year of the observation

The direction of origination variable, *DORG,* is included to capture differences in the fares offered to U S and European-originating passengers Such differences could result from differences between the U S and European ticket distribution systems, or in the brand loyalties of U S and European travelers In addition to directly influencing yields, these differences could affect the impact of liberalization on yield, the model allows for either possibility

The distance variable captures economies of stage length, whereby the cost per unit distance decreases as fixed terminal costs are spread over more distance units

The fare index variable *FINDEX* is used in place of time dummies in the second variant of the model This variable captures changes in yields for the world airline industry as a whole To the extent that observed changes in yield in the North Atlantic follow industry wide trends, the changes are unlikely to be caused by liberalization One problem with the fare index is that it is influenced by fares in the North Atlantic that it is being used to explain However, since North Atlantic traffic is a fairly small fraction of the worldwide total, this simultaneity is not considered to be a major problem

The European and fifth freedom dummy variables capture differences among the airlines offering service in the North Atlantic These categories are not mutually exclusive a European carrier can operate fifth freedom routes between the U.S and another European country The European dummy in included to capture cost effects, since European airlines typically have higher cost structures than U S airlines The fifth freedom variable captures both service quality effects and differences is pricing strategy [4] A fifth freedom airline may offer schedules poorly suited to the local market, and may perceive local traffic as "gravy" from which only variable costs need to be recovered

The national dummy variables capture yield differences among countries that are not tied to liberalization It is important to include these because the same countries that pioneered liberalization with the U S may have also had a lenient policy toward pricing (and capacity) under the prior, more restrictive bilateral It is necessary to control for this to ensure that the coefficients on the liberalization variable reflect the impact of liberalization and not the pre-existing policies of countries adopting liberalization

The fare model was estimated on a data set consisting of 187 observations, covering the four years 1974, 1979, 1984, and 1989, and equally divided among the five European countries considered in our study Observations for a given year and country were selected at random The initial estimates revealed that the directional coefficients were all insignificant, and the directional variables are therefore removed from the models presented here The liberalization variable, *LIBC*, is statistically significant in both versions of the model, and as anticipated, larger when time dummies are excluded These models respectively imply that liberalization causes reductions in discount fares of 35 and 45 per cent [5] Also as anticipated, the models indicate that neighbors' liberalization reduces fares, by 27 per cent in the first model and 42 per cent in the second This effect is statistically significant only in the latter model, however

Other model results are generally as expected Notable findings are that discounts fare to Netherlands were, on average, 43 per cent less than those to other European countries, that after falling sharply in the late 1970s, discount yields have climbed upward since 1984, increasing 33 per cent in the subsequent 5 years,[6] and that fifth freedom carriers do, on average, tend to charge lower fares Finally, it is interesting that yields in the North Atlantic follow trends in IATA average yields, but in a more pronounced way--a 1 per cent change in the latter is estimated to lead to 2 per cent change in the former Perhaps this reflects the dampening effect of restrictive bilaterals and other checks on competitive behavior that continue to be the norm in most of the markets in which IATA carriers operate

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[4]A fifth freedom airline on a route is one from a country other than the ones connected by the route Fifth freedom carriers in the North Atlantic are typically from the Middle East and Indian Subcontinent, and serve the routes in order to link North America and their home regions

[5]These are calculated as $100\ (1-e^{-0\,44})$ and $100\ (1-e^{-0\,62})$ respectively

[6]Below, in Section 7, we argue that this increase can be interpreted as evidence of declining impact of liberalization on fare levels

There remains the question of which model to accept in the subsequent analysis We have argued that the first model, by absorbing some of the impact of liberalization into the time dummy variables, will tend to underestimate the impact of this policy Nonetheless, this model suggests a very strong impact, while the impact estimated in the second model seems almost implausibly large We thus adopt the conservative approach and accept the first model as the preferred one

Accessibility Model

We now turn to the impact of liberalization on accessibility, as defined in the previous section To determine this impact, we used a simple log-linear model

$$\log\left(ACC_{Cy}\right) = \alpha + \beta_1 \; LIBC_{Cy} + \beta_2 \; LIBN_{Cy} + \beta_3 \; \log(USENP) + \beta_4 \; \log(TRD_{Cy}) + \bar{\theta}_{Cy} \; \overline{DCY}_{Cy} + \varepsilon \qquad (11)$$

Where

ACC_{Cy}	is the "accessibility" of service to country *Cy* from the U S , measured as the total annual domestic enplanements at U S airports that are gateways to this country (i e which have non-stop service to it) divided by *USENP*
$LIBC_{Cy}$, $LIBN_{Cy}$	are variables indicating liberalization and liberalization of neighbors
USENP	is the total annual domestic enplanements at U S airports, as obtained from the Federal Aviation Administration *Airport Activity Statistics*.
TRD_{Cy}	is the sum of annual exports and imports, in 1989 \$, between the U.S and country *CY*
$\overline{DCY}_{Cy}$	is a vector of dummy variables, corresponding to the five nations considered in our study, indicating the European destination of the route

This model implies that the number of gateways is determined by liberalization variables and by the propensity to travel between the U S and the other country The liberalization effect is actually threefold First provisions of the bilateral designate which routes, and consequently which gateways can be served Our liberalization variables do not directly concern these provisions of the bilateral, but there is strong correlation between liberal capacity and pricing and permissive route designations Second, by increasing competition, liberal bilaterals encourage airlines to develop new routes where competition, at least initially, may be less fierce Third, by reducing fares, liberal bilaterals increase the number of routes with economically viable traffic densities Although these mechanisms are conceptually distinct, it is difficult to isolate them empirically, and we do not attempt to do so in the above model

We estimated the model using annual data for the years 1970-1989 and for each of the five European countries considered throughout this study The trade and enplanement variables were found to be insignificant--apparently the impact of liberalization on traffic overwhelms these other factors Thus our preferred model, summarized in Table 3, contains only liberalization and national dummy variables According to this model, liberalization had a pronounced impact on service accessibility, increasing it by 55 per cent (e^{439}) The success of the diversion theory is also evident, since liberalization of a neighbor's bilateral increased accessibility 38 per cent (e^{319})

4. The Impacts of Liberalization on Demand

The results of the previous two sections can be used to estimate how liberalization has affected the demand on the North Atlantic air routes Before presenting these estimates, we reiterate their limitations First, they do not explicitly take substitution effects into account We have argued in Section 2 that our demand elasticities implicitly and approximately reflect substitution effects however Since substitution is not explicitly considered, our estimates of impact refer to the entire set or liberalizing events that occurred, not to the liberalization in a particular market That is, we cannot estimate how demand to, say, Germany would be different if the bilateral with that country were restrictive, all else being equal We can--subject to our various caveats--estimate how demand to Germany would be different if *none* of the bilateral liberalizations had occurred

Second, our estimates of demand impact consider only impacts stemming from the impact of liberalization on fares and service accessibility Other service quality dimensions, most notably service frequency and load factor, are not considered We have explained these omissions in Section 2, but our results from Section 4 point to one other justification The large impact of liberalization on accessibility suggests that most if not all of the increase in flights resulting from liberalization took the form of increases in the number of routes rather than in the frequency of service on routes

Table 4 presents estimates of the impacts of liberalization on demand for the year 1989 Since all three models are log-linear, these estimates are easy to calculate For a country with a liberal bilateral agreement (termed a "liberal country", and including France, Germany, Great Britain, and the Netherlands) in Table 4, we assume that yields are 35 per cent less and accessibility is 55 per cent greater because of liberalization For Italy, the only one of the five countries considered with a restrictive bilateral, but with liberal neighbors, we assume yields to be 28 per cent less and accessibility to be 38 per cent greater as a result of liberalization

Applying the yield and accessibility elasticities (-0 86 and 0 17, respectively) from the total traffic version of the demand model, we calculate the demand-side impacts of these supply-side changes After using these parameter values to derive our baseline estimates, we performed sensitivity testing by reducing each estimated parameter in turn by its standard error

Overall, liberalization is estimated to have increased traffic between the U.S and the five European countries by 56 per cent For the countries with liberal bilaterals, the increase is 57 per cent, while for Italy it is 39 per cent The dominant component of the increase is that from reduced fares With this impact alone, traffic would be 48 per cent greater The accessibility improvements add another 8 per cent to the demand level Also, as a result of the multiplicative nature of the model, the impact of the yield and accessibility changes together are somewhat more than the sum of the separate impacts Although more an artifact of the model than a true finding, this synergy is certainly reasonable, since increases in accessibility can be supposed to expand the pool of potential North Atlantic travelers who may respond to a reduction in fares

The largest source of uncertainty in these results is the impact of liberalization on fares When the coefficients measuring this impact (those on *LIBC* and *LIBN* in the yield model) are reduced to one standard error below their estimated values, the demand impact of liberalization falls from 56 to 36 per cent The fare elasticity is also a significant source of uncertainty When it is reduced by its standard error, the estimated demand impact of liberalization falls to 45 per cent In contrast, the accessibility effects introduce little uncertainty into the overall estimates, with estimated demand impacts falling just 2-3 per cent under the low accessibility impact and low accessibility elasticity scenarios This insensitivity derives both from the relatively low accessibility elasticity and from the low standard errors of the supply-side and demand-side accessibility coefficients

5. The Impacts of Liberalization on Consumer Welfare

The impacts of liberalization on consumer welfare were estimated by calculating the change in consumer surplus arising from reduced yields and improved accessibility The fact that both of these supply-side changes enter into the calculation required some adjustment to the usual procedure If only the yield had been affected, shifting from P_1 to P_2, then, assuming a constant elasticity demand function $Q(P) = \alpha P^{-\beta}$, the change in consumer surplus would be

$$\Delta CS = \int_{P1}^{P2} Q(p)dp = \frac{\alpha(P_1^{-\beta+1} - P_2^{-\beta+1})}{-\beta+1} \qquad (12)$$

In our case, we have a constant elasticity demand function with two arguments, $Q(P,A) = \alpha P^{-\beta} A^{\gamma}$, and have found that both arguments have been affected by liberalization

Letting their values with and without liberalization be (P_1,A_1) and (P_2,A_2) respectively, we might try to measure the resulting change in consumer surplus as

$$\Delta CS = \int_{P2}^{\infty} Q(p,A_2)dp - \int_{P1}^{\infty} Q(p,A_1)dp \tag{13}$$

Unfortunately, one can see from equation (12) that the integrals in (13) do not converge when $\beta \leq 1$ Recalling that our estimate for this parameter is 0 86, another approach is needed.

Consider the function $G = P \quad A^{-\frac{\gamma}{\beta}}$ The demand function $Q(G) = \alpha G^{-\beta}$ is exactly equivalent to the two-argument demand function specified above Thus, by substituting G in place of P in equation (1) we can calculate the change in consumer surplus from any combination of changes in yield and accessibility The function G is not, however, unique in this respect any scalar multiple of G has the same properties The choice of scalar multiple amounts to a choice of a reference market, in terms of which dollar values will be measured In setting this multiple at unity, we adopt as a reference a hypothetical market in which the values of the accessibility variable is also unity Thus, when we say that the generalized cost in a transatlantic market has the value g, we mean that the combination of price and accessibility in that market is equally attractive as a combination in which the price is g and the accessibility is 1 Similarly, changes in generalized cost as measured below are equivalent to changes in monetary cost in the perfectly accessible market

One further complication is that, since the change in consumer surplus depends on the absolute change rather than the percentage change in G, we need to estimate country-specific average yield levels To do this, we begin with the known average yield for the North Atlantic as a whole We next use the yield model to estimate the average yield for each country up to a scale factor[7] Using the passenger-miles of traffic between the U S and each country, we compute the scale factor necessary to arrive at the known North Atlantic average yield Since we know the accessibility for each country, and have estimates of how yield and accessibility are affected by liberalization, we have the two pairs of (P,A) values required for estimating the change in consumer surplus

Table 5 contains the results Overall, we estimate that liberalization resulted in consumer benefits of \$5 1 billion, or \$585 per traveler, in 1989 Average benefits are about 30 per cent greater for the countries with liberal bilaterals, but the impact on Italian travelers in

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[7]To make this calculation, we assumed that the ratio of average to discount yield is the same for each country This is probably not very accurate, particularly in the case of Netherlands whose discount yields were found to be significantly lower than those of the other countries However, when we used a different approach that assumed the same average yields for all liberalized countries, benefit estimates were virtually unchanged

nonetheless substantial, averaging $440 The aggregate estimate is of the same order of magnitude as that obtained by Morrison and Winston for U.S deregulation, but the average benefit per traveler is considerably larger For long-haul (2,500-2,999 miles one-way travel distance) markets, the Morrison-Winston estimate (1986, p 34), in 1989 currency, is $180 [8]

Both fare and accessibility impacts make sizable contributions to the overall gain in consumer surplus The benefit is about 35 per cent greater than it would be if only yields had been affected Thus, accessibility gain plays a more important role in generating benefits than it does in inducing traffic This is because we are measuring the *change* in consumer surplus, as opposed to the *overall volume* of traffic Further, the reduction in generalized cost arising from accessibility gains contributes to the surplus of all users of the system, while only effects on marginal travelers are reflected in the change in traffic level

The impact of liberalization on yields is the primary source of uncertainty in these benefit estimates, just as it was in the estimates of demand impact If the fare impacts of liberalization are reduced by their standard errors, estimated benefit drops 40 per cent On the other hand, because the standard errors on the accessibility impacts are quite small, they introduce very little uncertainty into the benefit estimates

Through a fortuitous coincidence, the low fare impact scenario presented in Table 5 has a special interpretation Recall that the yield model indicates a fairly steep increase in yield between 1984 and 1989 Since no country had a change in liberalization status (as defined for purposes of the yield model) over this period, at least part of this increase could be interpreted as a lessening over time of the yield reductions stemming from liberalization To roughly estimate what part, we compared the 1984-89 yield increase estimated by our yield model with that for IATA average yields over the same period If we assume that the "excess" yield increase observed in our data (as compared with the IATA increase) represents a diminishing effect of liberalization on yields, we can compute this diminished effect for the year 1989 This turns out to be very close to the effect assumed under the low fare impact scenario in Table 5

The sensitivity of benefits to the fare and service elasticities goes in opposite directions A lower fare elasticity leads to a higher estimate of benefits If demand were less fare-elastic (as represented by the line D' in Figure 2), it would be higher under the non-liberalized fare scenario, and more passengers would benefit from the fare reduction associated with liberalization Thus the consumer surplus gain from a reduction in generalized cost from P1 to P2 would increase from the area P1-A-C-P2 to area P1-B-C-P2 The same logic does not, however, apply in the case of the accessibility elasticity Since generalized cost is

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[8]Their results are given in 1977 dollars, which we converted using a multiplier of 2 04 (the ratio of the CPIs for these two years) Of the $88 total, $84 is from fare reduction and $5 is from reduced travel time A reduction in service frequency results in a $1 disbenefit

measured in dollar units, a reduction in the accessibility elasticity simply translates into a smaller generalized cost decrease

6. Conclusions

Liberalization of the North Atlantic air transport market, like its antecedent, U S domestic deregulation, has resulted in substantial increases in demand and benefits to travelers Our baseline estimate of traffic growth arising from liberalization is 56 per cent, and of benefit is $585/traveler These impacts stem largely from a reduction in yield of 35 per cent, although a 44 per cent increase in accessibility also played a significant role

In the last section, we argued that the yield impact of liberalization may have diminished over time If that argument is accepted, then impacts of liberalization are time specific For the year 1989, estimates of traffic growth and benefit that reflect diminished yield impact are 37 per cent and $349 per passenger We consider these impact estimates the more prudent ones

Even our prudent benefit measure is twice that estimated by Winston and Morrison for long-haul passengers from U S domestic deregulation There are several possible reasons for this First, the North Atlantic passenger trips are naturally much longer and thus more expensive on average than even long haul domestic trips The same percentage price reduction will therefore result in a greater benefit to North Atlantic travelers Second, the performance of the North Atlantic market prior to liberalization was considerably worse than that of the domestic market Under the guidance of IATA, participants in this market acted much more as a cartel than did the U S domestic industry Further, transoceanic carriers, lacking any significant intermodal competition, could exploit a more captive market Finally, the North Atlantic market, being smaller and lower density than the U S domestic one, had more to gain from economies of density This impact is apparent in the contribution of accessibility gains to the overall impact It may also play an implicit role by reducing unit costs and thereby allowing the sharp fare reductions observed in this market Finally, the Winston and Morrison estimates reflect mode shifts only, and not the additional consumer surplus associated with induced demand

Our results shed a somewhat different light on the diversion theory that guided U.S bilateral strategy in the late 1970s We have found that a liberal bilateral with a given country affected fares and accessibility in neighboring countries even when the bilaterals with these countries remained restrictive Thus the diversion strategy does not depend upon bilateral liberalization *per se* to be effective--it can also produce its intended consequences through increased permissiveness of government regulators under a nominally restrictive regime The situation is similar to that in the U S prior to the Airline Deregulation Act, when the Civil

Aeronautics Board relaxed restrictions on entry, exit, and pricing so much that the legislation itself had minimal impact

We have not considered how liberalization affected producer surplus It seems highly unlikely that airline profits increased as a result of liberalization, as Morrison and Winston found they did as a result of deregulation Traveler benefits as high as we have estimated must have come out of the hides of the airlines to some extent Nonetheless, major U S carriers have continued to push for entry into the North Atlantic market, in some cases playing large sums for this privilege This is clear evidence that the market is perceived, at least by some airlines, to be profitable

Our finding, admittedly tentative, that the impact of liberalization have decreased over time bears further comment On the one hand, this could be interpreted to mean that airlines initially overreacted to the liberalized environment, and subsequently made individual adjustments in order to restore profitability Alternatively, the adjustment could instead consist of new ways of reducing competitive pressures through informal cooperation as well as the formation of international alliances Certainly, the latter have become increasingly important in recent years, and there is evidence (Youssef, 1991) that they result in higher fares in markets where the alliance partners formally competed As barriers to cross-national airline ownership diminish, there is the prospect that such alliances will proliferate, become tighter, and perhaps evolve into full blown mergers From this perspective, the period analyzed in this study may be unique, a time when government checks on airline competition were lifted, but before the airlines were able to establish their own

As industry has adjusted, U S government policy has retrenched Since the early 1980s, the U S commitment to liberalization has turned from the idealistic crusade articulated in the introduction by Alfred Kahn, to a far more pragmatic approach in which air rights are used as an instrument of foreign policy, and in which care is taken that further moves toward liberalization (permitting cabotage, for instance) are "fair" to U S carriers Indeed, the U S has adamantly refused to include air transport in the GATT process, preferring to maintain the bilateral process rather than be placed in the position of "trading fishing rights for air rights" in the words of a DOT official At the same time, by allowing increased levels of foreign ownership of U.S carriers, U S policy appears to be encouraging the transnational consolidation described above These various actions reveal a policy that is restrictive in some contexts, and permissive in others, but unified in its focus on furthering the interests of the U S carriers Indeed, as this paper is written, a committee has been formed to determine how to "save" the U.S airline industry While the national interests triggering these policy shifts may be real, the blessings to consumers brought by Kahn's deregulatory idealism must not be forgotten

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Table 1.
Demand Model Results

Dependant variable log(US-European country passengers) Estimated coefficients (standard errors)

Variable	Total traffic	U S traffic	European traffic
Constant	1 722 (1 627)	1 893 (1 902)	2 092 (2 001)
$YLD_{N\,Atl}$ (¢/mile)	-0 861 *** (0 167)	-0 868 *** (0 188)	-0 915 *** (0 194)
ACC_{Cy} (no dimension)	0 168 *** (0 048)	0 170 *** (0 054)	0 165 *** (0 056)
USENP (enplanements)	0 533 *** (0 134)	0 618 *** (0 152)	0 528 *** (0 158)
TRD_{Cy} (U S $89)	0 156 (0 096)	-0 044 (0 112)	0 294 ** (0 118)
DOL (Index=100 in 1970)		0 062 (0 107)	-0 539 *** (0 112)
D86	-0 138 *** (0 033)	-0 217 *** (0 037)	
D_{France}	-1 058 *** (0 096)	-1 199 *** (0 105)	-0 942 *** (0 117)
$D_{Germany}$	-0 871 *** (0 079)	-0 775 *** (0 084)	-0 993 *** (0 097)
D_{Italy}	-1 242 *** (0 108)	-1 201 *** (0 119)	-1 455 *** (0 131)
$D_{Netherlands}$	-1 510 *** (0 109)	-1 705 *** (0 121)	-1 338 *** (0 133)
Number of observations	105	105	105
R^2	0 988	0 984	0 986
Autoregressive parameter	0 668 *** (0 076)	0 657 *** (0 079)	0 696 *** (0 075)

* Significant at the ten percent level
** Significant at the five percent level
*** Significant at the one percent level

Table 2
Yield Model Results

Dependant variable log(yield) (¢89/Mile)	Estimated coefficients (standard errors)	
Variable	With time dummies	Without time dummies
Constant	1 082	1 409
	(1 776)	(1 760)
$LIBC_{Cy}$	-0 436***	-0 616***
	(0 153)	(0 099)
$LIBN_{Cy}$	-0 318	0 541***
	(0 211)	(0 137)
$DIST_{Rt}$	-0 348*	-0 363*
	(0 199)	(0 199)
$D_{Germany}$	0 117	0 109
	(0 090)	(0 088)
$D_{Netherlands}$	-0 556***	-0 558***
	(0 094)	(0 094)
D_{France}	-0 136	-0 138
	(0 088)	(0 088)
D_{Italy}	-0 189	-0 332**
	(0 144)	(0 111)
$DTYPEEU_{Al}$	0 053	0 065
	(0 063)	(0 059)
$DTYPEFF_{Al\,Rr}$	-0 375*	-0 358
	(0 194)	(0 194)
D1974	0 460***	--
	(0 142)	--
D1979	0 061*	--
	(0 120)	--
D1984	-0 290***	
	(0 069)	
FINDEX	--	2 057***
	--	(0 346)
Number of observations	187	187
Adjusted R^2	0 640	0 639

* Significant at the ten percent level ** Significant at the five percent level
*** Significant at the one percent level

Table 3
Accessibility Model Results

Dependant variable log(country accessibility)
(no dimension)

Variable	Estimated coefficients (standard errors)
Constant	-1 054 *** (0 114)
$LIBC_{Cy}$	0 439 *** (0 085)
$LIBN_{Cy}$	0 319 *** (0 089)
D_{France}	-0 422 *** (0 148)
$D_{Germany}$	-0 375 ** (0 148)
D_{Italy}	-1 054 *** (0 148)
$D_{Netherlands}$	-0 359 ** (0 154)
Number of observations	100
Adjusted R^2	0 877
Auto-regressive parameter	0 607

* Significant at the ten percent level
** Significant at the five percent level
*** Significant at the one percent level

Table 4

1989 North Atlantic Traffic (000) Under Alternative Liberalization Scenarios

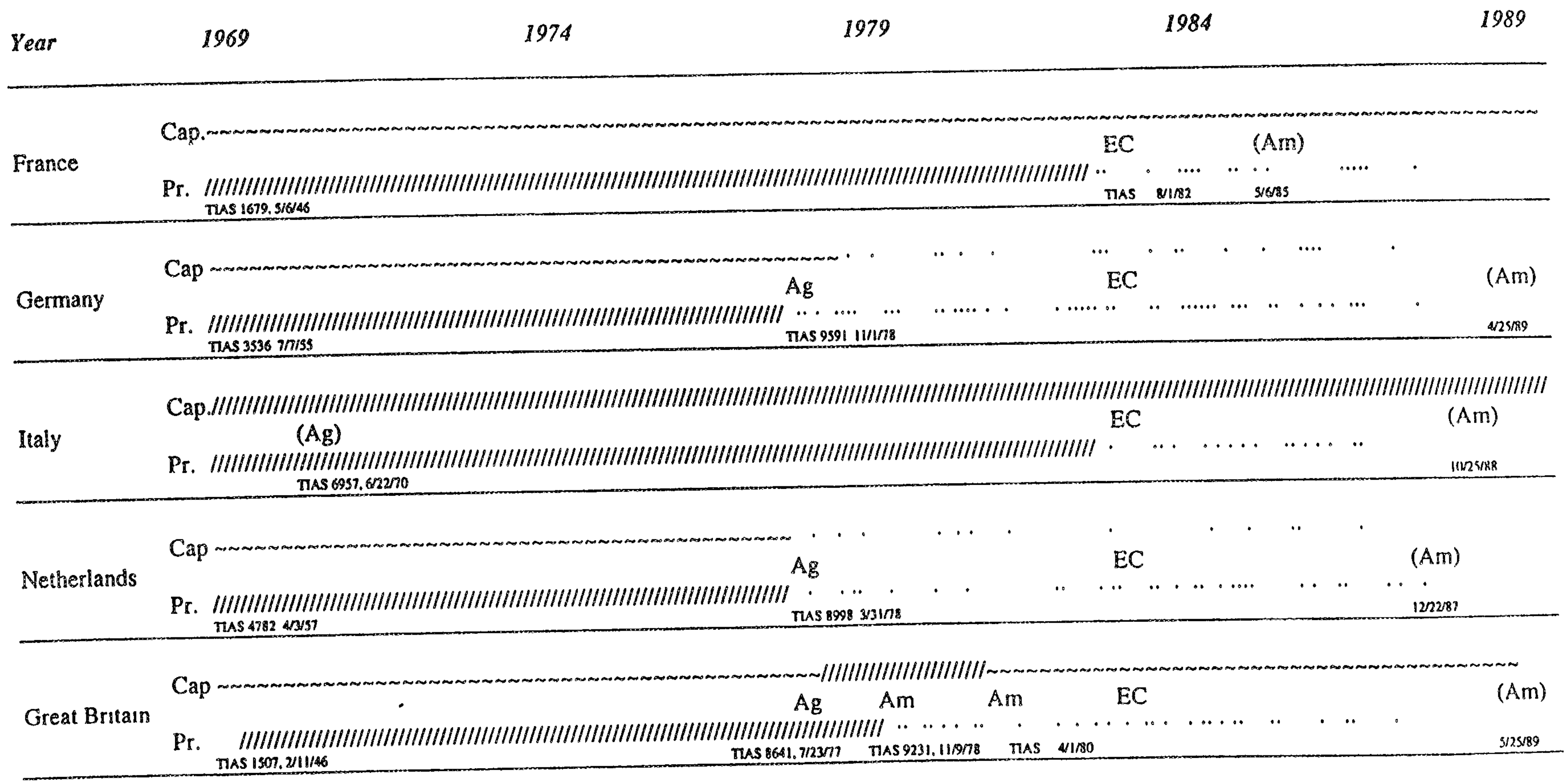
Destination	Actual	Accessibility Impacts Only	Fare Impacts Only	No Liberalization	Growth Due to Liberalization
Baseline					
LIBERALIZED	8100	5565	7524	5169	57%
ITALY	681	518	645	491	39%
TOTAL	16881	11648	15694	10829	56%
Low Fare Impact					
LIBERALIZED	8100	6348	7524	5897	37%
ITALY	681	621	645	589	16%
TOTAL	16881	13318	15694	12383	36%
Low Accessibility Impact					
LIBERALIZED	8100	5565	7632	5244	54%
ITALY	681	518	655	498	37%
TOTAL	16881	11648	15920	10985	54%
Low Fare Elasticity					
LIBERALIZED	8100	5985	7524	5560	46%
ITALY	681	546	645	518	32%
TOTAL	16881	12516	15694	11637	45%
Low Accessibility Elasticity					
LIBERALIZED	8100	5565	7684	5279	53%
ITALY	681	518	655	498	37%
TOTAL	16881	11648	16024	11057	53%

Table 5

Consumer Benefit Estimates under Alternative Scenarios

Destination	Benefits (Million $1989)	Benefits per Traveler ($1989)
Baseline		
LIBERALIZED	4836	597
ITALY	300	441
TOTAL	5137	585
Fare Impacts Only		
LIBERALIZED	3591	443
ITALY	216	318
TOTAL	3807	434
Accessibility Impacts Only		
LIBERALIZED	358	44
ITALY	21	31
TOTAL	379	43
Low Fare Impact		
LIBERALIZED	2951	364
ITALY	116	170
TOTAL	3067	349
Low Accessibility Impact		
LIBERALIZED	4611	569
ITALY	282	414
TOTAL	4893	557
Low Fare Elasticity		
LIBERALIZED	5065	625
ITALY	330	485
TOTAL	5396	614
Low Accessibility Elasticity		
LIBERALIZED	4335	535
ITALY	257	378
TOTAL	4592	523

Figure 1
Capacity and pricing clauses in various
US bilateral agreements



EC US-ECAC Agreement Ag Bilateral Agreement Am Amendment to a bilateral agreement
(.) Agreement that does not affect capacity and pricing clauses

. . . Liberal clause ~~~~ Semi-liberal clause ////// Restrictive clause

Figure 2
Impact of Lower Pnce Elastıcıty on Benefit