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SOME REGULATORY AND INSTITUTIONAL BARRIERS TO CONGESTION PRICING AT AIRPORTS

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I. Introduction

The growing demand for air transportation of people and freight over the last decade has not been matched by a commensurate growth of airport capacity.[1] Demand for landing and takeoff slots today exceeds supply at key airports, resulting in persistent congestion. Various federal regulations together with past practices at some airports prevent airports from raising landing fees in order to reduce demand during peak periods. As airport congestion continues to increase, travel times have lengthened and uncertainty about travel schedules has increased.[2] Airports are one part of the complex network of the national air system. Airport congestion problems are, in a very real sense, pushed into the air as air traffic control operations must delay and re-route incoming flights. A seemingly minor incident of demand outstripping supply at a major airport can infect large parts of the airport and airways system with delays.[3] In addition to the observable costs of lost time and unproductive delays, there are unobservable costs as well. Congestion at airports is a national economic concern because it is a drag on the growth of the productive capacity of the economy, and it has the potential to become worse in the future.

Airport and airways congestion is a complex problem and it has been argued that there are a number of dimensions of the airport and airways system that are in need of reform. These proposed reforms include encouraging private ownership and management of airports, reforming and/or privatizing the air traffic control (ATC) system, and implementing cost-based charges for ATC users. Airport congestion pricing could be an important part of an overall solution to airport and airways congestion, but could also act as a remedy in the absence of other reforms. *The purpose of this report is to identify and describe some of the regulatory and institutional barriers to the implementation of congestion pricing by airports and offer suggestions that could reduce these barriers.*

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[1] During the 1990s, only one new runway was opened at a commercial airport on the East Coast of the United States. (Federal Aviation Administration, Office of Associate Administrator for Airports, Top 100 Airports, New Runways Opened, November 2000.) Although airports can increase capacity through a variety of methods, runway capacity is often looked upon as a primary indicator of capacity and capacity expansion.

[2] Some evidence of increasing congestion is included in the appendix.

[3] Agam Sinha of the Mitre Corporation has shown an example where a minor incident of excess demand at Newark Airport causes twenty minute delays for 250 aircraft as far away as Chicago.

The use of congestion pricing by airports to establish their landing fees could reduce airport congestion during peak-periods, providing travelers with improved service and reducing the uncertainty that congestion imposes on travel schedules. Moreover, the value of the certainty that a flight could depart and land at its scheduled times, as reflected in market clearing landing fees, would provide both a signal and resources for expansion of capacity by congested airports.

Congestion pricing is used successfully in many sectors of the economy including telecommunications, electricity, hotels, advertising and other modes of transportation. Airlines use peak-load pricing in allocating seats on planes scheduled to fly during high demand periods. The Port Authority of New York and New Jersey, which also operates La Guardia Airport, recently implemented a peak-pricing plan for use of the George Washington Bridge.[4] However, congestion pricing is not used at any U.S. airport.

Beyond the regulatory hurdles discussed in this report there may be challenges in designing and implementing congestion pricing plans. These challenges may include the possibility of airports abusing their market power, air carriers attempting to use the system to dominate markets, and the need to provide reasonable accommodations for small and under-served communities and general aviation. While a detailed discussion of implementation issues is outside the scope of this report, these are important issues and merit serious study.

Federal regulations permit airports to charge three different types of fees: fees for landing facilities, fees for other aeronautical facilities, and fees for non-aeronautical facilities and services.[5] This report is concerned only with regulations that affect landing fees. Airport landing fees are assessed on the basis of aircraft weight and are typically neither time-of-day nor congestion dependent. In principle, landing fees at a self-sustaining airport are determined by dividing the annual cost of operating the aeronautical facilities (the cost base) by the total weight of the airplanes expected to use the facility during the year. Landing fees are collected from users on the basis of aircraft weight, and annual revenues are generally prohibited from exceeding the cost base. Under the current legal

[4] New York Times, January 5, 2001. Public Notice, p. A11.

[5] Airfield fees include charges to land a commercial carrier at an airport. Non-airfield aeronautical fees include charges for use of the airport's maintenance facilities and passenger terminals. Non-aeronautical fees include charges for facilities and services that are not related to essential airport services.

and regulatory framework, airlines have nearly complete discretion over the scheduling of flights. When demand for runway time exceeds the physical and technological capacity of an airport, the scarce resource is allocated using a first-come first-served queue.

During congested periods at airports each additional takeoff or landing imposes indirect costs on other airport users. These costs include, but are not limited to, the value of time air travelers waste as a result of increased congestion. Today, airport landing fees are not permitted to reflect the cost of congestion and other externalities and therefore contribute to the problem of airfield facilities becoming congested during peak periods.

Broadly, U.S. commercial airports are subject to safety, environmental and economic regulation by the Federal Government. A number of economic regulations inhibit the economically efficient operation of the national air system by impeding the introduction of airport landing fees that reflect the cost of congestion. An institutional arrangement, long-term agreements with carriers using the airfield that prevent the airport from unilaterally changing the landing fee structure, also inhibits the introduction of congestion pricing systems at certain airports.

II. Congestion Pricing at Airports

In a market economy prices serve two purposes. In the short-run, when capacity (or supply) is fixed, they serve to allocate scarce resources efficiently. An efficient allocation ensures that scarce resources go to their highest valued use, and that the efficient quantity is consumed. In the long-run, prices act as a signal to capital markets to invest where return is highest, thus ensuring that firms' investments in capacity yield the greatest return.

When price is not used to allocate scarce resources another allocation mechanism must be used. Non-price mechanisms include random allocation, queuing, and administrative rationing – whereby a centralized authority determines who is best suited to receive the scarce resource. The non-price mechanism most widely used at U.S. airports is queuing. In lieu of using prices to ration scarce runway access during peak hours of the day at congested airports, allocation is accomplished using flight delays, and cancellations. Using prices to allocate scarce runway access could reduce congestion at individual airports, improve efficiency by allocating peak-period access to those flights that value it

most highly, shifting other flights to more attractively priced off-peak periods, and provide market-based signals as to where the need to expand capacity is greatest.[6]

While congestion pricing at airports could take many forms, we summarize two general approaches in order to illustrate how they might operate to reduce congestion at currently congested airports. Either system could be effective in reducing airport congestion.[7] In either approach the goal would be to permit market determined prices to induce airlines to schedule an efficient number of flights into and out of an airport based on its physical and technological capacity.

The first approach would set prices administratively to balance airport capacity with demand for runway access. Prices would reflect the additional costs imposed on other users because of increased congestion by flights landing during peak-periods. Landing fees would be higher at times when demand exceeded the availability of landing slots and lower at other times. An airport could adjust landing fees periodically in response to market conditions.

The second pricing approach, an auction, would allow airports to periodically auction a fixed number (equal to each airport's capacity) of landing and takeoff slots to the highest bidders. For example, an airport (in conjunction with the FAA) could determine its per quarter hour takeoff and landing capacity and a competitive bidding process for takeoff and landing slots among air carriers could determine fees during each period. Such an auction would be complicated by the fact that each airport is part of a network; the value of each carrier's use of an airport depends on its use of other airports.

In principle, auctions and administrative pricing are both effective methods airports could use to reduce peak-period demand and improve efficiency. In terms of implementation each method has strengths and weaknesses. For both methods, however, it is likely that the implementation costs will be small relative to the potential gains. Administrative pricing, while relatively simple to implement, provides less certainty about congestion levels than auctions. Auctioning take-off and landing slots provides greater certainty about congestion levels, but entails a more complex design and may be more

[6] Airports may not be fully responsive to price signals in part because they often face environmental and other hurdles to capacity expansion.

[7] The purpose of this section is not to discuss which approach is superior. Both approaches could be effective and the choice of approach would depend on regulatory concerns and an airport's specific situation.

costly to operate than an administrative pricing system.[8] As will be discussed in greater detail below, there may be fewer regulatory hurdles to implementation of administratively set congestion prices.

Whether congestion prices are set administratively or take-off and landing slots are auctioned, such a pricing system could include safeguards to prevent airports from abusing their market power, discourage carriers from using the system to attempt to dominate markets, and provide reasonable accommodations for small and under-served communities and general aviation. The implementation of either system to allocate scarce runway access could result in reduced congestion as some flights shift to more attractively priced off-peak periods, encourage use of secondary airports in some markets, and provide market-based signals as to where the need to expand capacity is greatest.

III. The Current System of Allocating Scarce Runway Capacity

Under the current legal and regulatory framework, airlines have near complete discretion over the scheduling of flights. In principle, an air carrier can schedule its airplanes to takeoff from or land at any airport at any time.[9] As noted in the previous section, when too many flights are scheduled, queuing is the most widely used mechanism to allocate scarce airport capacity. When demand for runway access exceeds an airport's physical or technological capacity, the FAA allocates runway access through the air traffic control system, by requiring airplanes to line up on the tarmac, wait at gates prior to departure, or by other means of queuing. Allocation of runway access is done on a first-come first-served basis. If the queue becomes too long, airlines may cancel and/or consolidate some flights. Under this approach, airline consumers spend unproductive and perhaps unpleasant time waiting in airport terminals and sitting on planes waiting to takeoff or land; carrier operating costs are increased as flight crew and ground crew time is wasted and aircraft are underutilized. Unlike a market or price based system of allocating

[8] Widespread adoption of auctions to allocate runway access would necessitate airports holding joint auctions because carriers must, for example, secure a complimentary landing slot in order for a take-off slot to have value. The FCC has successfully carried out auctions of spectrum with similar network attributes, although a large joint auction of airport take-off and landing slots could be quite complex. FCC auctions also accommodate set-asides for certain categories of spectrum and competitive concerns.

[9] In practice, this right is subject to various practical limitations such as whether the airline has arranged for gates to be available for its arriving and departing passengers.

scare peak-period runway access, a non-market allocation method like queuing does not ensure that peak-period runway access goes to the flights that value it most highly.

III.A. Landing Fees

Landing fees are normally charged on the basis of pounds of landed weight.[10] In general, heavier planes need longer and stronger runways, and cause more wear and tear to facilities and thus are responsible for more direct costs. Similarly, heavier planes are more likely to be long haul flights and may have a greater willingness to pay. At an airport without congestion, weight is thought to be a reasonable proxy for Ramsey prices.[11] However, when there is congestion, a weight-based pricing system offers airlines no incentive to take steps to reduce the number of flights using the airport during peak periods.

Because weight-based prices do not reflect full costs, including, but not limited to, the cost of congestion imposed on the airport system and other users, they contribute to the excess demand for airport landing facilities during congested periods. It is apparent from current congestion levels that the present system of landing fees provides little incentive for users to shift flight activity to less congested airports or to off-peak times, or to substitute fewer flights in large planes for multiple flights in smaller planes. Instead air carriers schedule more departures and arrivals during the peak periods than they would if landing fees reflected congestion costs.

Airlines schedule flights in response to consumer demand and the costs of providing service. Airlines, as profit driven organizations, are responding rationally to the incentives created by, among other factors, government regulations. With the current fees for landing at congested airports, voluntary cutbacks in scheduled flights by one carrier will likely simply create opportunities for other airlines to add to their schedules making it unrealistic to expect that cajoling an airline into making voluntary changes in scheduling

[10] Most landing fees are between $0.75 and $3.00 per thousand pounds of aircraft weight. Weights are based on manufacturer specifications; airplanes are not weighed upon arrival or departure from an airport. Fees are charged only for landing; there are typically no takeoff fees. According to the Airports Council International, landing fees account for between 2 and 4 percent of an airline's cost for a typical commercial airline flight.
[11] Richard S. Golaszewski, Reforming ATC an Assessment from the American Perspective. Presented at the Fourth Hamburg Aviation Conference, Hamburg University, February 2001.

can solve congestion problems. [12] Like other administrative allocation mechanisms, "voluntary" reductions in flight schedules are unlikely to have any lasting effect on congestion so long as landing fees do not accurately reflect costs and demand. Of course if all carriers were successfully persuaded to voluntarily reduce flights, the results could approximate aspects of airline regulation since the government would have to resolve the inevitable disputes among carriers or challenges by airports or passengers. Resolution of such disputes about routes and times may eventually lead to the DOT reviving "convenience and necessity" determinations.

Other non-price allocation methods, such as the slot lottery or "slottery" recently instituted at La Guardia Airport in New York, should be effective in reducing congestion, but do not ensure an efficient use of scare airport resources. Distributing landing slots by lottery reduces congestion by limiting the number of flights into and out of La Guardia to the airport's physical and technological capacity. However, allocating slots by lottery does not ensure that runway access is allocated to those flights that value them most highly, thus leading to inefficient outcomes. Further, while the slottery may reduce congestion at La Guardia for those lucky enough to win landing slots, demand in excess of supply for use of the airport at current prices will still exist. The slottery approach simply makes the excess demand less apparent while carriers fortunate enough to win desirable slots capture their value.

III.B. Excess Demand and FAA Ground Hold Programs

When demand for take-off and landing slots exceeds the capacity of an airport, the FAA may institute a "program". During a program, airplanes are put on ground hold, switched to slowed travel and entry routes, or otherwise delayed in order to reduce the number of incoming and outgoing flights to the airport's physical capacity.[13] Generally, the FAA programs order incoming and outgoing flights on a first-come-first-served basis, modified by technical considerations. Larger planes carrying more passengers are not granted priority in FAA congestion management programs.

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[12] For example, San Francisco International Airport (SFO) and United Airlines recently agreed on a voluntary plan under which United agreed to limit the number of daily flights from Los Angeles to SFO.

[13] An airport's physical capacity is governed by the number and layout of runways, taxiways, and gates; weather conditions; and technology (air traffic control systems and ground control systems).

The FAA typically provides the airlines at least a few hours notice that a program is likely to be implemented at an airport. In a situation where *scheduled* flights exceed good weather airport capacity (as distinct from a weather or mechanical delay in which the capacity of the airport is reduced), airlines are notified of the situation quite early in the day. In some cases airlines can probably forecast program implementation fairly accurately. Several airports have FAA-run programs during peak periods on an almost daily basis. Airlines normally wait to see the details of the program (what landing slots and times they have been assigned) and then delay flights accordingly or cancel scheduled flights in some cases.

IV. Airport Landing Fees: Current Regulations and Institutional Arrangements

Over time, the DOT and FAA, Congress and the courts have woven an intricate set of economic regulations governing airport activities. These regulations were designed to achieve a variety of objectives including prohibiting airports from using their market power in a manner that would be detrimental to the interests of air carriers and consumers. Unfortunately, some of these same regulations may restrict the ability of airports to adopt market-based solutions to airport congestion problems even though federal policy clearly contemplates congestion pricing at airports as a means of dealing with excess demand for runway access. Paragraph 3.2 of the Rates and Charges Policy[14] states

> A properly structured peak pricing system that allocates limited resources using price during periods of congestion will not be considered to be unjustly discriminatory. An airport proprietor, may, consistent with the policies expressed in this policy statement, establish fees that enhance the efficient utilization of the airport.

A "properly structured" plan must be consistent with several economic regulations that appear to either impede the introduction or limit the effectiveness of congestion pricing. These include regulations prohibiting an airport's landing fee revenue from exceeding the cost of operating the airfield (revenue neutrality), limitations on the types of costs that may enter the cost base, prohibitions against airports subsidizing airline

[14] Department of Transportation, Federal Aviation Administration, Docket Number 27782, RIN 2120-AF90, Policy Regarding Airport Rates and Charges, Federal Register 61(121), p. 31994-32022, June 21, 1996. This policy was remanded to the DOT for further review, (United States Court of Appeals, District of Columbia Circuit, Air Transport Association of America v. Department of Transportation, et al, No.96-1235, August 1,

operations, and limitations on airports' ability to cap the number of flights they are willing to accept. The revenue and cost regulations are primarily concerned with landing fees that airports establish rather than fees that are part of a negotiated agreement between the airport and air carriers. However, these policies and regulations directly influence negotiated agreements because landing fees that airports set represent the outside alternative in the bargaining between airports and airlines.

As will be described below, the exact effects of many of the pertinent regulations with regard to the implementation of congestion pricing are somewhat ambiguous and are subject to interpretation. Overall, there is uncertainty about what a "properly structured" pricing plan entails and what types of pricing systems will be considered to be properly structured and therefore not unjustly discriminatory. This uncertainty about the criteria a congestion-pricing plan must meet in order to be approved (or not challenged) by users and/or the regulatory body probably discourages the implementation of airport congestion-pricing plans.

Finally, regardless of regulatory restrictions, some airports are unable to implement new landing fee systems due to long-term contracts with air carriers using the airport.

IV.A Revenue Neutrality

The FAA Authorization Act of 1994 reaffirmed the Transportation Department's authority to determine whether the landing and other aeronautical fees imposed by airports on air carriers are "reasonable."[15] The basis for imposing the reasonableness requirement is that when an airport accepts Federal grant money for an airport improvement, the airport must assure that it will be open for public use on fair and reasonable terms *without unjust discrimination* (emphasis added). There are several conditions that airport landing rates must satisfy in order to be considered reasonable and non-discriminatory. One of these conditions is revenue neutrality. Paragraph 2.2 of the Rates and Charges Policy states:

1997) and therefore does not represent the official policy of the DOT. Nonetheless, the policy remains the most cogent description of DOT's stance regarding landing fees.

[15] The Act does *not* give the DOT authority to set the *level* of aeronautical fees – only to review their reasonableness. A reasonableness requirement on the fees charged for aeronautic services by airports was not a new feature. In fact this requirement is embodied in two earlier pieces of legislation. Both section 511 of the Airports and Airways Improvement Act of 1982 (49 U.S.C. § 47107) and section 113(b) of the Federal Aviation Act of 1958, (49 U.S.C. § 40116) include the requirement that airports charge reasonable fees for aeronautical services.

> Revenues from fees imposed for use of the airfield ('airfield revenues') may not exceed the costs to the airport proprietor of providing airfield services and airfield assets currently in aeronautical use unless otherwise agreed to by affected aeronautical users.

This requirement, termed revenue neutrality, prohibits airports from collecting revenue in excess of their cost base for airfield operations.[16] This regulation does not necessarily prohibit the introduction of peak-load or auction pricing systems. Rather, by limiting the amount of revenue an airport can collect, the regulation limits the range of prices an airport could charge for landing during peak periods, thus limiting the effectiveness of a pricing system in reducing congestion.

For airports with a few daily peak use times, it may be feasible to implement a revenue-neutral system of landing fee surcharges and discounts that would induce carriers to shift some demand away from peak periods without violating the overall requirement of revenue neutrality. However, for airports that are congested throughout the day, the revenue neutrality requirement could be an absolute barrier to removing congestion through pricing. In either case, congestion pricing plans consistent with the revenue neutrality requirement would *not* generate appropriate investment signals to the airport.

IV.B. Allowable Costs

Other conditions that airport landing rates must satisfy in order to be considered reasonable and not unjustly discriminatory relate to the types of costs that are included in the airport cost base. The Rates and Charges Policy states that in determining landing fees airports are permitted to recover the direct costs associated with the operation and maintenance of airfield assets and earn a limited rate of return on some of the airport's investment in airfield assets.[17] In this latter respect DOT's treatment of airports is similar to that applied to regulated utilities, although airports, unlike utilities, are not assured of a

[16] Capping revenues from landing fees is a mechanism to restrain airports from using market power to set landing fees higher than competitive levels.

[17] The use of historical cost for the valuation of airfield assets was one of the central issues in the litigation that led to the remand of the Rates and Charges Policy. It appears that the DOT continues to stand by use of historical cost in the valuation of airfield assets. In a 1999 review of the DOT's 1995 decision not to allow Los Angeles International Airport (LAX) to use opportunity cost rather than historical cost (Second Los Angeles Int'l Airport Rates Proceeding, Order No. 95-12-33 (December 22, 1995)), the DOT successfully argued that it was justified in its refusal to allow the use of opportunity cost (United States Court of Appeals, District of Columbia Circuit, City of Los Angeles, Et Al. v. United States Department of Transportation, Et Al., No. 98-1071, February 5, 1999.)

"fair" rate of return on invested capital. Airfield assets include mainly runways, taxiways, navigation equipment and land dedicated to airplane operations. DOT requires that these assets be valued on the basis of historical costs. The replacement cost or the opportunity cost of these assets cannot be recovered from carriers using the assets even though the historical or book value of the airfield assets may be only a fraction of their true value.[18] This regulation imposes an additional restriction on an airport's ability to develop peak-period prices that could successfully reduce congestion.[19]

In addition, and perhaps more importantly, the costs imposed by congestion and other externalities cannot be considered in the calculation of the cost base and hence cannot be recovered in landing fees. If airports were allowed to include the costs imposed on other travelers in the airfield cost base, airports could then implement more robust congestion pricing systems within the constraints of revenue neutrality.

IV.C. Subsidies

Separately, section VI.B, Paragraph 12 of the Use of Airport Revenue Policy[20] states:

> DOT policy forbids direct subsidy of air carrier operations. Direct subsidies are considered to be payments of airport funds to carriers for air service. Prohibited direct subsidies do not include waivers of fees or discounted landing or other fees during a promotional period.

The policy on subsidies was established to prevent airports from paying carriers for the establishment and continuation of routes. This policy may not apply to congestion pricing, but that is not entirely clear at this time.

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[18] The Rates and Charges Policy is more flexible with respect to the calculation of the rate base for non-airfield aeronautic assets and services; the Policy allows for "any reasonable methodology to be used…".

[19] This regulation essentially prohibits airports from earning any economic profit associated with ownership of a scarce resource. It may partly explain the slow growth of airfield capacity relative to non-airfield services at some airports.

[20] Department of Transportation, Federal Aviation Administration, Docket Number 28472, Policy and Procedures Concerning the Use of Airport Revenue, Federal Register 64(30), p. 7696-7722, February 16, 1999. The main thrust of the policy is to require that revenue generated by an airport be used for the capital or operating costs of the airport, the local airport system, or other local facilities owned and operated by the airport owner or operator and directly and substantially related to the air transportation of passengers or property. This general requirement should not present a significant impediment to the implementation of an efficient system of congestion pricing.

It is possible that the DOT and/or the courts would interpret a complete waiving of off-peak landing fees or actual payments to carriers during off-peak periods as prohibited subsidies. This interpretation might restrict the ability of airports to implement congestion pricing in a revenue-neutral manner. A stricter interpretation of this policy, prohibition of any off-peak discount relative to the administratively determined "cost", would make implementation of a revenue-neutral congestion pricing system nearly impossible. Alternatively, the DOT and/or the courts might reasonably conclude that discounted off-peak landing fees as part of an overall fee structure, available to all air carriers and not designed to encourage airlines to plan new routes are legal and appropriate. The latter interpretation would provide airports some flexibility in the design of peak-load pricing systems. That this important issue remains unclear illustrates the uncertainty facing airports trying to manage airfield use.

IV.D. Ability to Affect Scheduling

In addition to the subsidy prohibition discussed above, there are other statutory restrictions on airports' ability to affect the rates, routes or schedules of airlines.[21] It is not clear how these regulations would be interpreted in the case of a congested airport that wished to auction peak-period runway access. Under certain interpretations, airports could be prohibited from introducing an auction-based system for allocating landing and takeoff rights. In order to auction landing and takeoff slots, airports would need clear authority to control the total number of planes scheduled to use the airport within any given period of time. If airports cannot limit the number of arriving or departing flights they would have to accept all bids in an auction for landing slots, suggesting that the auction would break down because the market-clearing price would be zero. It is also not clear if congestion prices set administratively by airports would be considered to be a mechanism to affect scheduling.

[21] The Federal Aviation Act of 1958, Section 105, the Preemption Section (49 U.S.C. Appendix § 41713) states that U.S. airports are not permitted to affect the rates, routes or schedules of airlines. The 1990 Airport Noise and Capacity Act (ANCA), 49 U.S.C. § 47524, limits the ability of local jurisdictions to impose restrictions on aircraft takeoffs and landings at local airports.

IV.E. Institutional Barrier

In addition to the statutory and regulatory barriers to the introduction of peak-load pricing at airports there is also an institutional barrier at many airports. Many large airports are signatories to long-term contractual agreements that prescribe the landing fee structure for airlines using their facilities. Airports with long-term contracts are unlikely to be able to implement significant changes in landing fees until their contracts expire.[22] The following table (Table 1) shows contract length and year of expiration for large hub airports in the U.S. as of 1998.[23] (A contract expires for all airlines at an airport at the same time.)

These contracts appear to rule out system-wide adoption of peak-pricing systems in the near-term because the average time to contract expiration at large hub airports is approximately 12.5 years. However, as half of the airports listed were not under contract as of 1998 or have contracts that expire prior to 2005, these individual airports and their customers could benefit from the adoption of peak-pricing plans in the near-term.

[22] Additional details on contractual arrangements between airports and air carriers are contained in the appendix.

[23] Source: Airport Business Practices and Their Impact on Airline Competition, FAA/OST Task Force, October 1999.

Table 1

Major Airports with User Fee Agreements with Carriers

Airport	*Length of Agreement*	*Expiration Date*
ATL – Atlanta	**30**	**2012**
BOS – Boston	**-**	**-**
BWI – Baltimore-Washington	10	2003
CVG- Cincinnati	**45**	**2015**
DCA – Reagan-National	25	2004
DFW - Dallas-Fort Worth	35	2009
DTW – Detroit	**16**	**2009**
EWR – Newark	**20**	**2018**
IAH – Houston	**-**	**-**
JFK – New York	**17**	**2015**
LAS – Las Vegas	5	2002
LAX – Los Angeles	**-**	**-**
LGA –LaGuardia	**1**	**1998**
MCO – Orlando	30	2008
MIA– Miami	**N/A**	**2020**
ORD – Chicago O'Hare	**33**	**1999**
PHX – Phoenix	**-**	**-**
PIT – Pittsburgh	30	2018
SAN – San Diego	5	N/A
SEA – Seattle	**32**	**2001**
SFO – San Francisco	**30**	**2011**
SLC – Salt Lake City	**25**	**2003**
STL – St. Louis	**40**	**2005**
TPA – Tampa	7	2006

Note: Bold type indicates inclusion in the top 20 list of "all-phases" delays from the 2000 Aviation Capacity Enhancement Plan, Office of System Capacity, FAA.

V. Conclusions

The preceding sections of this paper have identified a number of potential impediments to the introduction of an effective congesting pricing system at U.S. airports. The revenue-neutrality regulations combined with restrictions on the types of costs allowably included in the cost-base and potential restrictions on offering significantly reduced or even negative off-peak land fees has the potential to severely restrict the ability of airports to construct workable, effective pricing plans. It may be possible for some airports to shift some demand away from peak periods with congestion pricing plans that are revenue neutral and do not have low or even negative off-peak landing fees. However at a severely congested airport it is unlikely that it would be possible to fully implement a congestion pricing plan that reflects the cost of congestion in peak period landing fees

without either exceeding current revenue limitations or meeting revenue limitations by providing subsidies to off-peak users.

A common theme in exploring the regulatory framework surrounding airport pricing is uncertainty. The exact effect of each regulation with regard to the implementation of congestion pricing is somewhat uncertain. The cumulative effect of this regulatory uncertainty may represent a significant barrier to the introduction of congestion pricing at airports. Uncertainty about the rules slows the adoption of and experimentation with new approaches to reducing airport congestion. Airports appear to be reluctant to 'test the waters' with new approaches without clear guidance as to what constitutes an acceptable pricing plan. Further, when there is uncertainty about regulatory rules, it may fall to a judicial process to determine the exact meaning of regulations. Judicial decisions, made on a case-by-case basis, may not be easily generalizable – which could create additional uncertainty.

Removing regulatory impediments to the implementation of congestion pricing will likely require regulatory actions and new legislation. In the near-term a helpful step would be to reduce uncertainty about the meaning of regulations as they relate to congestion pricing. Identifying measures that could be implemented through regulatory rather than legislative change would also be useful. Such measures might include allowing a limited number of airports to experiment with congestion pricing systems and considering broader definitions of airport costs such as granting airports the right to include the current value or replacement cost of airfield assets and/or congestion-related costs in the rate base.

As discussed, airports with long-term user fee agreements face an additional barrier to implementation of congestion pricing. While significant, this barrier should not stand in the way of implementation of a regulatory framework that would allow individual airports that are not bound to long-term contracts to adopt congestion pricing. Consumers would benefit from individual airports adopting congestion pricing, even if widespread implementation could not take place in the short-term. A possible way to circumvent the institutional barriers is to consider the prospects for the use of the air traffic control system as a mechanism to implement congestion based landing and takeoff fees. In order to ensure that airports are not restricted from implementing congestion pricing plans in the future, airports should be encouraged to only sign short-term agreements with air carriers.

To reiterate a point made in the introduction, airport and airways congestion is a complex problem and airport landing fees are one dimension of a comprehensive solution. For example, it will be difficult to reach an efficient level of airport and airway use until air traffic control services are priced correctly. However, it is important to note that implementation of airport congestion pricing would reduce airport-based congestion even in the absence of other reforms and this reduction of airport-based congestion may have beneficial spillover effects in terms of reducing ATC congestion.

References:

The Airport Noise and Capacity Act of 1990, 49 U.S.C. § 47524.

The Airports and Airways Improvement Act of 1982, 49 U.S.C. § 47107.

Department of Transportation, Federal Aviation Administration, Docket Number 27782, RIN 2120-AF90, Policy Regarding Airport Rates and Charges. Federal Register 61(121), p. 31994-32022, June 21, 1996.

Department of Transportation, Second Los Angeles Int'l Airport Rates Proceeding. Order No. 95-12-33, December 22, 1995.

Department of Transportation, Federal Aviation Administration, Airport Capacity Benchmark Report 2001. April 2001.

Department of Transportation, Federal Aviation Administration, Docket Number 28472, Policy and Procedures Concerning the Use of Airport Revenue. Federal Register 64(30), p. 7696-7722, February 16, 1999.

Department of Transportation, Federal Aviation Administration, FAA/OST Task Force. Airport Business Practices and Their Impact on Airline Competition, October 1999.

Department of Transportation, Federal Aviation Administration, Office of Associate Administrator for Airports, Top 100 Airports, New Runways Opened, November 2000.

Department of Transportation, Office of Inspector General, Audit Report: Air Carrier Flight Delays and Cancellations: Federal Aviation Administration, Bureau of Transportation Statistics and Office of the Secretary of Transportation. Report Number: CR-2000-112, July 25, 2000.

The Federal Aviation Act of 1958, as amended, Section 133(b), the Anti-Head Tax Act, 49 U.S.C. § 40116.

The Federal Aviation Act of 1958, as amended, Section 105,Preemption Section, 49 U.S.C. § 41713.

Golaszewski, Richard S. Reforming ATC; an Assessment from the American Perspective. Presented at the Fourth Hamburg Aviation Conference, Hamburg University, February 2001.

New York Times, Port Authority of New York and New Jersey Public Notice, p. A11, January 5, 2001.

Sinha, Agam. Anatomy of a Delay. Presented at the FAA/TRB Aviation Gridlock Seminars, Phase 1, February 16, 2001.

United States Court of Appeals, District of Columbia Circuit, Air Transport Association of America v. Department of Transportation, Et Al, No.96-1235, August 1, 1997.

United States Court of Appeals, District of Columbia Circuit, City of Los Angeles, Et Al. v. United States Department of Transportation, Et Al., No. 98-1071, February 5, 1999.

Appendix

Congestion Measures

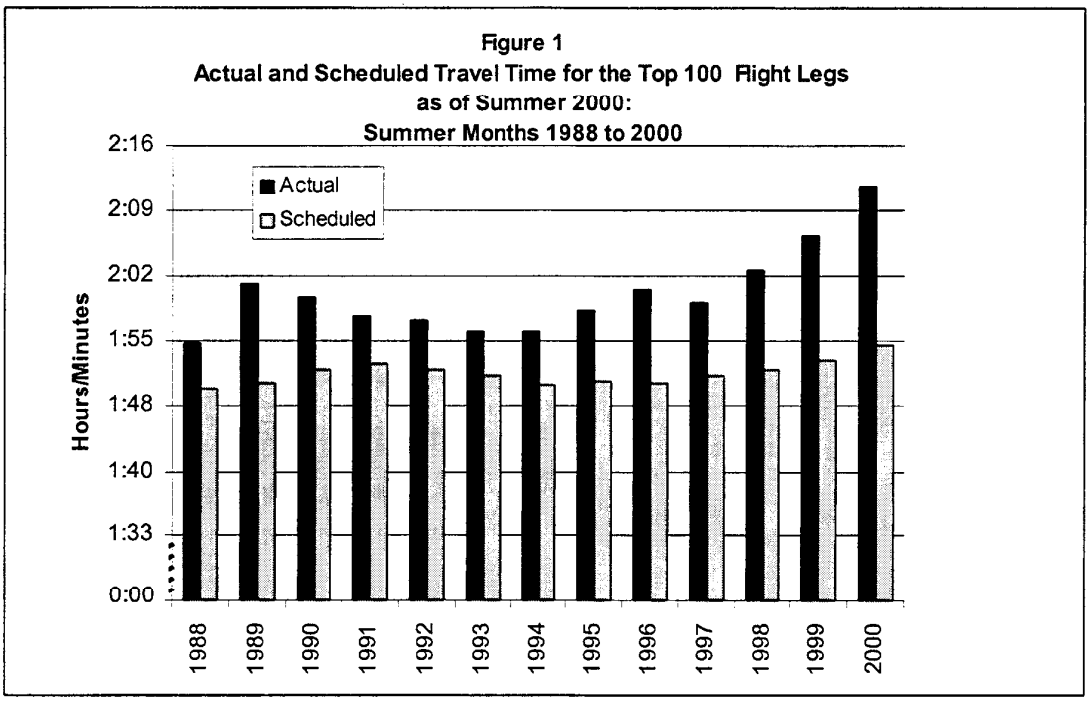
The Federal Aviation Administration (FAA) and the Department of Transportation (DOT) use different methodologies for data collection and have different definitions of what constitutes a delayed arrival or departure. Despite the methodological differences, both DOT and FAA statistics show an upward trend in the number of flight delays.[24]

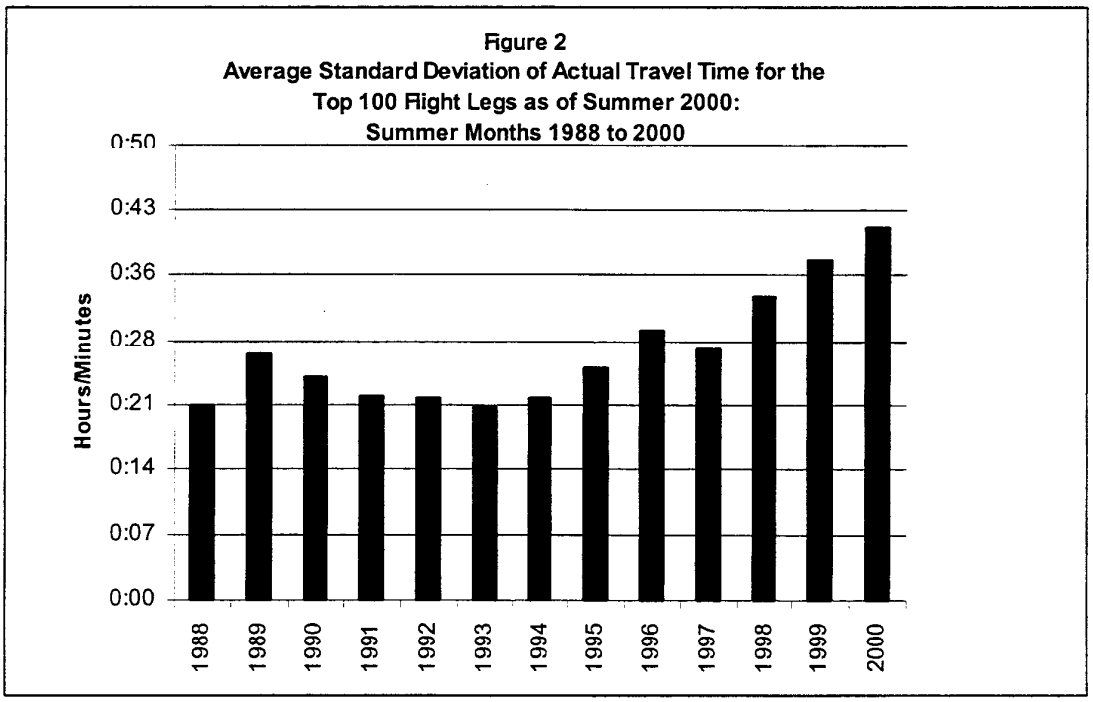
According to FAA statistics, the number of delays increased by 58 percent between 1995 and 1999. DOT statistics show an increase of 11 percent over the same period. The length of delays increased by 16 percent according to the FAA and 18 percent according to the DOT. In interpreting the upward trend in the number of delays in the DOT statistics, it is important to note that measures of year to year increases in delays are biased downward because scheduled flight times are increasing. Holding other factors constant, when airlines lengthen scheduled flight times there will be fewer measured delays.

For the purposes of this report we consider an alternate measure of congestion, changes over time in actual flight times. Actual flight time is the time between scheduled take-off and actual landing because passengers must be on-hand at the scheduled departure time. Unlike DOT delay statistics, this congestion measure is not biased downward due to increasing scheduled flight times. Figure 1 below shows that on the top 100 routes of Summer (May through August) 2000, scheduled travel time increased by nearly 5 minutes between Summer 1988 and Summer 2000, indicating that airlines have made adjustments to their schedules, probably reflecting effects of congestion. Actual travel time on those routes increased by more than 17 minutes on average, with most of that increase occurring in the last three years.[25] Figure 2 shows that during the same period, the standard deviation

[24] Department of Transportation, Office of Inspector General, Audit Report: Air Carrier Flight Delays and Cancellations: Federal Aviation Administration, Bureau of Transportation Statistics and Office of the Secretary of Transportation. Report Number: CR-2000-112, July 25, 2000. The FAA and DOT estimates of flight delays differ because they measure different types of delay. The FAA has recently released a detailed study of airport capacity benchmarks. Comparing capacity benchmarks with actual flight schedules provides a useful measure of congestion (Department of Transportation, Federal Aviation Administration, Airport Capacity Benchmark Report 2001. April 2001.)

[25] All figures quoted ignore the effect of cancelled and diverted flights. If each cancelled or diverted flight is counted as a two hour delay, then average travel time on these routes increased by more than 23 minutes between May 1988 and May 2000.





Source: DOT On Time Arrival Data 1988 – 2000, May through August of each year.
Notes: Top 100 routes as of May through August 2000, where route are point to point flights. Average travel time represents averages of point-to-point travel times where the number of flights in May through August 2000 is used to weight earlier year data. Actual travel time is measured as the time between scheduled take-off and actual landing. Canceled and diverted flights are not included.

of the average city-pair travel time nearly doubled from 22 minutes to 41 minutes on flights that were not cancelled or diverted. Again, most of this increase occurred in the last three years. The growth in the standard deviation means that passengers were less able to rely upon published arrival times in planning their business and leisure activities.

DOT-measured delays will decrease as DOT introduces more "slotteries" to parcel out the available slots at congested airports, as was done at La Guardia. In fact, by allocating all of the available landing slots at La Guardia, DOT should have eliminated delays caused by congestion at La Guardia. Accordingly, delay statistics should show a decline as a result of this administrative allocation of slots. In principle congestion could be eliminated altogether, and statistics on delay would show great improvement, if slotteries were used to award all available landing slots at all congested airports. Of course, such a solution would be inefficient because allocating slots by lottery does not ensure that airport slots are allocated to those airlines that value them most highly. At worst, under such a system excess demand for travel at peak periods would remain unobserved, airports could conclude that they had enough capacity, and airfares could rise for seats on those flights with desirable and certain time slots; the value of peak period slots would be captured by carriers with the desirable slots.

Contractual Arrangements between Airports and Airlines

Airport fees are set either by ordinance; i.e. the airport announces fees that it has unilaterally decided upon (subject to DOT regulations), or by negotiated agreement with the airlines that use the airport. Many airports are signatories to long-term agreements that forbid them from changing the landing fee structure for airlines using their facilities without permission from the signatory airlines. Airports with long-term contracts are unlikely to be able to implement any changes in landing fees until their contracts expire.

Financial and operational arrangements between airports and airlines are generally defined in what are known as use and lease agreements. These agreements specify the terms of use, costs and responsibilities assumed by each party. Airports with negotiated agreements serve both signatory and non-signatory airlines. Signatory airlines are those that have agreed to the terms of the use and lease agreement. Signatory airlines typically pay lower fees than non-signatories that do not carry any of the residual cost risk. Use and

lease agreements are typically classified into three types, residual agreements, compensatory agreements, and hybrid agreements.

Under residual agreements airlines assure that airports break even by paying sufficient landing fees to bring revenues up to the remaining (residual) costs of operations after accounting for all non-airline revenue sources.[26] Residual contracts do not specify a price for landing fees (since it depends on the residual costs), but clearly specify what costs can be included in the airport cost-base upon which landing fees (and other residual payments) are based. Residual contracts typically have a "no further charges" clause which forbids the addition of new cost categories such as congestion.

Under compensatory agreements airlines pay only for the facilities and services they use. Under compensatory agreements the airports assume the financial risks and rewards from non-airline revenue streams. Compensatory agreements tend to be shorter than residual agreements. Some compensatory contracts specify what costs may be included in the airports cost base, but others may have enough flexibility to allow congestion charges.

Hybrid agreements contain components of both residual and compensatory agreements. Typically a hybrid agreement provides for a residual contract, but limits the cost base to airfield operations.

[26] The benefit to an airline of being a signatory to a residual agreement at an airport is, typically, lower landing and lease fees and an ability to wield some power over airport capital spending decisions through majority in interest (MII) provisions. MII provisions are a common component of negotiated agreements between airports and airlines. MII provisions allow signatory airlines to allow or disallow specific capital projects that would impact the cost base of the airport. The purpose of MII provisions is to allow the airlines, which may be liable for airport costs in excess of revenue some degree of control over those costs.