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Sabine Cornelius* and Wilhelm Pfähler**

The Liberalisation of Air Transport: Lessons from the USA

The planned liberalisation of European air transport has run up against the problem that there is little scope for further expansion of airport infrastructure. If liberalisation is to be a success, the available infrastructure will have to be used more intensively. This means introducing efficient procedures for awarding take-off and landing slots in Europe. The policy pursued hitherto in Germany and the EC and lessons from the USA do not nurture hopes that the liberalisation of European air transport will be a huge success.

The demand for air transport in Europe is growing at a rapid pace. The completion of the European internal market, the expected accession of the EFTA countries and the hoped-for economic development of the Eastern European and CIS countries will greatly strengthen this potential demand. The Stanford Research Institute expects the demand for air services to increase by more than 100% in the next decade.¹ However, this dynamic growth in demand will collide with a largely fixed supply of airport infrastructure in Europe and closely regulated competition. It will therefore be able to develop only if both of these bottlenecks are removed, and simultaneously!²

The EC Commission's draft regulation of 17th July 1991 on the further liberalisation of European air traffic is already a first step towards the deregulation of competition. If the regulation is implemented, the airline companies of EC countries will be able in principle to fly to any airport within the Community and approval procedures for cross-border air fares will be eased further. The second step, aimed at removing the bottleneck in airport infrastructure, has yet to be taken.

Enlarging existing airports or building new ones is, at best, only a partial solution to the shortage of infrastructure in European air transport. For the foreseeable future, land for new airports or for the extension of existing ones will not be available where the demand exists, nor will such projects enjoy political support. The demand for air

transport will continue to be concentrated mainly at existing major airports close to centres of population, for only these airports are suitable for the "hub and spoke" system that keener price competition and increased supply will force the airlines to adopt once air transport has been liberalised.³ The success or failure of the liberalisation of European air transport will therefore hinge on better utilisation of available capacity in the airport infrastructure.

Efficient Use of Existing Airports

In principle, better capacity utilisation can be achieved by administrative, technical or economic means. Administrative instruments, such as the requirement to use larger aircraft, the switching of short-haul air traffic to other modes of transport or the banning of regional flights from the busiest airports, all disregard the demand side and are therefore economically inefficient.⁴ The technical

¹ See SRI International: A European Planning Strategy for Air Traffic to the Year 2010. Vol. 1: Analysis and Recommendations, Menlo Park, Ca., March 1991, p. 1-2-28.

² Von Rohr and Stoetzer also argue in this vein. See Anna von Rohr and Matthias-Wolfgang Stoetzer: Die Allokation von Landerechten auf Flughäfen. Eine ordnungspolitische Einschätzung, in: Wirtschaftsdienst, 1991, No. 6, pp. 311-315.

³ A "hub and spoke" network exists if flights are channelled through a central airport (the hub) rather than going direct. The hub airport is at the centre of a web of flight routes that allow airlines to combine passengers travelling from and to different airports and hence to operate more cost-effectively. Moreover, take-off and landing times are co-ordinated so that passengers with connecting flights with the same airline have minimum waiting times. Since these "spoke" flights are mostly concentrated at times of peak demand, the hub and spoke system even exacerbates the problem of congestion at the hub airports.

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means of using existing capacity more intensively, such as blind landing systems, integrated air traffic control and surveillance and better weather monitoring, have already been almost fully exploited in Europe. Reliance will therefore have to be placed on economic methods.

The three most important economic means of allocating take-off and landing slots efficiently at overloaded airports are:

- slot trading,
- slot auctions and
- an optimum time-related scale of variable landing fees.

The first two methods treat take-off and landing slots as a scarce good whose market value is determined by supply and demand. Allocating slots in this way is economically efficient, as it ensures that scarce slots go to the operators willing to pay the highest marginal price. Landing fees also lead to efficient slot allocation if they are optimised on the basis of peak-load pricing and the theory of externalities. For this purpose, the (marginal) social costs associated with take-offs and landings should be passed on to airlines in accordance with the principle that the originator pays. At times of peak demand, higher landing fees are charged than in periods of low demand, as external (marginal) congestion costs arise in addition to variable (marginal) operating costs. Whereas operators willing to pay a high price can continue to obtain landing slots in peak periods, those able to pay less must move their flights to less popular times.⁵

Utilisation in Germany and at the EC Level

So much for the theory; how does it work out in practice? On 1st June 1990 the Tenth Amendment to the Air Transport Law came into effect in Germany. As before, the Law provides that take-off and landing slots will be granted by the flight co-ordinator on an administrative basis according to the principle of "grandfather rights": in other words, whoever owned slots in the previous year is guaranteed continued use of those slots in the current year. The only innovation is that the flight co-ordinator may

now allow slots to be exchanged without remuneration after allocation, but he is not obliged to do so. The "grandfather" principle is unfair, economically inefficient and harmful to competition; it favours established airlines, takes no account of willingness to pay and erects barriers to market entry. Permitting the exchange of slots without remuneration does nothing to alter this situation. All this is well known.

It had been hoped that a better solution would be advocated at EC level, but the Commission's draft of 17th July 1991 on the further liberalisation of European air transport contains no concrete measures to introduce efficient and competitive slot allocation procedures. It does provide for the creation of a pool of returned and unused slots that would be awarded exclusively to market newcomers, but as the criterion for allocation would be waiting time (and not willingness to pay) and as this random rationing system would prevent new entrants from drawing up competitive timetables, the efficiency criteria cannot be met on the basis of the EC proposals.

Hence, only the Commission's proposal concerning fees is to be welcomed. Its objective is to have landing fees calculated according to the principle of the causation of costs, and therefore gives airports some scope for introducing fees that accord with this aim. It would have been better, however, if the Commission had recommended the introduction of optimum landing fees that varied according to the time of landing. With few exceptions, European airports at present charge according to weight. This produces an inefficient allocation of landing slots among carriers and also leads to wrong decisions when expanding capacity.

As things stand at present, it cannot be expected that the potential economic benefits of the planned liberalisation of European air transport will be reaped in full. What is lacking are efficient slot allocation procedures to ensure better utilisation of the fixed supply of airport infrastructure. The overloading of airports already entails high economic costs (delays, energy consumption, etc.). These costs will increase if German and European policymakers do not come up with a better solution to the problem.

The situation is reminiscent of the liberalisation of air transport in the USA more than a decade ago. It would therefore undoubtedly be beneficial for the Europeans to examine American attempts to introduce more efficient slot allocation procedures in the aftermath of liberalisation. The American experience has not yet been assimilated into the current German and European debate.

⁴ For a recent critical analysis of administrative procedures, see also Hartmut Wolf: Zur Vergabe von Start-/Landerechten auf europäischen Flughäfen: Administrative Lenkung oder Auktionsverfahren, in: *Weltwirtschaft*, 1991, No. 2, pp. 187-199.

⁵ In addition, peak-load pricing makes it possible to achieve more even capacity utilisation on a daily, weekly and annual basis, thereby providing undistorted indications of future required expansion. The optimum time of investment is when the cost of expanding capacity exactly matches the resulting saving in congestion costs. See Tae Hoon Oum and Yimin Zhang: Airport Pricing, Congestion Tolls, Lumpy Investment, and Cost Recovery, in: *Journal of Public Economics*, Vol. 43, 1990, pp. 353-374, here p. 360.

Slot Allocation in the USA

As long ago as the late sixties problems of overloading began to appear at some US airports in the form of considerable delays.⁶ The US Department of Transportation (DOT) therefore introduced the High Density Rule⁷ at four airports: Chicago O'Hare, Washington National, New York La Guardia and New York Kennedy. This rule, which still applies today, aims to bring the high demand for take-off and landing slots (due to low landing fees⁸) into line with existing capacity by imposing administrative restrictions on the number of take-off and landing operations per hour.⁹ As the High Density Rule regulates only the supply of slots but not slot allocation, in 1969 the Civil Aeronautics Board (CAB) agreed to the formation of Airline Scheduling Committees. These are composed of representatives of the established airline companies, who reach agreement among themselves on the distribution of utilisation rights at slot-limited airports. The Committees meet every six months to draw up summer or winter timetables. About a month before the meeting the airlines submit a detailed list of the slots they want on an hourly and daily basis to the airport's reservations office. It is then attempted to match the number of slot applications to the available hourly and daily supply of slots for each slot-limited airport separately. The allocation process is considered completed when the participants have unanimously accepted a workable draft flight timetable.¹⁰

In the days of regulated air transport, this procedure for allocating slots proved an effective way of tackling the problem of overloading, since the CAB also regulated market access, the flight route structure and air fares. However, once deregulation had ended the CAB's forty-

⁶ See E. Stanley and Stanley A. Fawcett: Congestion at Capacity-Constrained Airports: A Question of Economics and Realism, in: *Transportation Journal*, Vol. 27, No. 4, Summer 1988, pp. 42-54, here p. 42.

⁷ At all US airports except the four named here, take-off and landing slots are still awarded on an economically inefficient "first come, first served" basis.

⁸ Even now, more than ten years after the Airline Deregulation Act came into effect, landing fees based on aircraft weight are still a marginal source of revenue for airport operators in the USA.

⁹ In addition, the High Density Rule provides for the distribution of slot quotas for regular and commuter airlines and for general aviation. See Federal Aviation Administration (FAA): *Airport Capacity Enhancement Plan*, Washington, D.C., 1989, p. 23.

¹⁰ For details on the allocation process in theory and practice, see David M. Grether, R. Mark Isaac and Charles Plott: *The Allocation of Landing Rights by Unanimity Among Competitors*, in: *American Economic Review*, Vol. 71 (2), May 1991, pp. 166-171; David M. Grether, R. Mark Isaac and Charles Plott: *The Allocation of Scarce Resources: Experimental Economics and the Problem of Airport Slots*, Boulder, San Francisco and London, 1989, p. 16.

year control of the industry, a host of new airlines swarmed into the market. The pressure of competition caused air fares to fall and passenger numbers to increase dramatically—the same effect that the liberalisation of air transport in Europe is expected to have. Even after deregulation, however, the US authorities continued to allocate slots by administrative means – just as Europe also currently plans to do. Inevitably, the sudden increase in traffic exacerbated the problem of congestion at major US airports. In response to the strike by air traffic controllers in 1981, the Federal Aviation Administration (FAA) imposed slot restrictions at a further 22 heavily used airports for two years.¹¹

The cost-free award of scarce slots on the basis of "grandfather rights" encouraged airlines to apply for additional units of the scarce good in order to gain a competitive advantage by offering more frequent flights. Moreover, the extension of "hub and spoke" flight networks meant that the demand for slots far exceeded the supply at peak times. Additional slots could often be acquired only by merging with another airline. This trend towards the creation of oligopolies and the sharp increase in flight delays after the entry into force of the Airline Deregulation Act in 1978 show that Scheduling Committees are an ineffective and anti-competitive method of slot allocation in deregulated markets. In view of this experience, it is incomprehensible that the Europeans should also want to continue to award slots on the basis of "grandfather rights".

The Experiment with "Slotteries" in the USA

As the hectic growth in air traffic after deregulation made it increasingly difficult to achieve "mutual agreement" at meetings of the Scheduling Committees, the FAA agreed to the introduction of slot trading on an experimental basis in 1982. The experiment was limited to only six weeks, and yet several hundred slots were traded in that short space of time. Market newcomers, such as People Express, obtained take-off and landing rights for the first time. Failsafe Committees were set up soon afterwards as a transitional arrangement, but they were abolished again in 1984 following bitter disputes and were replaced by the traditional Scheduling Committees. Once again, it was rare for the Committees to reach agreement, so that in April 1986 the DOT decided to introduce the Buy-Sell Rule at the four airports subject to slot limitations.¹²

¹¹ See Congressional Budget Office: *Policies for the Deregulated Airline Industry*, Washington, D.C., July 1988, p. 66.

¹² Robert M. Hardaway: *The FAA "Buy-Sell" Slot Rule: Airline Deregulation at the Crossroads*, in: *Journal of Air Law and Commerce*, Vol. 52, No. 1, Fall 1986, pp. 1-75.

This allows airlines to trade freely in administratively awarded take-off and landing rights for domestic flights at half-yearly slot exchanges, also called "slotteries". The aviation authorities nevertheless retain the right to exclude slots from trading if considerations of over-riding importance apply;¹³ this includes, for example, take-off and landing rights for international flights and "essential air services".¹⁴ A "use it or lose it" rule requires unused slots to be returned to the FAA in order to prevent dominant airlines from restricting competition by hoarding slots. Returned slots are then redistributed by lottery.

The replacement of Scheduling Committees by the Buy-Sell Rule is undoubtedly a great advance towards an economically efficient procedure for the allocation of scarce slots. For example, the market entry of the Pan Am Shuttle between New York and Washington was greatly facilitated by the start of slot trading,¹⁵ and the introduction of "slotteries" led to a marked improvement in slot utilisation at Chicago O'Hare by United Airline and American Airlines.¹⁶ These are clear indications of efficiency improvements as a result of "slotteries".

The fact that the initial distribution of tradable take-off and landing rights is still determined by "grandfather rights" remains a problem, however. This places newcomers at a clear disadvantage and generates unjustified windfall profits for established airlines. It continues to be difficult to enter the market with a viable flight network, as the slots allocated cost-free to newcomers on the basis of "grandfather rights" and those that can be bought in slotteries are mostly at unattractive times of take-off and landing, and therefore unsuitable as the basis for developing a competitive timetable. Wealthy established airlines can even block market entry by buying up available slots. For example, just two airlines – United Airline and American Airlines – between them control 77% of the slots at Chicago O'Hare airport. They could easily misuse their market position in order to block market entry by providing several flights a day.¹⁷ There are also barriers to market exit by inefficient operators, since the fact that the available utilisation rights at the slot-limited airports

are "assigned" for an unlimited period on the basis of "grandfather rights" removes the incentive for established airlines constantly to review their continued market presence on the basis of all relevant costs. As a result, it will be impossible to avoid introducing measures to promote competition in order to ease the problems caused by the initial distribution of slots.

Time-related Variable Landing Fees

Auctions and optimum, time-related variable landing fees are other economically efficient methods of allocating scarce slots. Whereas auctions have not been used so far in the USA, some experience has been gained with more efficient landing fees.

As long ago as 1969 Michael Levine¹⁸ called for the replacement of weight-related landing fees by a scale of time-related fees, but it was not until 1979 that the airport authorities of New York and New Jersey introduced a rudimentary peak-load pricing system by charging fixed peak surcharges for take-offs and landings at peak times in addition to the usual weight-related fees.¹⁹ The main objective was to persuade general aviation aircraft (small private planes and corporate jets) to transfer their operations to less busy times or underused airports. Until that time, many US airports charged no landing fees for small aircraft, and only in rare cases did they charge more than \$10.²⁰ This pricing system has been much criticised by economists, as it led to behaviour that exacerbated congestion; the low or non-existent landing fees created an incentive for the operators of smaller aircraft to make take-offs or landings at peak times. There can be no economic justification for allowing this category of user, who have the lowest willingness to pay for take-offs and landings at peak times, to pay landing fees that reflect neither the variable runway operating costs nor the external congestion costs. The increase in minimum fees for peak-time landings at the New York airports of Kennedy, La Guardia and Newark to \$50 in 1979 (compared with \$5 in 1968) led to a considerable reduction in movements by smaller aircraft at peak times.²¹ The fact

¹³ The Tenth Amendment of the German Air Transport Law contains a similar rule with regard to cost-free slot exchanges.

¹⁴ Slots crucial to maintaining regional air traffic are excluded from trading and general aviation is not subject to the Buy-Sell Rule. For details, see Francis McGowan and Paul Seabright: *Deregulating European Airlines*, in: *Economic Policy*, October 1989, pp. 284-344, here p. 316.

¹⁵ See Jonathan D. Ogur, Curtis L. Wagner and Michael Vita: *The Deregulated Airline Industry: A Review of the Evidence*, in: *Economic Issues, United States of America*, Federal Trade Commission, Bureau of Economics, January 1988, p. 46.

¹⁶ See Severin Borenstein: *On the Efficiency of Competitive Markets for Operating Licences 1*, in: *Quarterly Journal of Economics*, Vol. 103, No. 2, May 1988, pp. 357-385, here pp. 374 f.

¹⁷ See Borenstein, *op. cit.*, pp. 377 ff.

¹⁸ Michael E. Levine: *Landing Fees and the Airport Congestion Problem*, in: *Journal of Law and Economics*, Vol. 12, No. 1, April 1969, pp. 79-108.

¹⁹ Whereas in Europe landing fees are usually based on take-off weight, in the USA the criterion is the maximum permitted landing weight. See Christian Assaily and Didier Launez: *Airport Charges in Europe*, in: *Institute of Air Transport, Studies and Reports*, Vol. 14, No. 2, 1989.

²⁰ See Ross D. Eckert: *Airports and Congestion. A Problem of Misplaced Subsidies*, Washington, D.C., 1977, p. 21.

²¹ See Nawal K. Taneja: *Introduction to Civil Aviation*, Massachusetts and Toronto, 1987, p. 69.

that these airports are still significantly overloaded suggests, however, that although the peak surcharge was raised to \$100 a few years ago,²² the differential between peak and off-peak fees is still too small.

A more recent attempt to reform landing fees policy was made in 1987 by the Massachusetts Port Authority (Massport) at Boston Logan airport. The main objective of the Program for Airport Capacity Efficiency (PACE) was to ease present and future congestion by shifting small aircraft movements to off-peak times. A scale of charges was devised that raised landing fees for smaller aircraft by between 43% and 260%, depending on the time of day. At the same time, incentives to use larger aircraft were created by reducing the landing fees they paid.²³ During the first phase of the PACE project, which lasted for about six months from the middle to the end of 1987, landing fees were calculated on the basis of a combination formula that provided for a fixed basic fee of \$88 per landing irrespective of aircraft size and a variable weight-related component of 47 cents per thousand pounds of landing weight.²⁴ There are indications that the problem of congestion was significantly reduced within a short time of the introduction of this pricing mechanism, partly because commuter airlines switched to larger and hence more efficient aircraft and partly because the number of take-offs and landings by small private jets at Boston Logan airport fell by 20-30%.

Flights by corporate jets, on the other hand, proved less responsive to price. As the owners of small aircraft are often politically and economically influential lobbyists and considered that this new pricing policy harmed their interests, they lodged objections with the FAA in the spring of 1988.²⁵ The complainants argued that Massport's new scale of charges was unfair, disproportionate, unjust, discriminatory and hence unconstitutional. After about six months of investigations and hearings, their complaint was accepted in December 1988; in its judgement the DOT ruled that Massport's price reform was unlawful and ordered the immediate termination of the pricing policy. Ironically, the grounds given for the decision were that the

charges had been calculated on the basis of a cost allocation method that could not be justified economically. Citing the peak-load pricing theory, the DOT said there was no reason why the operators of small aircraft should pay the fixed basic charge even at times of low demand, when they did not impose congestion costs on other runway users.²⁶ As Massport's main intention, in the opinion of the DOT, had obviously been to eliminate small aircraft movements at Boston Logan airport, this attempt to regulate and control market access clearly exceeded the Authority's powers and collided with the duties and objectives of the Department itself.²⁷

It is significant, however, that in its decision the DOT fundamentally acknowledged the right of every airport to introduce more efficient scales of landing fees, provided they complied with the law. It referred in particular to the peak surcharge policy practised at the New York airports of Kennedy, La Guardia and Newark. However, given that Massport incurred costs of \$2-3 million solely on account of the legal disputes over the PACE experiment, it is highly unlikely that other US airports will attempt to reform their landing fees in the near future.

Conclusions

The lessons from the USA suggest at least four conclusions. First, the deregulation of air transport is incomplete if the procedures for awarding take-off and landing rights are not reformed at the same time. Indeed, there is reason to fear that unless the procedures are reformed the problem of congestion will become dramatically worse, entailing high economic costs. Secondly, the proposals made so far by the German Government and the EC Commission to overhaul the allocation of slots are far from enough to get to grips with the problem. Thirdly, the initial success of slot trading and time-related variable landing fees in the USA confirm that it is possible in practice to move closer to more efficient slot allocation procedures. At all events, there is no case for retaining "grandfather rights" on the grounds that more efficient mechanisms are impracticable. Fourthly and lastly, the switch to more efficient allocation procedures entails a loss of power and influence on the part of the regulatory authorities and the loss of economic rent on the part of the airlines that have been favoured hitherto. The latter will fight to defend their privilege and will have no hesitation in putting forward specious arguments and trying to persuade us they are acting for the good of society.

²² Ibid.

²³ See J. R. G. Brander, B. A. Cook and J. E. Rowcroft: Deregulated Airline Markets as Open Access Commons, in: *The Economist*, Vol. 137, No. 4 (1989), pp. 466-475, here p. 473. Until the introduction of the PACE, landing fees were charged on the traditional basis of aircraft weight, subject to a minimum fee of \$25. Certain commuter flights were exempted.

²⁴ See Department of Transportation (DOT), Office of the Secretary: Investigation into Massport's Landing Fees. Opinion and Order, Washington, D.C., 22nd September 1988 (FAA Docket 13-88-2), p. 3. An exception was made for certain regional flights, which thereafter were charged a fixed landing fee of \$25.

²⁵ DOT, op. cit., p. 1.

²⁶ DOT, op. cit., p. 9.

²⁷ See Calvin Davison and Lorraine B. Halloway: The Two Faces of Section 105 – Airline Shield or Airport Sword, in: *Journal of Air Law and Commerce*, Vol. 56, No. 1, Fall 1990, pp. 93-123, here p. 112.