

Some effects of intensified security and safety procedures on airports and airlines

The case of decreasing optimum airplane size

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When Pan Am Flight 103 crashed near Lockerbie, Scotland, December 1988, killing 270 people, it was the worst act of terrorism ever in the air transport industry. After September 11, 2001, it almost appears as a footnote in history. People no longer considered air transport as a safe way of travelling and demand for air transport services expressed by passengers decreased enormously. Airlines responded by cutting capacity and lowering prices of their services. This resulted in better load factors, but still yield is very low. This article demonstrates that airports have a major stake in the airlines' struggle to overcome the effects of September 11 on profitability. The explanation of this statement is found in a simple total cost based model of optimum plane size.

Airports and airlines serve the end-user by means of a sophisticated system of relations. After the airborne attacks on WTC and Pentagon buildings, air transport faces some serious problems. Intensified security measures at airports after September 11, are affecting the relation between airlines and airports. A total cost based model of optimum plane size, shows that after the events of September 11 the optimal plane size could have decreased.

Together airports and airlines serve customers in a system of complementary services. Actually, the end – user is a customer of the airport and the airline simultaneously. The

Airline	Flight	Destination	Scheduled	Gate	Remarks	New time
	3R203	Las Piedras	13:00	R2		
AA	AA314	San Juan	14:45	05	Cancelled	
AA	AA1298	Miami	15:03	06	Cancelled	
DL	DL516	Atlanta	15:35	08	Cancelled	
KL	KL741	Lima	15:45	01		
S3	S3-1331	Caracas	15:55	R1		
US	US654	Philadelphia	16:04	04	Cancelled	
S3	S3-1312	Las Piedras	16:15	R2		
AA	AA796	New York	16:19	07	Cancelled	
LM	LM810	Curaçao	17:00	R1		
3R	3R205	Las Piedras	17:00	R2		
DL	DL854	New York	17:10	08	Cancelled	
LM	LM516	Curaçao	18:35	R1		
VH	VH821	Caracas	18:50	02		

September 11, 2001 led to cancellations and intensified security

consumer uses the air transport service provided by the airline. In this service, ground handling activities and flying are melted to one integrated service. The increased hassle and time costs at the airports makes the air transport service less attractive. After September 11, people are more sensitive for travel time. In economic terms, the time elasticity of demand is now higher than before September 11. The awareness of the consumer's effort makes time being recognized as a major input of passengers in the consumption of air transport services. Especially for frequent flyers, the increased time costs for the passenger (user cost) resulted in an alternative mode choice for short distance travelling. A change in the modal split seems to be one of the effects on shorter travel distances.

The airlines' reaction on the decreasing demand of air transport

was to cut capacity and offer flights for very low prices. Cutting capacity means flying less frequent. It is commonly assumed that demand reacts rather in-elastically to frequency offered. The first effect thus was that load factors rose. On the other hand, price wars emerged. Therefore, yields decreased. At airports, the increasing security measures resulted into increasing ground handling capacity utilization. Their reaction

was to charge more for their services to cover the increased security costs. Before September 11, the costs of security checking used to be a

part of the negotiations

between airlines and airports. These costs have therefore never been 'visible' for passengers. To cover the extremely increased security costs after September 11 the 'internal character' of these costs changed into 'external'. Security surcharges are now sometimes charged to passengers directly. Costs are passed on to the customers and are no longer in control of airlines. Beside uncertainty in travel time, passengers are now also confronted with uncertainty in terms of 'money'. Airports are more and more in the driver's seat regarding the definition of the total level of service to passengers, whereas in former days the airlines were. If airports only care about covering costs and do nothing to improve their services, in the long term this policy will have negative effects for airlines and for airports. Some of these negative effects can be explained by a total cost based model of optimum plane size.

In a 'total cost' based model of optimum plane size, user and producer cost have to be distinguished. User costs are costs related to time and effort put in by the consumer of the service. For example, consumers have to make costs when going to or from the airport, costs of check-in times, and hassle time in security procedures. Producer costs are the average costs of producing a standardized transport service: seat-miles. User and producer costs together are the total costs of the air transport service.

It is difficult to identify some empirical evidence for the user cost variable. Nevertheless, it is accepted to state that the user cost increase as the airplane size increases. Passengers flying on a large aircraft have to check-in earlier and have more queuing at the airport than passengers flying on a smaller aircraft. Regarding the producer cost, a database with direct operating costs for in-production aircraft of several types has been analyzed. This analysis supports the statement that average costs of producing a standardized air transport service (seat - miles) decreases as the airplane size increases. Now it is clear that as the airplane size increases, the user cost increases as well and the producer cost decreases. Trading off the increasing user cost and the decreasing producer cost will result into a plane size that matches the minimum level of total costs (producer + user cost). This size is the optimum aircraft size.

Back to the main issue of this article: "Airports have a stake in the airlines' struggle to overcome the effects of September 11th on profitability". The question resulting from this statement is: "What could happen if airports would only care about covering costs due to increased safety and security procedures after September 11?". In a total cost based model of optimum plane size, the following scenario may be valid:

The extra security costs of the airport are under control, but the passenger waiting time and hassle still is out of control. That makes it justifiable to state that the user cost in air travel will rise. Let us keep the model as simple as possible, and assume we are

dealing with a simple flight from A to B. On this direct flight, the plane is not affected by longer check-in times and security hassle. The passengers just have to be at the airport earlier and the airplane's turnaround time is not affected. So, assuming a simple direct A to B flight makes it justifiable to state that the producer cost on this particular flight did not change after September 11. Therefore, the producer cost in the model did not change. The increase of user cost on a particular flight increased the total costs of the air transport service as well. As the total costs level changes, the optimum plane size will change. In the model, a new minimum level of total costs matched with a smaller optimum size. We may not forget that flying smaller planes will withhold airlines from gaining economies of scale and, larger airports will be confronted with more aircraft movements, and therefore more congestion.

The model is supported by a recent published article at the website of [airwise.com](http://airwise.com/news.airwise.com/display/story.html?name=2002/06/1023793862.html):
news.airwise.com/display/story.html?name=2002/06/1023793862.html.
David Siegel, CEO of US Airways, states that in the airlines struggle to recover from the impact of the September 11 attacks, it will change its fleet towards more regional jets. "The growth of regional jet operations represents the future. It is central to the successful restructuring of our company." he said.

Based on examining the sophisticated relation between airports and airlines, and analyzing what could happen if airports after September 11 would only care about covering their costs in a total cost based model of optimum plane size, the following lessons can be learned:

- If only the costs at the airport are covered, still the airlines suffer.
- If airports do nothing, they prevent airlines to benefit from economies of scale.
- Airports must enable airlines to look for economies of scale and density in the airline industry, by bringing down waiting time for passengers.
- Investing in handling equipment will prevent many problems. A proper reengineering of the process used to handle customers

and their luggage could enable airlines to put in service larger airplanes.

- Airports benefit from larger planes as well: flying larger planes means less congestion.

Considering the lessons to be learned from this analysis, it could be stated that the short-term airport policy of only covering costs hurts the airport client; the airline. It should therefore be the airport's first responsibility to protect its client's need to attain economies of scale.