Maximize Market Competition—not Utilization: That's the Law

An Exhaustless Inc. White Paper

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During the winter of 2006-2007 there were several well-publicized incidents in which airline passengers endured lengthy delays grounded on New York runways. These delays led states to court, where they unsuccessfully tried to impose their own consumer protections for passengers[1]. These consumer protections were eventually codified in The FAA Modernization and Reform Act of 2012.

In their continuing effort to efficiently manage the NAS, in March 2007, the FAA added the automated process called Adaptive Compression to their traffic management tools[2], specifically the way they manage changes to reservations for airport slots during live operations. This was an addition to the Airspace Flow Program, begun months earlier. In 2007, congestion delays at airports grew so long that Congress held hearings and commissioned studies on the problem. Since then, delays have only gotten worse (see Figure 1), and Congress is still looking for answers.

Adaptive Compression is but one tool that the FAA uses to maximize utilization. However, the Airline Deregulation Act mandates that the Secretary maximize competitive market forces, not utilization. Regulators, not passengers, decided that maximizing utilization was in the public's interest. The DOT policies that prioritize utilization play a significant role in delays, and substitute physical competition for market competition.

And yet, it is understandable that the DOT has relied on maximizing utilization; they have no authority to introduce market-based mechanisms to manage the slots, so they use the tools that they can to manage demand at congested airports.

Other DOT/FAA policies initiated or proposed to reduce delays and/or increase utilization[3]:

[1] http://cases.justia.com/federal/appellate-courts/ca2/07-5771/07-5771-cv_opn-2011-03-27.pdf?ts=1410915880

[2] https://www.faa.gov/about/history/media/final_1997_2016_chronology.pdf, May 23, 2007 announcement.

[3] To reduce delays, you must reduce utilization. See Exhaustless' White Paper, The Limits of Arrival Rate: You Can't Have It Both Ways.

Slot-limits

The FAA imposes slot-limits at congested airports, which cap the flight volumes – of both scheduled and unscheduled flights - to prevent flight schedules from exceeding the operational capacity of the airport. The FAA stated that the slot-limits were calculated based on the historical operating capacity of the airport using the UMD model. The other variable that was modeled was the cancellation rate, which was described as the upper limit of a delay.

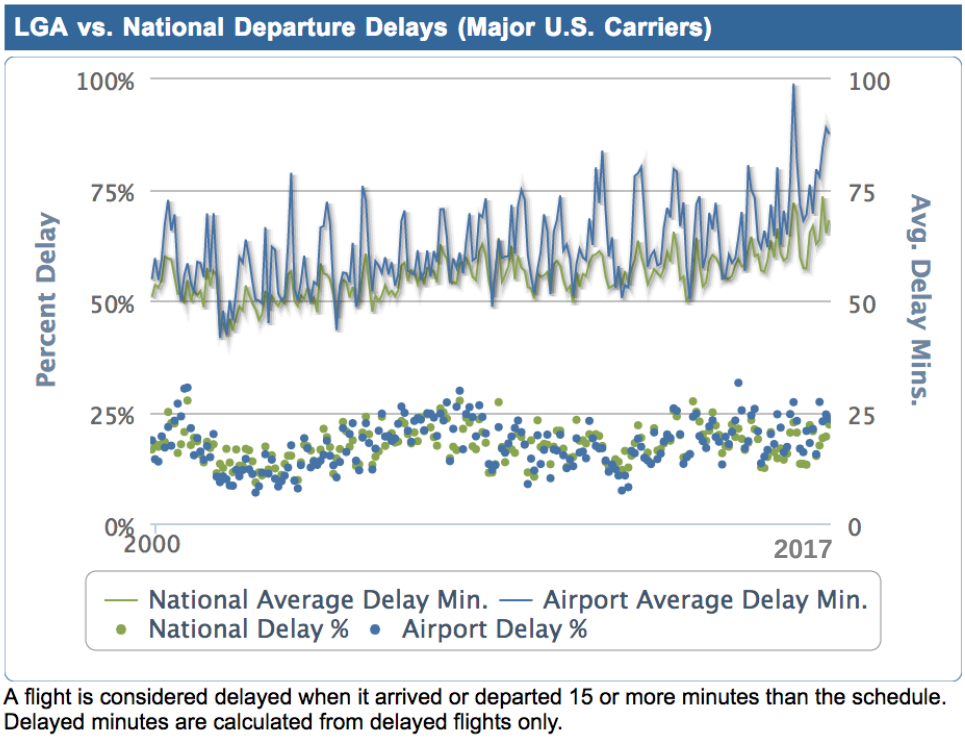

Figure 1. BTS Delay Data for LaGuardia, 2000 – 2017, Years ending in June

The slot-limits at LGA has remained the same since 2007 when the average delay was 50 minutes. Yet the delays have continued to increase since then to an average delay of 75 Who decided that 50 minutes was a reasonable delay or that 90 minutes was unreasonable?

Use-or-lose slot policy

The slot-holder must use the allocated slot 80% of the time, with waivers provided in unusual situations. The 80% is said to provide a 'reasonable allowance' for cancellations.

From the FAA:

> *This proposal would better **ensure that the scarce resource of slots is used optimally**. The FAA acknowledges that requiring carriers to operate their full allocation of slots could increase the number of operations. However, **any increase in delays over current levels should remain within the accepted delay levels** that were modeled at the time the current Orders, and corresponding hourly slot limits, were implemented. This model assumed full slot usage.* [4] *(Emphasis added)*

So, the main goal of the use-or-lose policy is to maximize utilization. The 80% threshold was arbitrarily selected by regulators, not by markets. And the 'accepted delay level' was just before cancellation, so delays were unbounded up until they led to cancellation. What would passengers set as an acceptable delay level? Would they limit the maximum level, or the average level?

Automated Traffic Management Processes

Background traffic management processes have automated and streamlined the task of reshuffling the operational schedule in response to flight delays or cancellations. Dynamic scheduling processes[5], including adaptive compression, follow a "greedy" (software-engineering sorting term) policy of rescheduling flights to their soonest departure time. They are designed to maximize utilization by preventing any slot from being "unused." The more aggressive the adaptive optimizations applied, the more the executed schedule is likely to deviate from the planned scheduled.

The fact that manually rescheduling flights was time-intensive served to slow down the process of reshuffling and allowed any slack to gracefully absorb a higher percentage of random delays. Today's automated scheduling tools aggressively seek to reduce slack, which is seen as unused capacity rather than as a buffer for randomness. Air traffic controllers are unlikely to return to the time-intensive process of manual reshuffling.

[4] https://www.federalregister.gov/documents/2015/01/08/2014-30378/slot-management-and-transparency-for-laguardia-airport-john-f-kennedy-international-airport-and#p-57

[5] https://www.fly.faa.gov/Products/Training/Traffic_Management_for_Pilots/TFM_in_the_NAS_Booklet_ca10.pdf

Developers for adaptive compression foretold the higher variability in delays that would result from automation in their 2006 documentation. Congress was told about the deployment of the process, but the expectation of higher unpredictability[6] was left out of the testimony.[7]

Air traffic controllers argue that the schedule at LaGuardia hasn't changed much in the past 30 years, so increased delays must be caused by something other than the flight schedule. And while it is true that the slot-limits that are supposed to restrict the schedule have not changed in the past decade, there have been significant changes during that period in how the traffic management system executes the schedule to include unscheduled events en route. Because these schedule changes are made by automated background processes, they are less visible to the controllers. But the resulting imbalance of arrival activity at the expense of departures is obvious, causing further ground delays and the familiar queue of aircraft on the runway. This is especially egregious at airports like LaGuardia where arrivals and departures share the runway.

NextGen

When NextGen was first proposed, it was described as the solution to the excess-demand problem. While NextGen makes sense as a routine upgrade of avionics to use modern GPS technology, Congress has long known that it will not reduce flight congestion in high-density regions. Recent court rulings over noise[8] are expected to slow down NextGen deployment, making the program's schedule unclear.

ATC Privatization

The administration believes that privatizing air traffic control would lead to faster adoption of NextGen, which may be true. And there may be other benefits to privatizing ATC, such as employee retention, budget control, and the ability to charge for usage of air traffic resources. We are neutral on this topic. But the experts have all spoken – NextGen will not increase capacity or significantly reduce delays from congestion.

Supply and demand are not affected by the privatization of air traffic control, as this will not, and cannot, place a market price on the slot. We must let markets price the use of airspace capacity to reduce peak-demand times and reduce utilization and delays.

[6] http://cdm.fly.faa.gov/wp-content/list_yo_files_user_folders/cdm_editor/cdm_arch_gen_info/gdpe_Principles_of_Adaptive_Compression.doc

[7] https://www.transportation.gov/content/airline-delays-and-consumer-issues

[8] https://www.skyharbor.com/docs/default-source/pdfs/flight-paths/faa-flight-paths-decision-details-8-29-17.pdf?sfvrsn=0

Conclusion

To continue with maximum-utilization policies is to continue the descent in prices and service. To effectively manage the limited resource of slots in congested markets, we must follow the law and maximize competitive market forces. We need to implement market-based mechanisms that will tie higher profits to higher service quality. Passengers must compete by paying a premium for quality service, and airlines must compete by paying a premium to service the reduced-congestion slot. This is the way to reshape passenger demand and market supply for congestion-free flight service rather than forced utilization policies.