

An Auction at LaGuardia

Questions and Issues Related to Auction Design

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There are two critical points in every aerial flight -- its beginning and its end.

— Alexander Graham Bell, 1906.

It only takes five years to go from rumor to standard operating procedure.

— Dick Markgraf

Agenda

- ⌘ What are the goals?
- ⌘ What is being auctioned?
- ⌘ What are the property rights associated with sale?
- ⌘ What are the restrictions/conditions associated with secondary trading?
- ⌘ Auction details
- ⌘ How often does the auction take place?
- ⌘ How are the revenues to be used?

What are the Goals of the Auction?

- ∞ Decrease passenger delay
- ∞ Provide more predictability
- ∞ Increase passenger throughput
- ∞ Provide incentives to increase future capacity
 - ∞ Improve infrastructure
 - ∞ Provide incentives for better airspace use
- ∞ Allow new entrants
 - ∞ May *reduce* airfares due to competition
- ∞ Assure access from LGA to smaller communities
- ∞ Revenue generation
 - ∞ For what purpose?

What is a slot?

∞ What is a “slot”?

∞ “Slot” = “a reservation for an instrument flight rule takeoff or landing by an air carrier of an aircraft in air transportation.”

∞ Right to land or take off:

∞ *within a given period of time* (e.g. 15 minute period)

∞ *At a specific airport*

What are the Property Rights that Go Along with a Slot?

- ✎ Use of the Airport (gates, baggage facilities, ticketing)
- ✎ Length of lease must be specified – what happens at end of lease (reverts to FAA, owned indefinitely given “proper” use?)
- ✎ Right to sell sub-lease use of slot for any portion of lease period
- ✎ Any restrictions on ownership?
 - ✎ Cannot have leases on greater than x% of airport slots?
 - ✎ Specific allocation for
 - Small communities
 - International treaties (not relevant to LGA)
 - New entrants
- ✎ What happens when slot “not available” on day of operations?

What should be Auctioned?

✎ Auction each arrival and each departure slot?

✎ Airline may face *exposure problem*

✎ Couple an arrival with a departure?

✎ If so, when must departure take place?

✎ Most general: Let bidder determine (through *combinatorial bidding*)

✎ Is feasibility an issue?

✎ Complexity for bidder an issue?

Slot Allocation: How much should be auctioned?

✎ What is the capacity at LaGuardia?

- ✎ Capacity will determine what is being auctioned
- ✎ But... capacity is currently not well- defined

✎ Depends on distribution of aircraft

✎ Depends on weather conditions (Visual Flight Rules (VFR) versus Instrument Flight Rules (IFR))

✎ Is capacity known? (i.e. How should capacity be measured?)

- ✎ Number of arrivals/departures
- ✎ Number of passengers served
- ✎ Capacity of airport and surroundings

What Happens at Day of Operations?

∞ Dynamic system means there will still be some uncertainty on day of operations

- ∞ Weather (on route, at LGA, at other airports)
- ∞ Maintenance and scheduling issues for airline
- ∞ Emergency issues at airport

∞ Approaches to resolve uncertainty:

- ∞ Collaborative Decision Making (CDM)
- ∞ Day-of-operations exchange
- ∞ Auction specifies
- ∞ Other

Auction: When and how often?

∞ For long-term property rights;

∞ Airlines require relatively long planning horizons

What Happens to the Revenue from Auction?

∞ Vouchers

- ∞ Makes current owners “whole”
- ∞ Must retain some revenue for
 - Reduction in the number of slots available
 - Cost of administering the auction and associated administrative issues
 - Other?

∞ Replaces existing taxes

- ∞ Replaces airport landing fees

∞ Goes to infrastructure improvements

∞ Goes to airports

∞ Goes to US Treasury

Auction Details I: General Principles

- ∞ Keep it as simple as possible
- ∞ Give bidders the information they need

Therefore:

- ∞ Price Discovery Necessary
 - ∞ *Activity rules* necessary to assure price discovery occurs
- ∞ All items auctioned simultaneously
- ∞ Likely need for combinatorial auction of both fungible (substitutes) and complementary goods

REMEMBER:

Auction frameworks exist as does software

Auction Details II: Choosing an Auction Mechanism

Alternative auction designs

- Non-package Simultaneous Multi-Round (SMR)
- Package-bidding Simultaneous Multi-Round (SMR)
- Combinatorial clock
 - With or without proxy final round

Must decide how much information is available to bidders during auction

- Too much can lead to collusive behavior
- Too little and bidder does not know what to bid

AUCTION DESIGN III: Other Issues

☞ Transitioning (Incumbency)

- ☞ Vouchers
- ☞ Phased in over a number of years

☞ Details matter

- ☞ Pricing
 - ☞ Bidding language
 - ☞ Tools for bidders
 - ☞ Last-and-best
 - ☞ Transparency
 - ☞ Reproducibility
- ☞ Can auction handle complexities/characteristics of other airports?
- ☞ Legislative and rule-making issues

Discussion