



# Airport Economics

Istanbul Technical University  
Air Transportation Management, M.Sc. Program  
Aviation Economics and Financial Analysis  
Module 14  
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# Outline

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- **The impact of infrastructure charges (airport and air navigation) and airline costs and competitiveness**
- **Pricing policies: what carriers have to pay**
  - Residual pricing
  - Compensatory pricing
- **Passenger charges**
- **Risk in the value chain**
  - Airport vs airline markets

## Outline – cont.

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- **Slots and capacity**
- **Regulation of prices**
  - Rate-base rate of return
  - Cost plus
  - Price cap
  - Other (consultation / monitoring / trigger regulation / arbitration / contracts)

## Impacts of Charges



# Impacts on Airlines

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- **Airport charges are a small portion of an airline's operating costs**
  - Especially for long-haul routes
- **Charges have a larger effect on LCCs and short-haul routes**
  - LCCs have a smaller cost base than legacy carriers
  - Short-haul routes will pay a higher volume of charges

## Impacts on Airlines – cont.

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- **Generally, the cost of airport charges will be less than the costs of changing airports to avoid those costs**
  - The negative impact on demand would also contribute to outweighing the airport charges

# Airline and Passenger Charges



# User Charges

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- **Chicago Convention (1944), Article 15, Chapter 2:**
  - Uniform conditions for aircraft of all contracting states
  - Non-discriminatory charges for international air services



## User Charges – cont.

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- **ICAO Policies on Charges for Airports and Air Navigation Services (2009), Doc 9082/8:**
  - Users must bear their full and fair share of the cost
  - Airports should maintain full financial records
  - Full cost includes operating costs of airport and essential services, as well as interest, depreciation, repairs and management
  - No charges for facilities not used
  - Non-discrimination between domestic and foreign carriers
  - Non-aeronautical revenues can be used towards cost base

# Aeronautical Charges

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- **Landing fee (based on MTOW)**
  - Generally a fixed rate per tonne
  - A main source of revenue for airports
- **Terminal area navigation fee**
- **Aircraft parking and hangar fee**
- **Passenger service charges**
  - Another main source of revenue
- **Security charges**

## Aeronautical Charges – cont.

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- **Noise and emission charges**
- **Cargo service charges**
- **Ground (ramp and traffic) handling charges**
- **Concession fees for aviation fuel & oil**

# Passenger Charges

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- **One of the main sources of revenue for an airport**
- **Commonly charged on departing passengers**
- **The level of charges varies across airports**
  - Some have lower charges for domestic pax
    - Political reasons
  - Some have additional fees for connecting pax
    - Others remove this fee to attract connecting traffic

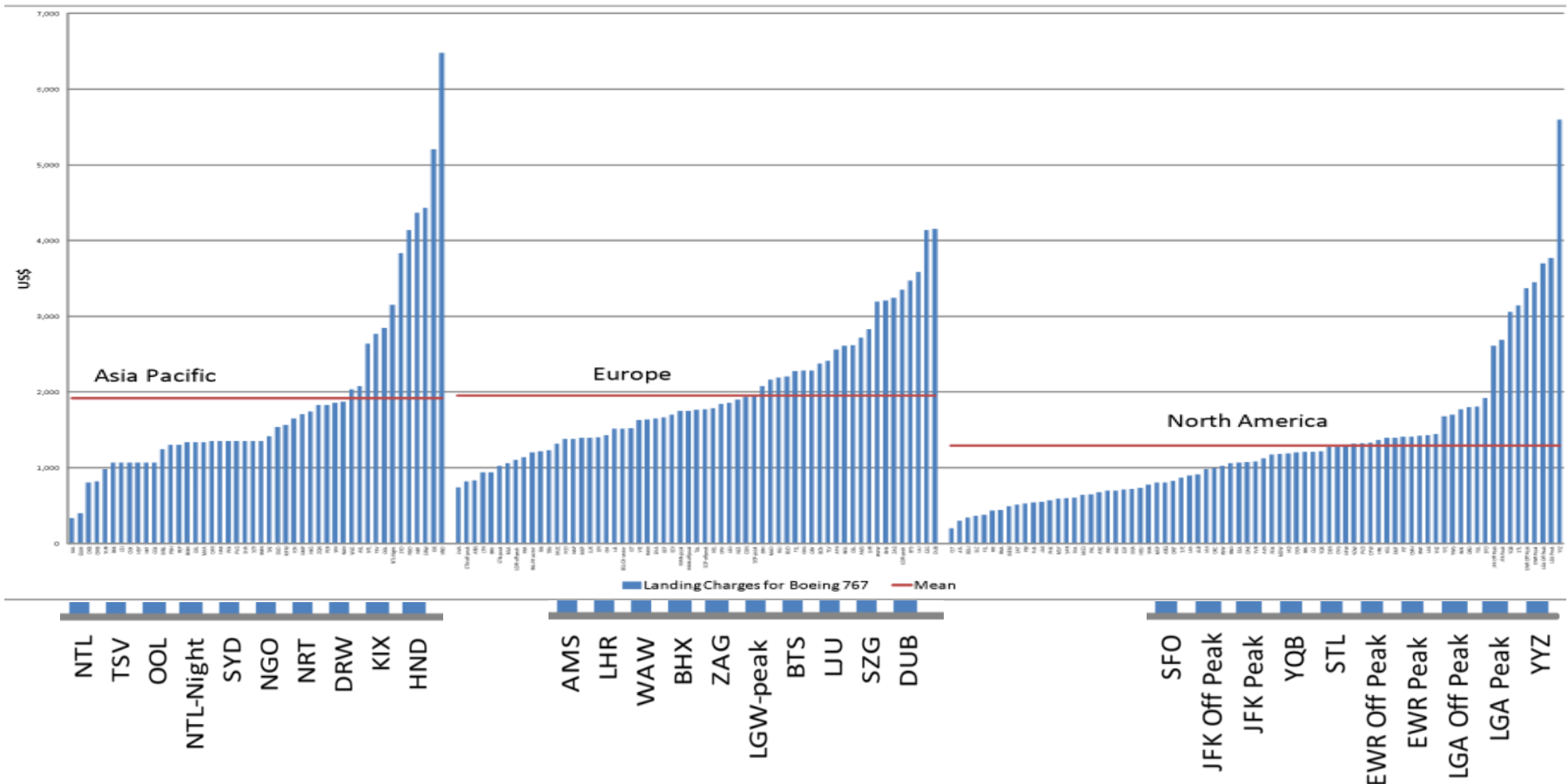
Source: Graham (2001)

# Landing Charges Example

	Boeing 747 - 400 2-class, 524 seats MGLW: 630 000lbs MTOW: 875 000 lbs	Airbus 320 - 100 2-class, 150 seats MGLW: 142 000 lbs MTOW: 162 000 lb	Boeing 767-400 2 Class, 304 seats MGLW: 204 000 lbs MTOW=450,000lb)	CRJ200 - LR 50 Seats MGLW: 47 000lbs MTOW: 53 000 lb
ATL	300	67	161	22
CLT	417	93	225	30
SLC	587	131	316	42
TPA	596	133	321	43
FLL	619	138	333	45
LAS	795	178	428	57
MCI	952	212	512	69
SNA	1089	243	586	78
SJC	1174	262	632	85
MCO	1269	283	683	92
CVG	1304	291	702	94
MSP	1526	340	821	110
DCA	1532	342	825	110
SEA	1584	354	853	114
YVR*	1702	315	875	87
LAX	1754	391	944	126
IAH	2001	447	1077	144
ORD	2070	462	1114	149
SFO	2175	485	1171	157
YUL*	2725	504	1401	165
BOS	2738	611	1474	197
DFW	2993	668	1611	216
LGA	4303	960	2317	310
JFK*	4681	867	2408	284
EWB*	5031	932	2588	305
YYZ*	12290	2275	6321	745

Source: Air Transport Research Society (2008)

# Landing Charges B767-400



Source: Air Transport Research Society (2012)

# Non-aeronautical Charges

Concession fees



Rentals of airport space/equipment



Parking / car rentals



Off-airport activities



# Airport Charges in the United States

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- **Residual agreements**
  - Under the residual method, after an airport deducts all non-airline revenue from its total annual expenses, the airlines are responsible for the remaining (residual) amount, and rates are set accordingly.
- **Compensatory agreements**
  - Under the compensatory method, an airport is divided into various cost centers (airfield, terminals, parking areas, etc.) & airlines pay a share of those costs, based on the amount of space they occupy, planes they land/depart and other measures of airline use.



# Passenger Charges in the U.S.

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- **Airports are not legally allowed to charge passenger fees**
- **Passenger Facility Charge (PFC) can be used**
  - Funds generated go towards infrastructure projects
  - Airlines do not have influence on how funds are allocated

# Revenue Sources for U.S. Airports

**Table 12.6** Sources of revenue for the 32 US airports with largest number of annual passengers in 2006

Revenue source	Revenue (\$000)	Percentage of total operating revenue	Percentage of total revenue
Terminal rental charges	2 298 351	25	18
Landing fees	1 954 598	22	16
Cargo and hangar rentals	260 011	3	2
Fuel sales	105 240	1	1
Other	398 246	4	3
Total aeronautical revenue	5 016 447	56	40
Land and non-terminal facilities	294 835	3	2
Terminal concessions	922 634	10	7
Rental cars	712 149	8	6
Parking	1 552 794	17	12
Other	552 804	7	5
Total non-aeronautical revenue	4 035 215	44	32
Total operating revenue	9 051 662	100	72
Interest income	661 542		5
Grant receipts	924 221		7
Passenger facility charges	1 747 435		14
Other	165 661		1
Total non-operating revenue	3 498 859		28
<b>Total revenue</b>	<b>12 550 521</b>		<b>100</b>

Source: Data obtained from FAA Form 5100-127

## Risk in the Value Chain



# Airports: Ownership Models

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- **Public ownership**
  - Administrative (functionally dependent on national, regional or local government)
  - Corporatized (independent economic entity but shares are owned by public authorities)
- **Mixed ownership**
  - Independent economic entity
  - Shares are owned by public and private investors

# Airports: Ownership Models

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- **Private ownership**
  - Independent economic entity
  - Shares are owned by private investors
  - Or by corporatized entities with mixed ownership

# Airports: Ownership and Efficiency

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- **Government majority ownership airports and airports owned by multi-level governments are less efficient than private majority ownership airports**
- **Private majority ownership airports have significantly higher operating profit margins; airports with government majority and multi-level government ownership have the lowest margins**

Source: Oum, Adler & Yu, JATM, 2006

# Airports: Ownership and Efficiency

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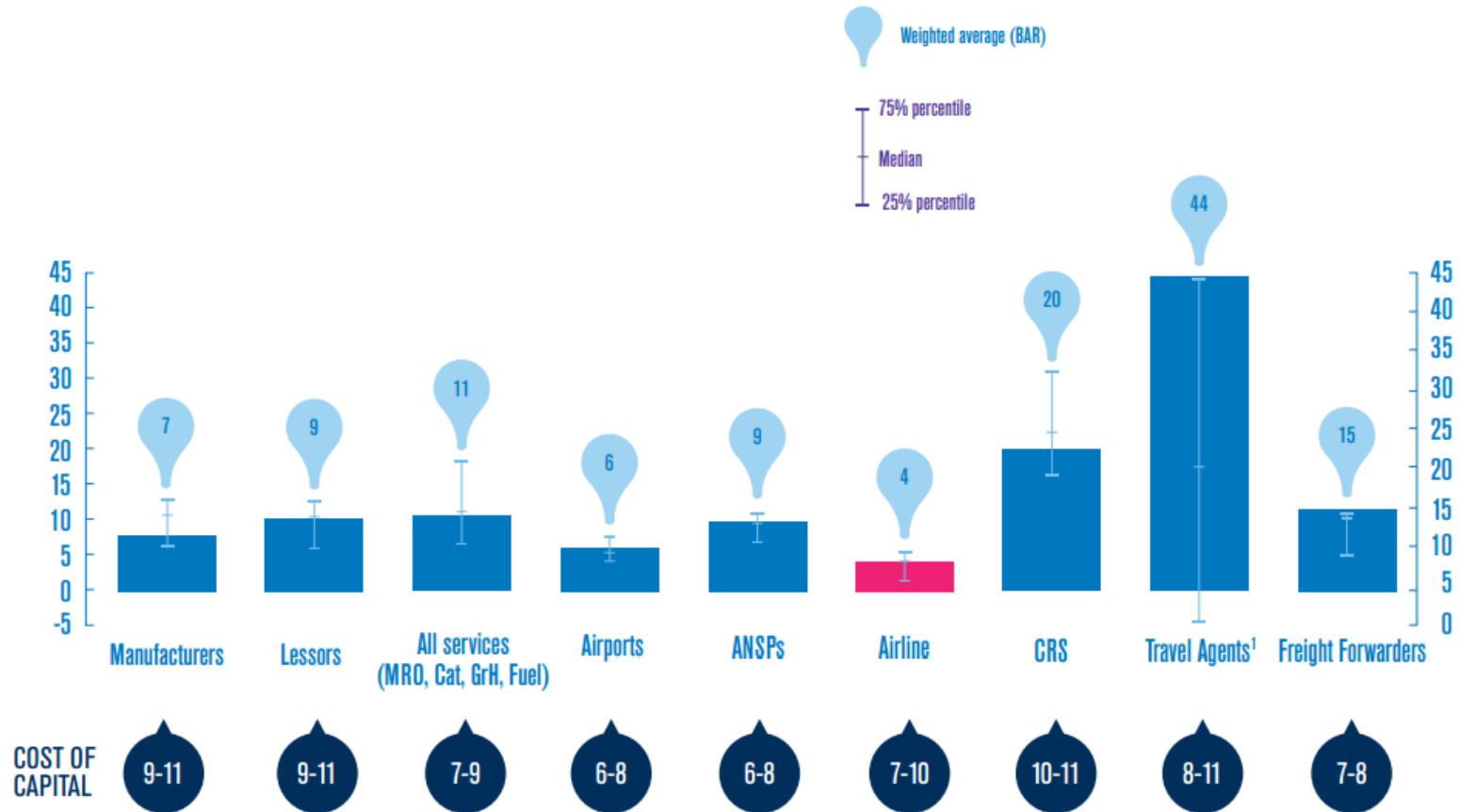
- **Private majority ownership airports have higher proportion of non-aeronautical revenues and lower aeronautical fees (excluding US airports)**
- **Airports with majority private ownership (including 100% private ownership) do not achieve significantly higher efficiency than the 100% government-owned airports, such as those in the US**

Source: Oum, Adler & Yu, JATM, 2006

# Airport Return on Capital above Airlines

CHART 12: RETURN ON CAPITAL VARIES THROUGHOUT THE VALUE CHAIN

ROIC excluding goodwill of sample, period 2004-2011, %



¹ Limited sample

Source: IATA

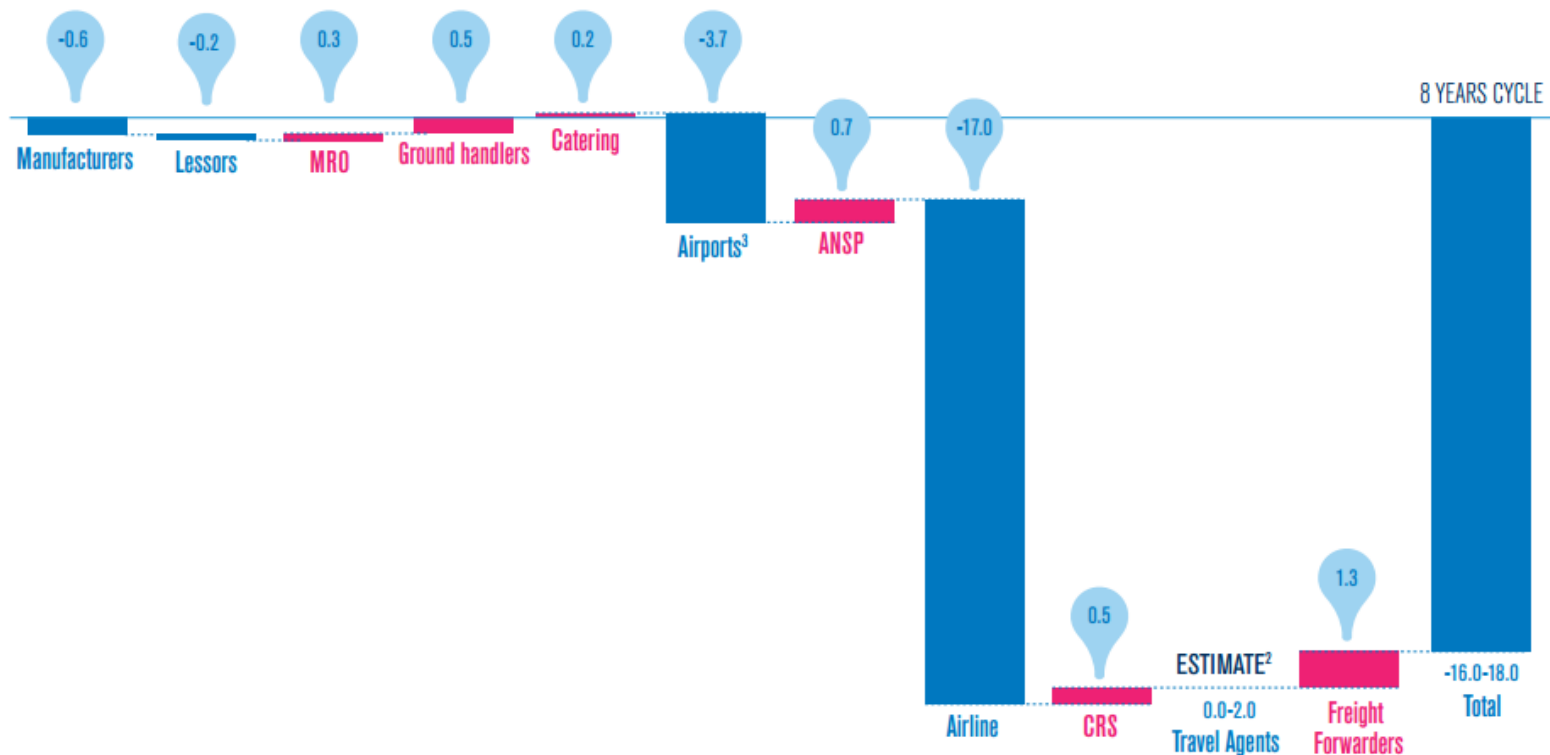
Source: McKinsey & Company for IATA



# Economic Profits Stronger than Airlines

**CHART 14: ECONOMIC PROFITS IN THE AIR TRANSPORT VALUE CHAIN (EXCLUDING FUEL AND LABOR)**

Average economic profit<sup>1</sup>, (ROIC-WACC) × invested capital, USD billion, 2004-2011



<sup>1</sup> Based on invested capital excluding goodwill, extrapolated to total industry

<sup>2</sup> Sample too small to give meaningful estimate

<sup>3</sup> Economic profit for airport sector extrapolated based on weighted average of sample excluding AENA. AENA subsequently added back to sector estimate

Source: McKinsey & Company for IATA

Source: IATA

## Slots and Capacity



# Capacity and Airport Slots

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- **Capacity is a major issue at many airports around the world**
  - Traffic is growing faster than additional capacity can be added
- **To deal with capacity issues, varying practices for slot allocation have been developed**
- **A slot is a time period for departure or arrival**
  - Could include runway, gate, customs flow, check-in counters

Source: Graham (2001)

# Slots

- **International slots coordinated through IATA slot allocation process**
  - Bi-annual conferences, with voluntary participation by airlines
  - Set procedures for over capacity airports
    - Grandfather rights
    - Airport coordinator (often from national carrier)
- **The EU has its own slot allocation regulations**
  - Similar to IATA but mandatory rather than voluntary
  - Coordinator must be independent

Source: Graham (2001)

## Slots – cont.

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- **Slots scarce at peak times at congested airports**
  - Tokyo Narita
  - London Heathrow
  - New York City La Guardia, JFK
  - Washington D.C.
- **In the United States, at slot-controlled airports, slots can be traded, bought or sold**
  - La Guardia and Washington Reagan

Source: Graham (2001)

## Regulatory Schemes



# Need for Regulation

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- **Airports are being commercialized and privatized**
  - Some have market power and could abuse this power
- **Regulation aims to allow airports to:**
  - Receive an acceptable return on capital
  - Have incentives towards efficient operations and investments

# Regulation Schemes

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- **Rate-of-return**

- Airports fully recover costs
- And earn an allowed profit or reserve
- Used in the Netherlands, Germany (Dusseldorf), Italy
- Can lead to airports not being cost-effective and can lead to overinvesting

- **Price cap**

- Incentives for cost-efficiencies while controlling price
- Used in the UK, Ireland, Germany (Hamburg), India, Chile

Source: Graham (2001)



## Regulation Schemes – cont.

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- **Price Cap – cont.**

- Formula for maximum price
- Price cap = CPI-X or RPI-X
  - CPI = consumer price index; RPI = retail price index
  - “X” factor reflects productivity gains
- Allows for unlimited profit levels

- **Default Price Cap**

- Option between a common set price cap or a separate contract with the airport operator
  - Must be agreement between the user and the operator

Source: Graham (2001)

## Regulation Schemes – cont.

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- **Trigger regulation  
(price monitoring/“light-handed”)**
  - May trigger hard-handed regulation
  - Used in Denmark, Australia and New Zealand
- **Consultation / Arbitration**

# Accounting Methods for Price Caps

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- **Single-till**
  - Both aeronautical and non-aeronautical operations are included when setting prices
  - Commercial revenues can be used to reduce airport charges
- **Dual-till**
  - Only aeronautical operations (revenues) are included when setting prices
  - Incentives towards increasing commercial revenues
    - Will not cause airport charges to be lowered

Source: Graham (2001)

# Regulations - Benefits and Costs

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- **Benefits**

- Constrains exercise of market power
- Prevents airports from charging excessive prices
- Transparency and predictability of pricing

- **Costs**

- Administrative costs (staff, industry expertise, etc.)
- Monitoring costs (regular reporting, compliance verification)
- Intervention costs (airlines, airport tenants, etc.)
- Reduced efficiency

## Airport Trends



# Future Trends

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- **Global trend towards airport privatization to continue**
  - Just commencing in the U.S. (e.g. Chicago Midway)
  - Lease or purchase
- **Airports need to be financially self-sufficient**
- **Governments will continue to divest airports, but**
  - increase regulatory rules & constraints
    - security and safety issues
    - political & regulatory matters

## Future Trends – cont.

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- **Greater influence as a stakeholder**
  - Air policy, bilaterals, greater appreciation of role of airports



## Thank You!

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## Possibly remove Slides from Com 444



# Airports: Expansion

- **New airports**
  - Expensive
    - few in NA and Europe
    - many in Asia
  - Existing airports (?)
    - split traffic
    - shut down
  - Location
    - Transportation
    - Noise/safety issues
    - Environmental impact



# Airports: Expansion

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- **Existing airports**
  - Build JIT
    - Time development with demand
    - Cost versus congestion
  - Additional runways
  - Terminal building

# Airports: Passenger Traffic

<b>BUSIEST AIRPORTS – TOTAL PASSENGERS</b>				
<b>TOP 10 WORLD AIRPORTS BY PASSENGERS</b>				
<i>Total Passengers: arriving and departing passengers; direct transit passengers counted once</i>				
<b>RANK</b>	<b>CITY</b>	<b>CODE</b>	<b>TOTAL PASSENGERS</b>	<b>% CHANGE</b>
1	Atlanta GA, USA	ATL	92 389 023	3.5
2	Beijing, China (People's Republic of)	PEK	78 675 058	6.4
3	London, United Kingdom	LHR	69 433 565	5.4
4	Chicago IL, USA	ORD	66 701 241	(0.1)
5	Tokyo, Japan	HND	62 584 826	(2.5)
6	Los Angeles CA, USA	LAX	61 862 052	4.7
7	Paris, France	CDG	60 970 551	4.8
8	Dallas/Fort Worth TX, USA	DFW	57 803 439	1.5
9	Frankfurt, Germany	FRA	56 436 255	6.5
10	Hong Kong, China	HKG	53 328 613	5.9

Source: ACI (2012)

# Airports: Cargo Traffic

BUSIEST AIRPORTS – CARGO (FREIGHT AND MAIL)				
TOP 10 TOTAL CARGO AIRPORTS 2011				
RANK	CITY	CODE	TOTAL CARGO	% CHANGE
1	Hong Kong, China	HKG	3 976 768.2	(4.5)
2	Memphis TN, USA	MEM	3 916 410.0	(0.0)
3	Shanghai, China (People's Republic of)	PVG	3 085 267.7	(4.4)
4	Anchorage AK, USA*	ANC	2 543 105.0	(3.9)
5	Incheon, Korea (Rep of)	ICN	2 539 221.0	(5.4)
6	Paris, France	CDG	2 300 063.0	(4.1)
7	Dubai, United Arab Emirates	DXB	2 269 767.9	(0.0)
8	Frankfurt, Germany	FRA	2 214 939.1	(2.6)
9	Louisville KY, USA	SDF	2 188 421.8	1.0
10	Tokyo, Japan	NRT	1 945 351.0	(10.3)
*ANC data include transit freight.				

Source: ACI (2012)

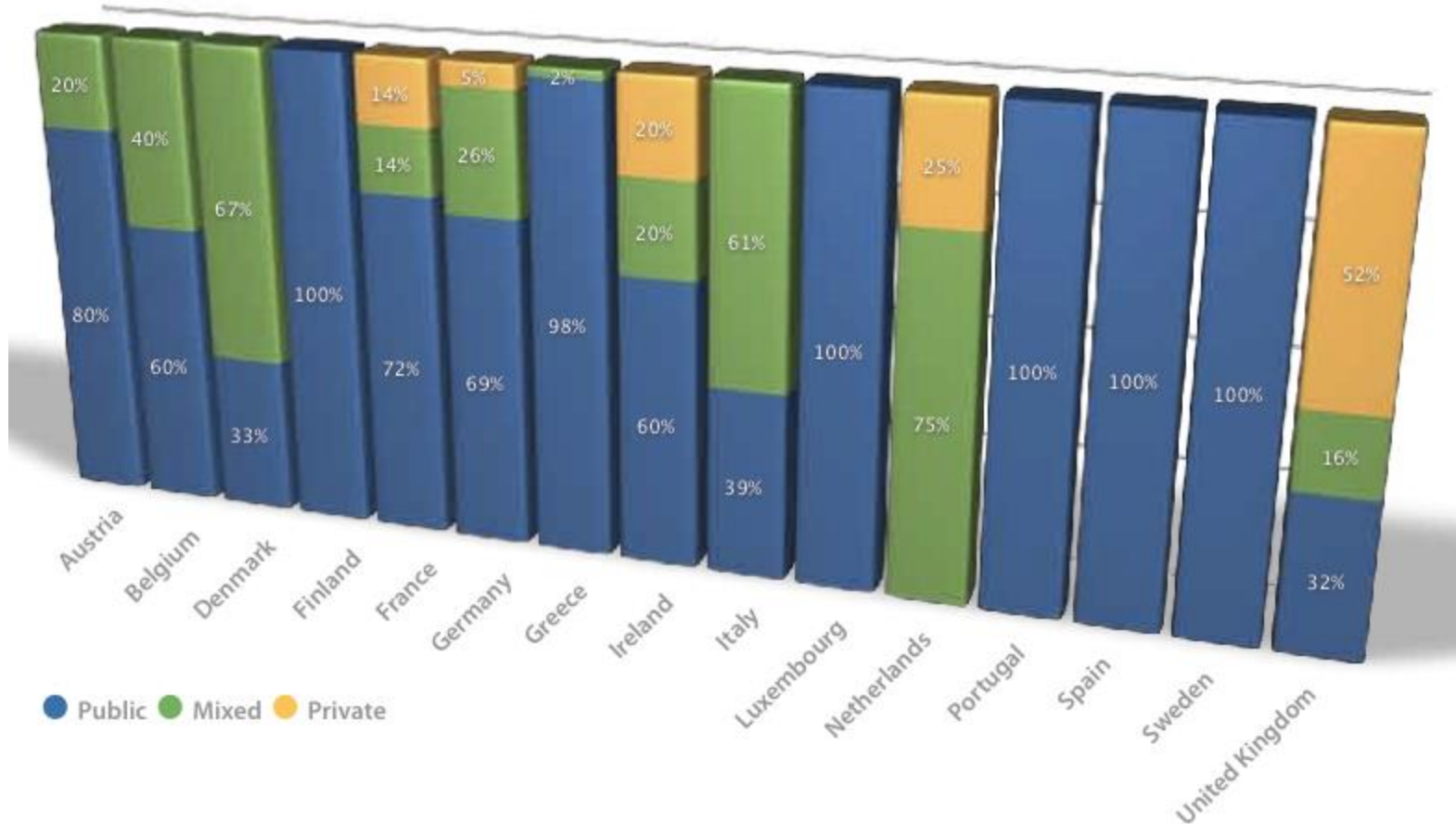
# Airports: FedEx, Memphis

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- <http://www.youtube.com/watch?v=iYzQ7JSBIGU>

# Airports: European Airports

Type of ownership in EU-15 Member airports (N=266)



Source: *The Ownership of European Airports*, ACI (2010)

# Airports: European Airports

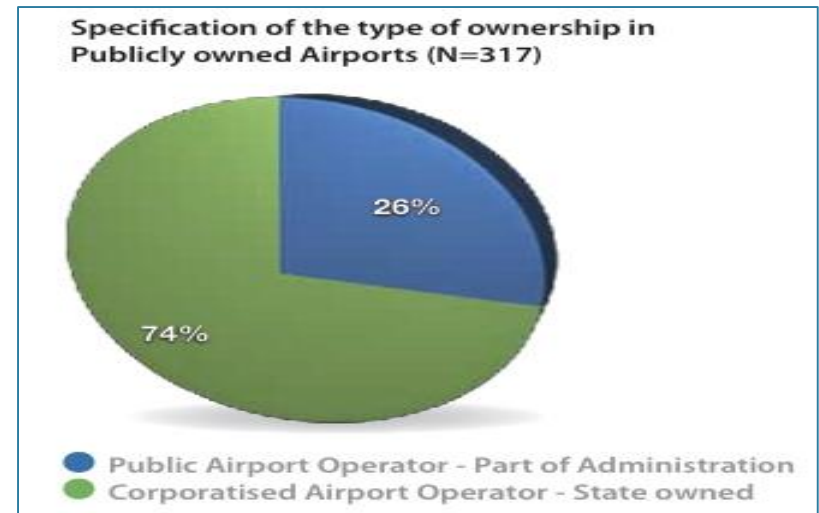
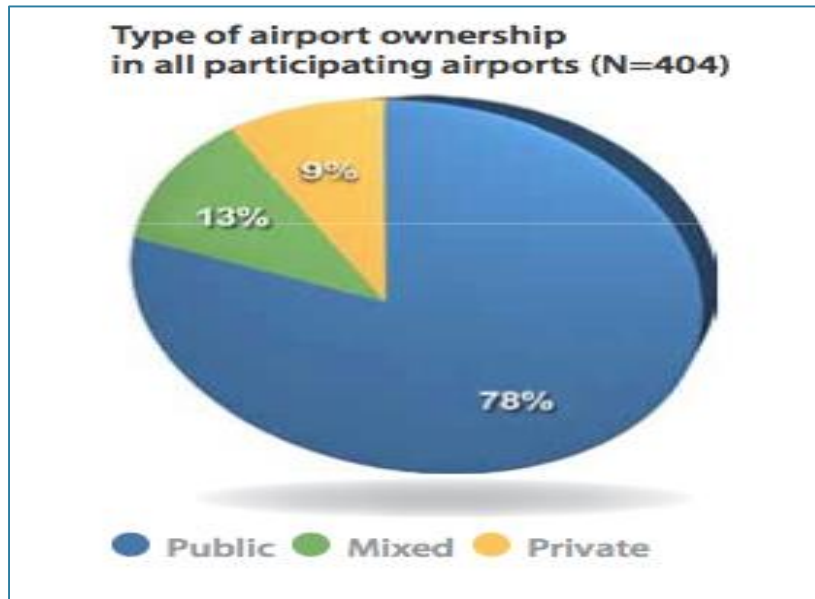
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- **Government ownership**
  - Prior to the 1980s airports viewed as government owned utilities
  - Development and expansion funded by governments
- **Private ownership**
  - As airports become privatized, locally controlled and fiscally responsible, it is recognized that :
    - airports are a business subject to competition and
    - are not a natural monopoly

Source: *The Ownership of European Airports*, ACI (2010)



# Airports: European Airports



Source: *The Ownership of European Airports*, ACI (2010)

# Airports: Canadian Model

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- **Long term leases (plus renewal options)**
- **Private Airport Authorities**
  - not part of government
  - no government support
  - airports pay annual rents to federal government (Transport Canada)
- **Non-profit but entrepreneurial**
  - Profits reinvested in airport

# Airports: Canadian Model

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- **Responsibility**
  - All aspects except passenger screening (CATSA) & ATC
  - Operations, comm activities, planning, construction