Key Findings: 2013 ATRS Global Airport Performance Benchmarking Project

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Key Findings

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OUTLINE

Objective of the ATRS Benchmarking Study

Airports Included and ATRS Database

Some Characteristics of Sample Airports

Methodology

Key Results on Efficiency and Costs

User Charge Comparisons
OBJECTIVE OF THE BENCHMARKING STUDY

- To provide a comprehensive, unbiased comparison of airport performance focusing on:
  - Productivity and Operating/Mgt Efficiency
  - Unit Cost Competitiveness
  - Airport User Charges

- Our study does not treat service quality differentials across airports because of our research resource constraints
2013 ATRS Global Airport Performance Benchmarking Project

Airport Database
195 MAJOR AIRPORTS AROUND THE WORLD

- N. America, 77
- Asia Pacific, 51
- Europe, 67

- United States (65)
- Canada (12)
- Oceania Countries (16)
- Asia (35)

12 new airports
26 AIRPORT GROUPS

- Asia Pacific (9)
- Europe (17)

1 new
The ATRS Database contains historic information (since FY 2002) including financial data, traffic and capacity data for the major airports and airport groups in the following geographic regions:

- **Asia Pacific including Oceania; Europe; North America**
- **Limited data on S. America and Africa**

The data in each continent is segregated into:

- **Traffic statistics and composition**
- **Airport characteristics** (runways, terminals, ownership form, etc)
- **Aeronautical Activities and Revenue**
- **Non-Aeronautical Activities and Revenue**
- **Labor input and other Operating Expenses**
- **Financial info obtained from Balance Sheets**

Visit [http://www.atrsworld.org/Database.html](http://www.atrsworld.org/Database.html) for more details and to purchase.
2013 ATRS Global Airport Performance Benchmarking Project

Airport Characteristics
PASSENGERS TRAFFIC, FY2011
(IN '000 PASSENGERS)
PASSENGER TRAFFIC (’000)-TOP 10 AIRPORTS:
AIRCRAFT MOVEMENTS, FY 2010 ('000 ATM)

Objective  Data  Airport Characteristics  Methodology  Efficiency & Cost  User Charge
PASSENGERS PER AIRCRAFT MOVEMENTS, FY 2011

- Asia Pacific
- Europe
- North America
AIR CARGO TRAFFIC, FY 2010
(’000 METRIC TONS)
2013 ATRS Global Airport Performance Benchmarking Project

Methodology
AIRPORT PRODUCTIVITY INDEX

Outputs
- Aircraft movement
- Passenger
- {Cargo tonnes}
- Non-aeronautical revenue output

Inputs
- Labour
- Other non-capital (soft-cost) input
- [Runways, terminal size, # of gates]

Objective | Data | Airport Characteristics | Methodology | Efficiency & Cost | User Charge
METHODOLOGY:
EFFICIENCY MEASUREMENT

- **Variable Factor Productivity (VFP) Index**
  - Impossible - Total Factor Productivity (TFP) because of capital input cost accounting problem (comparable across different countries)

- **Unit Operating Cost Competitiveness Index**: Combines VFP and Input Price Index
MULTILATERAL AGGREGATION METHOD

• This **multilateral output (input)** index procedure uses the following revenue (cost) shares to aggregate output (inputs)

\[
\ln \frac{Y_i}{Y_j} = \sum \frac{R_{ki} + \bar{R}_k}{2} \ln \frac{Y_{ki}}{\bar{Y}_k} - \sum \frac{R_{kj} + \bar{R}_k}{2} \ln \frac{Y_{kj}}{\bar{Y}_k}
\]

\[
\ln \frac{X_i}{X_j} = \sum \frac{W_{ki} + \bar{W}_k}{2} \ln \frac{X_{ki}}{\bar{X}_k} - \sum \frac{W_{kj} + \bar{W}_k}{2} \ln \frac{X_{kj}}{\bar{X}_k}
\]
GROSS VARIABLE FACTOR PRODUCTIVITY (VFP)
NORTH AMERICA LARGE AIRPORTS
(YVR=1.0), FY 2011
POTENTIAL REASONS FOR THE MEASURED PRODUCTIVITY (GROSS VFP) DIFFERENTIALS

Factors Beyond Managerial Control:

- Airport size (Scale of aggregate output)
- Average aircraft size using the airport
- Share of international traffic
- Share of air cargo traffic
- Extent of capacity shortage - congestion delay
- Connecting/transfer ratio

We compute residual (Net) Variable Factor Productivity (RVFP) after removing effects of these Factors
GROSS VARIABLE FACTOR PRODUCTIVITY VS
RESIDUAL VFP: NORTH AMERICA
(YVR=1.0), FY 2011

<table>
<thead>
<tr>
<th>Airport</th>
<th>Gross VFP</th>
<th>Residual VFP</th>
</tr>
</thead>
<tbody>
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<td>MSP</td>
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<tr>
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<tr>
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</tr>
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<td>SFO</td>
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<td>1.0</td>
</tr>
<tr>
<td>FLL</td>
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<td>0.8</td>
</tr>
<tr>
<td>LGA</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>MDW</td>
<td>0.2</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Objective | Data | Airport Characteristics | Methodology | Efficiency & Cost | User Charge
ALTERNATIVE APPROACHES

We explored Alternative approaches:

- Data Envelopment Analysis (DEA)
- Econometric Cost Function Approach including Stochastic Frontier methods (SFA)

The rankings for top and bottom ranked airports are consistent despite using VFP, DEA or SFA.

Note: Industry acceptance of our report using more advanced/sophisticated methods is one of our major concern
RESIDUAL RANKING COMPARISON OF TOP 15 AIRPORTS IN US
RESIDUAL RANKING COMPARISON OF BOTTOM 15 AIRPORTS IN US

Rank

BOS CVG CLE SJC ALB PHL DFW STL ONT LAX ORD BWI PIT MSY MIA

Residual VFP Ranking  Residual DEA Ranking  Residual SFA Ranking

Objective  Data  Airport Characteristics  Methodology  Efficiency & Cost  User Charge
RESIDUAL RANKING COMPARISON OF MID-RANKED 15 AIRPORTS IN US

Objective Data Airport Characteristics Methodology Efficiency & Cost User Charge
2013 ATRS Airport Benchmarking

Key Results on Efficiency & Cost
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): ASIA (HKG=1.0), FY 2011

Gimpo, Incheon, Guam

Airports

Airport Groups

Residual VFP
Mean

Objective | Data | Airport Characteristics | Methodology | Efficiency & Cost | User Charge
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): OCEANIA (SYD=1.0), FY 2011

Objective

Data

Airport Characteristics

Methodology

Efficiency & Cost

User Charge
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP):
EUROPE LARGE AIRPORTS (CPH=1.0), FY 2011

Copenhagen Kastrup, Athens, Zurich
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP):
EUROPE SMALL & MEDIUM AIRPORTS (CPH=1.0), FY 2011
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP): NORTH AMERICA LARGE AIRPORTS (YVR=1.0), FY 2011

Objective

Data

Airport Characteristics

Methodology

Efficiency & Cost

User Charge
RESIDUAL (NET) VARIABLE FACTOR PRODUCTIVITY (VFP):
N. AMERICA SMALL & MEDIUM AIRPORTS (YVR=1.0), FY 2011

Oklahoma City, Richmond, Raleigh-Durham
TOP EFFICIENCY PERFORMERS (2013)
(based on Net VFP index=operating/management efficiency)

Asia Pacific:
- **Asian Airports:**
  - Gimpo, Incheon, Guam
- **Oceania Airports:**
  - Sydney, Auckland, Townsville

Europe:
- **Large Airports (> 15 million pax):**
  - Copenhagen Kastrup, Athens, Zurich
- **Small/Medium Airports (< 15 millions Pax):**
  - Geneva, Basel, Nice
TOP EFFICIENCY PERFORMERS (2013)
(based on Net VFP index=operating/management efficiency)

North America:

- **Large Airports (> 15 million pax):**
  - {Atlanta (Globally Most Efficient Airport)}
  - **Minneapolis St Paul**, Charlotte, Tampa

- **Small/Medium Airports (< 15 millions Pax):**
  - **Oklahoma City**, Richmond, Raleigh-Durham

Global (10th Global Excellence Award)

- **Hartsfield-Jackson Atlanta International Airport**
PAST AIRPORT EFFICIENCY EXCELLENCE TOP PERFORMERS, 2008 - 2012

**North America**
- Hartsfield-Jackson Atlanta International Airport

**Europe**
- Copenhagen Kastrup International Airport
- Large Airport Category: Oslo International Airport
  - Small/Medium Airport Category: Geneva Cointrin International Airport

**Asia-Pacific**
- Hong Kong International Airport
- Large Airport Category: Hong Kong International Airport
  - Small/Medium Airport Category: Seoul Gimpo International Airport
- Asian Airport Excellence Award: Hong Kong International Airport
  - Oceania Excellence Award: Sydney Airport

**2008**
- Hartsfield-Jackson Atlanta International Airport

**2009**
- Hartsfield-Jackson Atlanta International Airport

**2010**
- Hartsfield-Jackson Atlanta International Airport
- Large Airport Category: Oslo International Airport
  - Small/Medium Airport Category: Geneva Cointrin International Airport

**2011**
- Hartsfield-Jackson Atlanta International Airport
- Large Airport Category: Seoul Gimpo International Airport
  - Small/Medium Airport Category: Genève Aéroport
- Asian Airport Excellence Award: Hong Kong International Airport
  - Oceania Excellence Award: Sydney Airport

**2012**
- Hartsfield-Jackson Atlanta International Airport
- Large Airport Category: Copenhagen Kastrup International Airport
  - Small/Medium Airport Category: Genève Aéroport
- Asian Airport Excellence Award: Hong Kong International Airport
  - Oceania Excellence Award: Sydney Airport
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT

ASIA (HKG=0.0) – THE HIGHER THE BETTER

Haikou, Seoul Gimpo,
Airport Authority of India
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT

OCEANIA (SYD=0.0)

Queensland Airport Limited (QAL), Auckland, Dunedin (NZ)
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT
EUROPE - LARGE AIRPORTS (CPH=0.0)

Athens, Lisbon, ANA (Aeroportos de Portugal)
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT
EUROPE - SMALL & MEDIUM AIRPORTS (CPH=0.0)

Ljubljana(Slovenia), Basel, Tallinn (Estonia)
COST COMPETITIVENESS = NET VFP AND INPUT PRICE EFFECT
N. AMERICA - LARGE AIRPORTS (YVR=0.0)

Objective
Data
Airport Characteristics
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Efficiency & Cost
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COST COMPETITIVENESS: $= \text{NET VFP AND INPUT PRICE EFFECT}$

N. AMERICA - SMALL & MEDIUM AIRPORTS (YVR=0.0)

Oklahoma City, Richmond (Virginia), Raleigh-Durham
LANDING CHARGES
FOR BOEING 767-400, 2012 (IN US$)
ASIA PACIFIC: COMBINED LANDING AND PASSENGER CHARGES FOR BOEING 767, 2012 (IN US$)

Lowest charges: **Taipei Taoyuan, Dunedin (New Zealand)**

Highest charges: **Osaka Kansai, Tokyo Narita**
EUROPE: COMBINED LANDING AND PASSENGER CHARGES FOR BOEING 767, 2012 (IN US$)

Lowest charges: Riga (Latvia), Luxembourg

Highest charges: London Heathrow, Ben Gurion (Tel Aviv)
NORTH AMERICA: COST PER ENPLANED PASSENGER, 2011 (IN US$)

Canada:
Lowest CPE: Victoria, Regina
Highest CPE: Toronto, Montreal

United States:
Lowest CPE: Charlotte, California Bob Hope (Burbank, CA)
Highest CPE: New York JFK, Newark Liberty
The ATRS Global Airport Performance Benchmarking Report: 3 volumes, over 600 pages of valuable data and analysis.

- Can be purchased by visiting www.atrsworld.org

- Report sale finances our annual benchmarking research project
ACKNOWLEDGEMENT OF APPRECIATION

Gold Corporate Members

- Houston Airport System

Corporate Members

- Vancouver Airport Authority
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- Kazan international airport, Russia
- German Aerospace Center
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- Boeing
Thank You
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