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Key Findings of 2012 ATRS Global Airport Performance Benchmarking Project

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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**
  - **Comparison of Airport Charge Levels**

- Our study **does not treat service quality differentials** across airports

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Airports Included in the 2012 Report

Canada-US	77 airports	14 New
Europe	55 airports	11 New
	16 airport groups	2 New
Asia Pacific	9 airport groups	3 New
	35 Asian airports	3 New
	16 Oceania airports	7 New
Total	**183 airports**	35 New
	25 airport groups	5 New

The ATRS Database

- The ATRS Database contains historic information (since FY 2002) including financial data, traffic and capacity data of the major airports and airport authorities (groups) in the following geographic regions:
  - **Asia Pacific**
  - **Europe**
  - **North America**
- The data in each regions is segregated into:
  - **Airport Information** (capacity, type of ownership etc)
  - **Traffic**
  - **Aeronautical Revenue**
  - **Non-Aeronautical Revenue**
  - **Operating Expense**
  - **Balance Sheet**
- Visit http://www.atrsworld.org/publications.html for more details.

Data Sources: FY 2002-2010

Airport's Financial Statements, Annual Reports and direct data requests

US FAA, DOT statistics

Association of European Airlines (AEA) Statistics

ICAO Digest of Statistics:

- annual and monthly traffic data
- annual financial data - not for all airports

ACI, IATA

- annual traffic statistics; capacity information; airport charges
- general information surveys (Asia Pacific and Europe) occasional and not complete

IMF and World Bank

- various price indices including GDP deflators for service sectors and PPP

US Census Bureau, Statistics Canada

- regionally based Cost of Living Index

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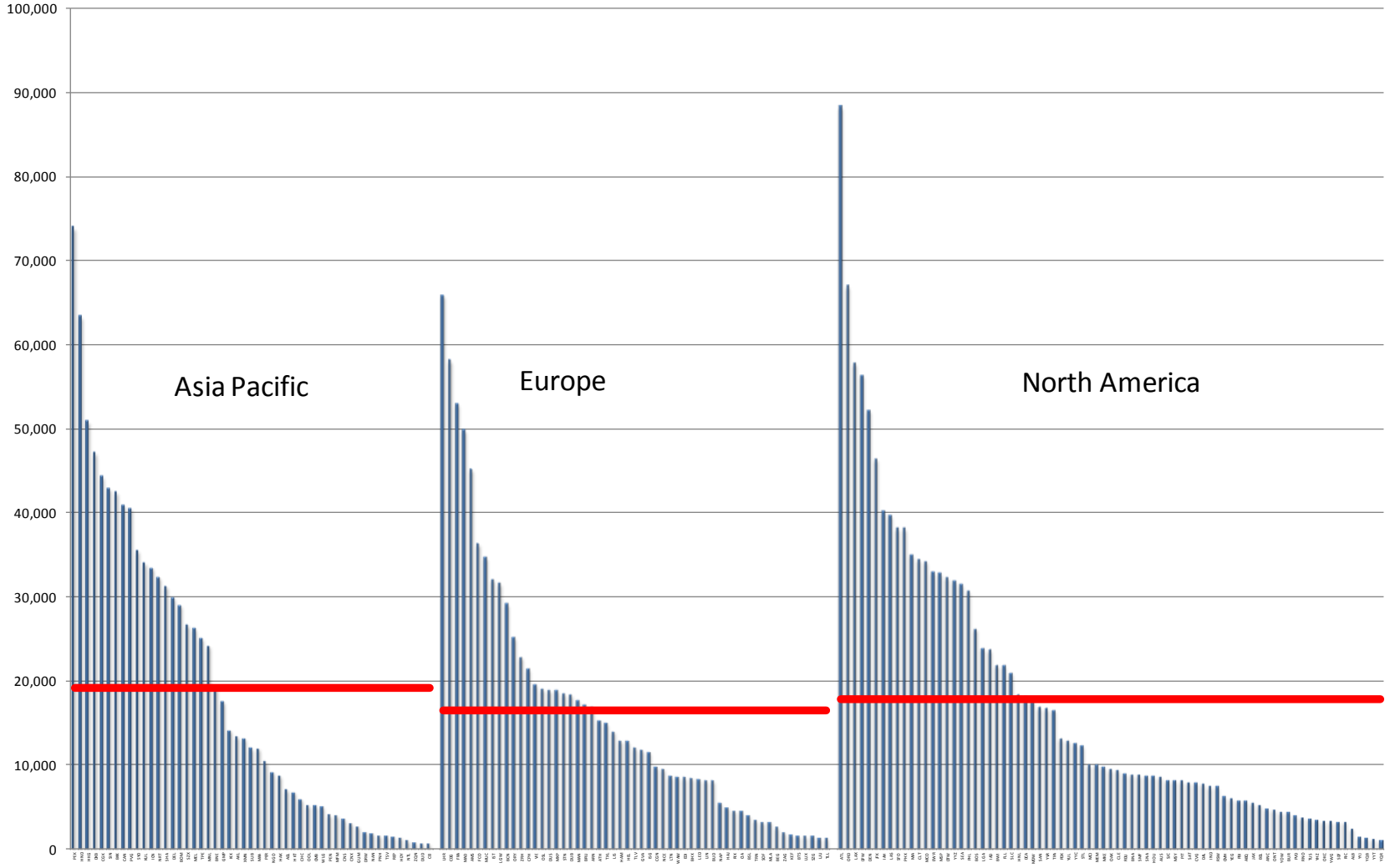
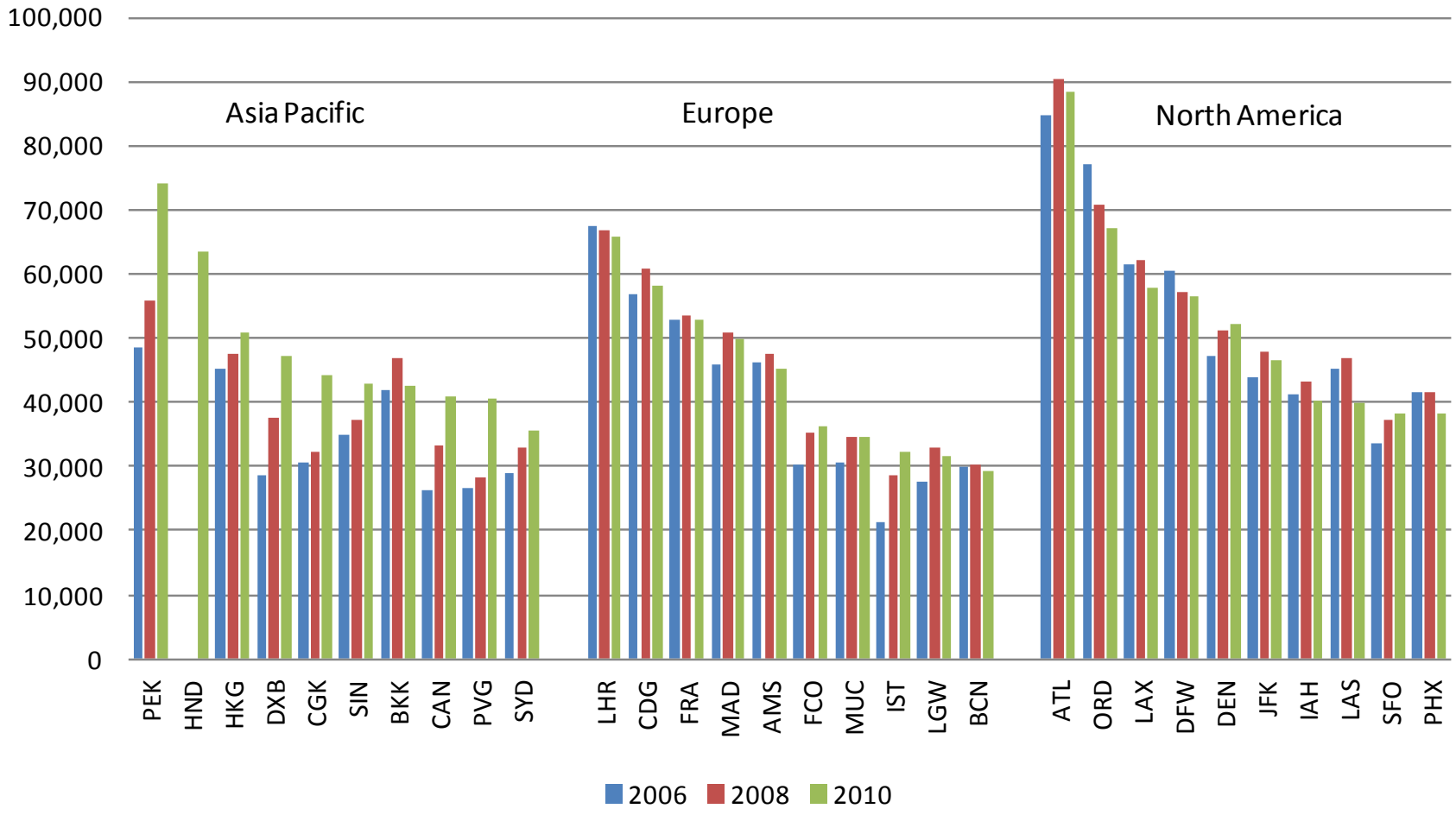
Passengers Traffic, FY2010

(in ’000 passengers)

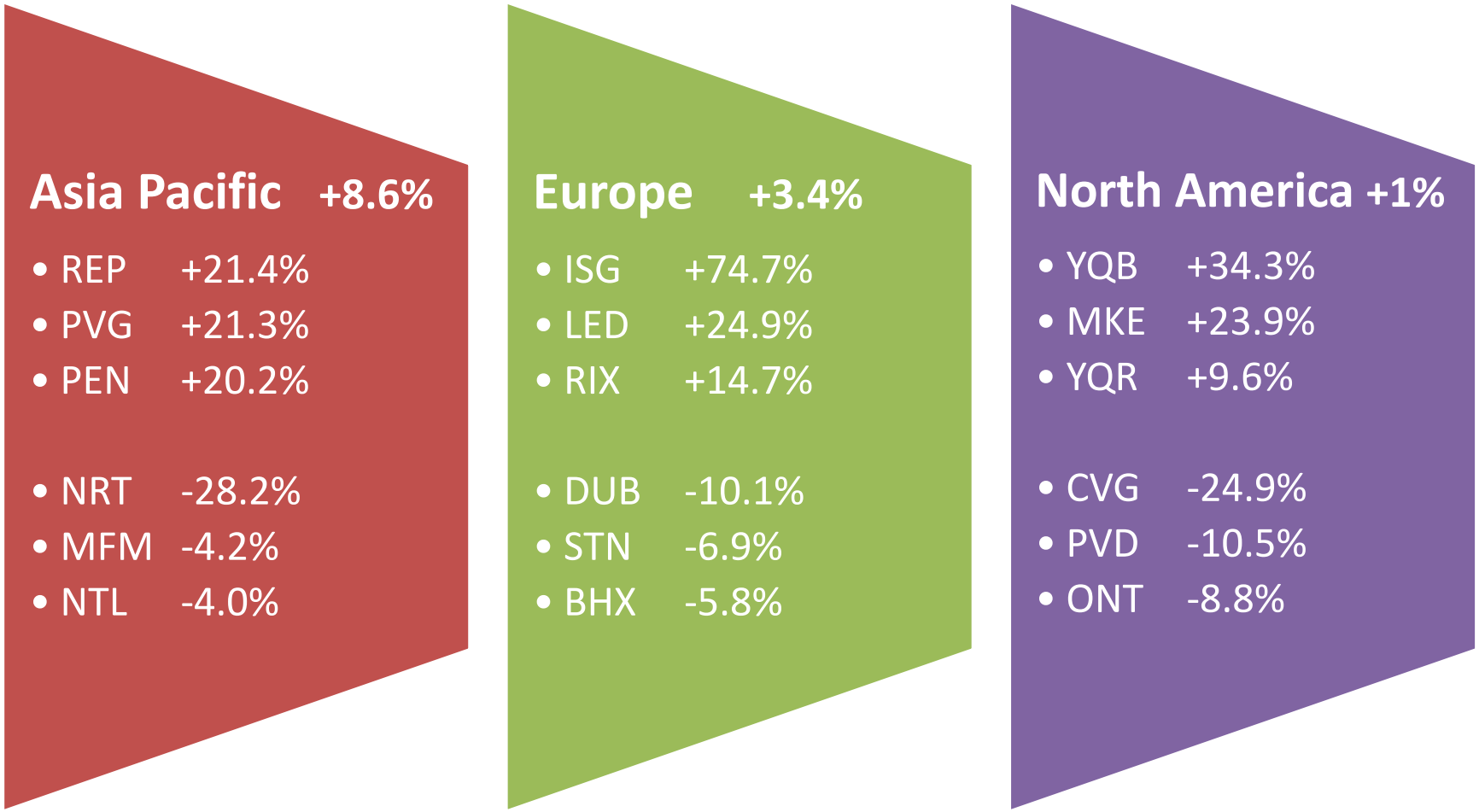


Passenger Traffic - Top 10 Airports

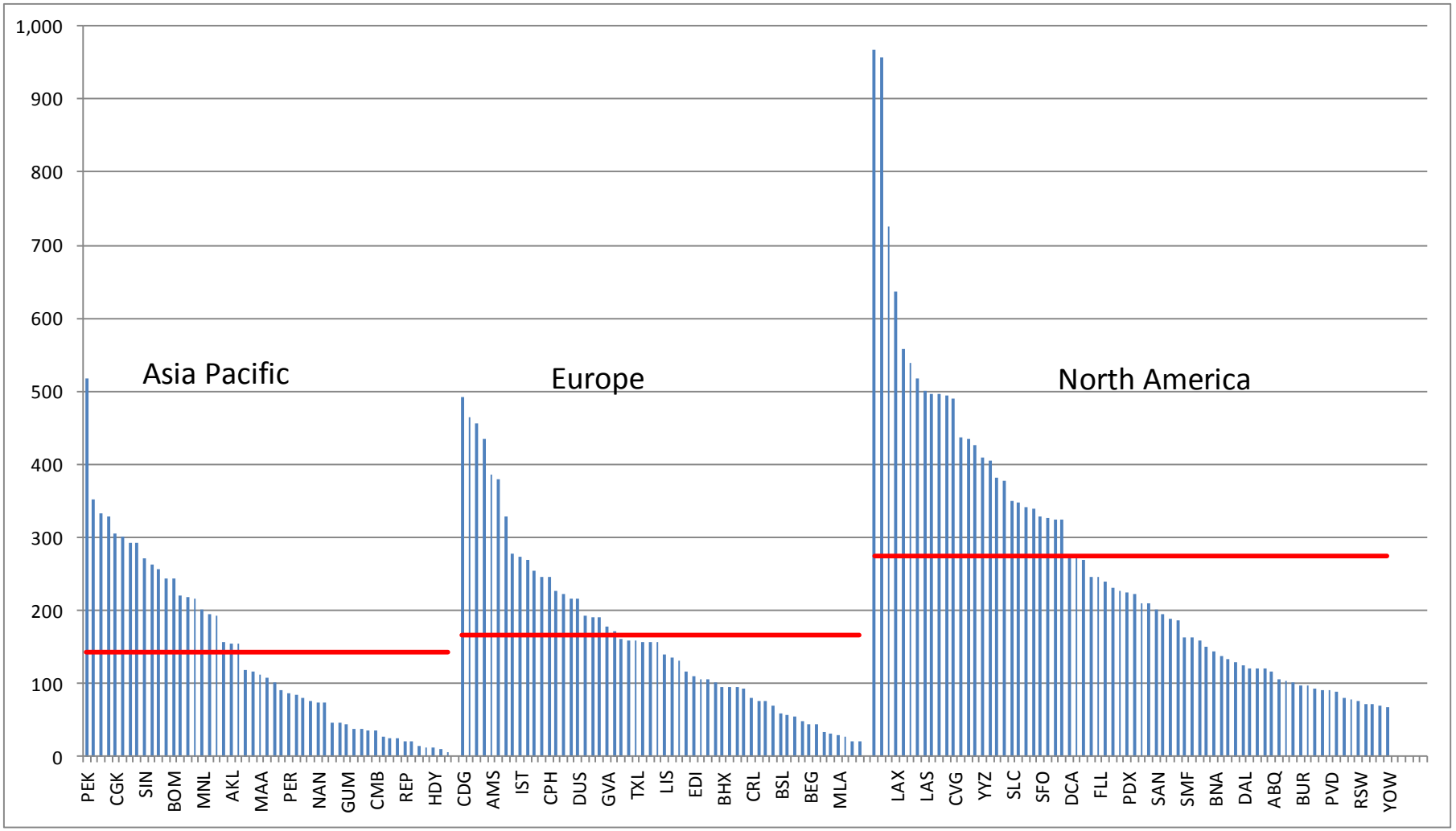
(’000 passengers) :FY2006, 2008, 2010



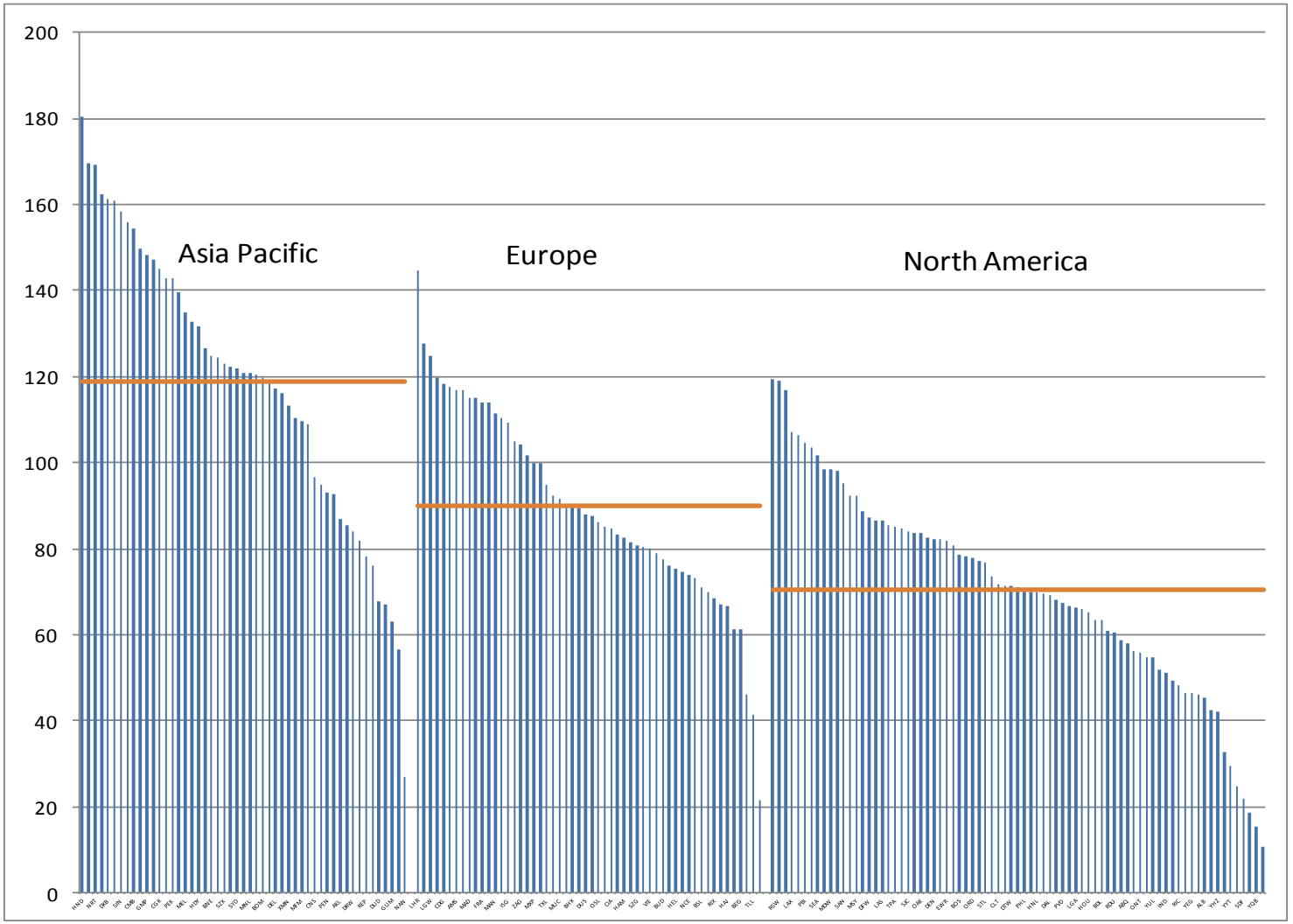
Top and Bottom 3: Change in Passenger Traffic FY2009-10



Aircraft Movements, FY2010 (’000 ATM)

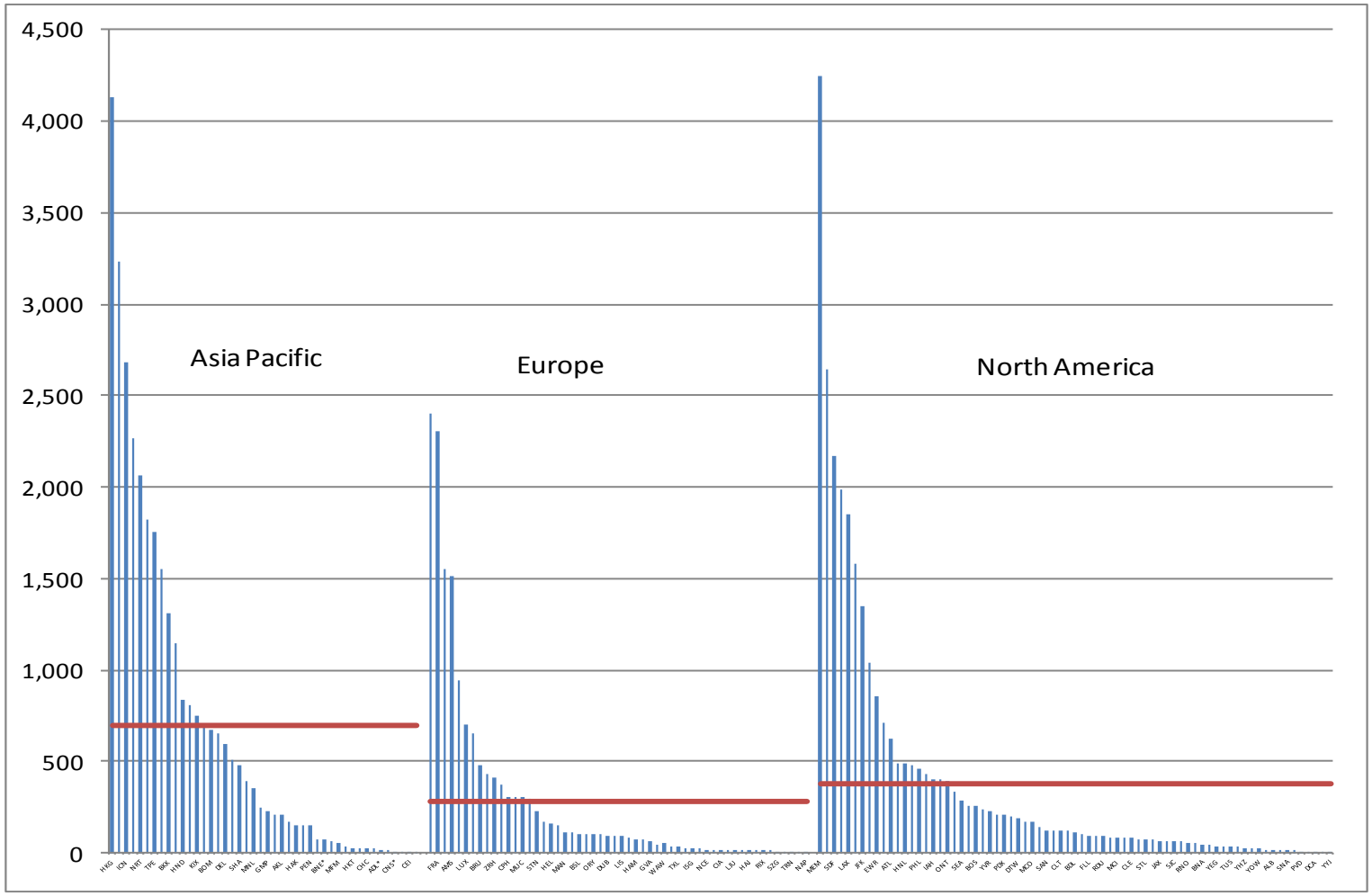


Passengers per Aircraft Movements, FY2010

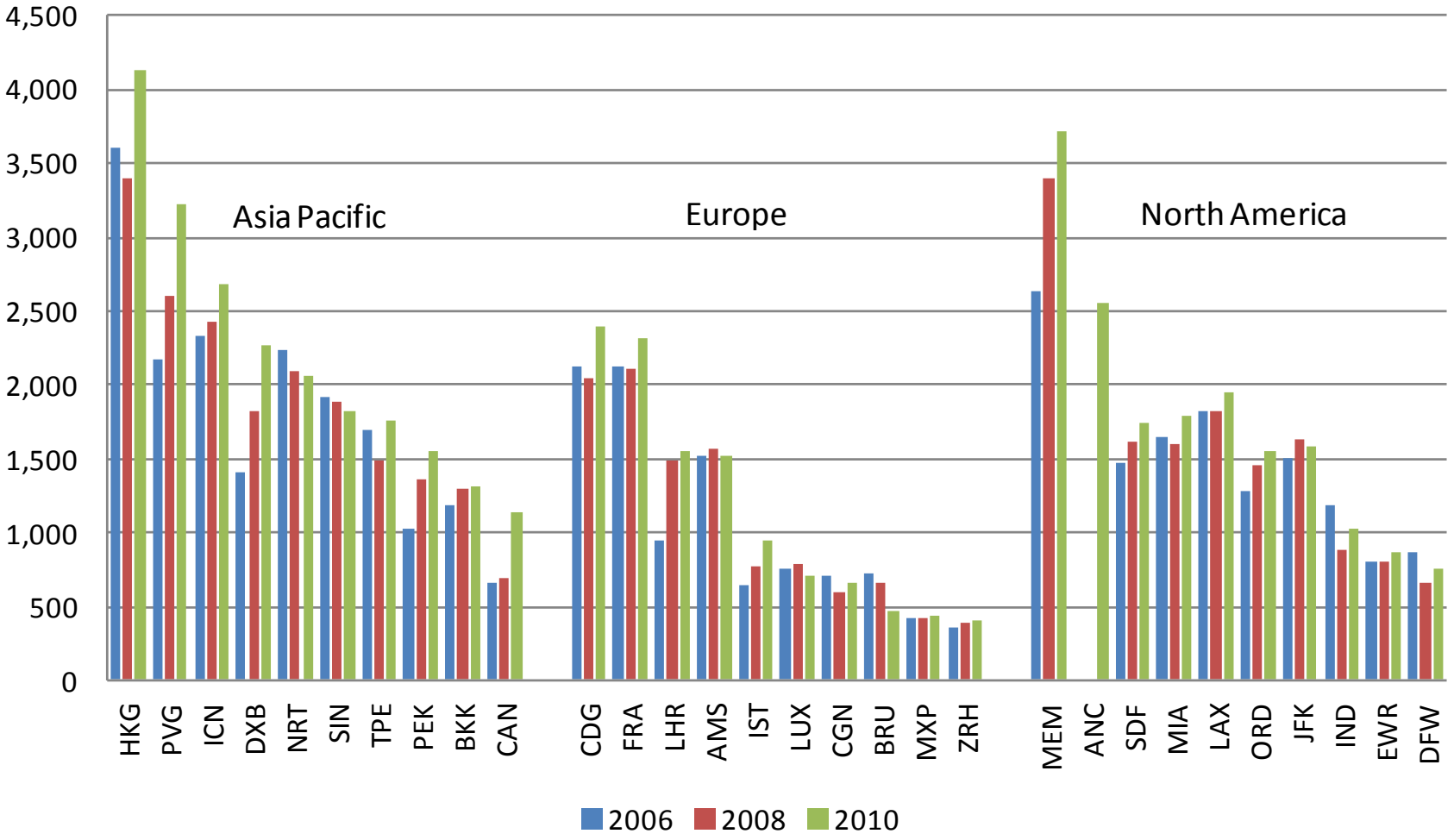


Air Cargo Traffic, FY2010

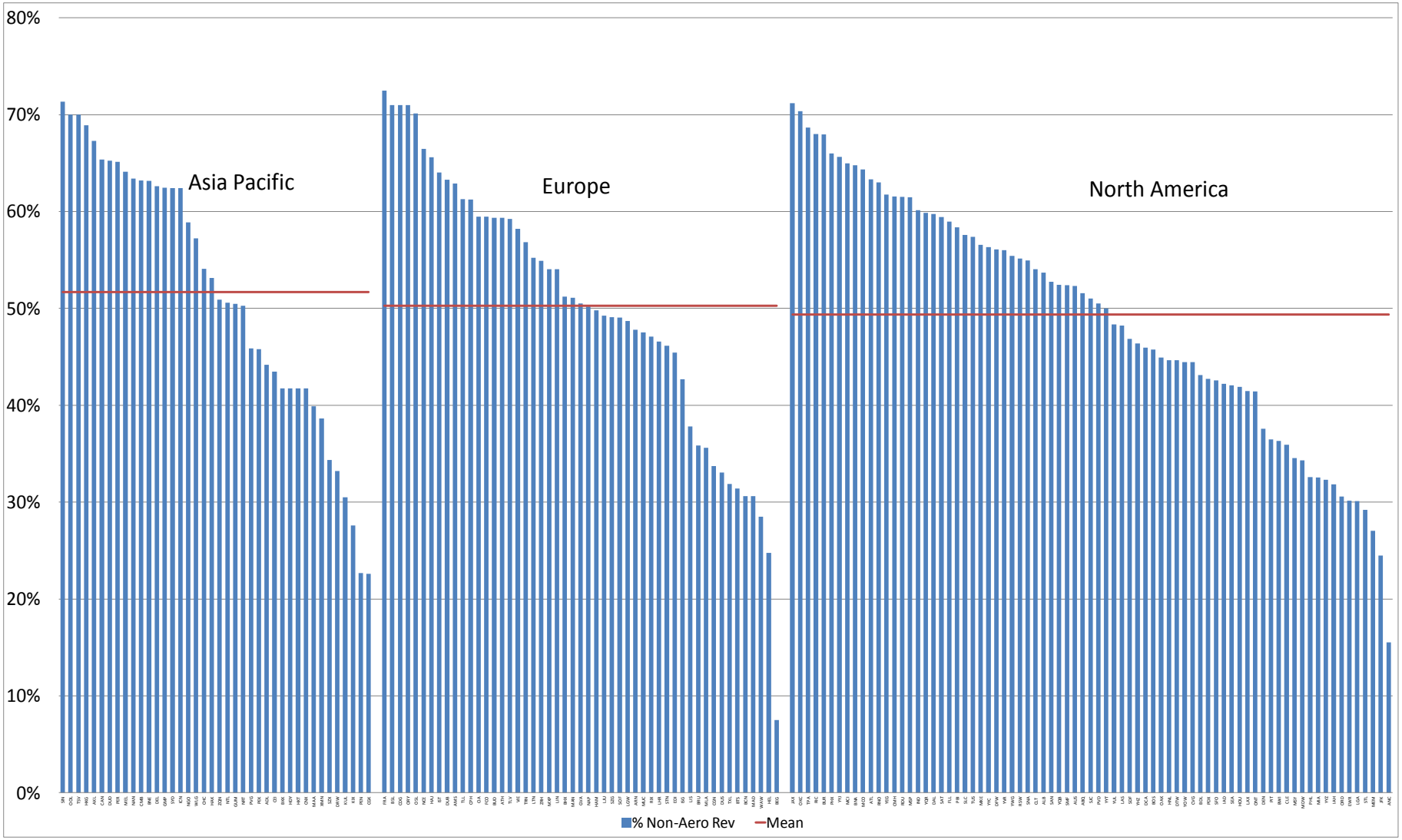
(’000 metric tons)



Air Cargo - Top 10 Airports ('000 metric tons)
FY2006, 2008, 2010



% Non-Aero Revenue, 2010



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Airport Productivity Index

Outputs

- Aircraft movement
- Passenger
- Non-aeronautical revenue
- Cargo

Inputs

- Labour
- Other non-capital (soft-cost) input

Methodology: Efficiency Measurement

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

- VFP is essentially the ratio of **total (aggregate) output index** divided by **total (aggregate) variable input index**, namely labor and soft cost input (total non-labor variable inputs).

- In fact, we compute VFP using the **multilateral index** procedure proposed by Caves, Christensen and Diewert (1982).

Multilateral Aggregation Method

- This multilateral index procedure uses cost shares (revenue shares) to aggregate inputs (outputs).

$$ln\frac{X_i}{X_j} = \sum \frac{W_{ki} + \bar{W}_k}{2} ln\frac{X_{ki}}{\tilde{X}_k} - \sum \frac{W_{kj} + \bar{W}_k}{2} ln\frac{X_{kj}}{\tilde{X}_k}$$

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
- 2010 Iceland volcano ash cloud (For European airports)

We compute residual (Net) variable factor productivity (RVFP) measures after removing effects of these Factors

Regression Models

Asia Pacific

	Coefficients	Standard Error	t Stat
Intercept	-2.050	1.325	-1.55
% Non-Aeronautical	0.530	0.113	4.69
% International	-0.011	0.007	-1.45
% Cargo	0.048	0.019	2.53
Capacity Constraint	0.140	0.076	1.84
Aircraft Size	0.143	0.132	1.08
Airport Size	-0.073	0.062	-1.18
Oceania	0.969	0.069	13.96
2010	0.039	0.098	0.39
2009	0.016	0.097	0.16
2008	0.061	0.099	0.62
2007	0.114	0.100	1.14
2006	0.096	0.101	0.95
2005	0.085	0.101	0.84
2004	0.057	0.100	0.57
2003	-0.021	0.101	-0.2
R Square	0.711		
Observations	195		

Europe

	Coefficients	Standard Error	t Stat
Intercept	-1.590	0.752	-2.110
% Non-Aeronautical	0.673	0.083	8.070
% International	-0.333	0.074	-4.510
% Cargo	0.021	0.031	0.690
Capacity Constraint	0.105	0.053	1.970
Aircraft Size	0.246	0.091	2.710
Airport Size	-0.052	0.049	-1.060
Volcano Ash	-0.336	0.283	-1.190
2010	-0.016	0.174	-0.090
2009	-0.212	0.092	-2.310
2008	-0.148	0.095	-1.550
2007	-0.076	0.095	-0.800
2006	-0.132	0.095	-1.380
2005	-0.110	0.095	-1.160
2004	-0.033	0.097	-0.350
2003	0.040	0.103	0.390
R Square	0.487		
Observations	205		

Regression Model

North America

	Coefficients	Standard Error	t Stat
Intercept	0.346	0.945	0.370
% Non-Aeronautical	0.561	0.105	5.360
% Connecting Traffic	0.045	0.022	2.100
% International	-0.016	0.005	-3.190
% Cargo	-0.033	0.023	-1.440
Capacity Constraint	0.111	0.075	1.490
Aircraft Size	-0.317	0.075	-4.210
Airport Size	0.102	0.057	1.780
2010	-0.006	0.031	-0.190
2009	0.019	0.027	0.690
2008	-0.029	0.027	-1.080
2007	-0.010	0.025	-0.390
2006	-0.013	0.025	-0.550
2005	-0.008	0.027	-0.290
2004	-0.002	0.023	-0.080
2003	-0.047	0.024	-1.930
R Square	0.4390		
Observations	584		

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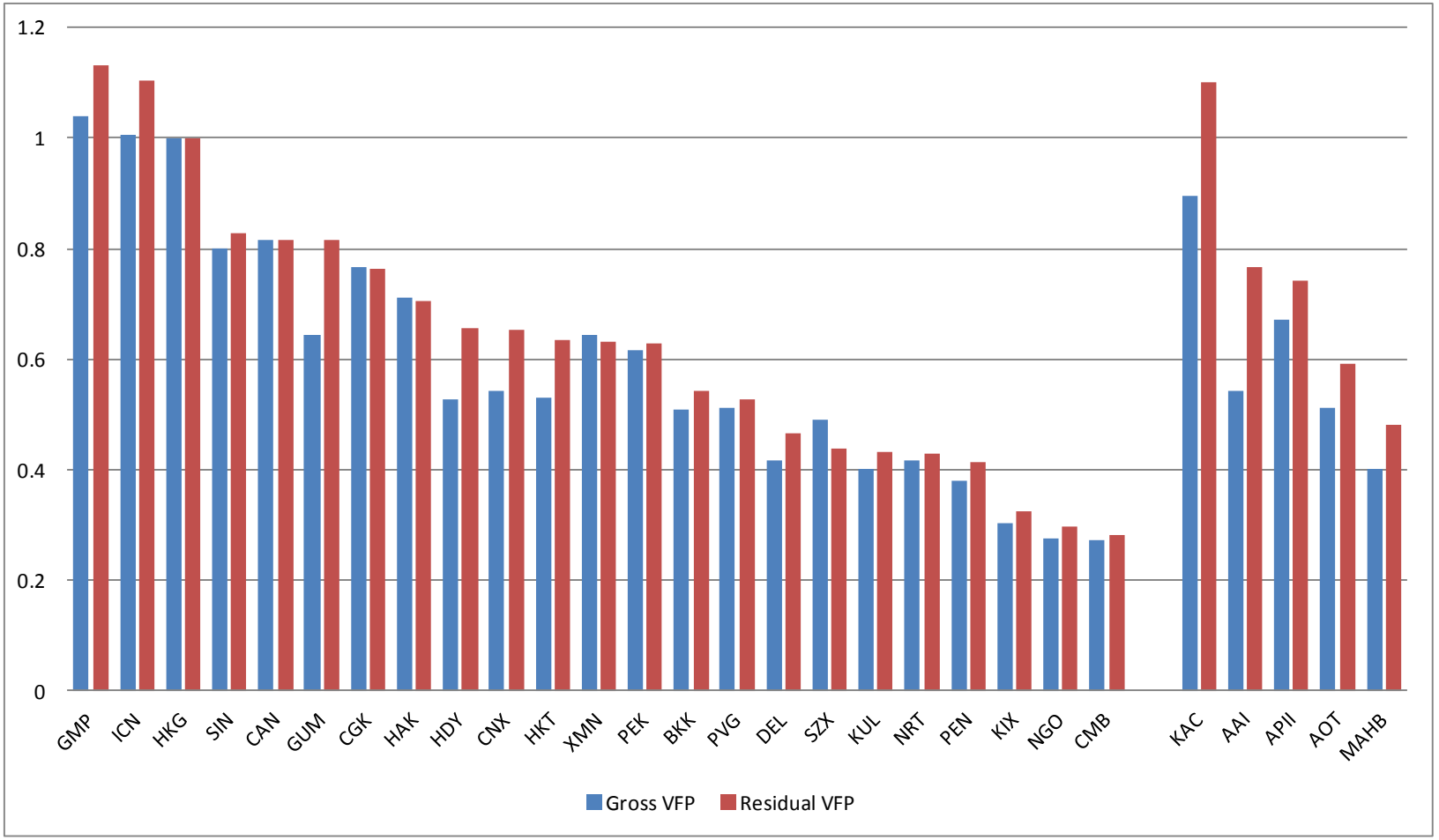
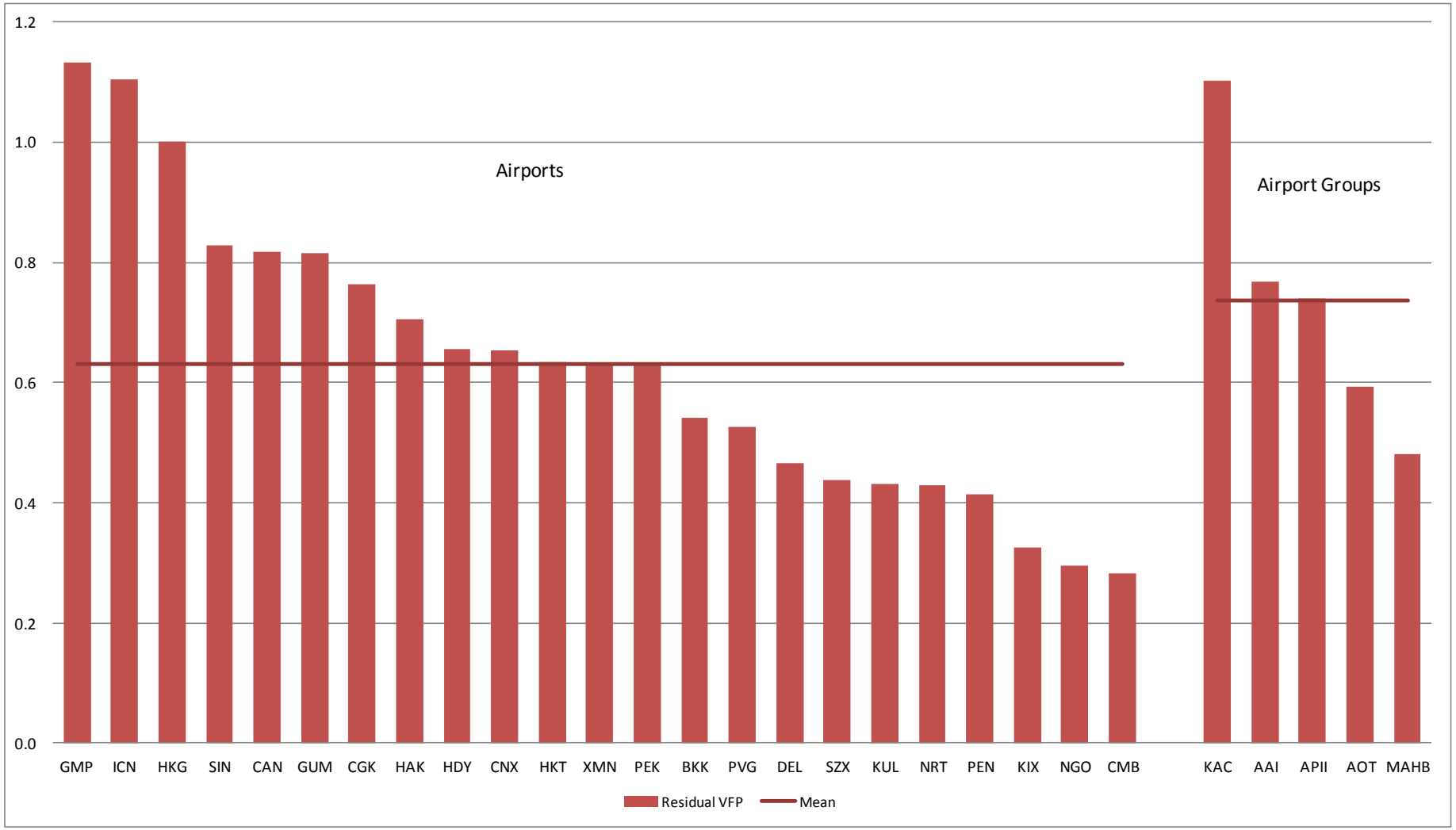
Gross Variable Factor Productivity vs. Residual Variable Factor Productivity

Asia (HKG=1.0), 2010



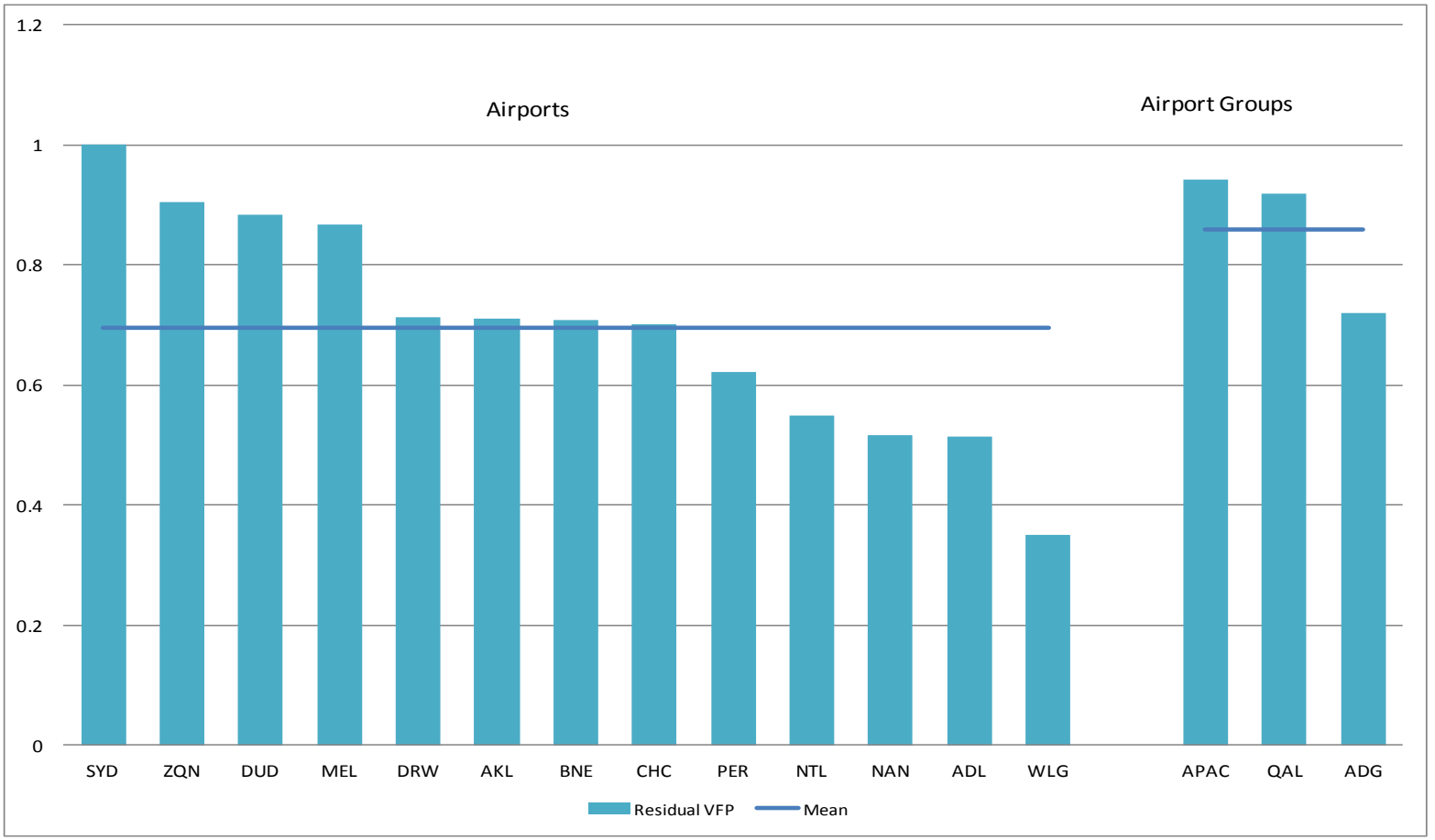
Residual (Net) Variable Factor Productivity: (after removing factors beyond managerial control) **:**

Asia (HKG=1.0)



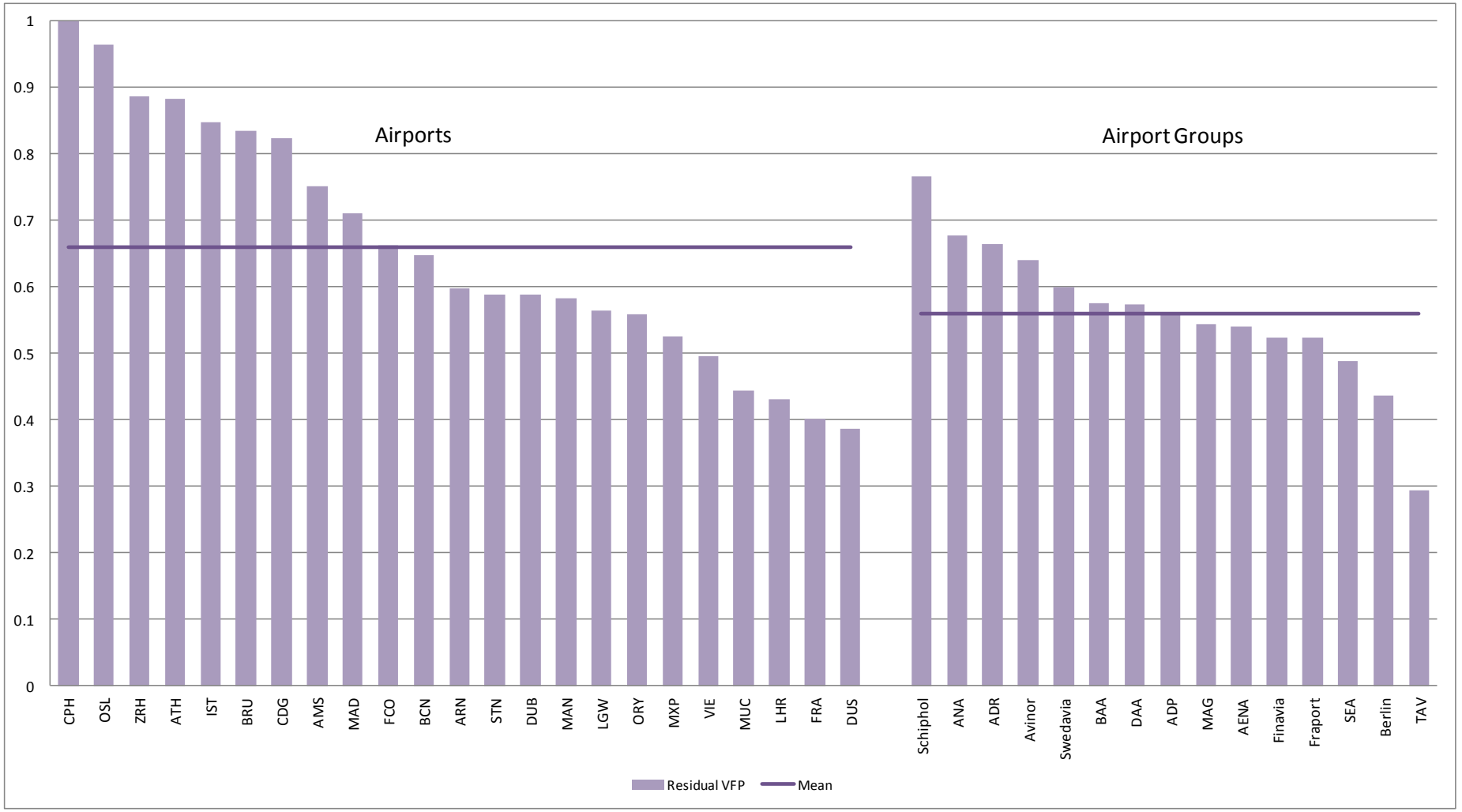
Residual (Net) Variable Factor Productivity

Oceania (SYD=1.0)



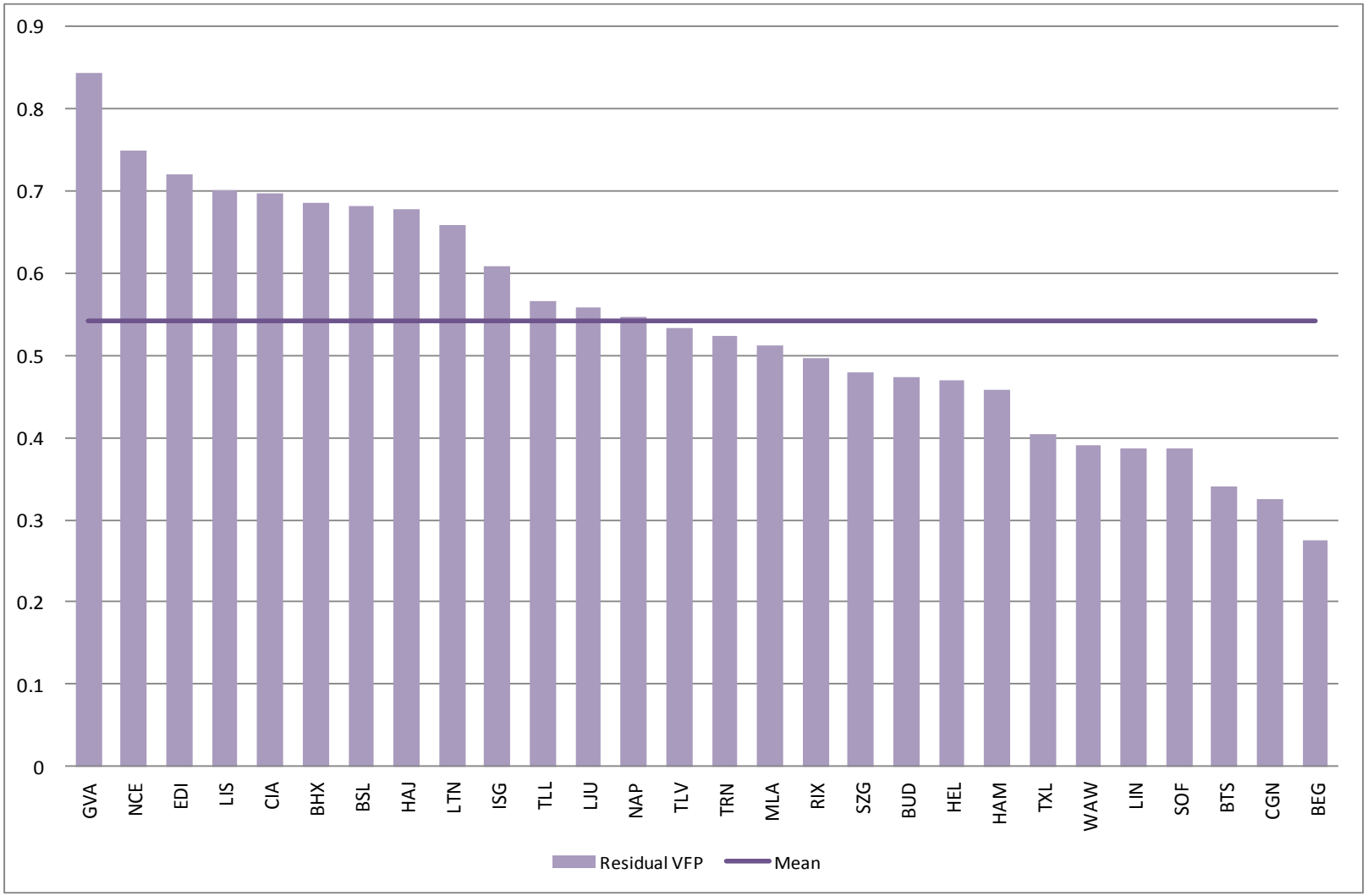
Residual (Net) Variable Factor Productivity:

Europe – Passengers > 15 million (CPH=1.0)



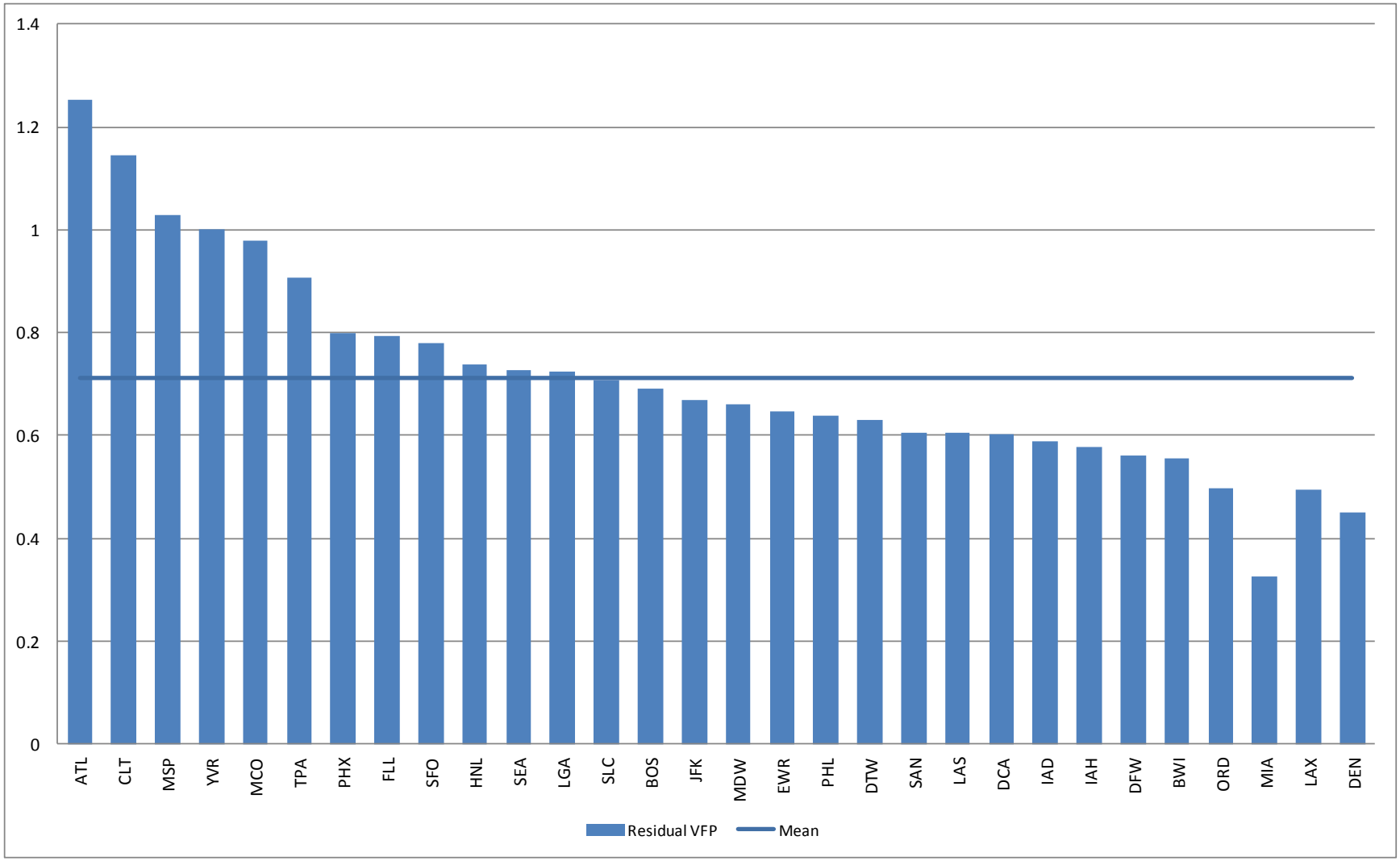
Residual (Net) Variable Factor Productivity:

Europe – Passengers < 15 million (CPH=1.0)



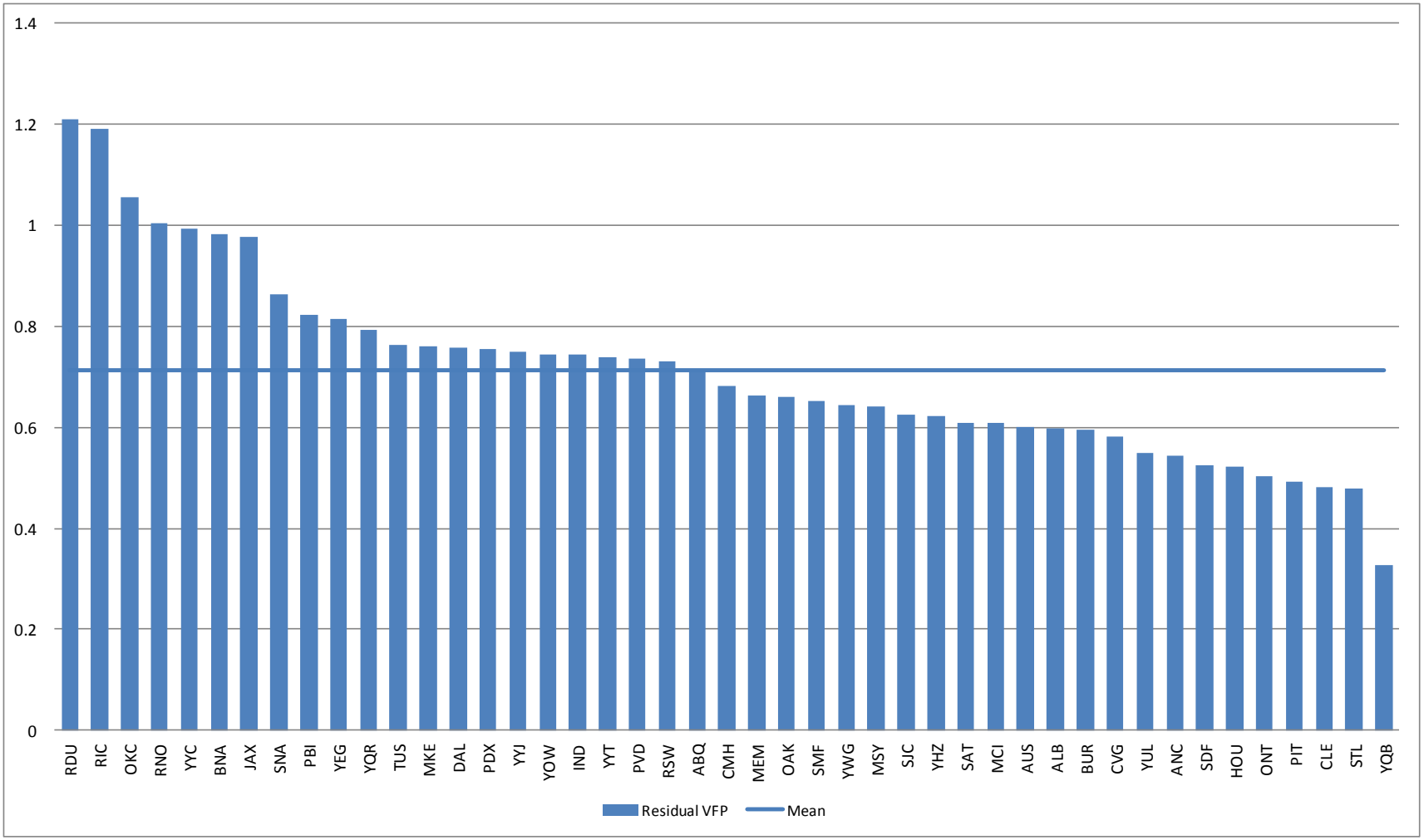
Residual (Net) Variable Factor Productivity:

N. America – Passengers > 15 million (YVR=1.0)



Residual (Net) Variable Factor Productivity:

N. America – Passengers < 15 million (YVR=1.0)



Top Efficiency Performers (2012)

(based on Net VFP index=operating/management efficiency)

Asia Pacific:

- *Asian Airports*:
  - **Gimpo**, Incheon, Hong Kong
- *Oceania Airports:*
  - **Sydney**, Queenstown

Europe:

- *Large Airports (> 15 million pax):*
  - **Copenhagen**, Oslo, Zurich
- *Small/Medium Airports (< 15 millions Pax):*
  - **Geneva,** Nice, Edinburgh

North America (Canada/US):

- *Large Airports (> 15 million pax):*
  - **Atlanta**, Charlotte, Minneapolis/St Paul
- *Small/Medium Airports (< 15 millions Pax):*
  - **Raleigh-Durham**, Richmond, Oklahoma City

Top Efficiency Performers (2012)

(based on Net VFP index=operating/management efficiency)

Asian Airport Category:

Gimpo International Airport

	GMP	Mean
Labour Productivity (HKG=1.0)	0.538	0.343
Soft Cost Productivity (HKG=1.0)	1.240	0.963
Residual VFP (HKG=1.0)	1.133	0.631

Runner up: Incheon International Airport

Top Efficiency Performers (2012)

(based on Net VFP index=operating/management efficiency)

Oceania Airport Category:

Sydney Airport

	SYD	Mean
Labour Productivity	1.000	0.548
Soft Cost Productivity	1.000	0.684
Residual VFP	1.000	0.695

Runner up: Queenstown Airport

Top Efficiency Performers (2012)

(based on Net VFP index=operating/management efficiency)

Europe Large Airports (> 15 million pax) Category:

Copenhagen Airport Kastrup

	CPH	Mean
Labour Productivity	1.000	1.263
Soft Cost Productivity	1.000	0.439
Residual VFP	1.000	0.660

Runner up: Oslo Airport

Top Efficiency Performers (2012)

(based on Net VFP index=operating/management efficiency)

Europe Small/Medium Airports (< 15 million pax) Category:

Genève Aéroport

	GVA	Mean
Labour Productivity (CPH=1.0)	1.375	1.263
Soft Cost Productivity (CPH=1.0)	0.580	0.439
Residual VFP (CPH=1.0)	0.844	0.541

Runner up: Nice Cote D'Azur Airport

Top Efficiency Performers (2012)

(based on Net VFP index=operating/management efficiency)

N. America Large Airports (> 15 million pax) Category:

Hartsfield-Jackson Atlanta International Airport

	ATL	Mean
Labour Productivity (YVR=1.0)	1.546	0.553
Soft Cost Productivity(YVR=1.0)	1.481	0.875
Residual VFP (YVR=1.0)	1.251	0.712

Runner up: Charlotte Douglas International Airport

Top Efficiency Performers (2012)

(based on Net VFP index=operating/management efficiency)

N. America Small/Medium Airports (< 15 million pax) Category:

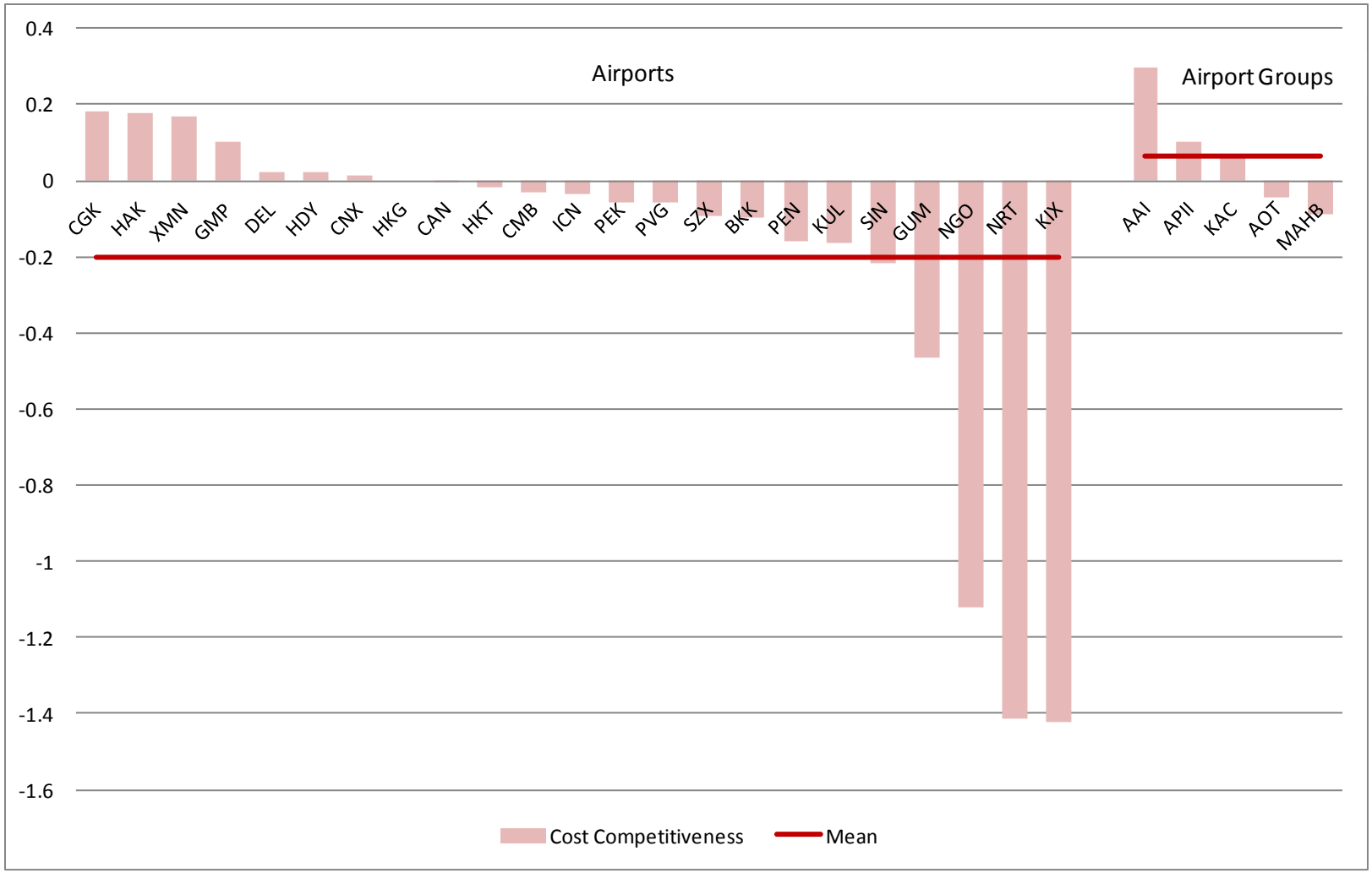
Raleigh-Durham International Airport

	RDU	Mean
Labour Productivity (YVR=1.0)	0.594	0.553
Soft Cost Productivity(YVR=1.0)	1.308	0.875
Residual VFP (YVR=1.0)	1.210	0.712

Runner up: Richmond International Airport

Cost Competitiveness: = Net VFP and Input Price Effect

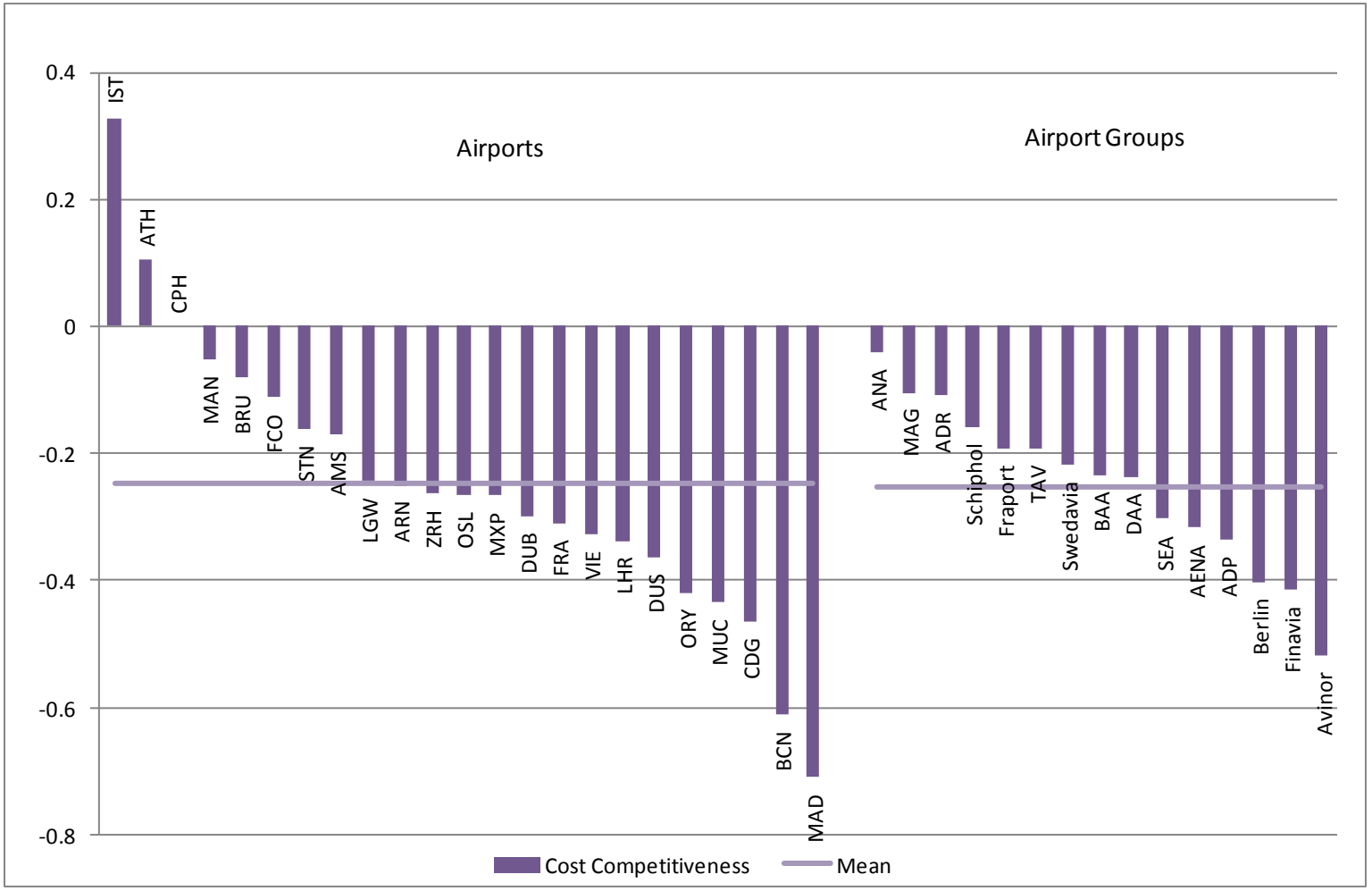
Asia (HKG=0.0) – *the higher the better*



Cost Competitiveness = Net VFP and Input Price Effect

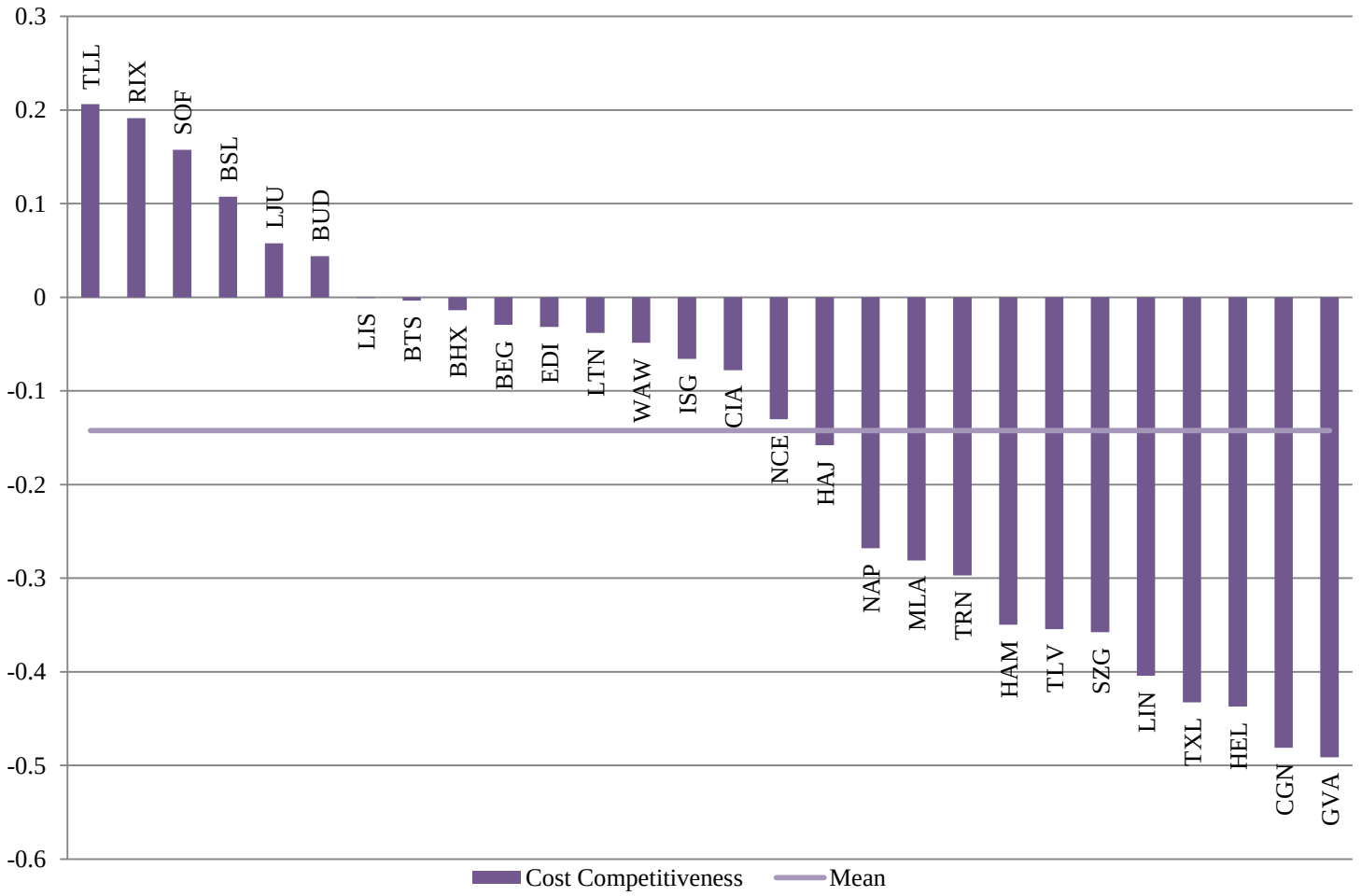
Oceania (SYD=0.0) *- the higher the better*

Cost Competitiveness = Net VFP and Input Prices Effect
Europe – Passengers > 15 million (CPH=0.0)



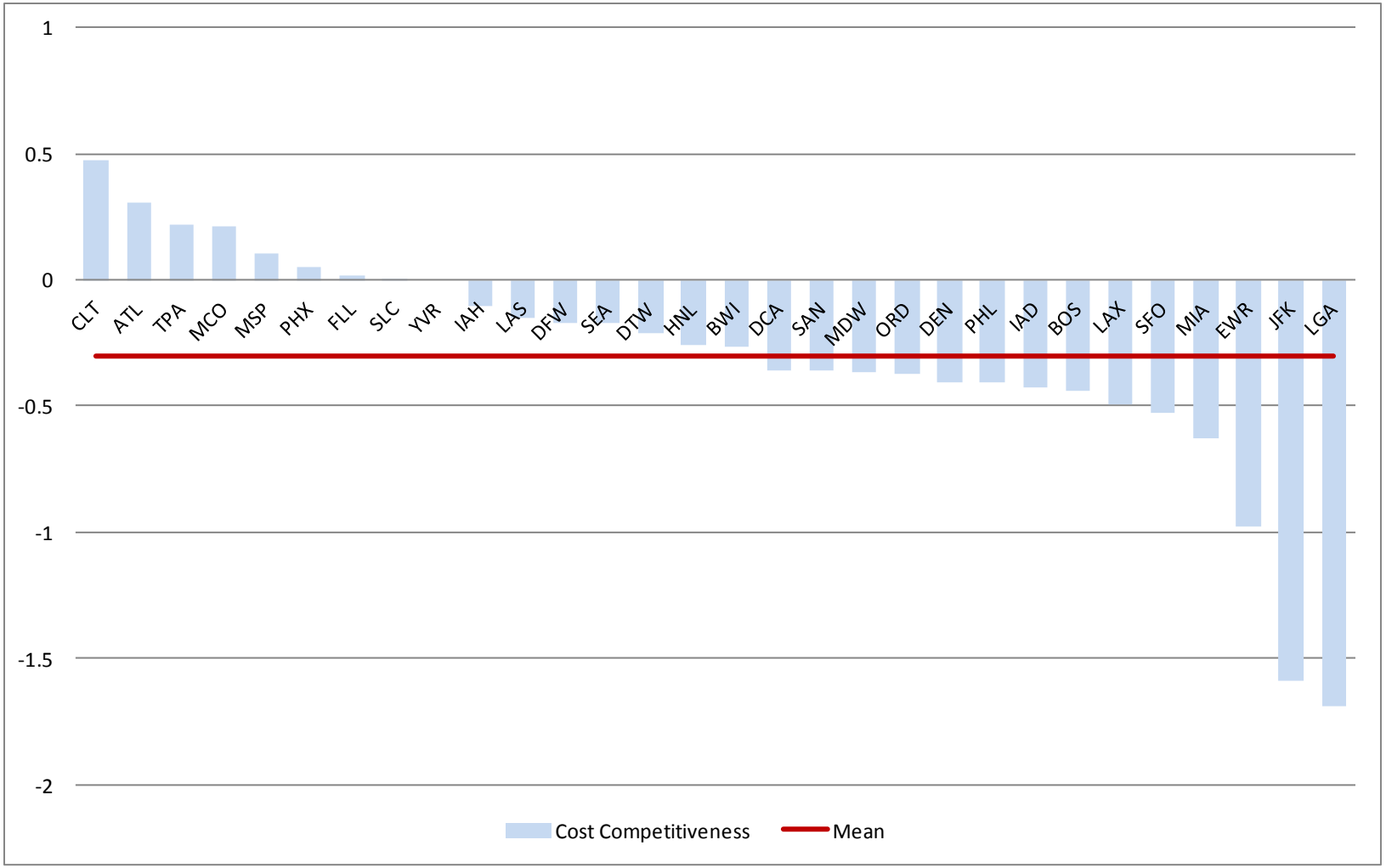
Cost Competitiveness = Net VFP and Input Prices Effect

Europe – Passengers < 15 million (CPH=0.0)



Cost Competitiveness = Net VFP and Input Price Effect

N. America – Passengers > 15 million (YVR=0.0)



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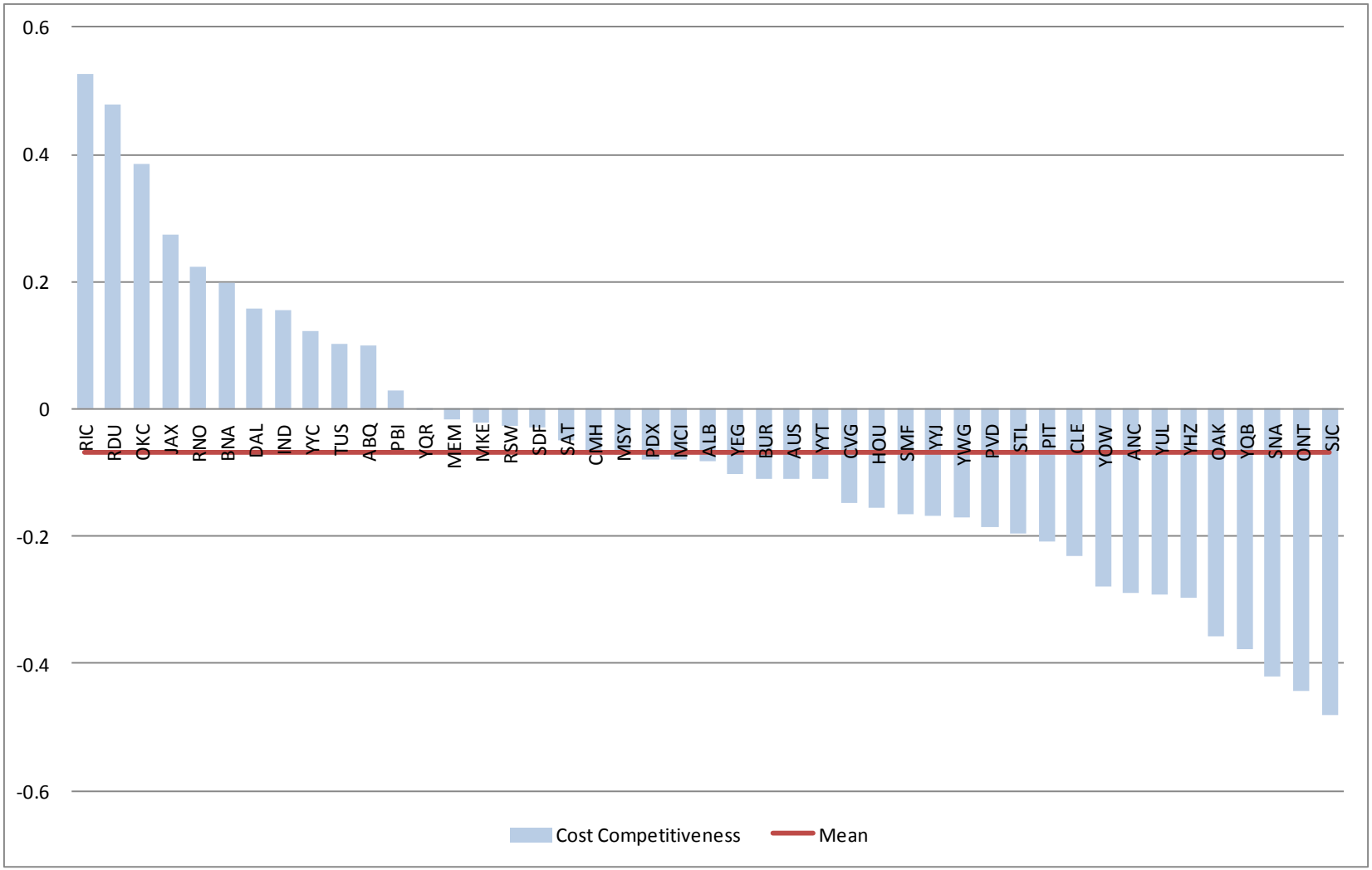
N. America – Passengers < 15 million (YVR=0.0)



Top Unit Cost Competitiveness Performers

Asia-Pacific:

- *Oceania:*
  - **Queenstown**, Dunedin
- *Asia:*
  - **Airports Authority of India**, Jakarta Soekarno-Hatta

Europe:

- *Large Airports (> 15 million Pax):*
  - **Istanbul Ataturk**, Athens
- *Small/Med Airports (< 15 million Pax):*
  - **Tallinn**, Riga

N. America:

- *Large Airports (> 15 million Pax):*
  - **Charlotte**, Atlanta
- *Small/Med Airports (< 15 million Pax):*
  - **Richmond**, Raleigh-Durham

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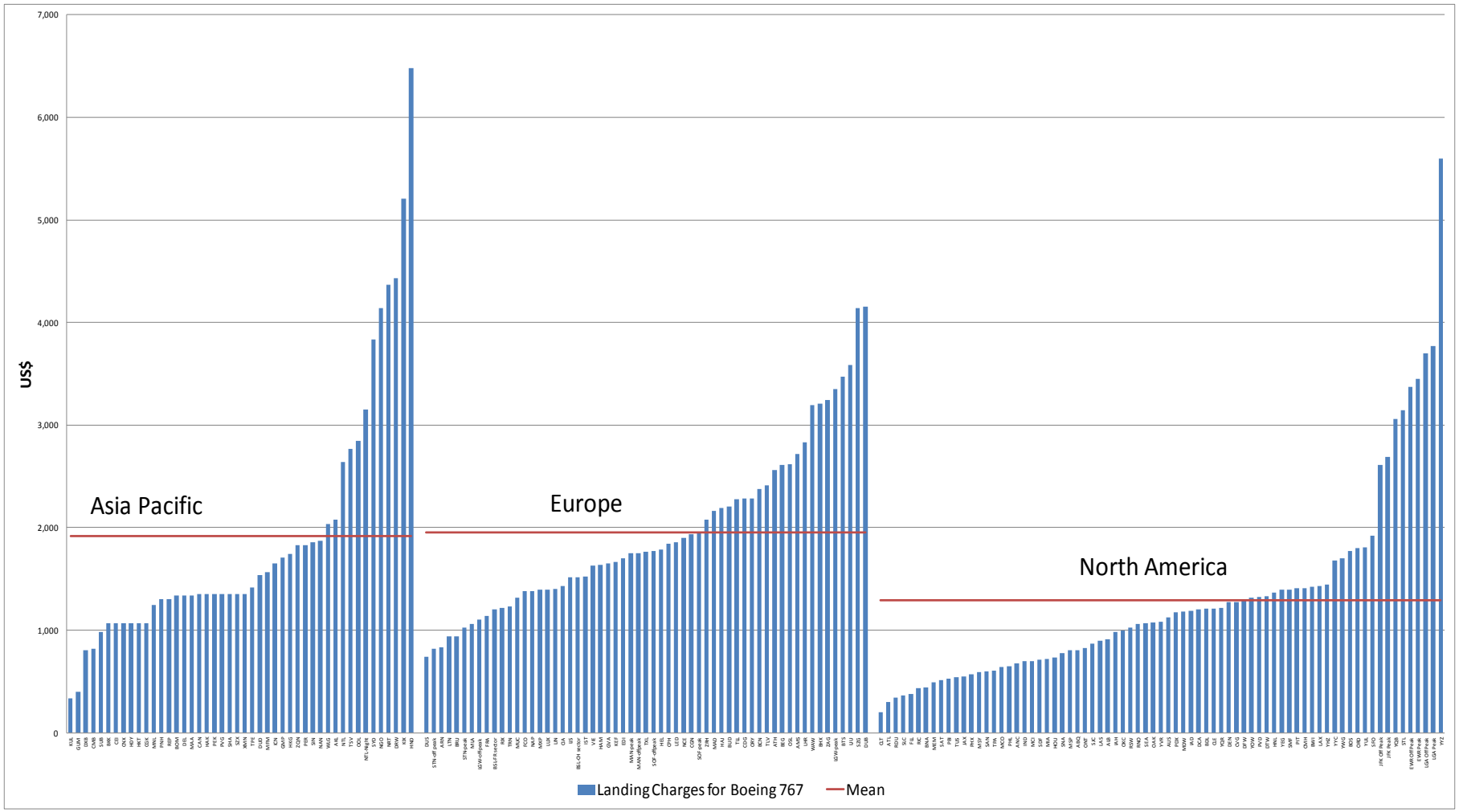
Landing Charges: Basis for computing

- **Assumptions:**
  - (Use of signatory airlines)
  - Passenger aircraft
  - Peak and off-peak charges separately treated
  - International flights
  - Some airports have summer/winter rates – **these are averaged**
  - Assumed 2 hours aircraft parking

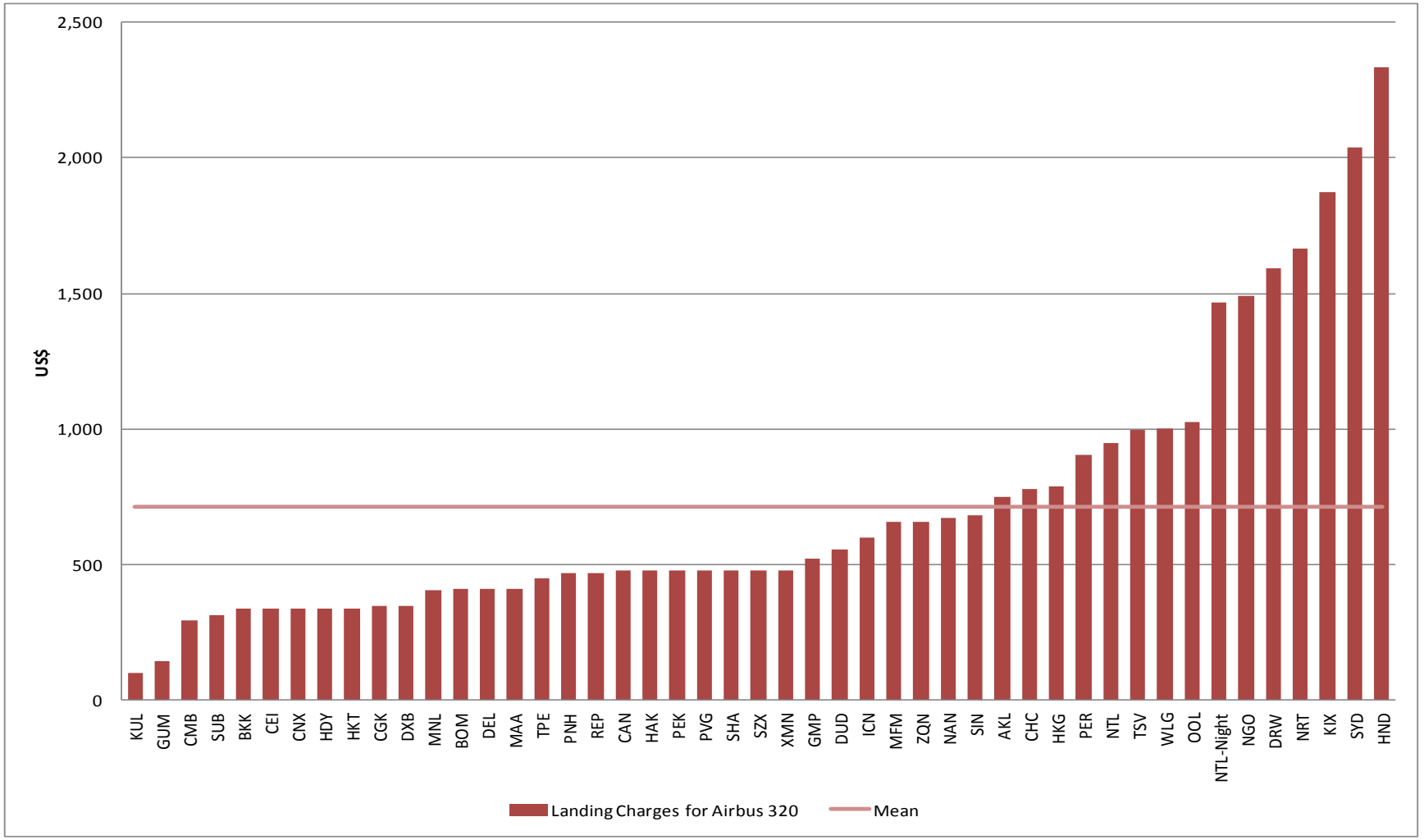
- **Exclusion**: Tax, Noise charges, lighting surcharge

Landing Charges

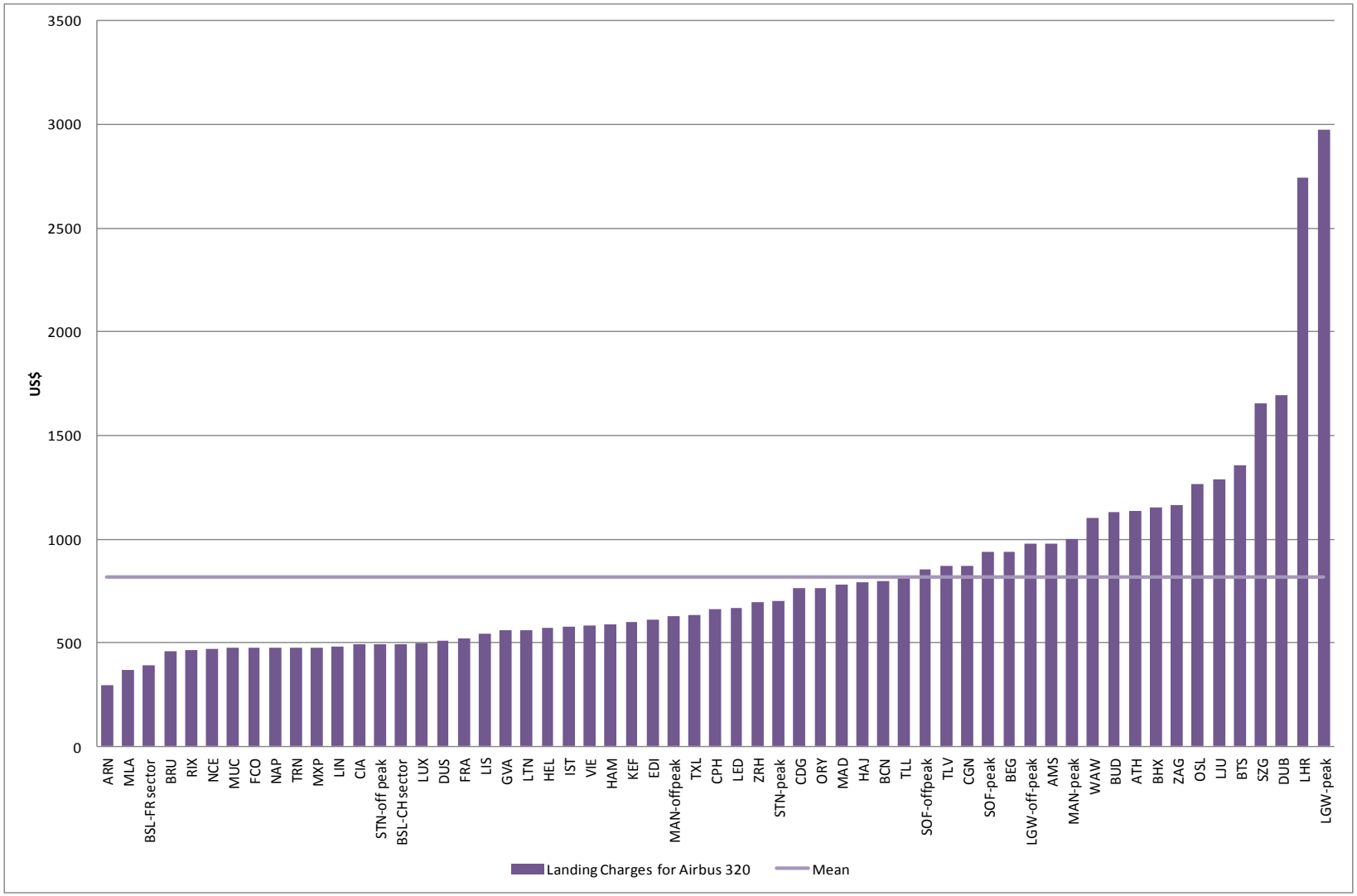
for Boeing 767-400, 2011 (in US$)



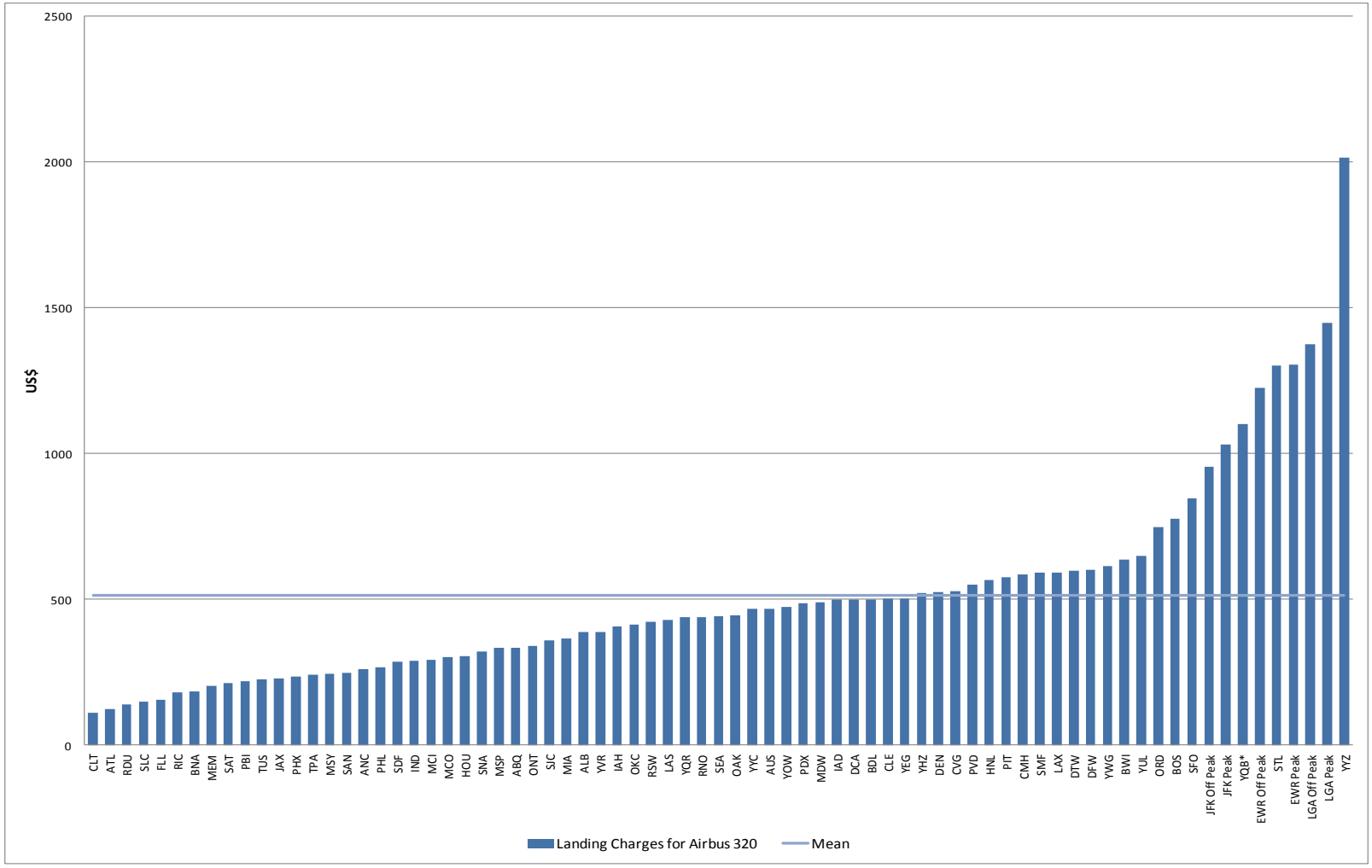
Asia Pacific: Landing Charge
for Airbus 320, 2011 (in US$)



Europe: Landing Charge
for Airbus 320, 2011 (in US$)



North America: Landing Charge
for Airbus 320, 2011 (in US$)



Summary – Landing/Takeoff Charges
for Airbus 320, 2011

Asia-Pacific:

- Highest charges: **Tokyo Haneda**, Sydney
- Lowest charges: : **Kuala Lumpur**, Guam

Europe:

- Highest charges: **London Gatwick-peak**, London Heathrow
- Lowest charges: **Stockholm**, Malta

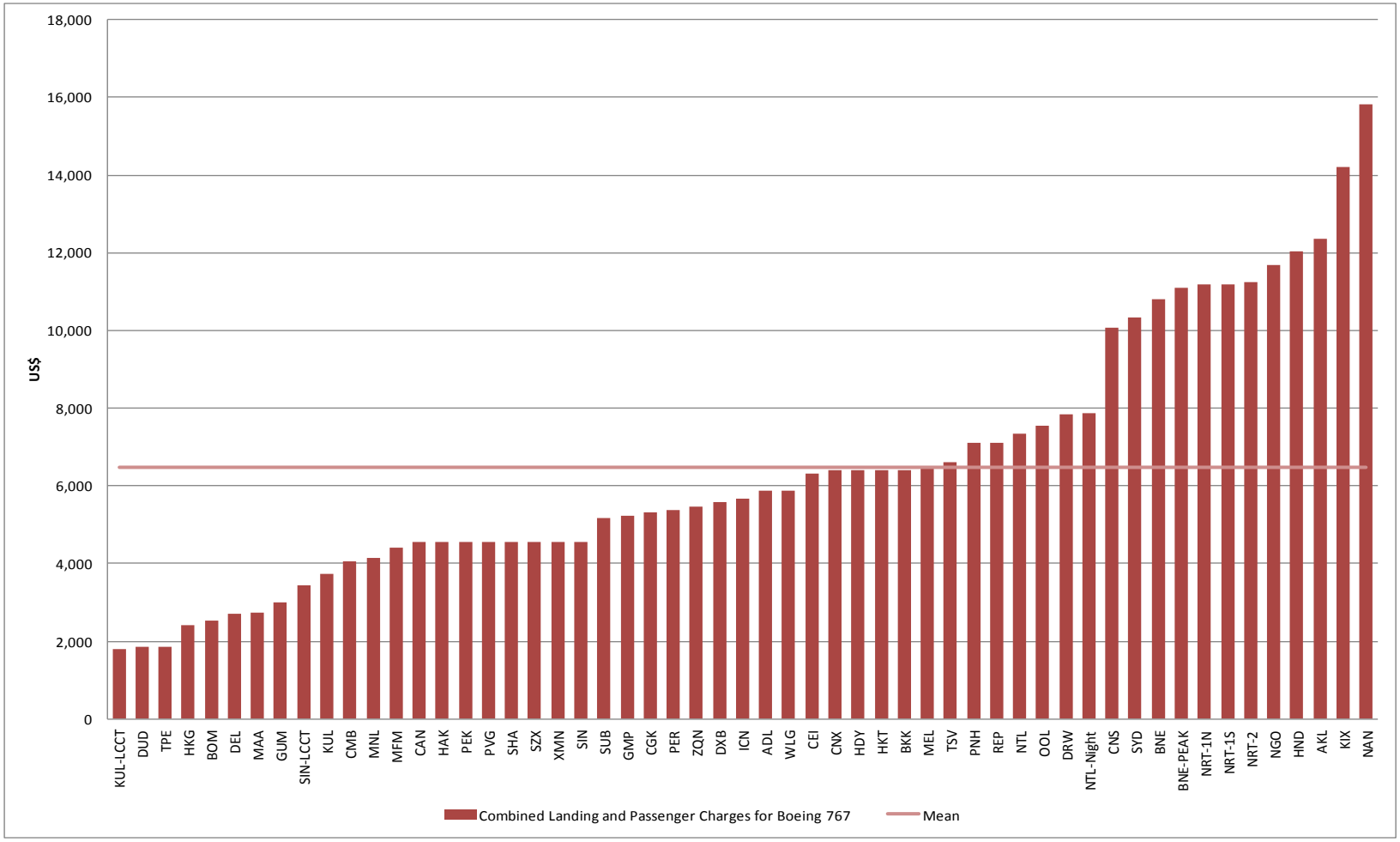
North America:

- Highest charges: **Toronto**, LaGuardia
- Lowest charges: **Charlotte**, Atlanta

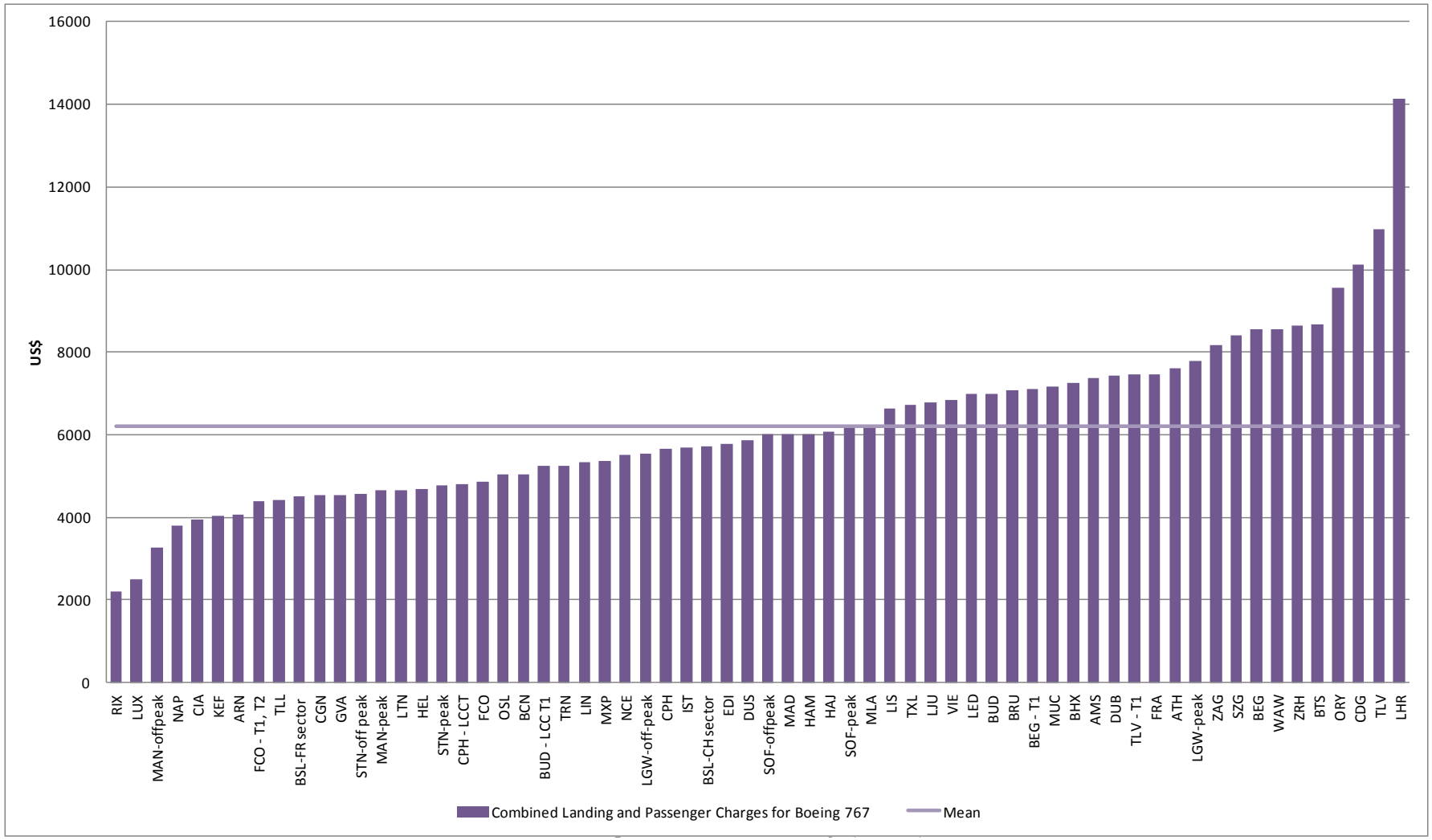
Combined Landing and Passenger Charges

Given that it is difficult to separate landing and passenger charges for some airports, the ***combined landing and passenger charge*** may reflect a better picture.

Asia Pacific: Combined Landing and Passenger Charge for Boeing 767, 2011 (in US$)



Europe: Combined Landing and Passenger Charge for Boeing 767, 2011 (in US$)



Summary – Combined Landing and Passenger Charges (Boeing 767)

Asia-Pacific :

- Highest charges: **Nadi (Fiji)**, Kansai
- Lowest charges: **Kuala Lumpur Low Cost Carrier Terminal,** Dunedin (New Zealand)

Europe:

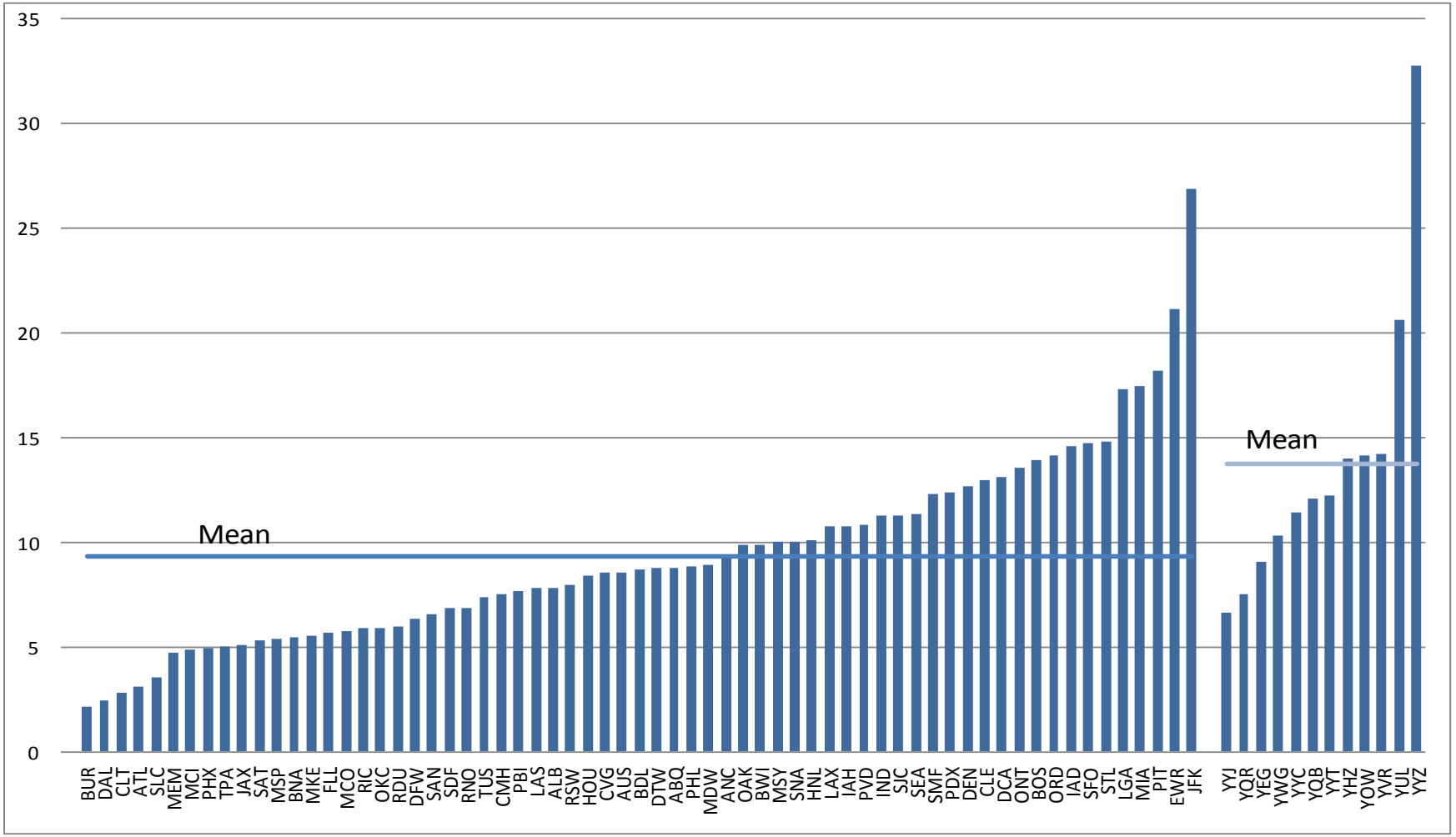
- Highest charges: **London Heathrow**, Ben Gurion (Tal Aviv)
- Lowest charges: **Riga**, Luxembourg

Cost per Enplanement for Airlines (CPE)

- For N. American airports, the data allows us to compute ***Cost per enplanement (CPE)***.

- CPE = ***sum of landing fees, terminal arrival fee, rents and utilities, terminal apron charges/tiedowns, and passengers other aeronautical payments to airports divided by enplaned passengers***

North America: Cost per Enplaned Passenger, 2010 (in US$)



Summary – Cost per Enplaned Passenger (CPE)

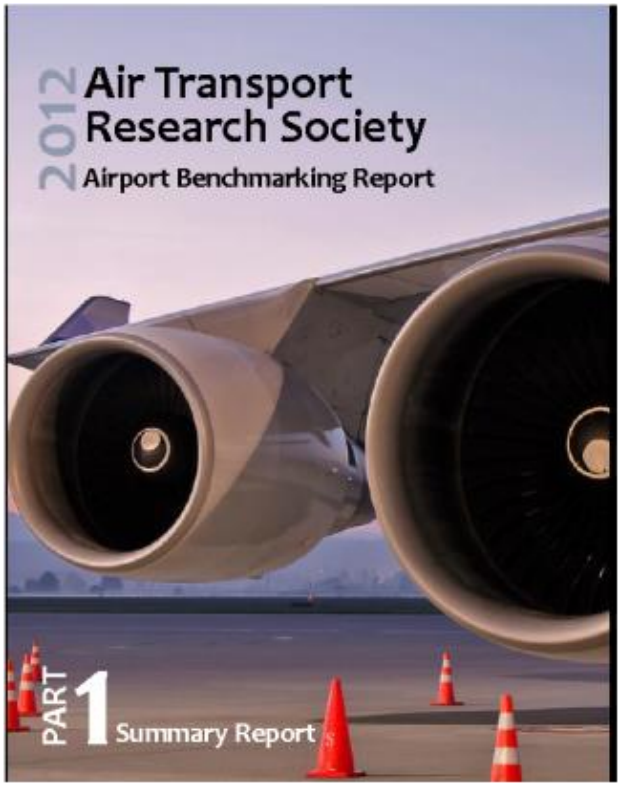
United States:

- Highest CPE: **New York JFK**, Newark Liberty
- Lowest CPE: **Bob Hope**, Dallas Love Field

Canada

- Highest CPE: **Toronto**, Montreal
- Lowest CPE: **Victoria**, Regina,

ATRS Airport Benchmarking Report



- 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**

Thank You

2013 ATRS World Conference

(Bergamo, Italy in late June, 2013)