Key Findings

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ATRS Global Airport Performance Benchmarking Task Force:

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Outline

- Objective of the ATRS Benchmarking Study
- Airports Included and ATRS Database
- Characteristics of Sample Airports
- Methodology
- Key Results on Efficiency and Cost Competitiveness
- Cost Efficiency from Airline Perspective

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**

- Limitation: Service Quality is not considered

Airports included in the 2015 Report

Canada-US	88 airports
Europe	70 airports 16 airport groups
Asia Pacific	9 airport groups 38 Asian airports 15 Oceania airports
Total	**211 airports** **25 airport groups**

The ATRS Database

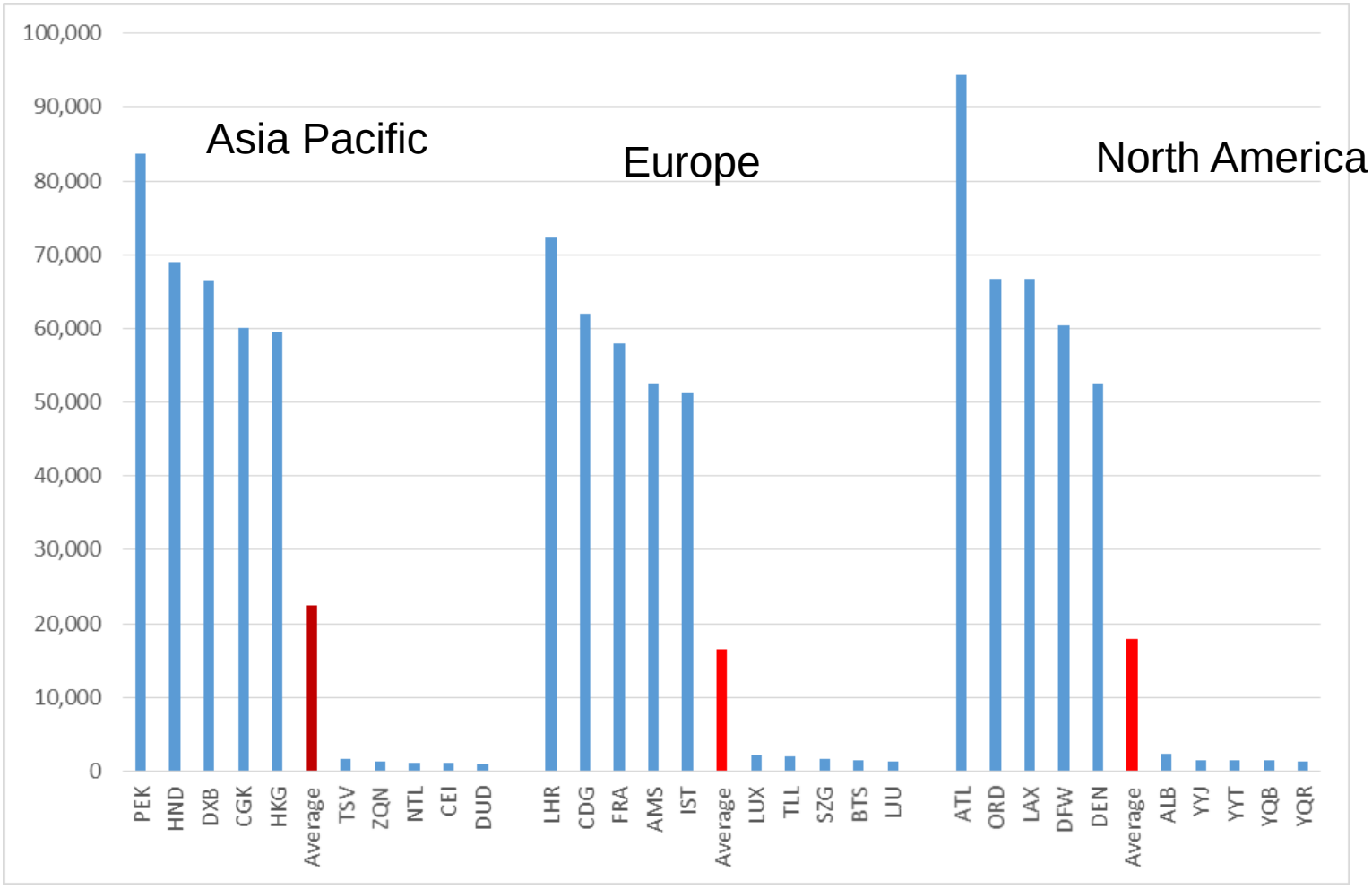
- The ATRS Database contains historic information (FY 2002-2013) including financial data, traffic and capacity data of the major airports and airport authorities (groups) in the following geographic regions:
  - **Asia Pacific**
  - **Europe**
  - **North America**
- The data in each regions is segregated 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.

Airport Characteristics

- Number of passengers ranges from 860,438 at Dunedin (New Zealand) to 94.4 million at Atlanta (United States) in 2013
- 40 airports with only 1 runway, and 7 runways at DFW and 8 at ORD
- Number of Employees ranges from 20 (Queenstown) to 19,009 (Frankfurt)
- 13 airports serve only international passengers, and international passengers account for less than 10 % of total traffic at 62 airports

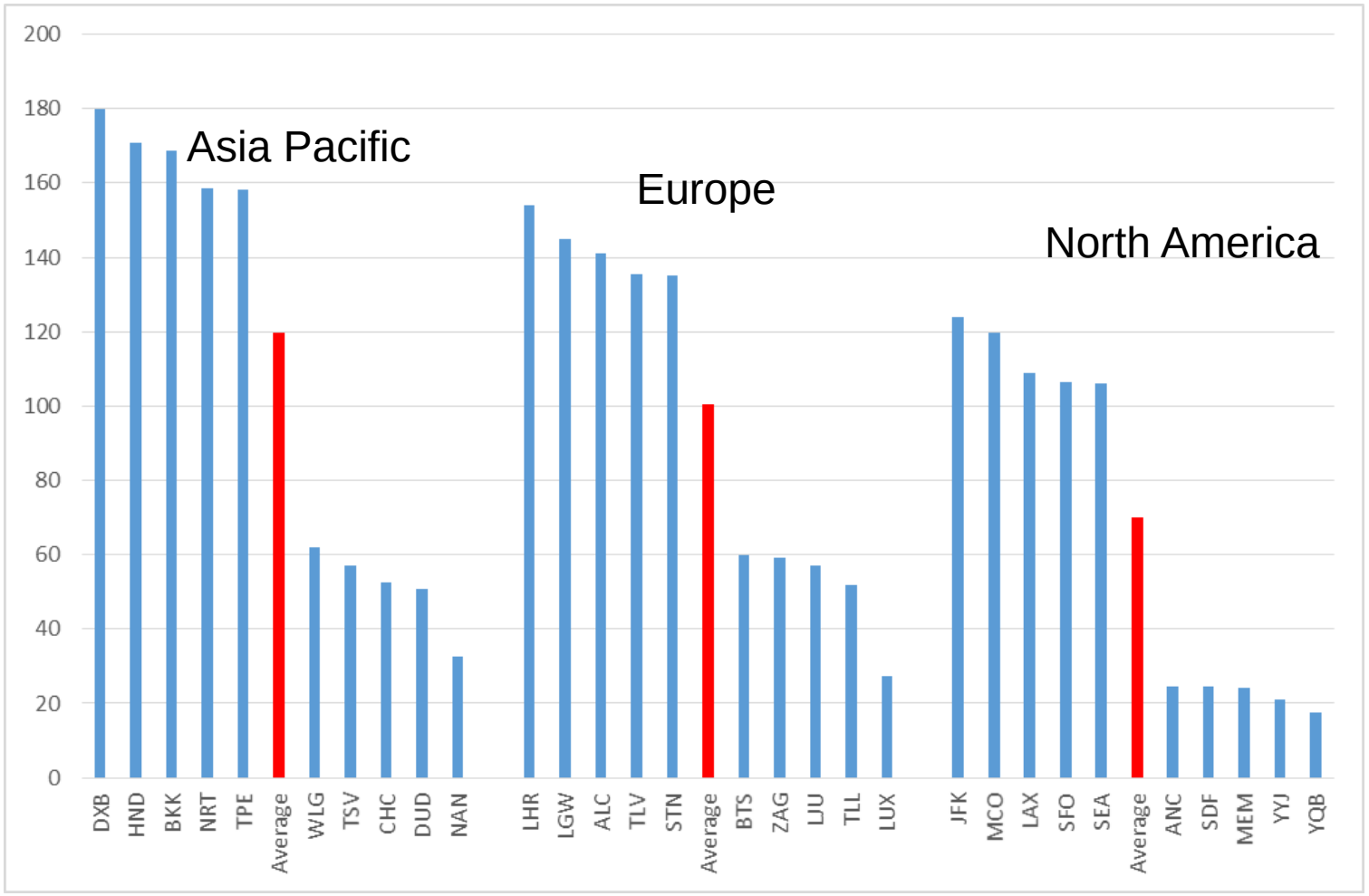
Passenger Traffic, 2013

Largest Five and Smallest Five ('000)



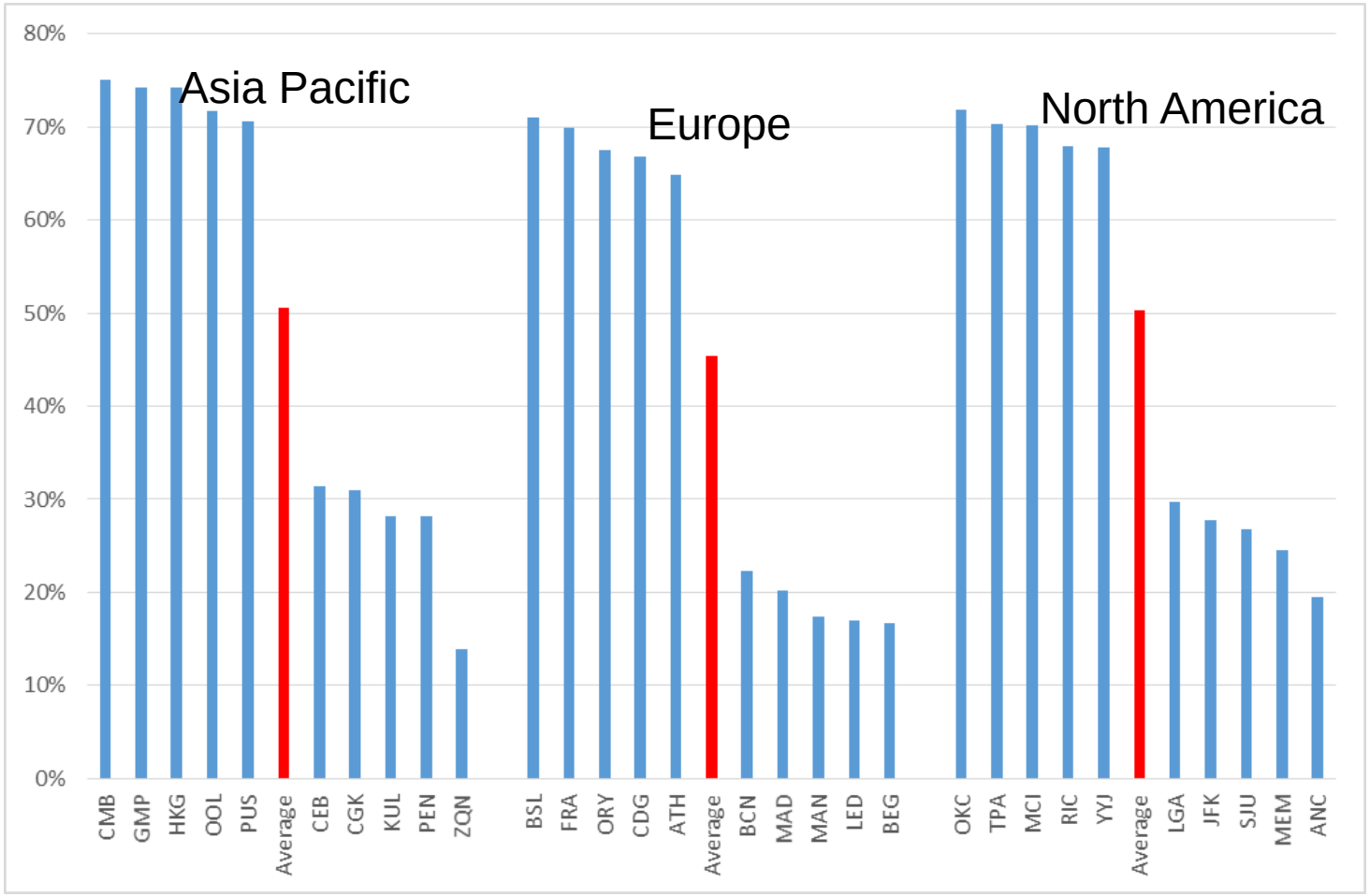
Passengers per Aircraft Movement, 2013

Highest Five and Lowest Five



% OF Non-Aeronautical Revenue, 2013

Highest Five and Lowest Five



Methodology

- **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).
- VFP is computed using the **multilateral index** procedure proposed by Caves, Christensen and Diewert (1982).

Multilateral Index Procedure

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

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

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

Methodology

Inputs	Outputs
• Labour • Other non-capital (soft-cost) input	• Aircraft movement • Passenger • Non-aeronautical revenue • (Cargo)

Gross Variable Factor Productivity

Methodology

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Factors Beyond Managerial Control:

- **Airport size (Scale of aggregate output)**
- **Average aircraft size**
- **Share of international traffic**
- **Share of air cargo traffic**
- **Extent of capacity shortage - congestion delay**
- etc

Residual (Net) variable factor productivity (RVFP) is computed after removing effects of these Factors

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Cost Competitiveness

- An airport enjoys lower unit costs than other airports when that airport is more efficient, or pays less for its inputs, or both
- A cost competitiveness indicator is constructed by summing the effects of variable input price and the effects of efficiency in using these variable inputs.

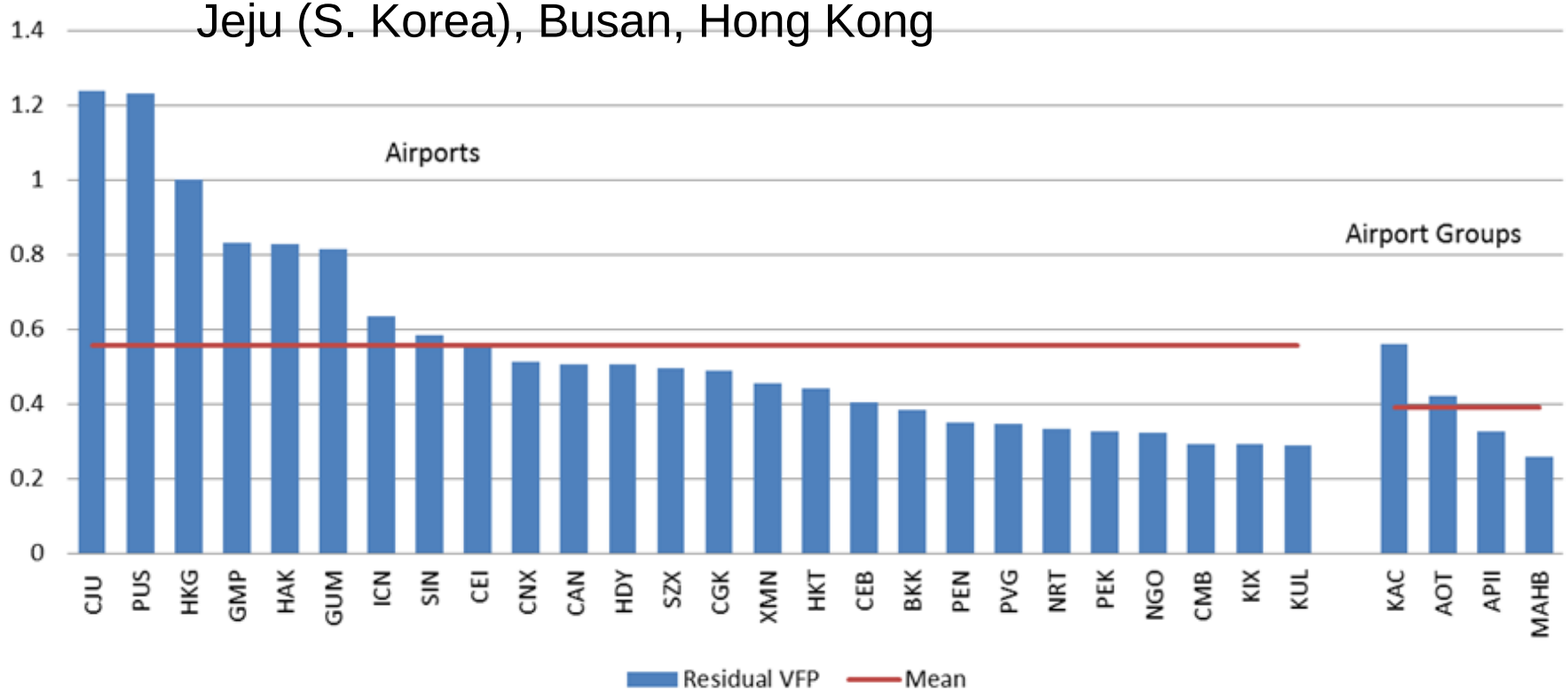
Key Results

- **Residual VFP (Efficiency)**

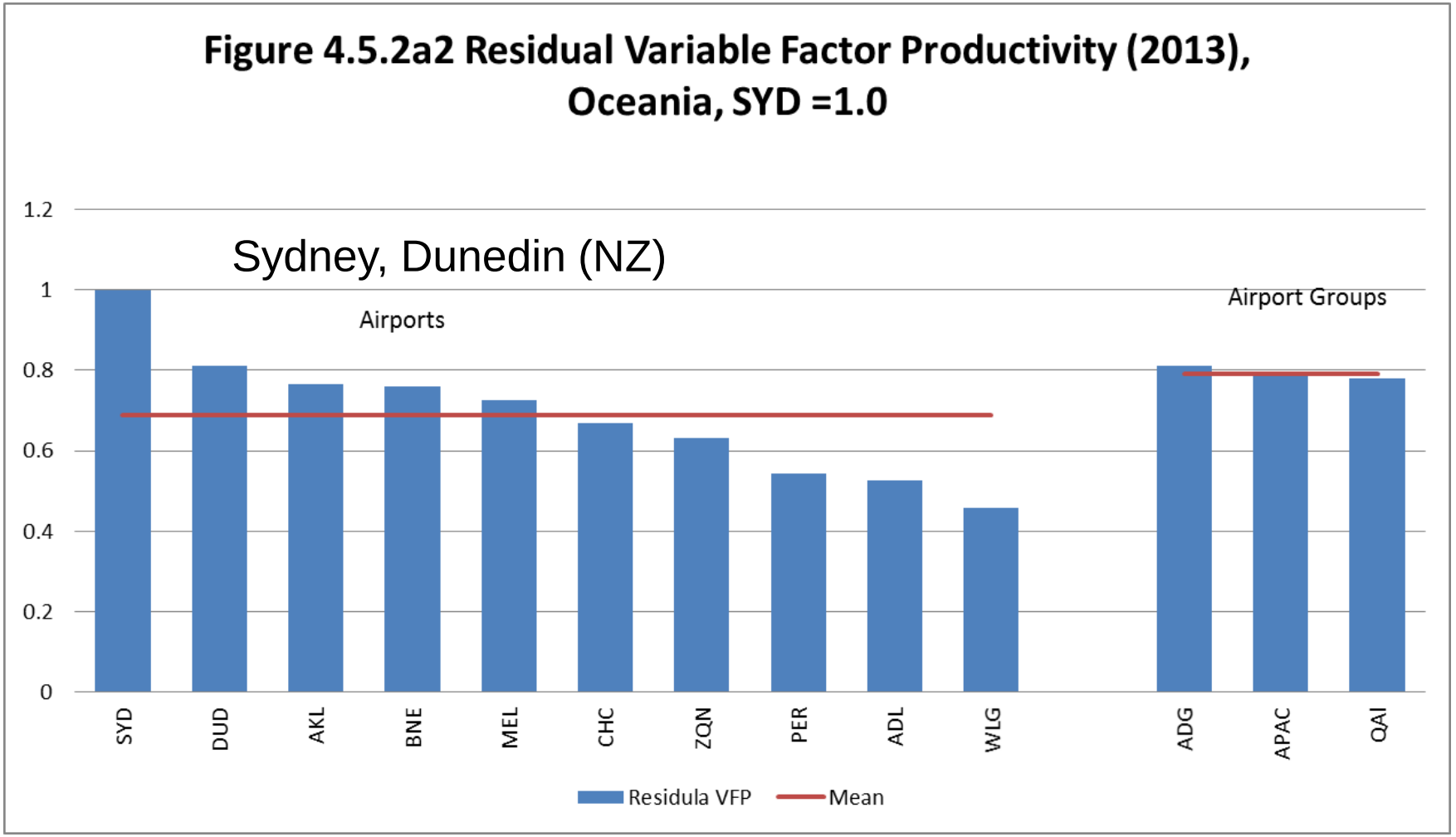
Key Results

Figure 4.5.2a1 Residual Variable Factor Productivity (2013), Asia, HKG=1.0

Jeju (S. Korea), Busan, Hong Kong



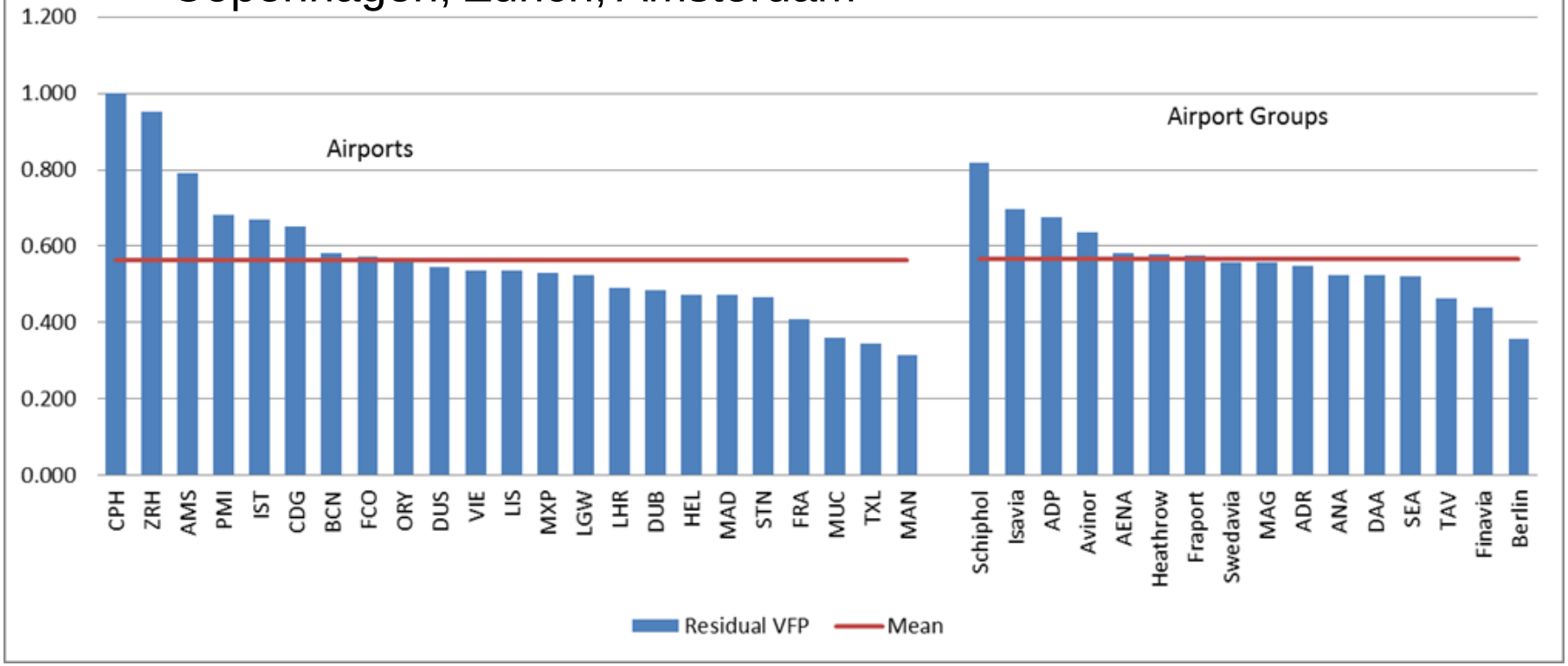
Key Results



Key Results

Figure 4.5.2b1 Residual Variable Factor Productivity (2013), Europe Large Airports, CPH=1.0

Copenhagen, Zurich, Amsterdam



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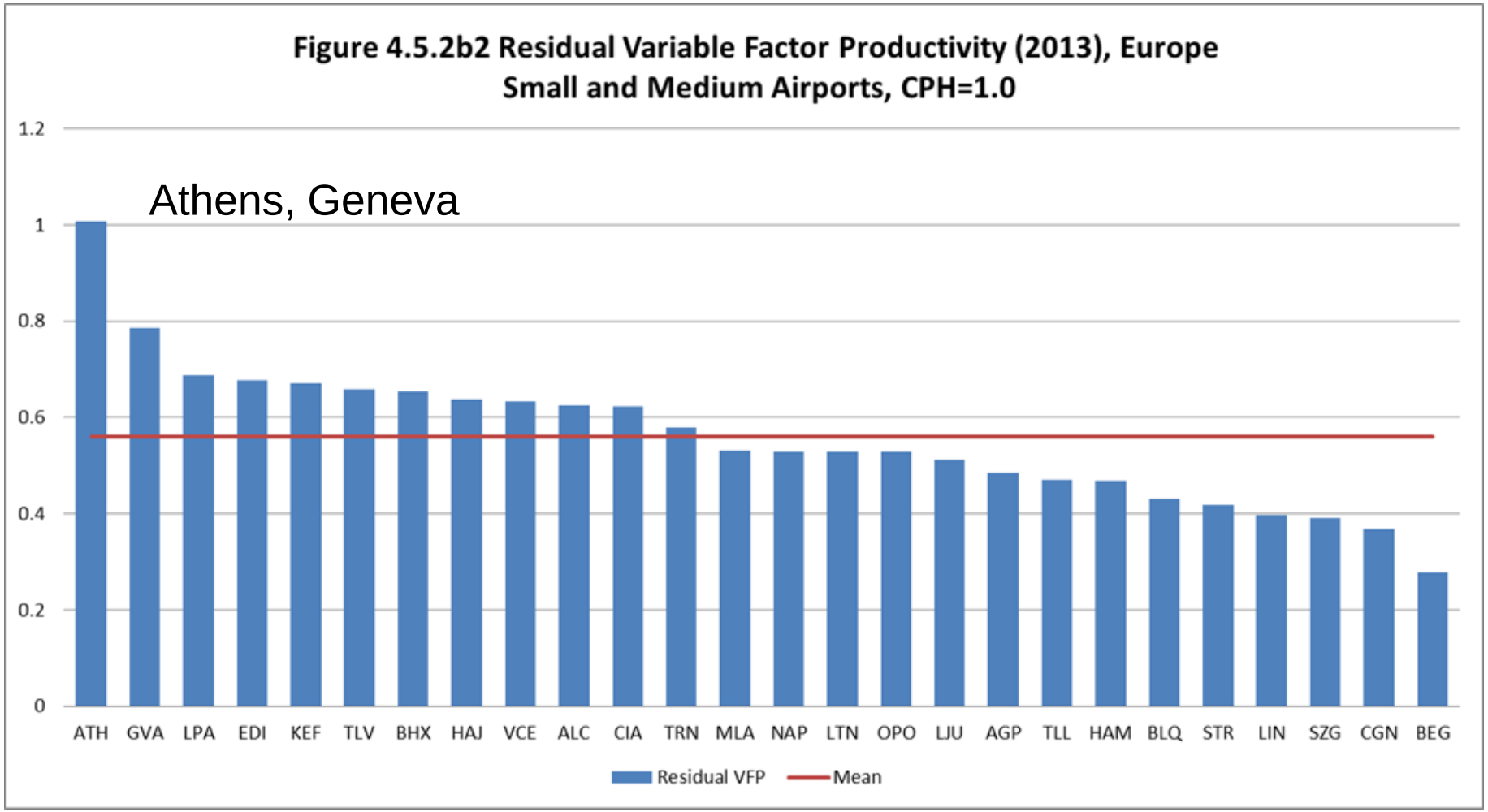
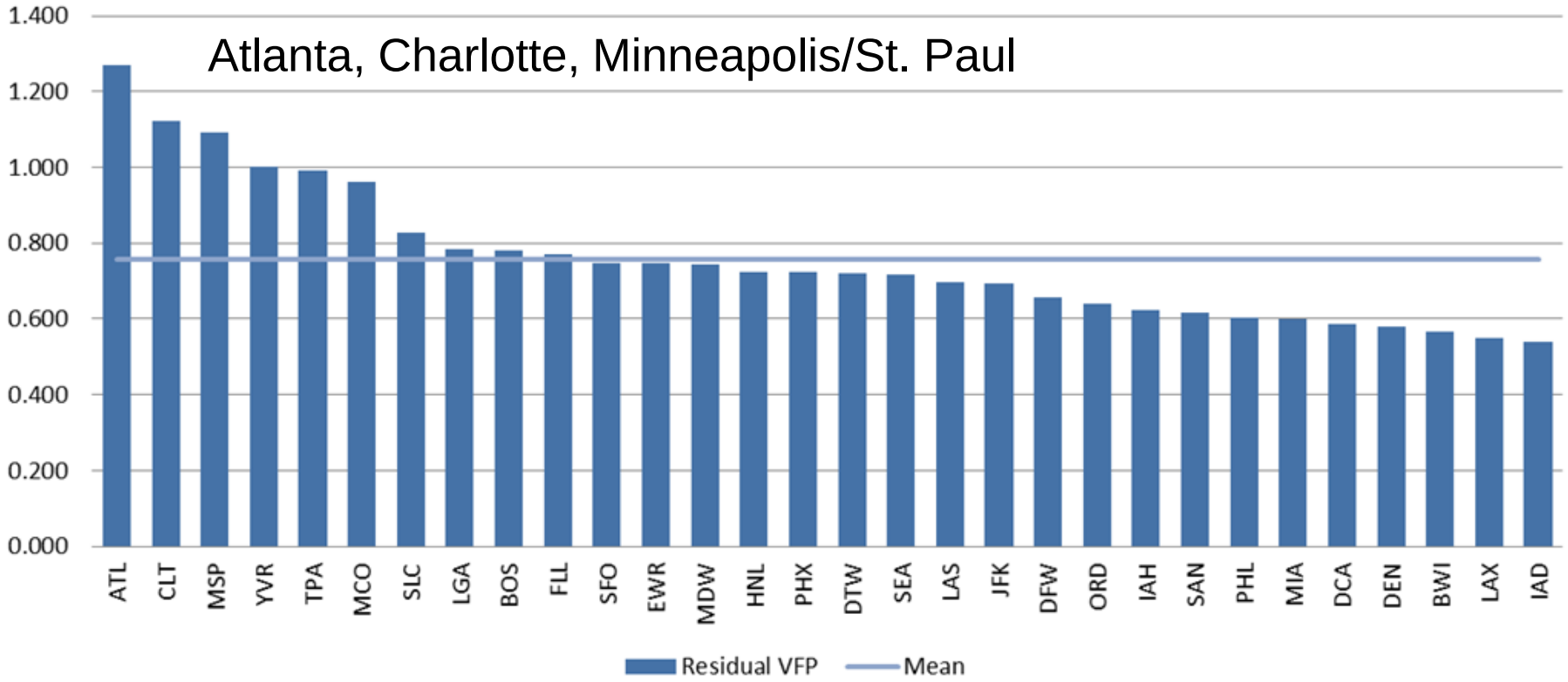


Key Results

Figure 4.5.2c1 Residual Variable Factor Productivity (2013), North America Large Airports, YVR=1.0



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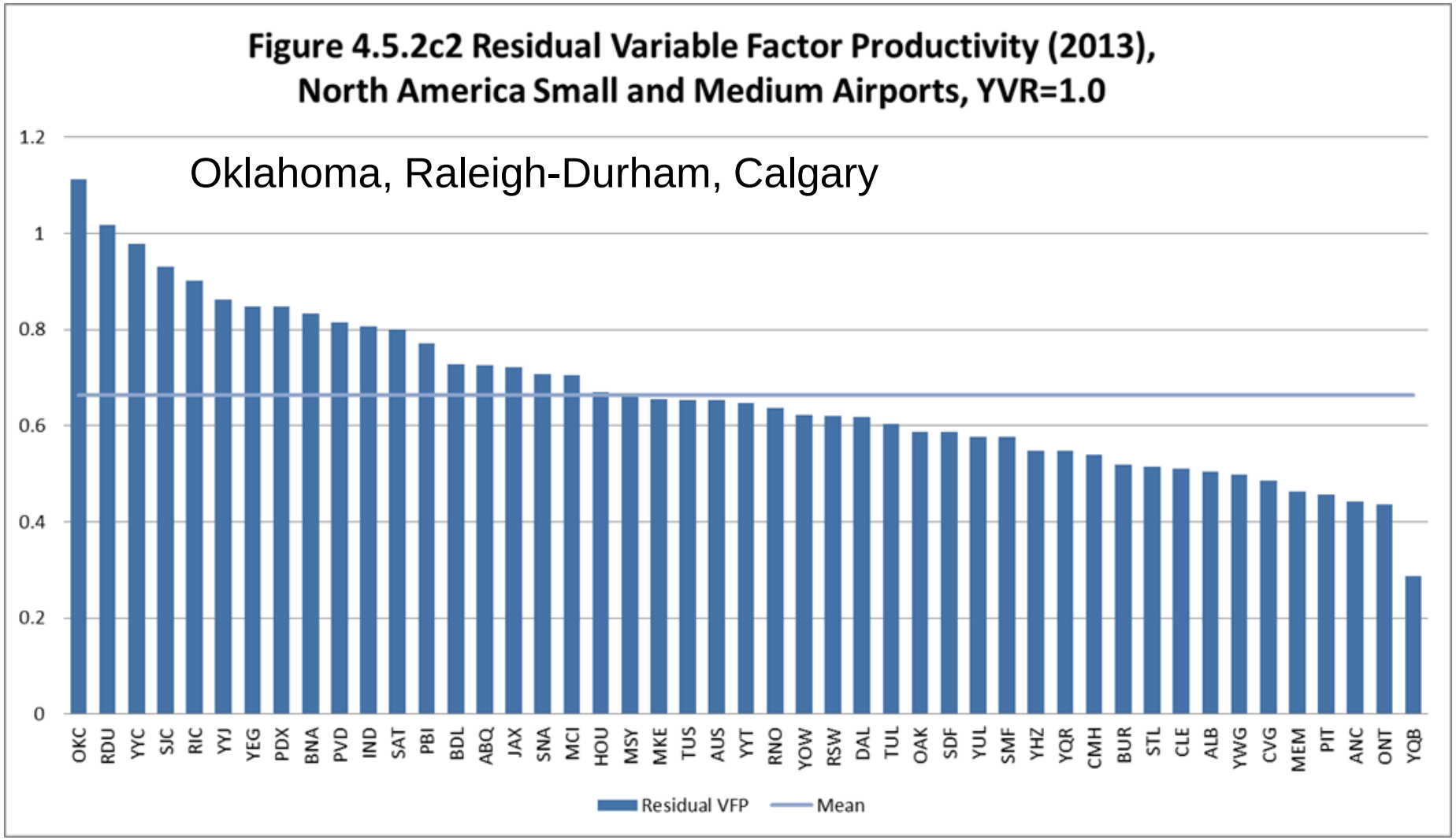

Top Efficiency Performers (2015)

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Asia Pacific:

- *Asian Airports*:
  - **Jeju**, Busan, Hong Kong
- *Oceania Airports:*
  - **Sydney,** Dunedin

Europe:

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

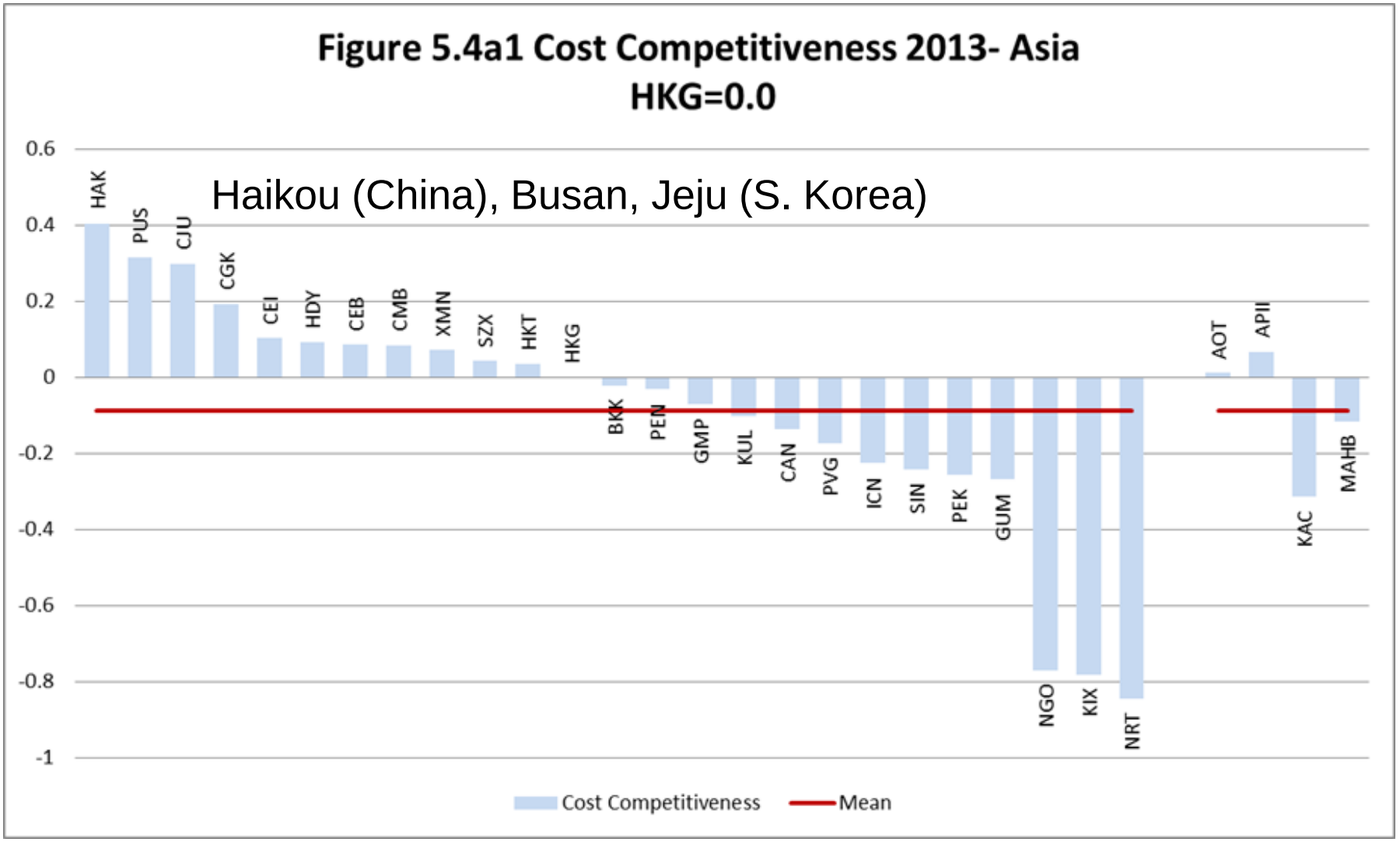
North America (Canada/US):

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

Key Results

- **Cost Competitiveness**

Key Results



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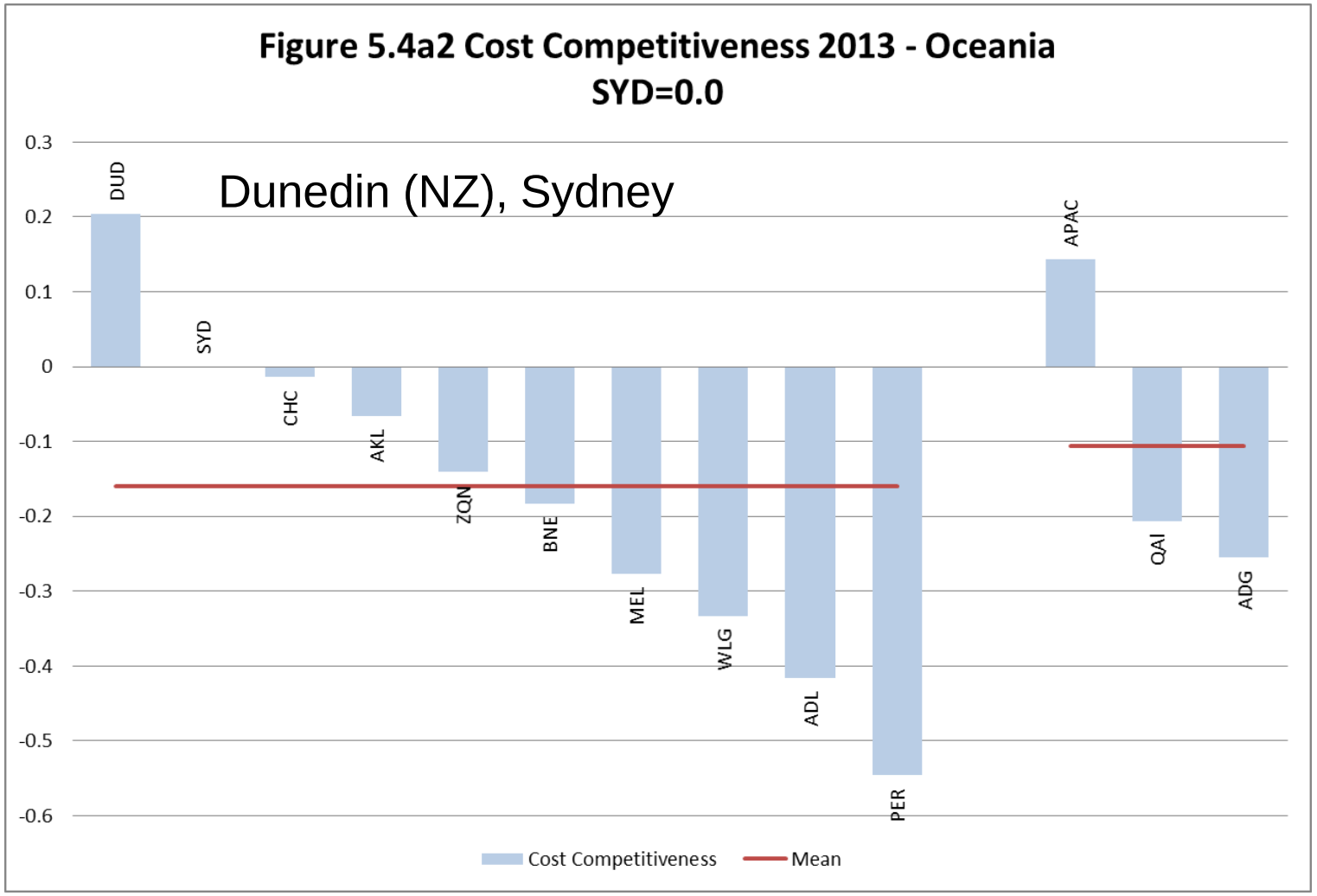

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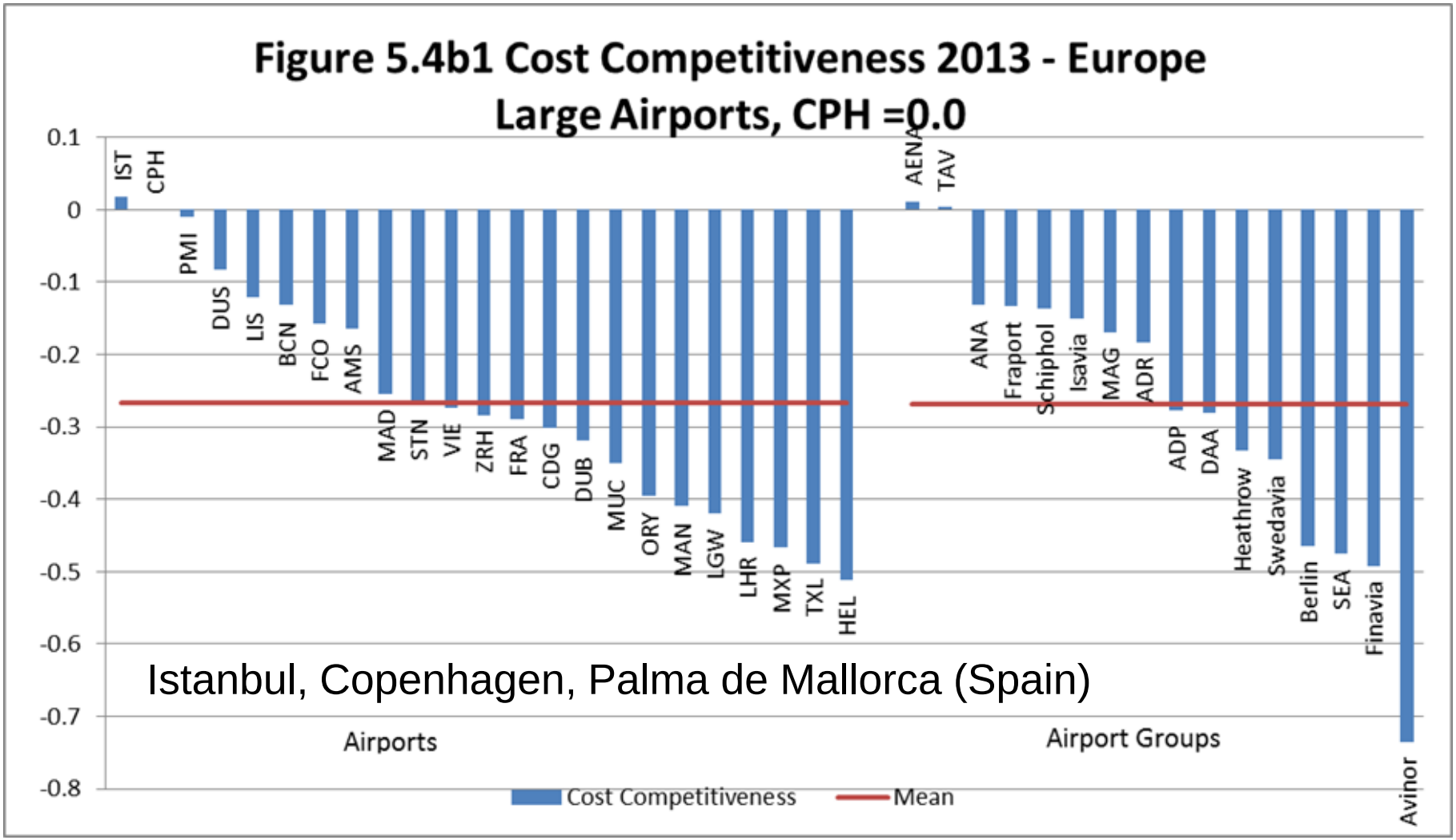

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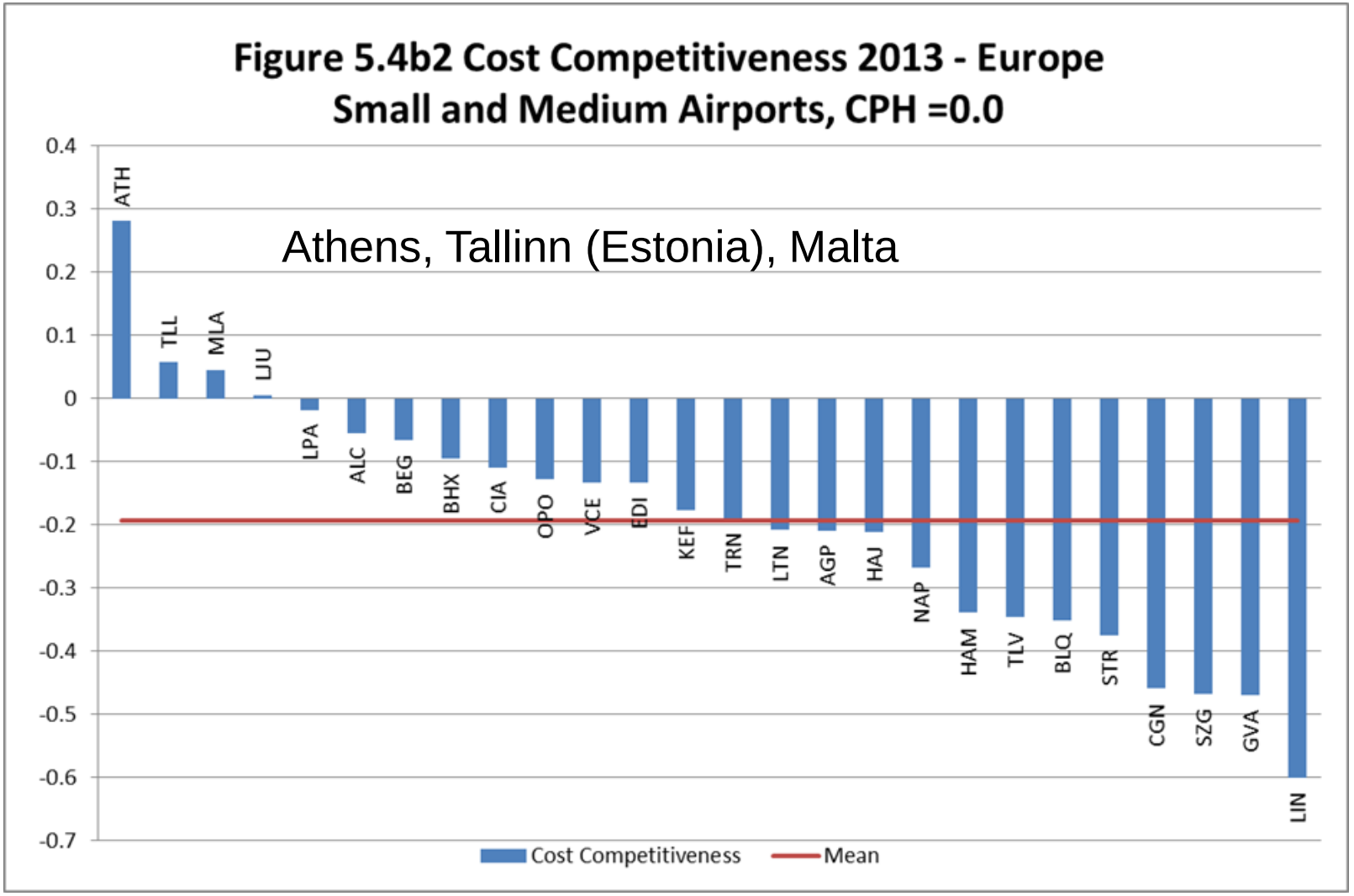

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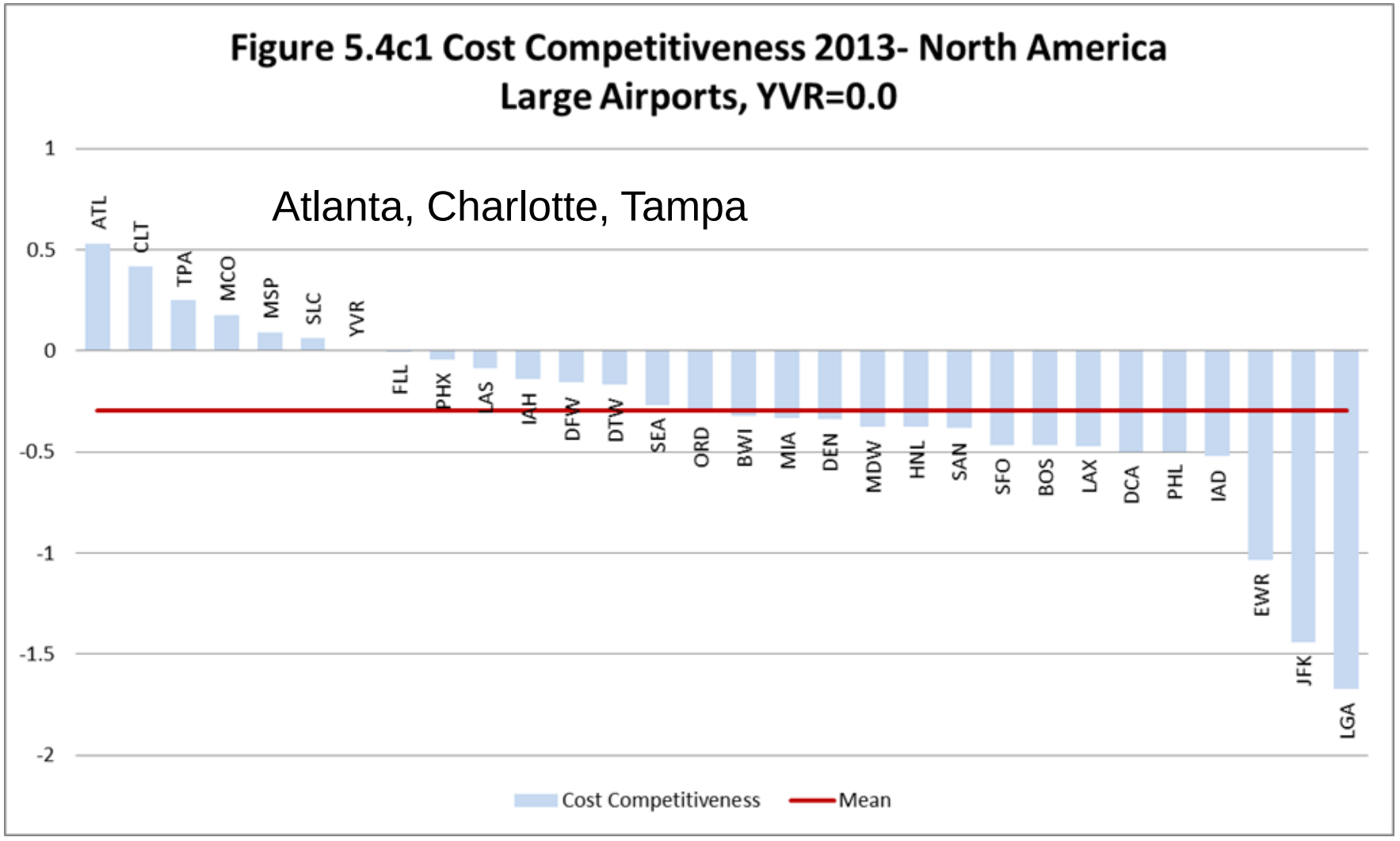

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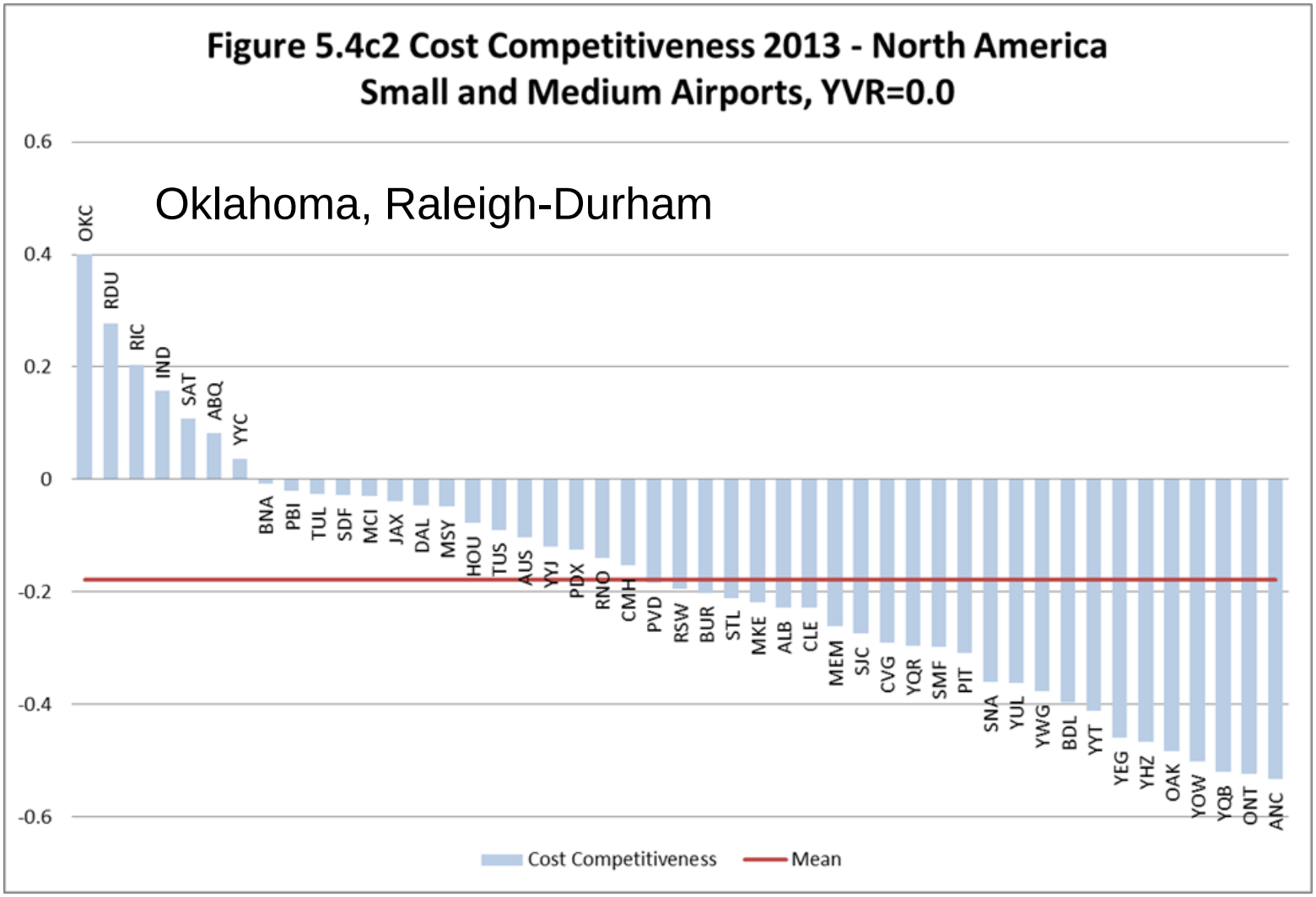


Top Cost Competitiveness Performers

Asia-Pacific:

- *Oceania:*
  - **Dunedin**, Sydney
- *Asia:*
  - **Haikou**, Busan

Europe:

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

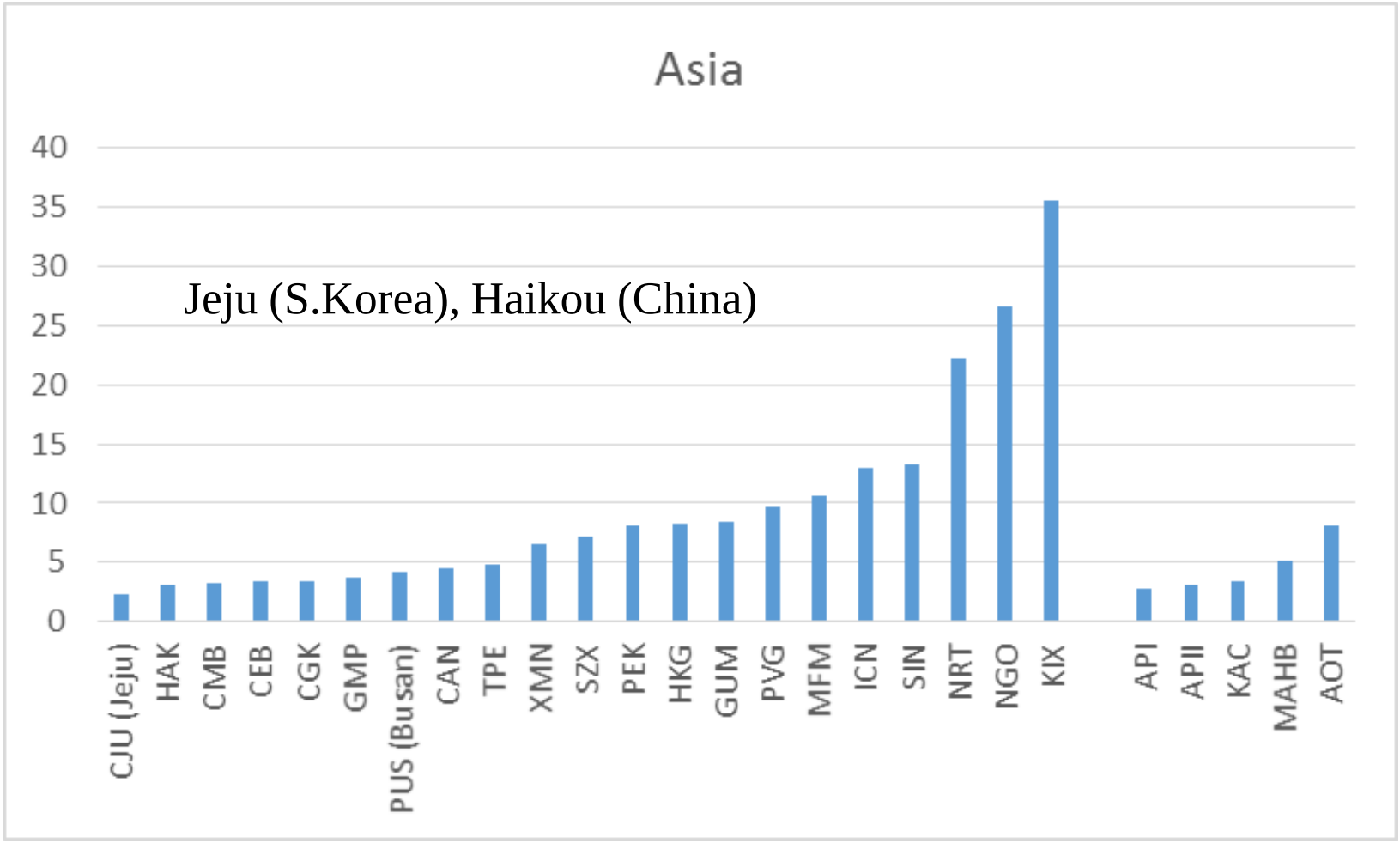
N. America:

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

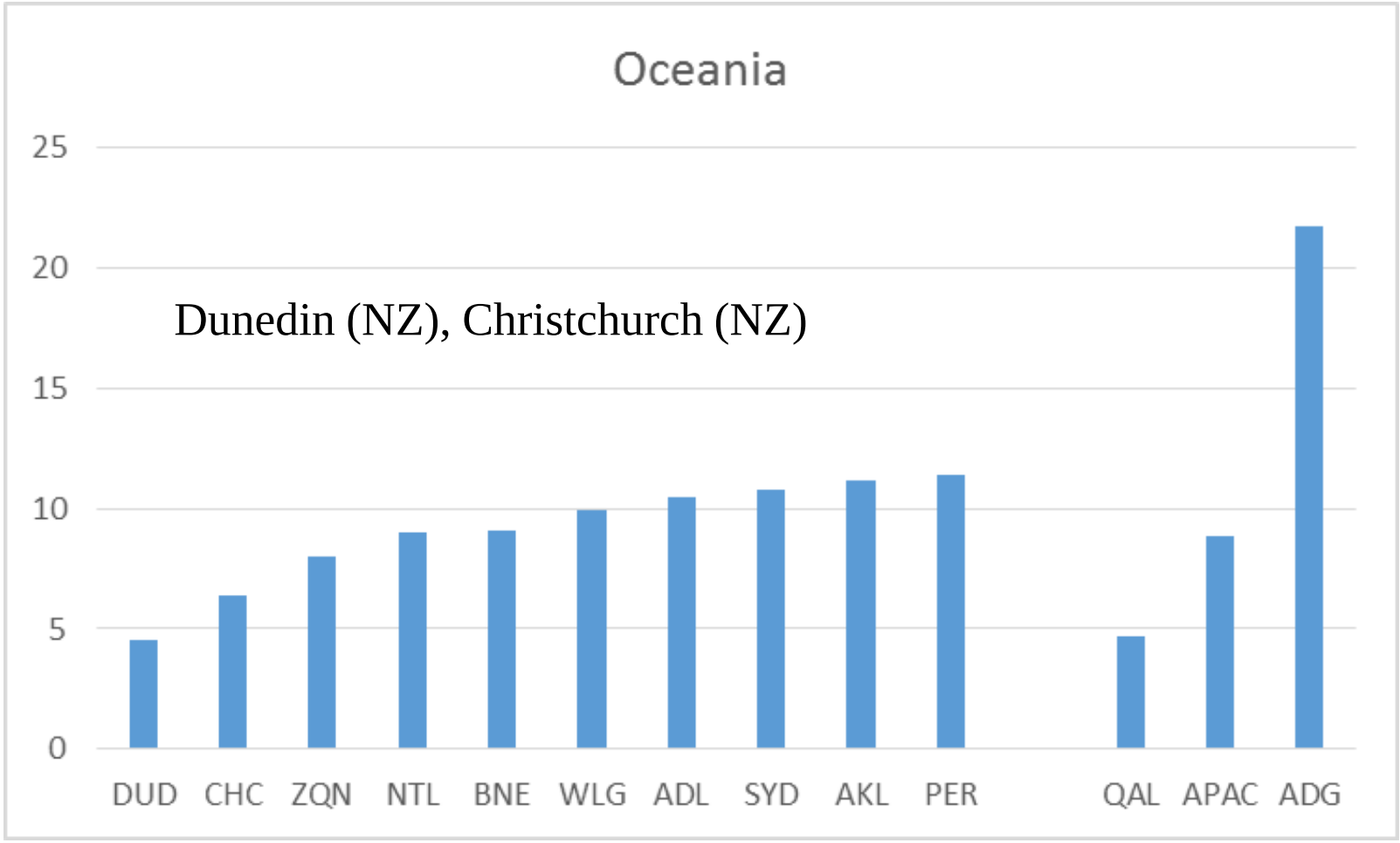
Cost Efficiency from Airline Perspective

- *Airports invest in infrastructure, facilities and management skills to provide the services at the least overall costs to airlines*
- *Cost per Enplanement (CPE) in the United States*
  - All fees and Charges airlines pay to airports per enplaned passenger
  - Commonly accepted measure for comparing airline costs amongst airports
- *Average Aeronautical Revenue per Passenger*

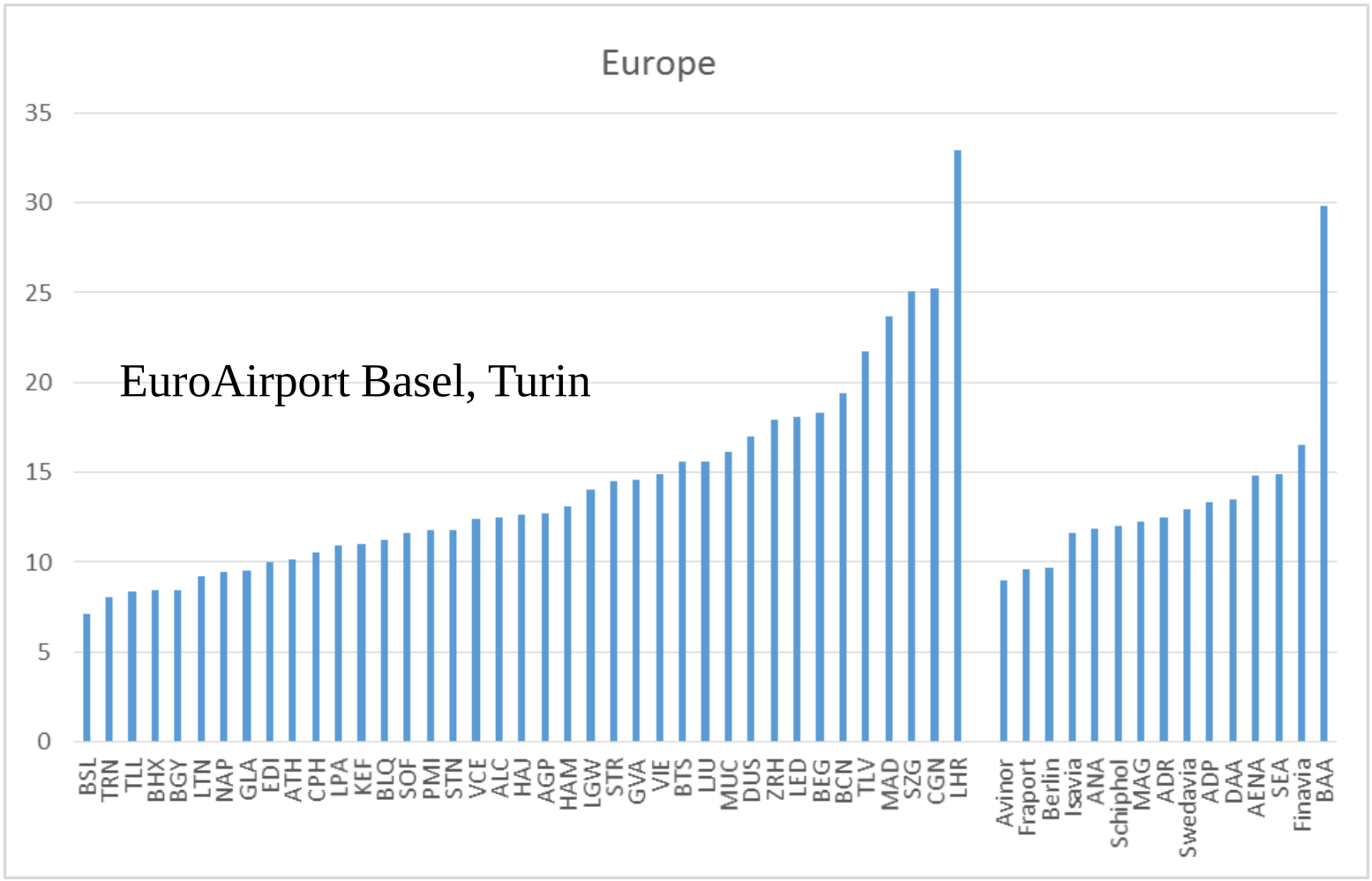
Aeronautical Revenue per Passenger



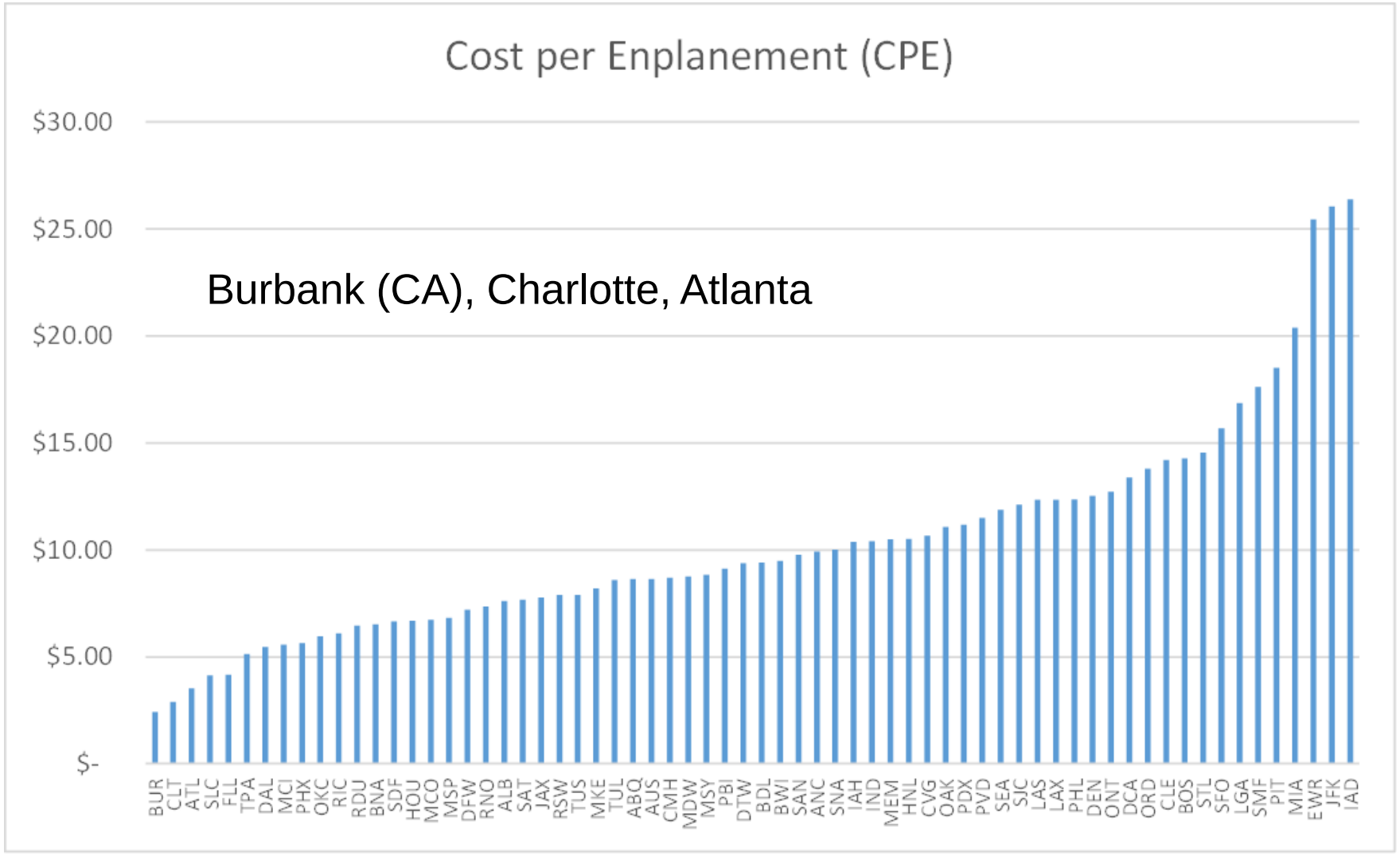
Aeronautical Revenue per Passenger



Aeronautical Revenue per Passenger



Costs per Enplanement (CPE)



Top Performers in Cost Efficiency to Airlines

Asia-Pacific:

- *Oceania:*
  - **Dunedin**, Christchurch
- *Asia:*
  - **Jeju,** Haikou

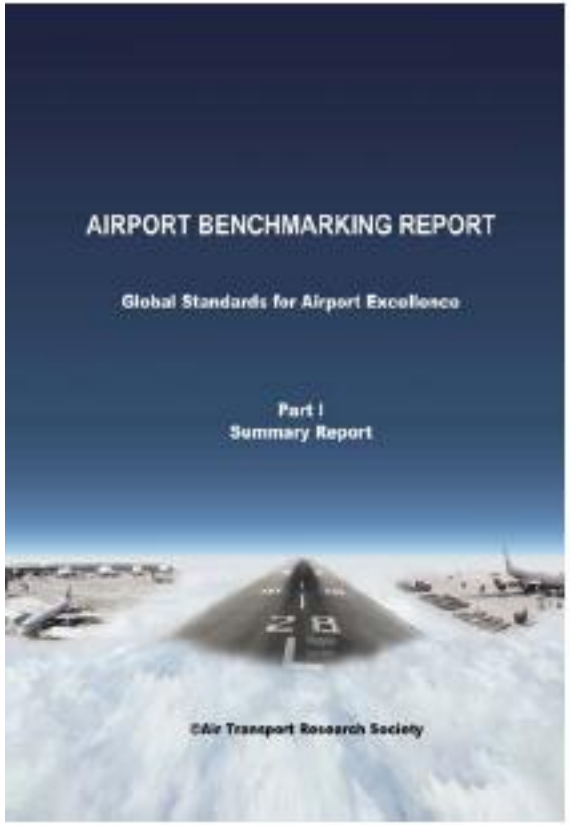
Europe:

- **EuroAirport Basel**, Turin

N. America:

- **Burbank,** Charlotte

ATRS Airport Benchmarking Report and Database



- The ATRS Global Airport Performance Benchmarking Report : 3 volumes, over 600 pages of valuable data and analysis.
- ATRS Airport Database (2002-2013)
- Details at

  www.atrsworld.org

- **Report and Database sale finances benchmarking research project**

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Thank You!

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Thank You

See you at the 2016 ATRS Conference in Rhodes Island, Greece