Key Results of the ATRS Global Airport Benchmarking

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Outline

- Objective of the Benchmarking Study
- Airports Included
- Methodology
- Key Results on Efficiency and Costs
- Airport User Charge Comparisons
- Effects of Business Strategies and Ownership forms
- Conclusions

Objective of the Study

- To provide a comprehensive, unbiased evaluation of airport performance, including:
  - Productivity and Efficiency
  - Unit Cost Competitiveness
  - Aviation User Charges Levels
  - (Financial Performance)

Objective of the Study – Con't.

- **Identify effects of**
  - Business environment within which an airport operates
  - Ownership and management forms
  - Extent of focus on non-aviation (commercial) activities
  - Extent of outsourcing
  - Ownership forms

On productivity, unit cost, other performance measures; and Airport User Charges

Airports Included in the 2006 Report*

Canada-U.S.	63 airports
Europe	38 airports and 10 airport groups
Asian Airport	24 airports and 4 airport groups
Australia and NZ	9 airports
Total	**134 airports and 14 airport groups**

* Mostly use 2004 data (except 2005 data used for airport user charges)

Data Sources: 2001-04

- Airport's Annual Reports, Financial Statements, 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
  - 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

Selective Airports Characteristics

Figure 3.4.1c: Passenger Traffic (2002-04) - North America

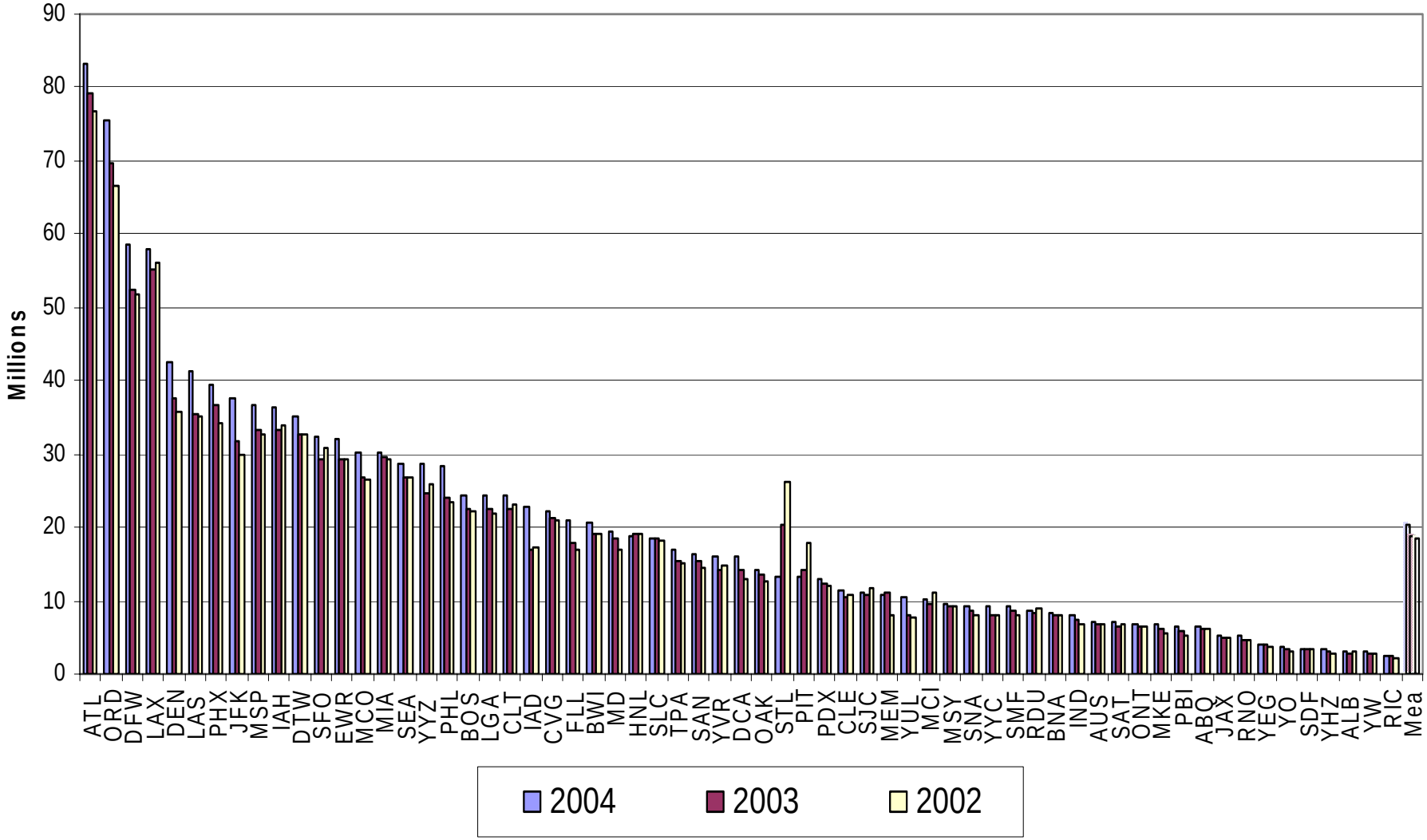
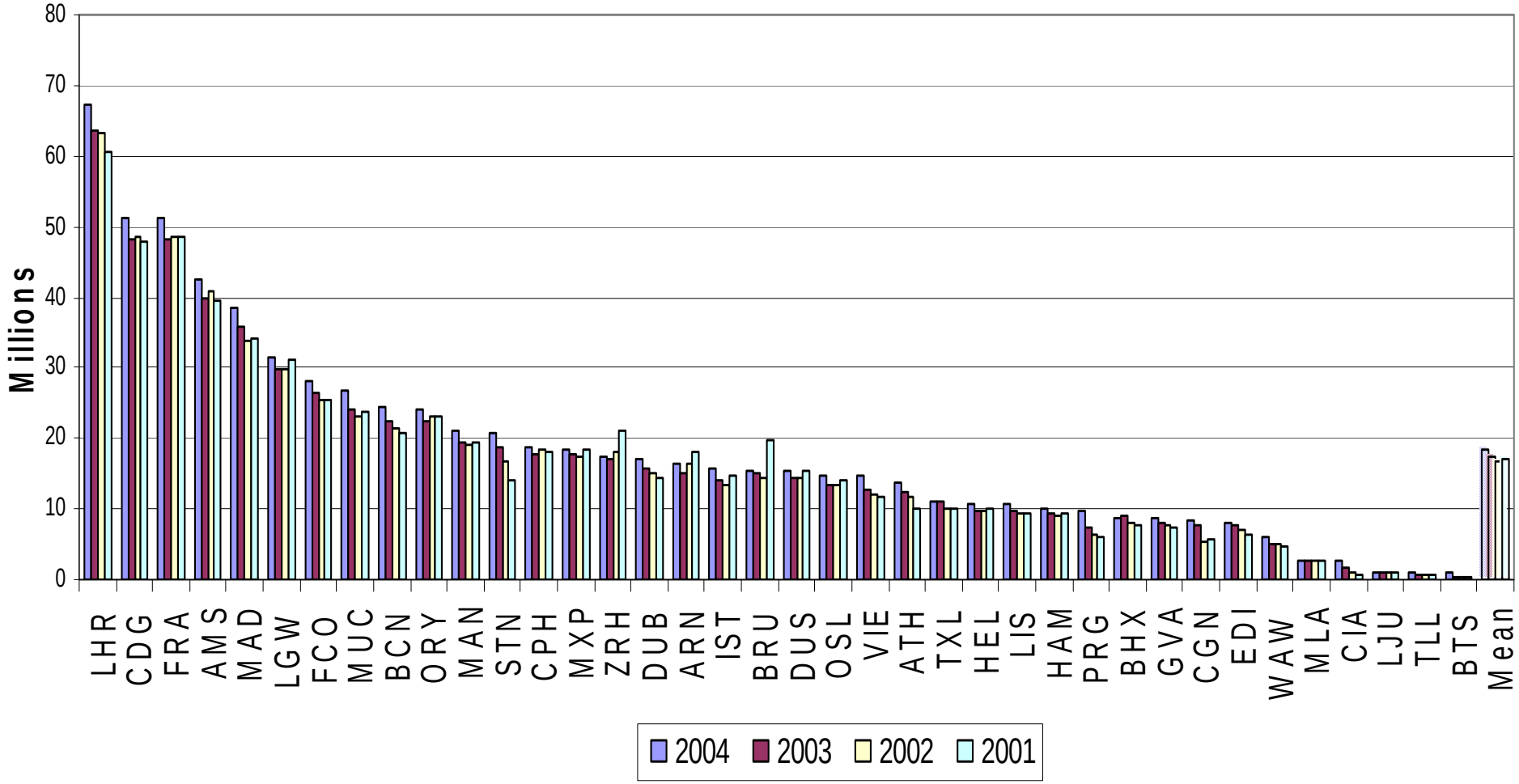


Figure 3.4.1b: Passenger Traffic (2001-04) - Europe



3.4.1c: Passenger Traffic (2001-04) - Asia Pacific

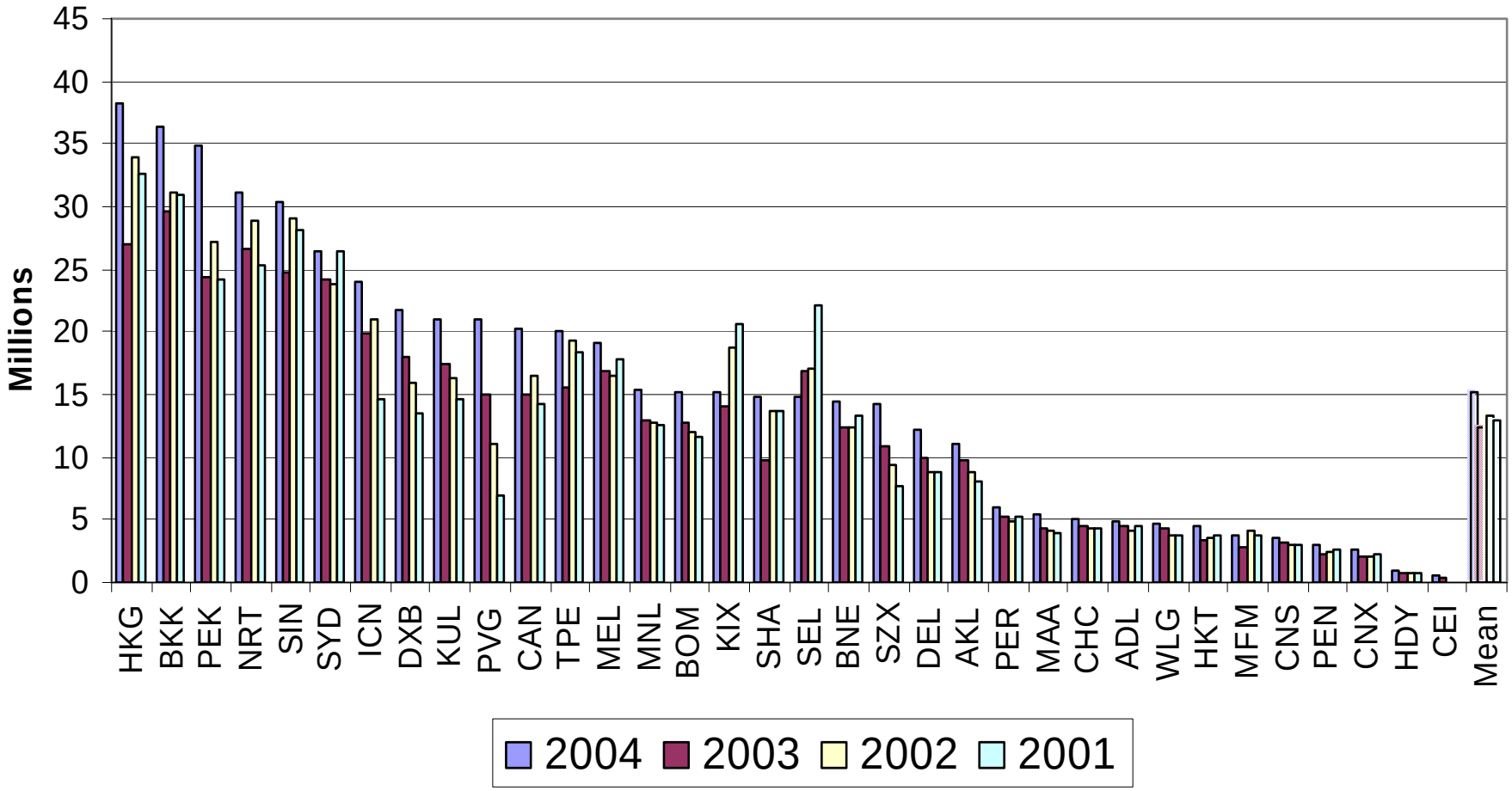


Figure S-5: Non-Aeronautical Revenue Share (2004)

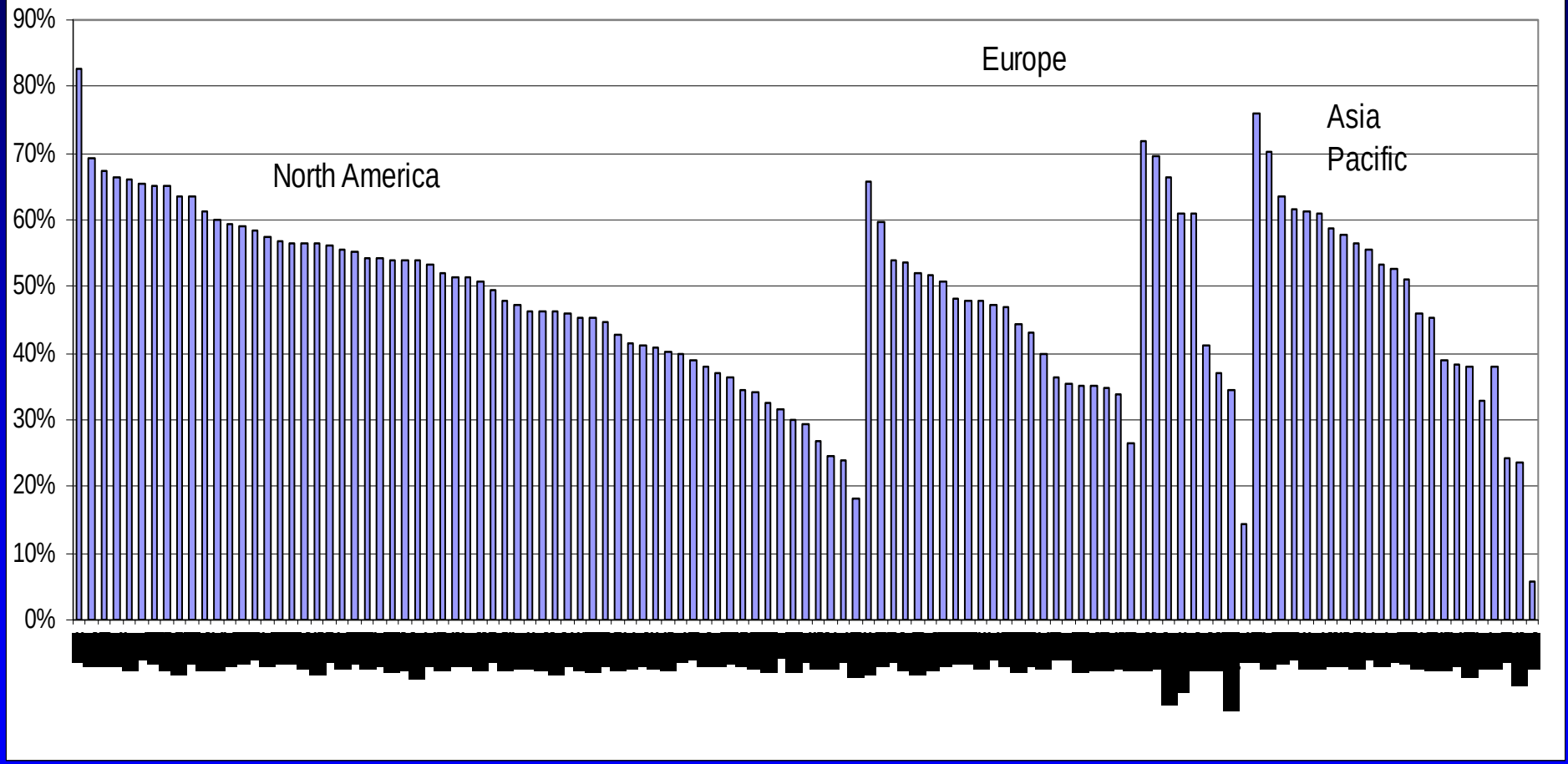
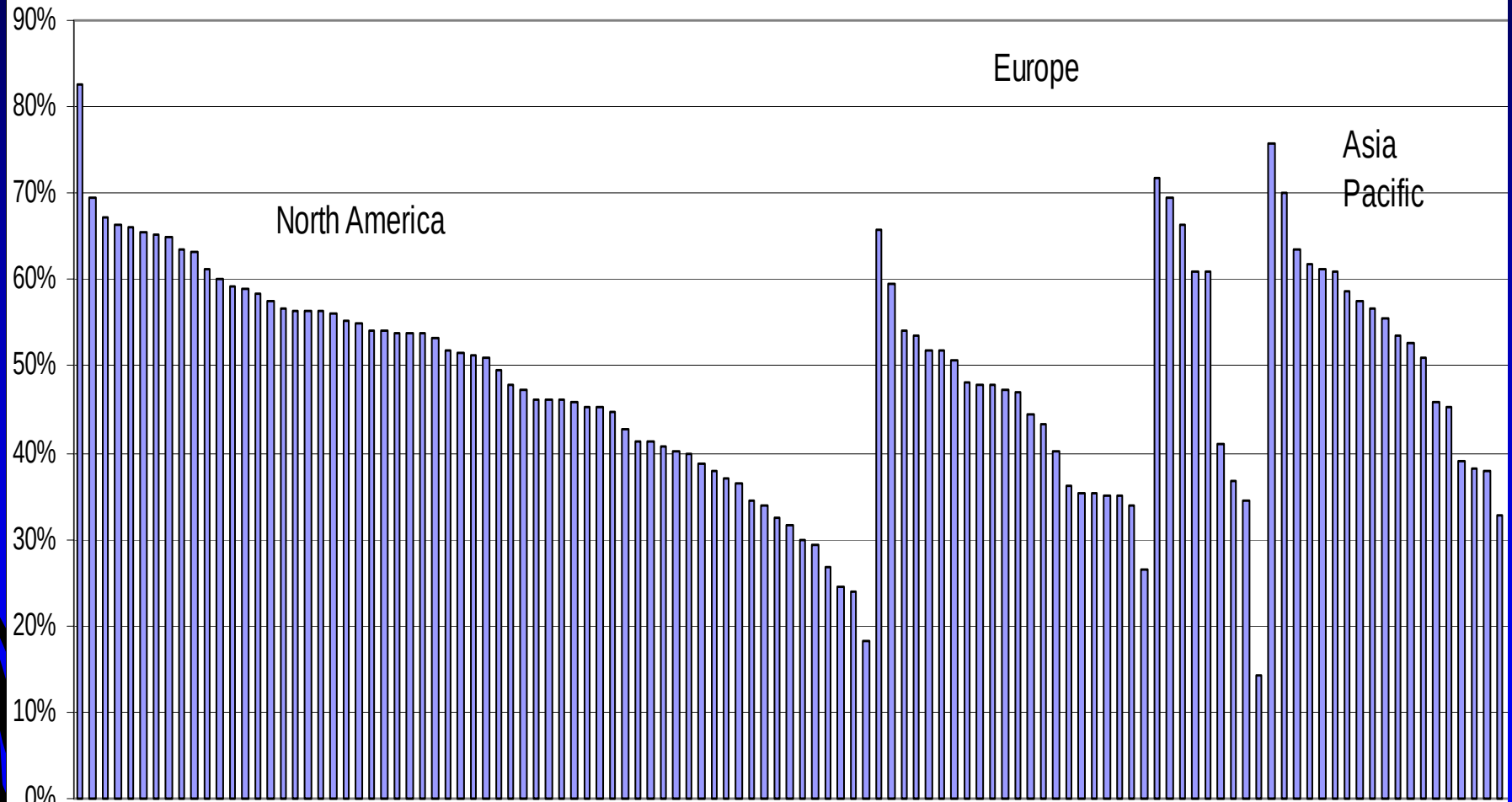
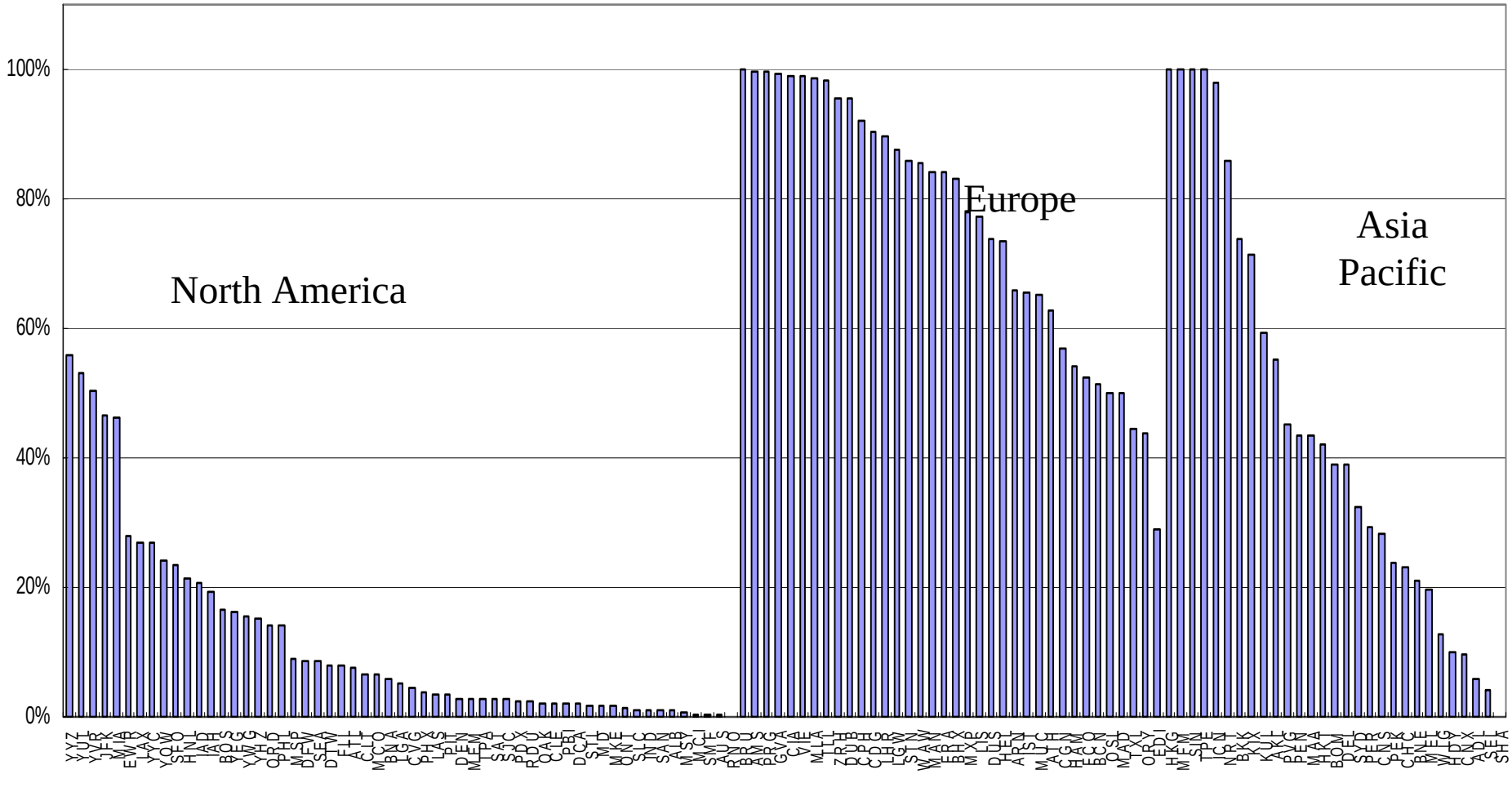


Figure S-5: Non-Aeronautical Revenue Share (2004)



International Share of Passenger Traffic (2004)



Airport Productivity Analysis

Inputs	Outputs
Labor Other non-capital (soft cost) inputs Runways Terminals Gates	Aircraft movements Passengers (Cargo) Other revenues including concessions

Methodology for productivity MEASUREMENT

- Partial Factor Productivity (PFP) Measures:
  - Labor Productivity
  - Capital Input Productivity
  - Productivity of Soft Cost Inputs

- Need to go beyond PFPs

⇒PFP does not tell the whole story

⇒Variable Factor Productivity (VFP);

⇒Total Factor Productivity (TFP: capital input accounting problem)

⇒Cost Competitiveness

- **Multiple Outputs:**

  Aircraft movements, passengers, Cargo Tonnes, and non-aeronautical services output
- The first step for computing any productivity (partial, multi-factor, or total factor productivities) is to aggregate these multiple outputs into **a single output index**
- Similarly, airports use multiple inputs which need to be aggregated into **a single input index.**

Efficiency Measurement Method:
Our Choice

Index number approach:

Productivity = Output Index / Input Index

VFP = Output Index / Variable Input Index

VFP (Variable Factor Productivity)

- Since multiple outputs need to be aggregated into an index, there has to be weights for aggregating multiple outputs; in applied studies we normally use revenue shares as weights for aggregation
- Since multiple inputs are used, they need to be aggregated to form an input index. Usually cost shares of these inputs are used as weights for aggregation.

Potential Reasons for the Measured Productivity (gross VFP) Differentials

(A) Factors Beyond Managerial Control:

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

We compute 'residual (net)' productivity measures after removing effects of the Factors Beyond Managerial Control (A)

(B) Factors within Managerial Control:

- Emphasis on commercial activities (non-aeronautical)
- Quality of Service (incl. passenger satisfaction)
- The Extent of outsourcing activities
- ***Managerial and technical efficiency (which we are trying to measure)***

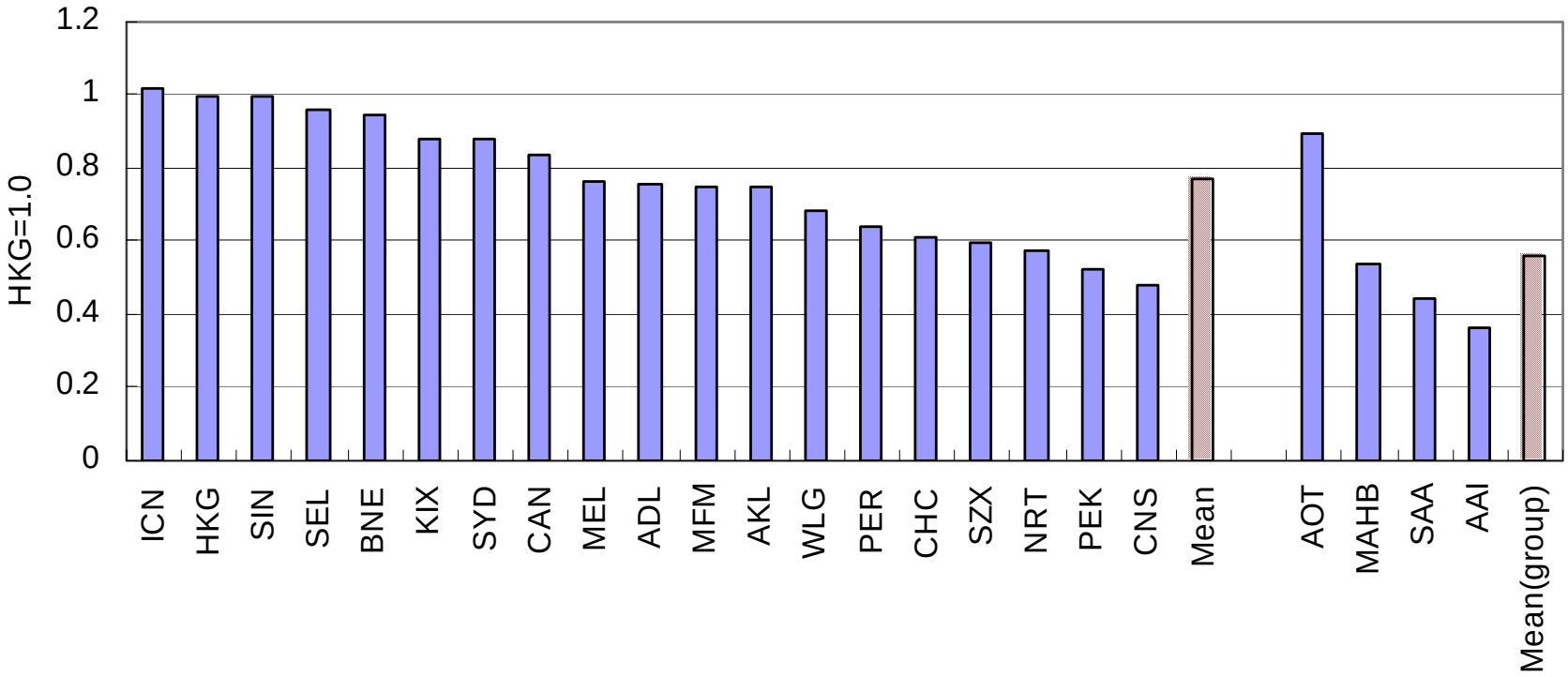
Results on Effects of Airport Characteristics on 'gross' VFP

- **(Airport size**: some mixed results on the effects of airport output scale: larger airports are expected to have higher 'gross' VFP, however, the effects may level off once airports reach certain size);
- **%International:** airports with higher proportion of international passengers are likely to have lower 'gross' VFP.
- **%Cargo:** airports with larger proportion of cargo traffic are expected to have higher VFP.
- **Capacity Constraints**: congested airports are likely to have higher 'gross' VFP.

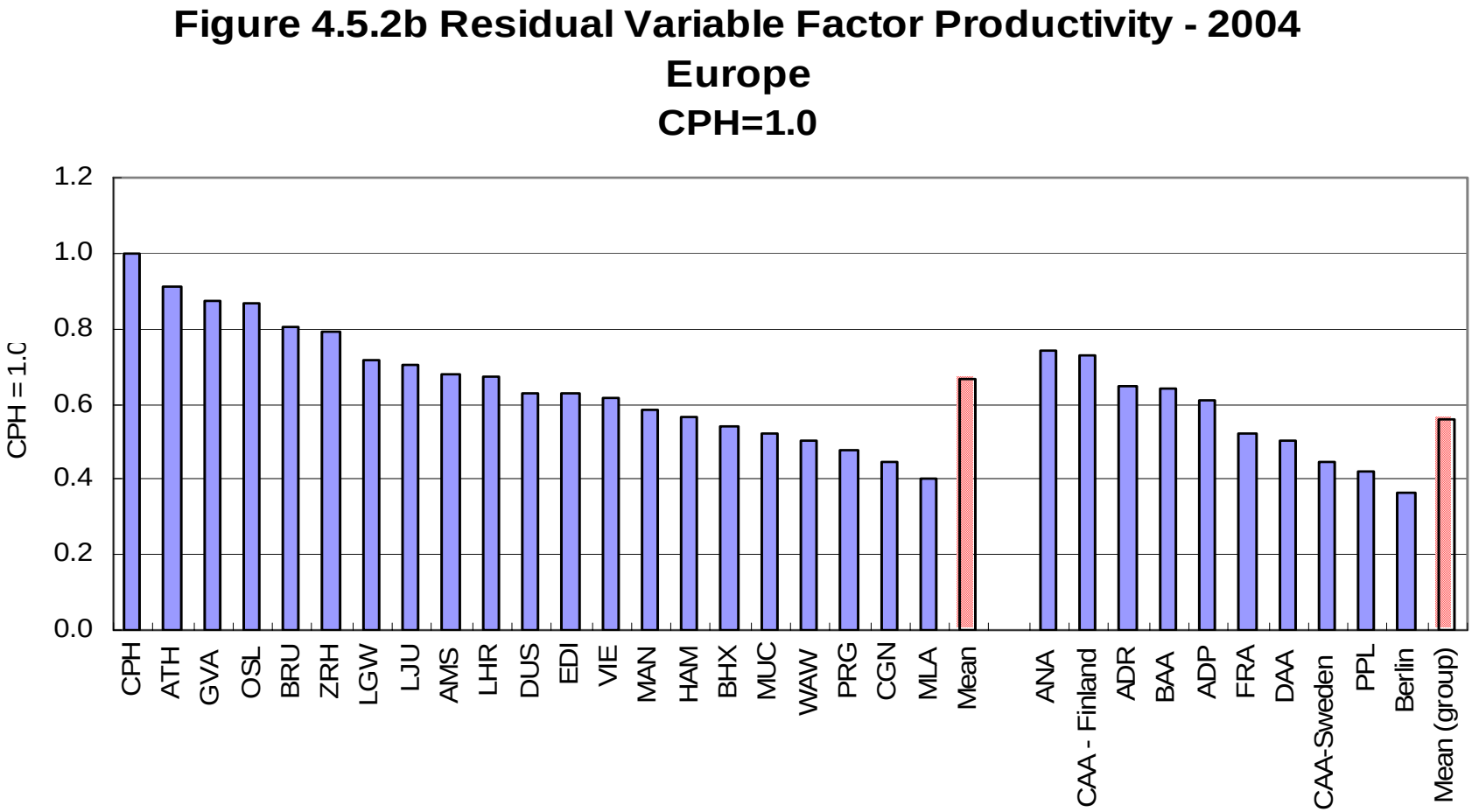
Therefore, these factors which are beyond airport's managers' control have been removed from our VFP measure before computing the 'residual VFP'.

Residual (Net) Variable Factor Productivity:
Overall operating efficiency measure – Asia-Pacific

Figure S-4c Residual Variable Factor Productivity - 2004
Asia Pacific
HKG=1.0

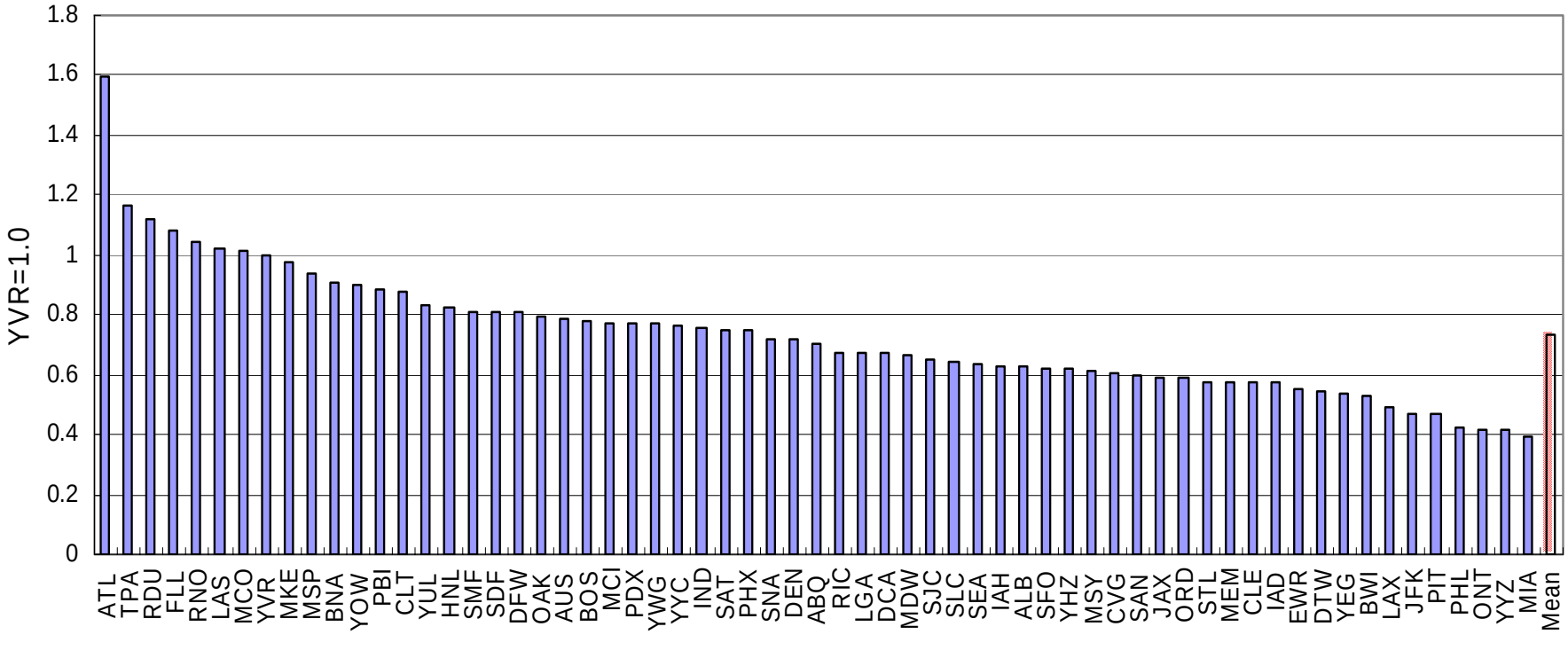


Residual (Net) Variable Factor Productivity:
Overall operating efficiency measure - Europe

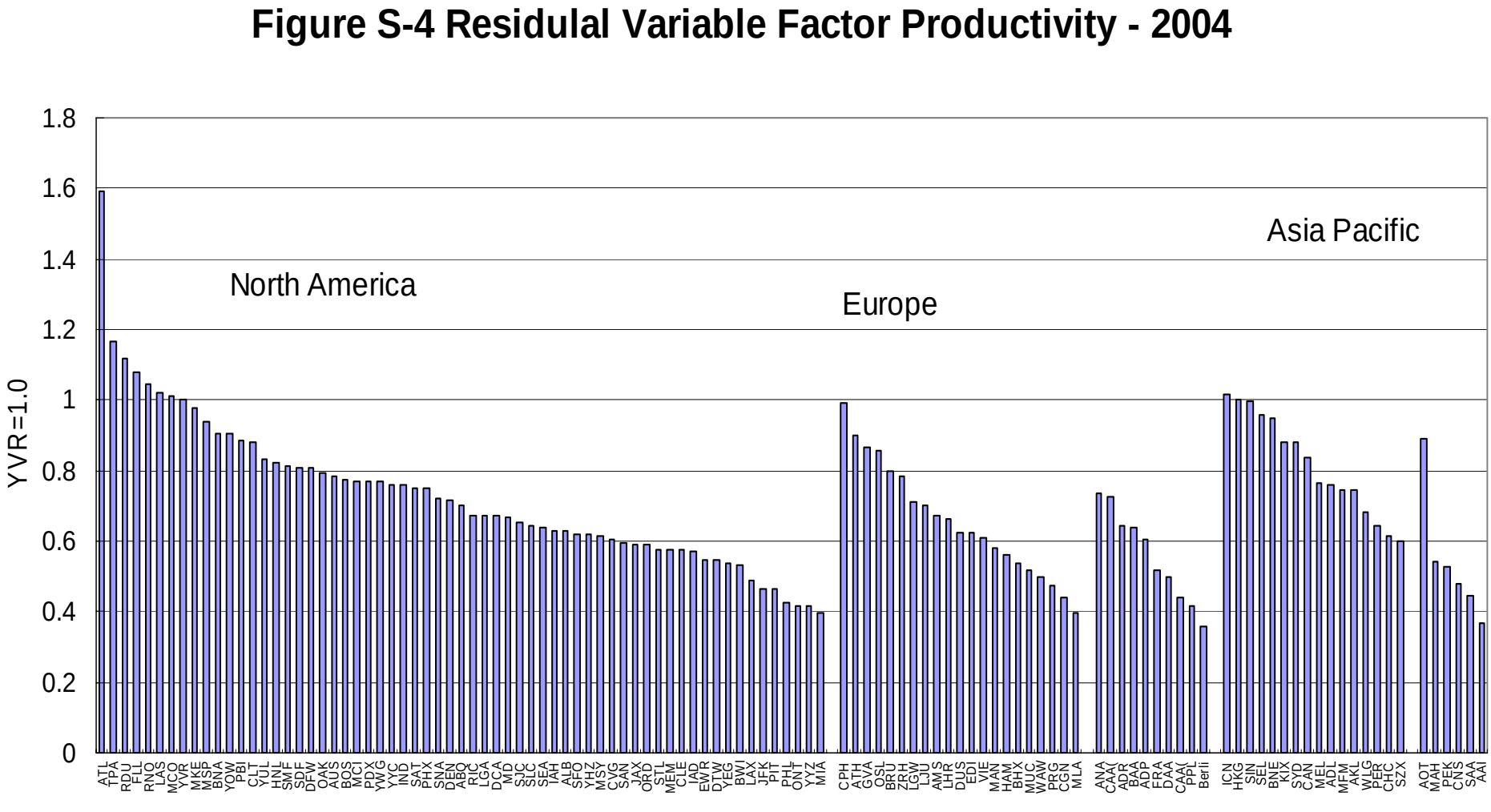


Residual (Net) VFP: Overall operating efficiency measure – **North America**

Figure 4.5.2a Residual Variablre Factor Productivity - 2004
North America
YVR=1.0



Global Comparison – Net VFP



Cost Competitiveness

consists of:

- **Productive Efficiency – Residual (Net) VFP**
- **Variable Input Prices:**
  - Labor price
  - Soft cost input price (incl. outsourcing price)

Figure 5.4a Cost Competitiveness 2004 - North America
YVR=0.0

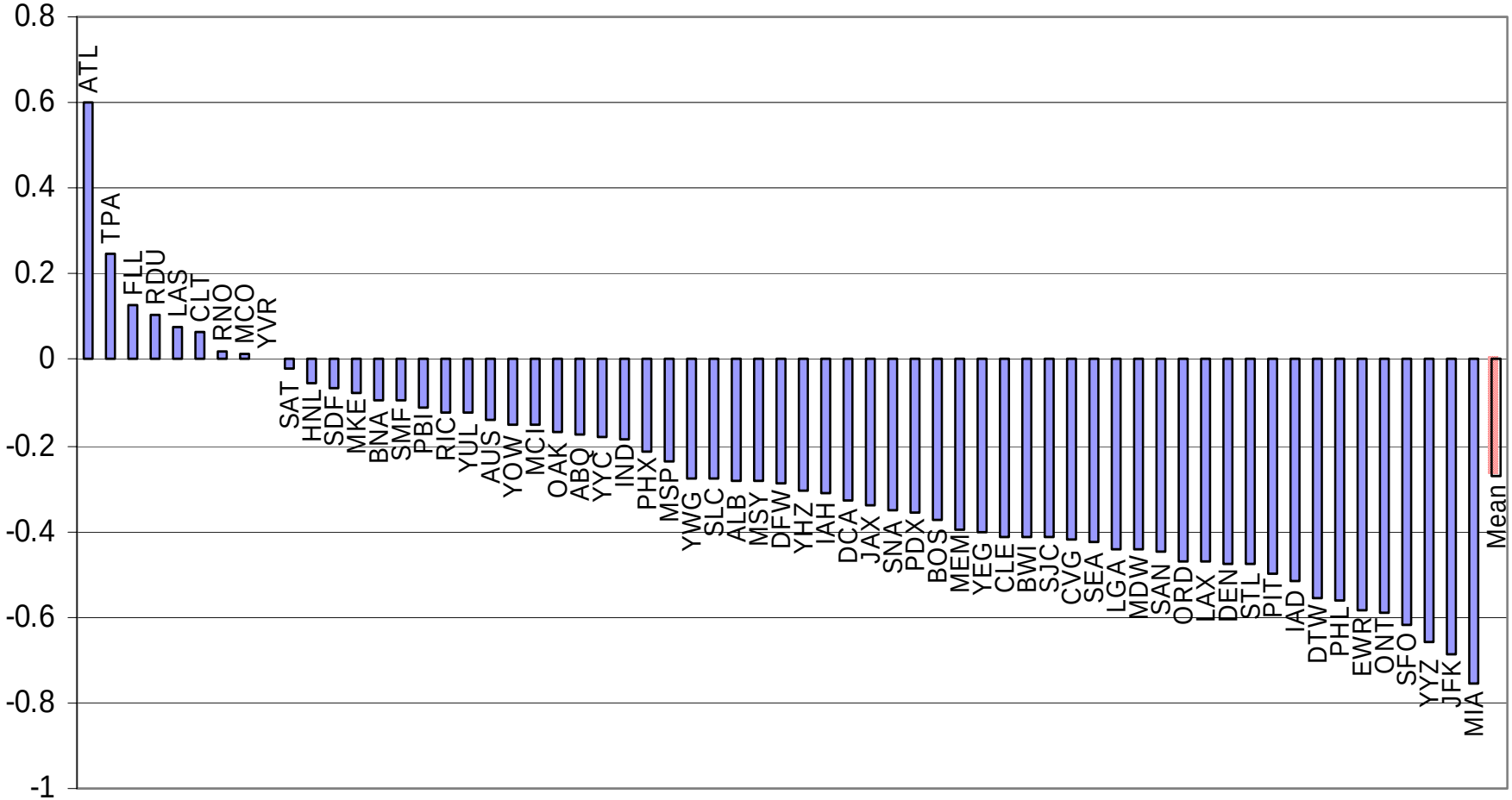


Figure 5.4b Cost Competitiveness 2004 - Europe
CPH=0.0

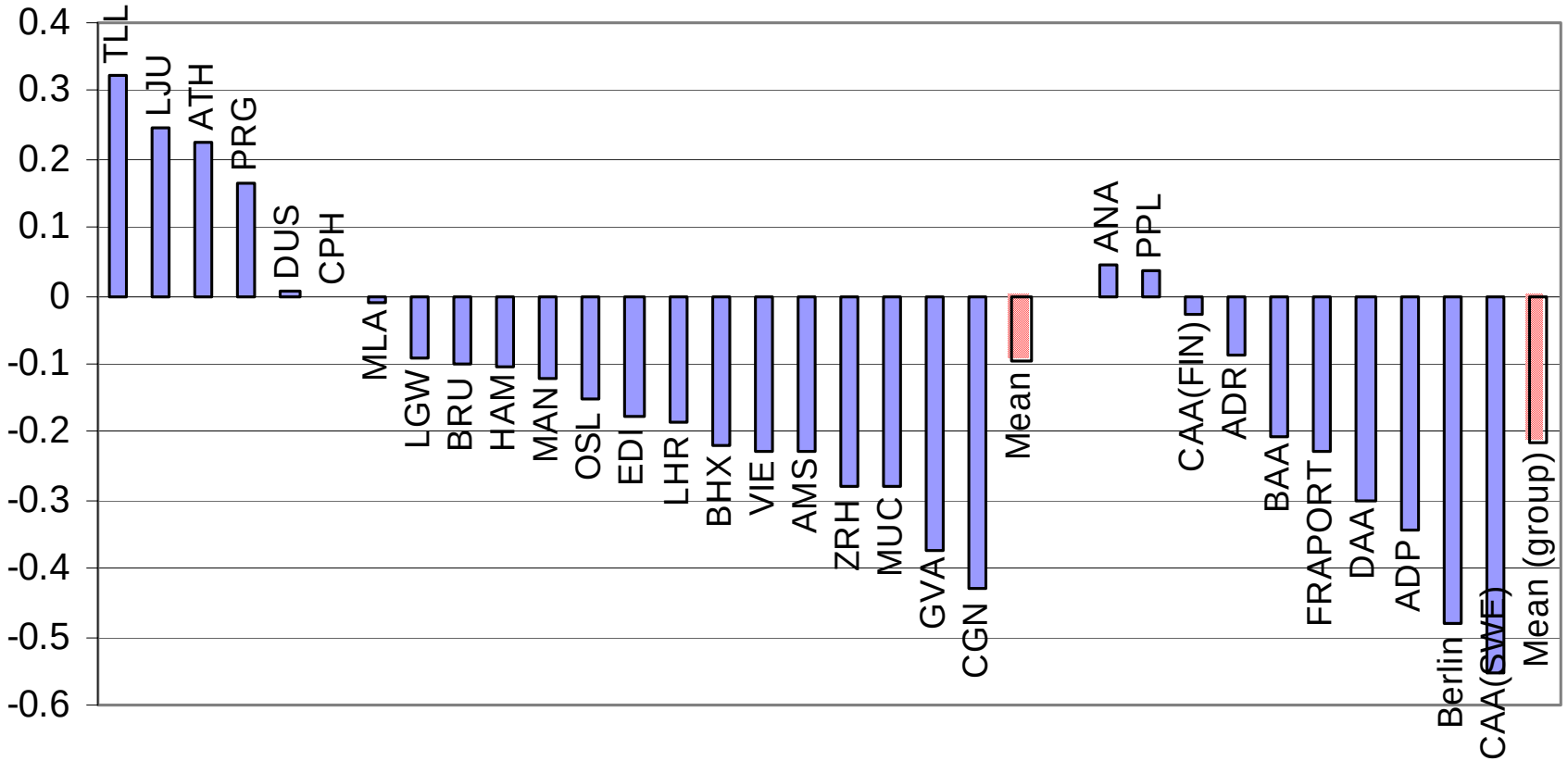
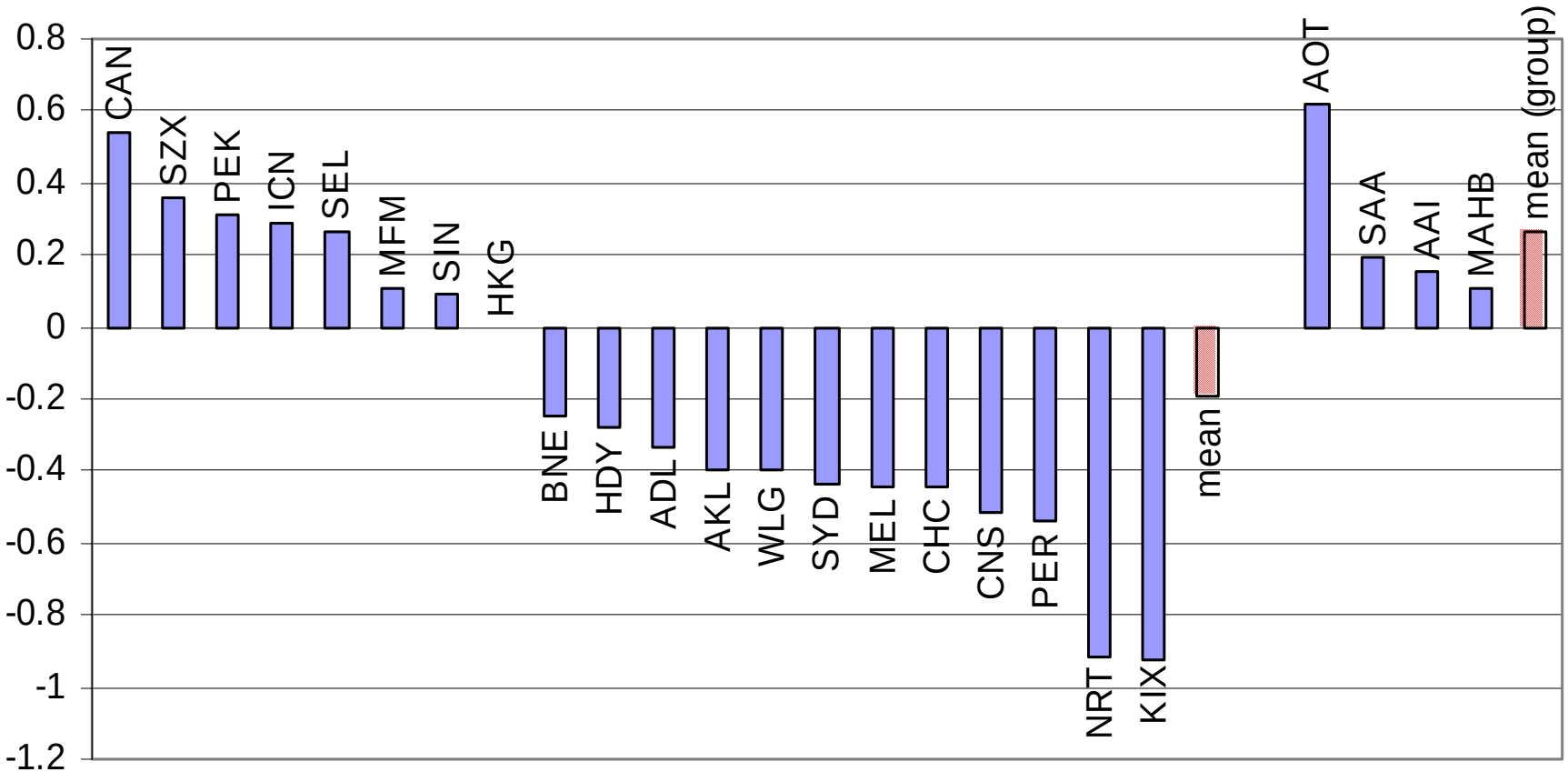


Figure 5.4c Cost Competitiveness (2004) - Asia Pacific
HKG=0.0



Top Performers

Top Operating Efficiency Performers based on Net VFP (Labor + Soft cost inputs only):

- Canada/US: Atlanta, Tampa, Raleigh-Durham
- Europe: Copenhagen, Athens, Geneva
- Asia-Pacific: Incheon (Korea), Hong Kong, Singapore
- Oceania: Brisbane, Sydney

Top Performers Based on Unit Cost Competitiveness Index

- Canada/US: Atlanta, Tampa, Fort Lauderadale,
- Europe: Tallinn, Ljubljana, Athens
- Asia: AOT, Guangzhou, Shenzhen, Beijing,
- Oceania: Brisbane, Adelaide

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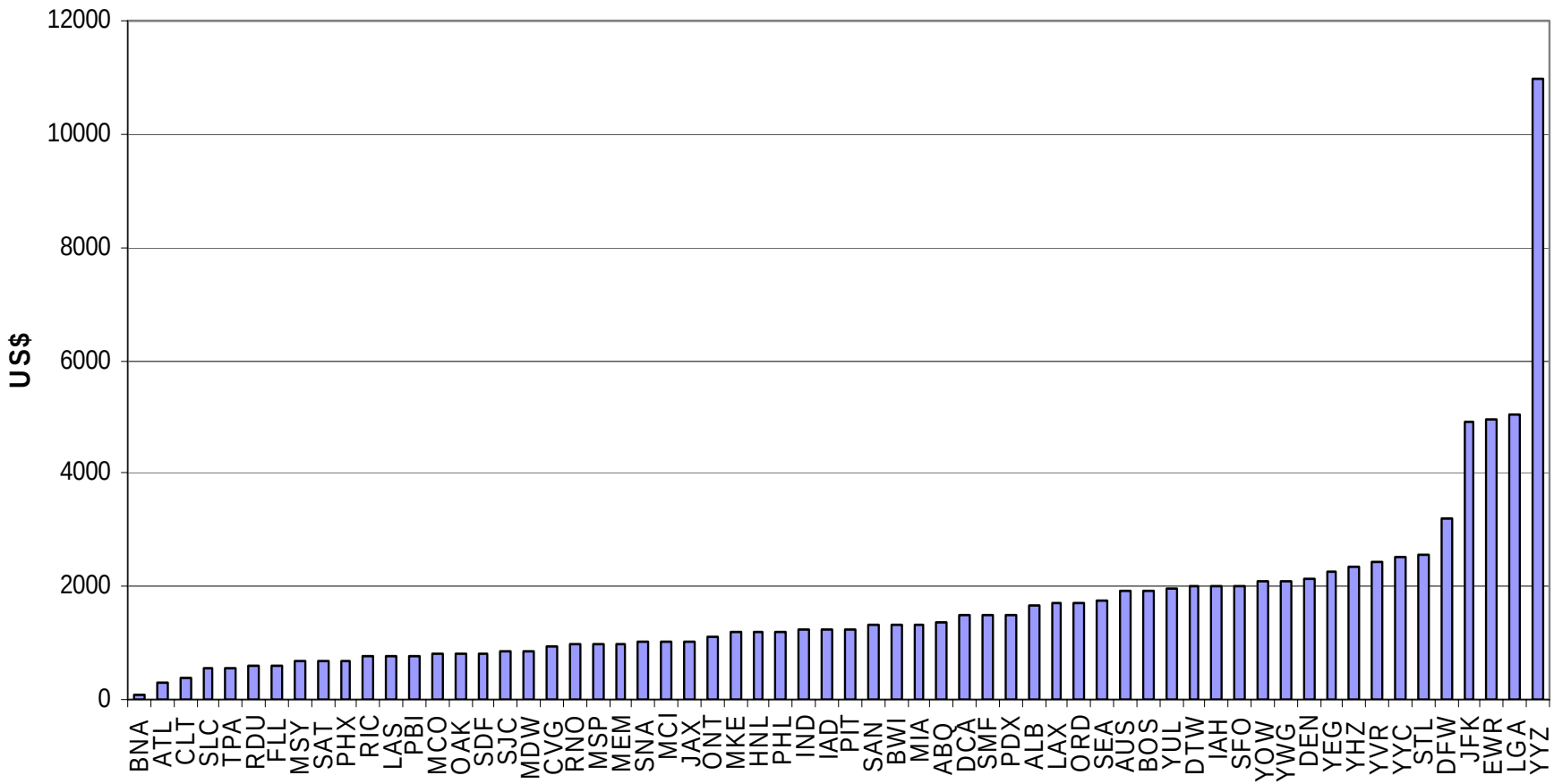
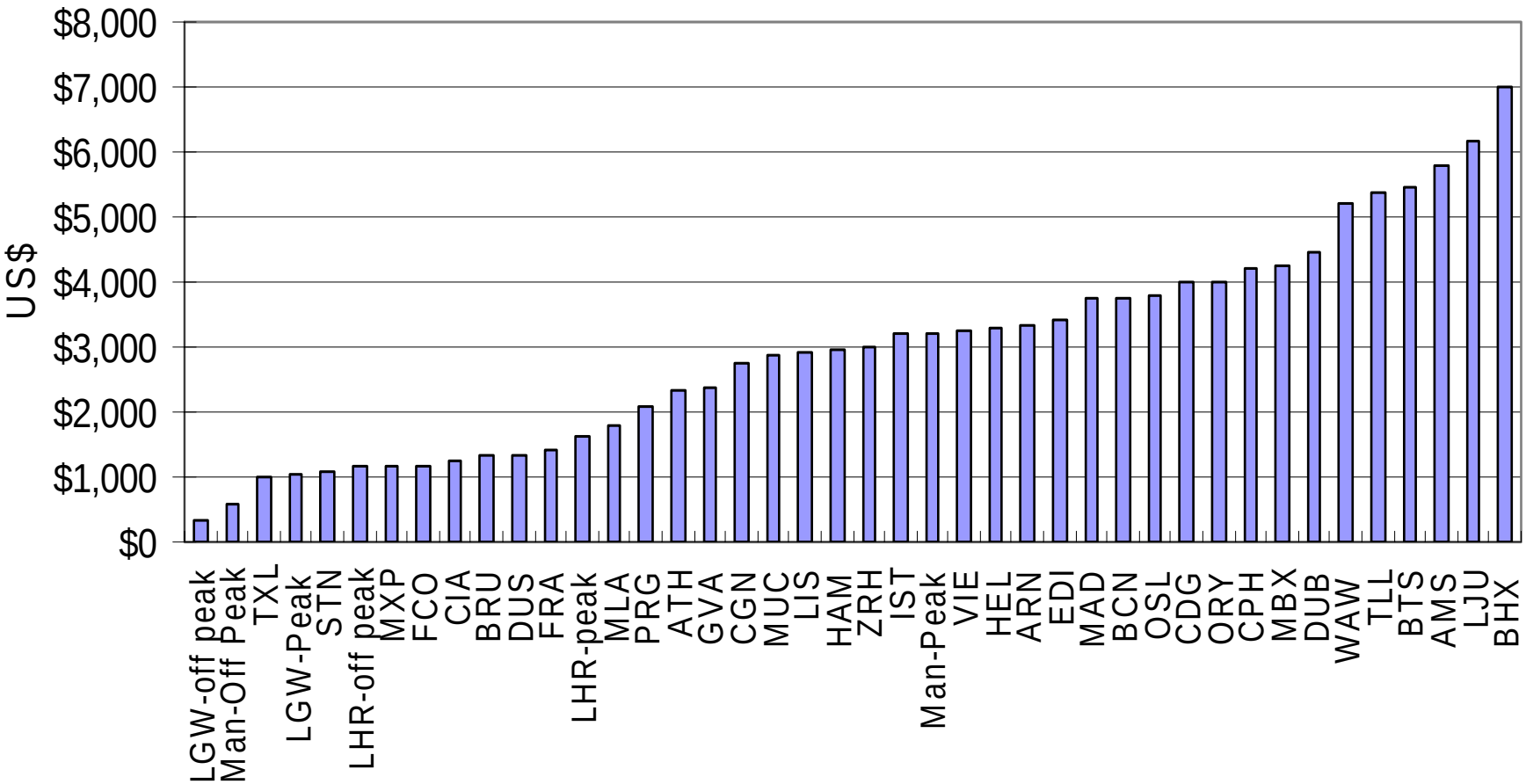
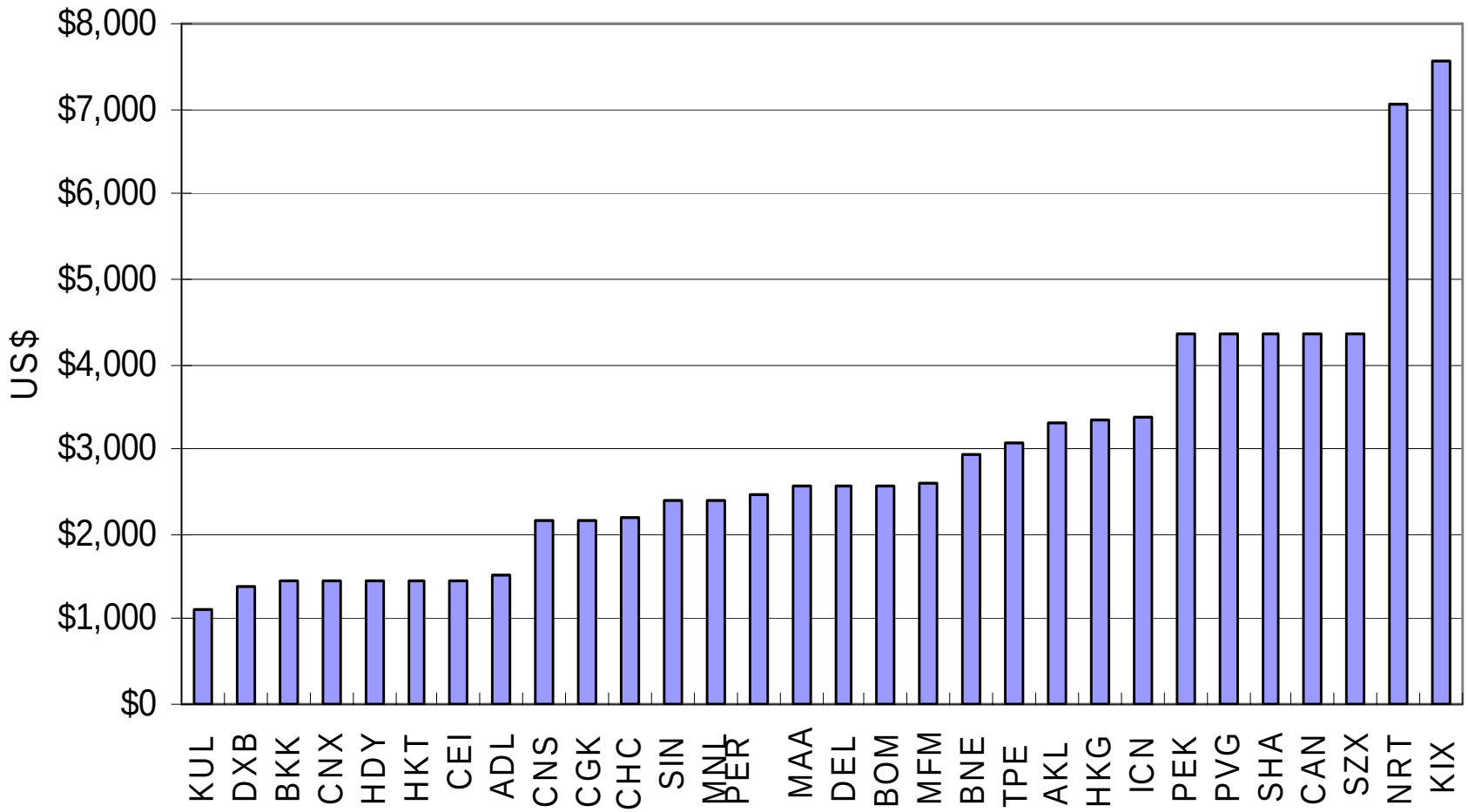
Landing Charges for Boeing 747 - North America
2005

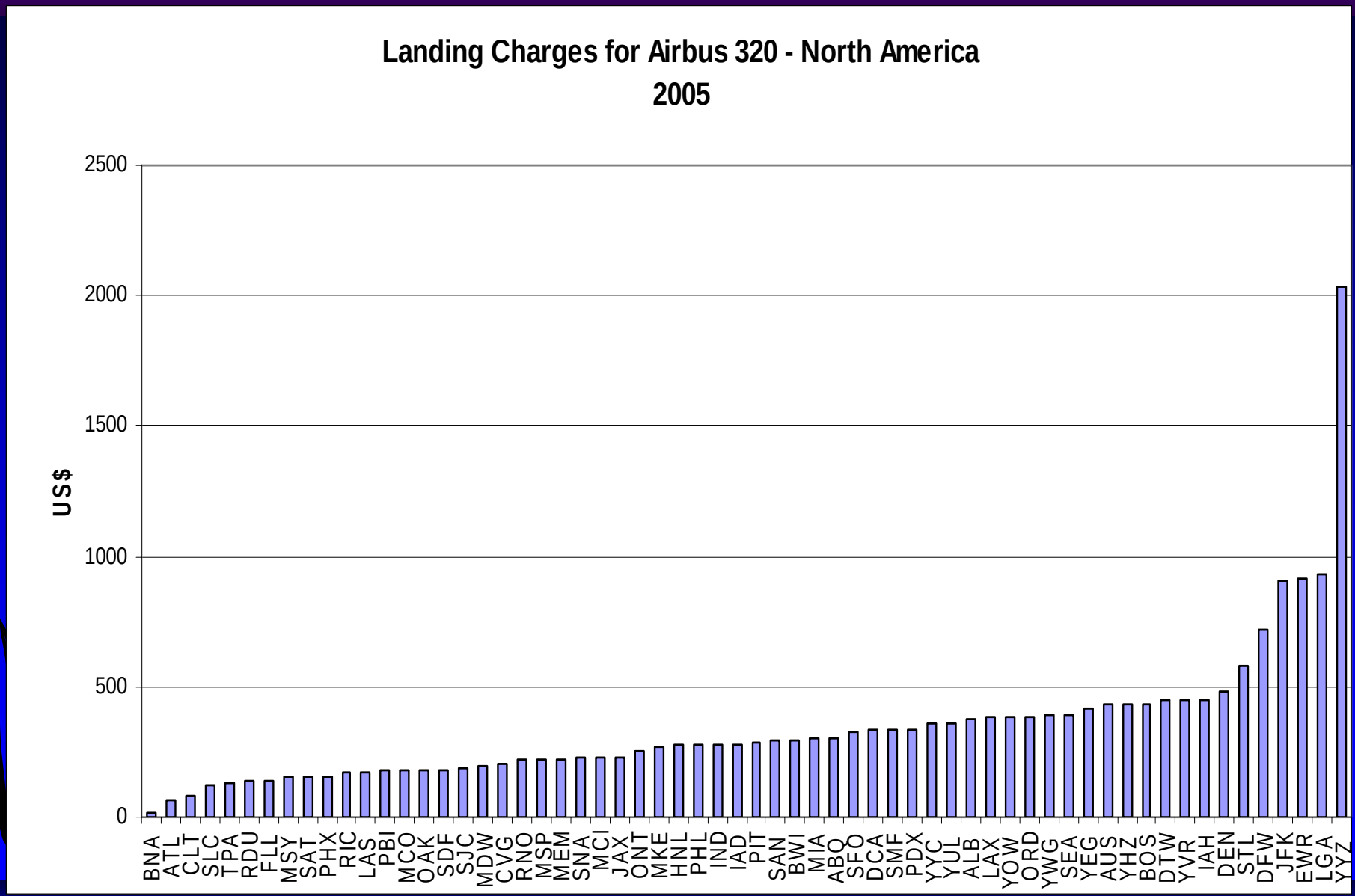


Landing Charges for B747 - Europe
2005

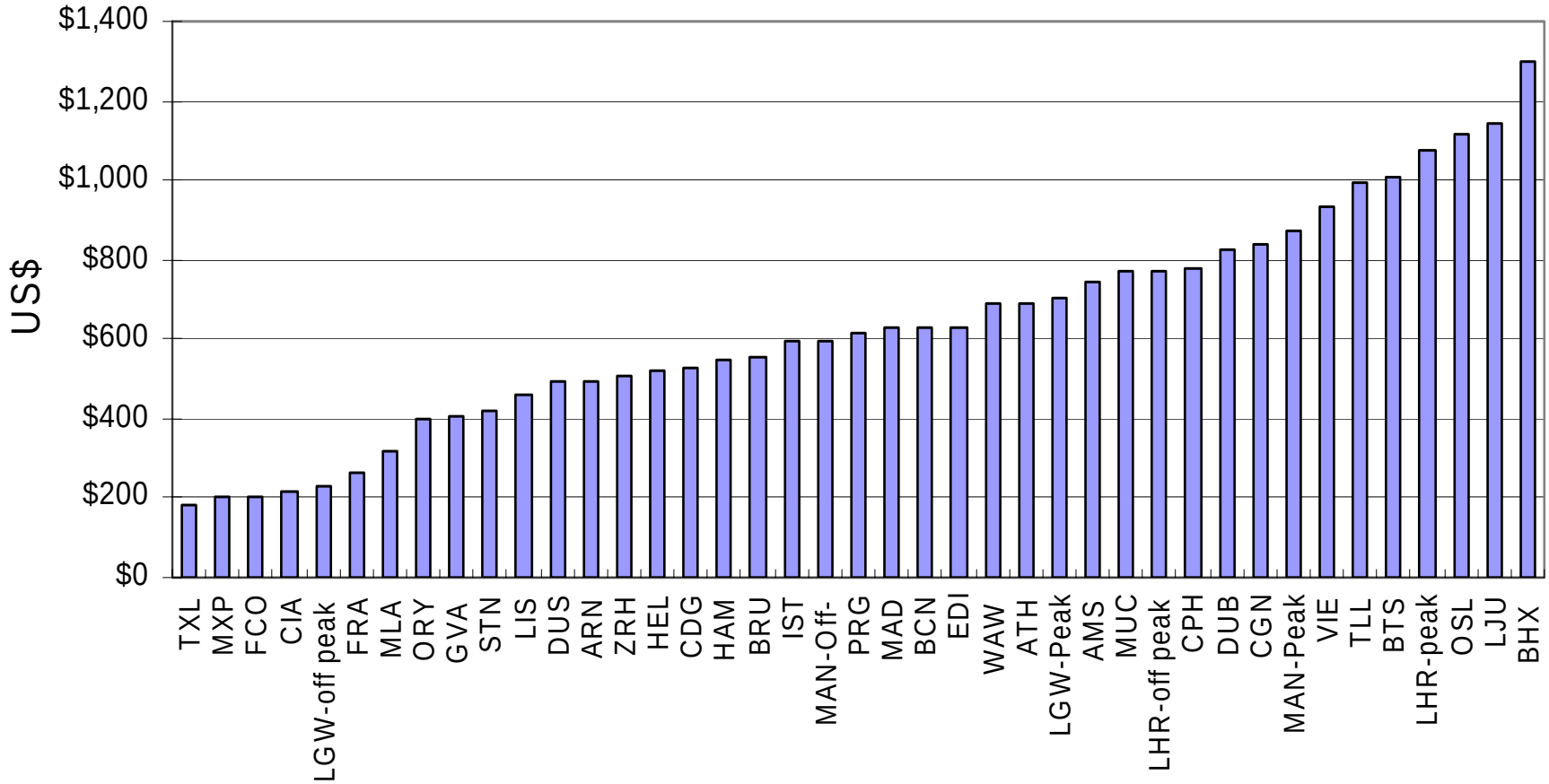


Landing Charges for B747 - Asia Pacific
2005

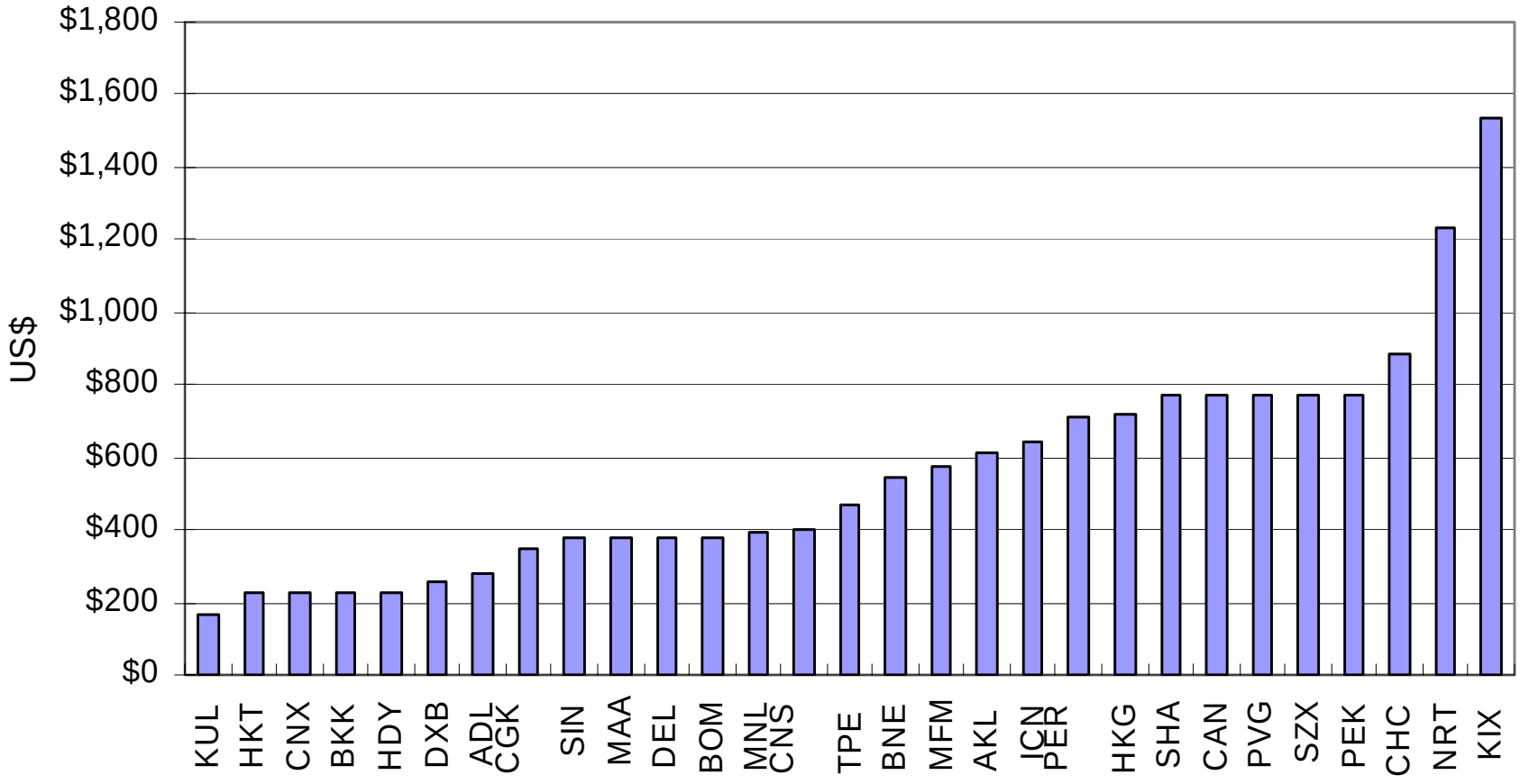




Landing Charges for Airbus 320 - Europe
2005



Landing Charges for Airbus 320 - Asia Pacific 2005



Summary – Landing/Takeoff Charges

- Global Results: Airports charging highest aircraft movement charges:
  - Boeing 747: Toronto, Narita, Kansai, Birmingham
  - Airbus 320: Toronto, Kansai, Narita, Birmingham
- North American Results (both B747 and A320):
  - Lowest aircraft movement charges: Nashville, Atlanta, Charlotte, Tampa, Salt Lake City
  - Highest charges: Toronto, LaGuardia, Newark, JFK
- European Results:
  - Lowest charge for B747: Gatwick-offpeak; Manchester-offpeak; Berlin Tegal, Gatwick-Peak, Stansted; Heathrow-offpeak;
  - Lowest charges for A320: Berlin Tegal, Milan Malpensa, Rome Fiumicino, Rome Ciampino, Gatwick-offpeak, Frankfurt, Malta
  - Highest charges for B747: Brimingham; Amsterdam, Bratislava, Tallinn, Warsaw
  - Highest charges for A320: Ljubljana, Oslo, Heathrow-Peak, Vienna
- Asia-Pacific Results:
  - Lowest charges: Kuala Lumpur, Thailand airports; Dubai; Adelaide, Jakarta Soekarno-Hatta, Singapore
  - Highest charges for B747: Kansai, Narita, major Chinese airports, Incheon;
  - Highest charges for A320: Kansai, Narita, Chrischurch, Major Chinese airports, Hong Kong

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Results on Business Strategies

- ***Diversification of Revenue Source is good:***
  - Airports with larger share of non-aeronautical revenue achieves higher Net VFP (efficiency)
- ***Outsourcing:***
  - Airports who contract out their terminal operations to outside operator achieve higher efficiency

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Empirical Results on Ownership Forms

- **Airports with private majority ownership** achieved **significantly higher profit margins** than others, despite the fact that they generally levy lower aeronautical charges (because of **their vigorous pursuit of commercial opportunities**).
- **Privatized airport with govt majority** is **less efficient than those owned by private majority or 100% gov't corporation**;
- **Airports with government majority and airports owned by multiple governments** are **the least efficient.**
- **Choice: either Majority Private Ownership or 100% Government Ownership**

About U.S. City Operated Airports:

- **However, Airports with private majority** are not necessarily more efficient than airports owned/operated by **U.S. city governments or 100% public corporations** (note: privatized airport also has monopoly power, not necessarily more efficient).
- Airports operated by ***U.S. and Canadian Airport Authorities*** are no more efficient than the airports operated by US city departments;

Please Note

- The ATRS Global Airport Performance Benchmarking Report : 3 volumes, over 400 pages with valuable data and analysis

  Can be purchased by visiting

  www.atrsworld.org

- 2007 ATRS World Conference: 21-23 June, to be hosted by **Univ. of California at Berkeley**