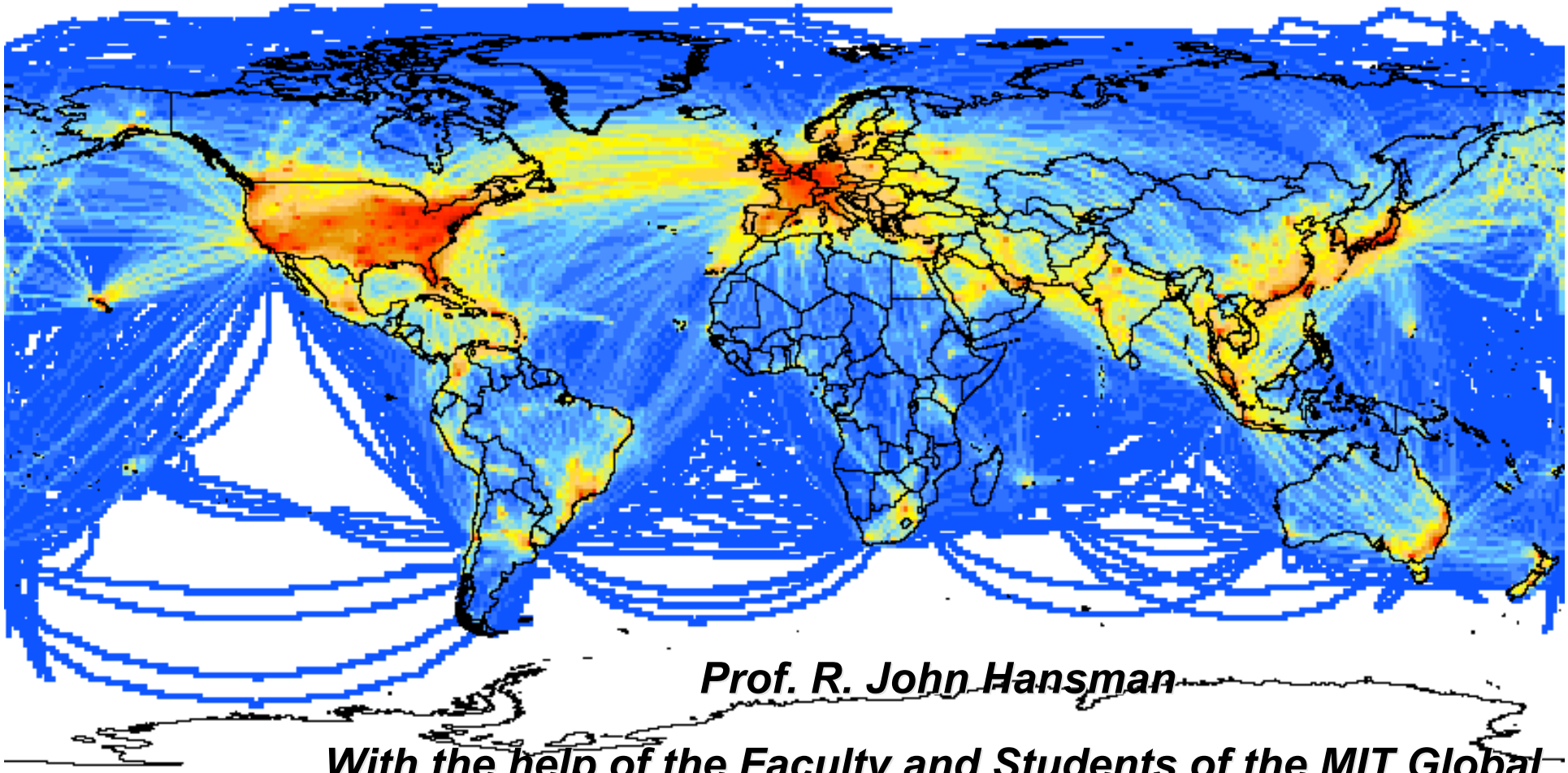
Overview of Recent Trends in the Airline Industry



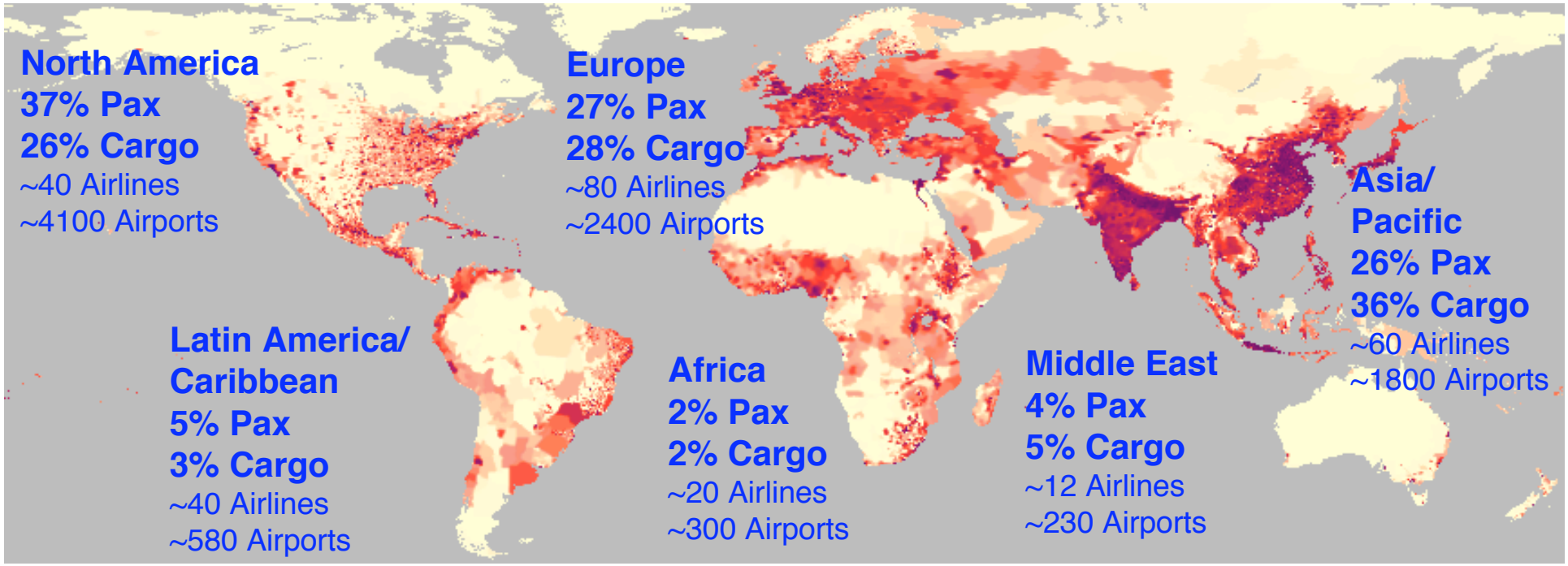
Prof. R. John Hansman

With the help of the Faculty and Students of the MIT Global Industry Study

rjhans@mit.edu

Traffic Source: Sage Analysis courtesy Prof Ian Waitz

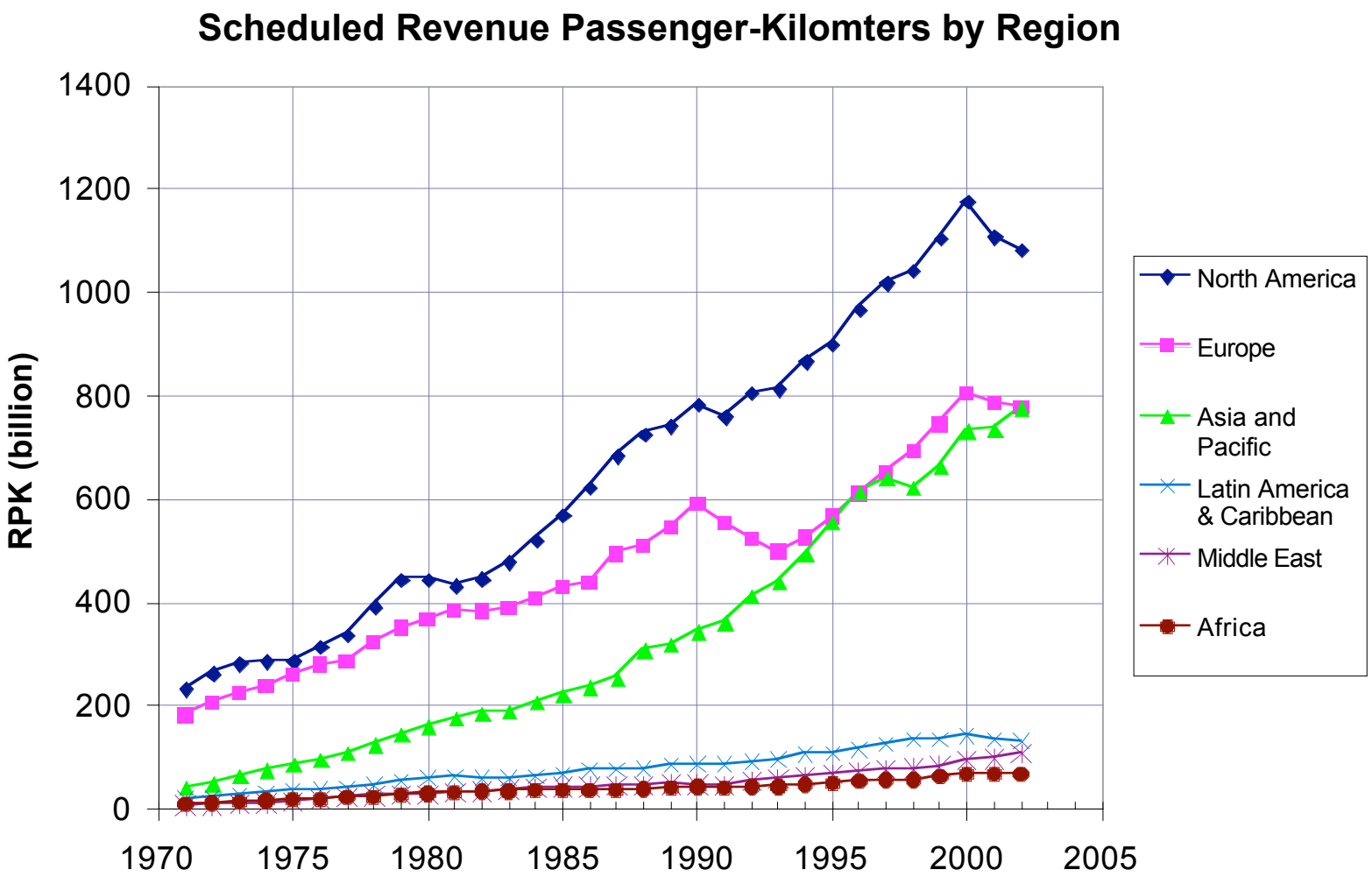
World Population Distribution & 2002 Air Transportation Activity



Population Source:http://www.ciesin.org/datasets/gpw/globldem.doc.html
Air Transport Source: ICAO, R. Schild/Airbus

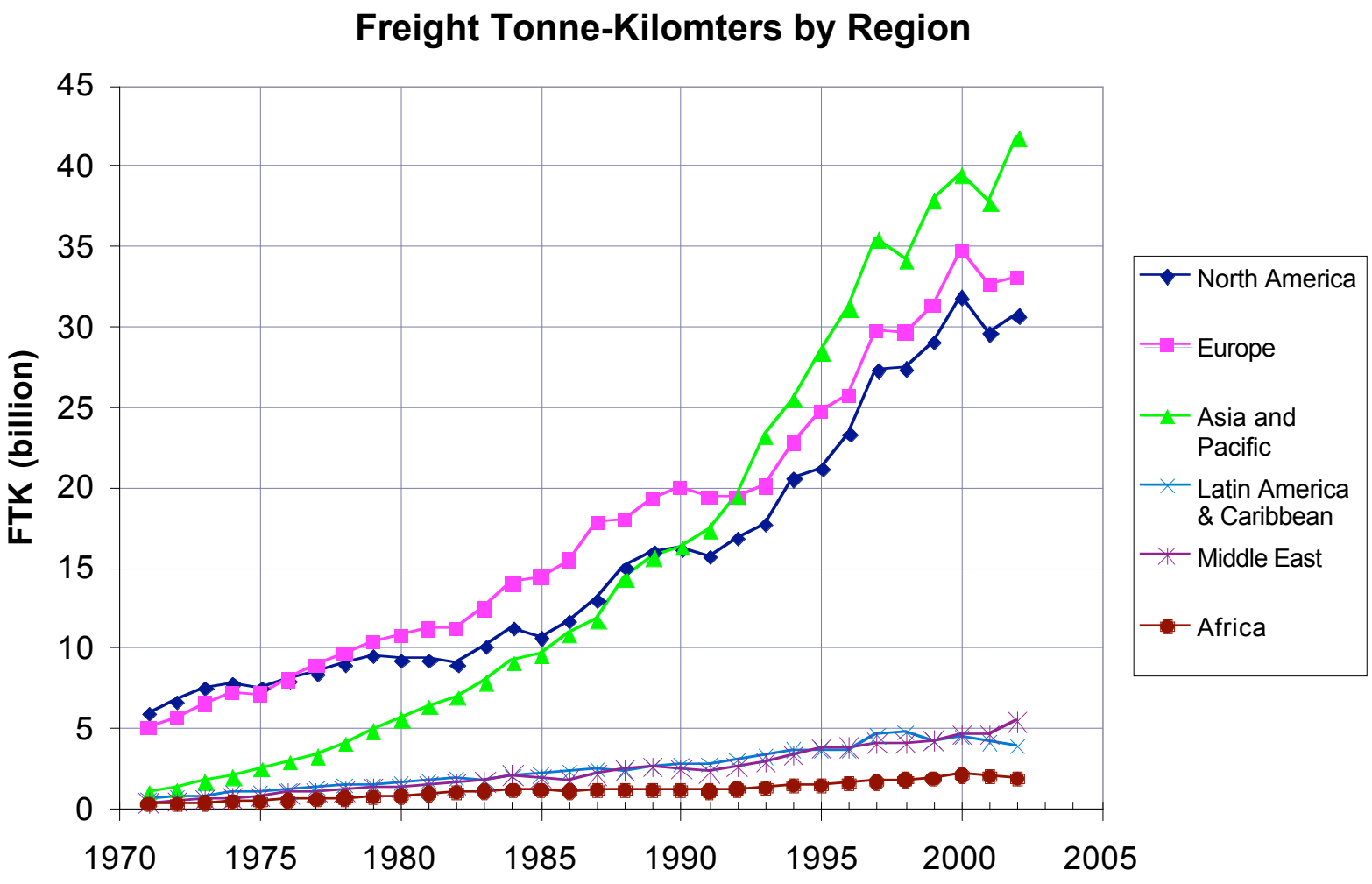
Passenger and freight traffic represent RPK and FTK share in 2002

RPK by Region



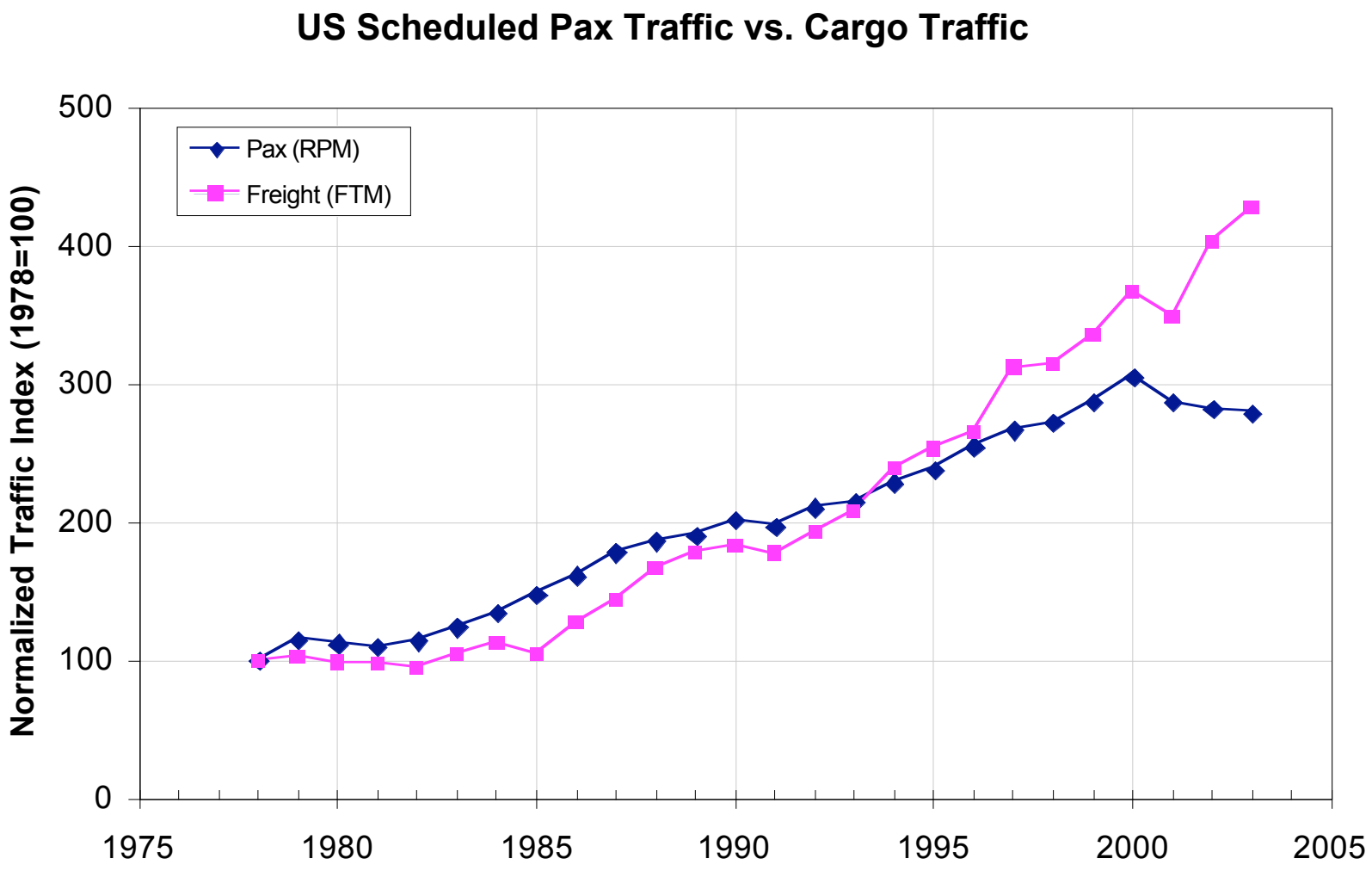
Source: ICAO, scheduled services of commercial air carriers

Freight Trends by Region



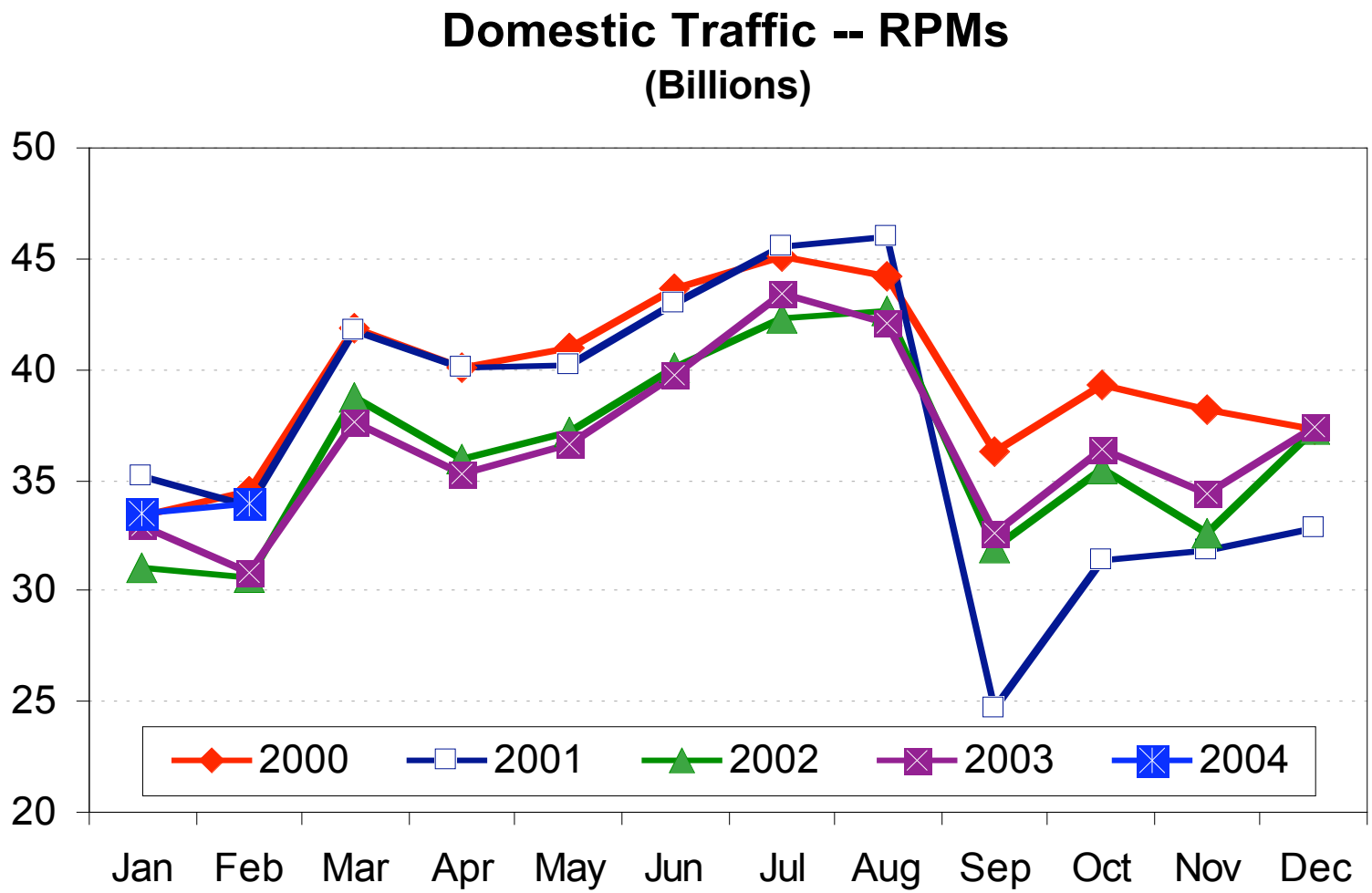
Source: ICAO, scheduled services of commercial air carriers

Rapid Cargo Growth since Mid 90s



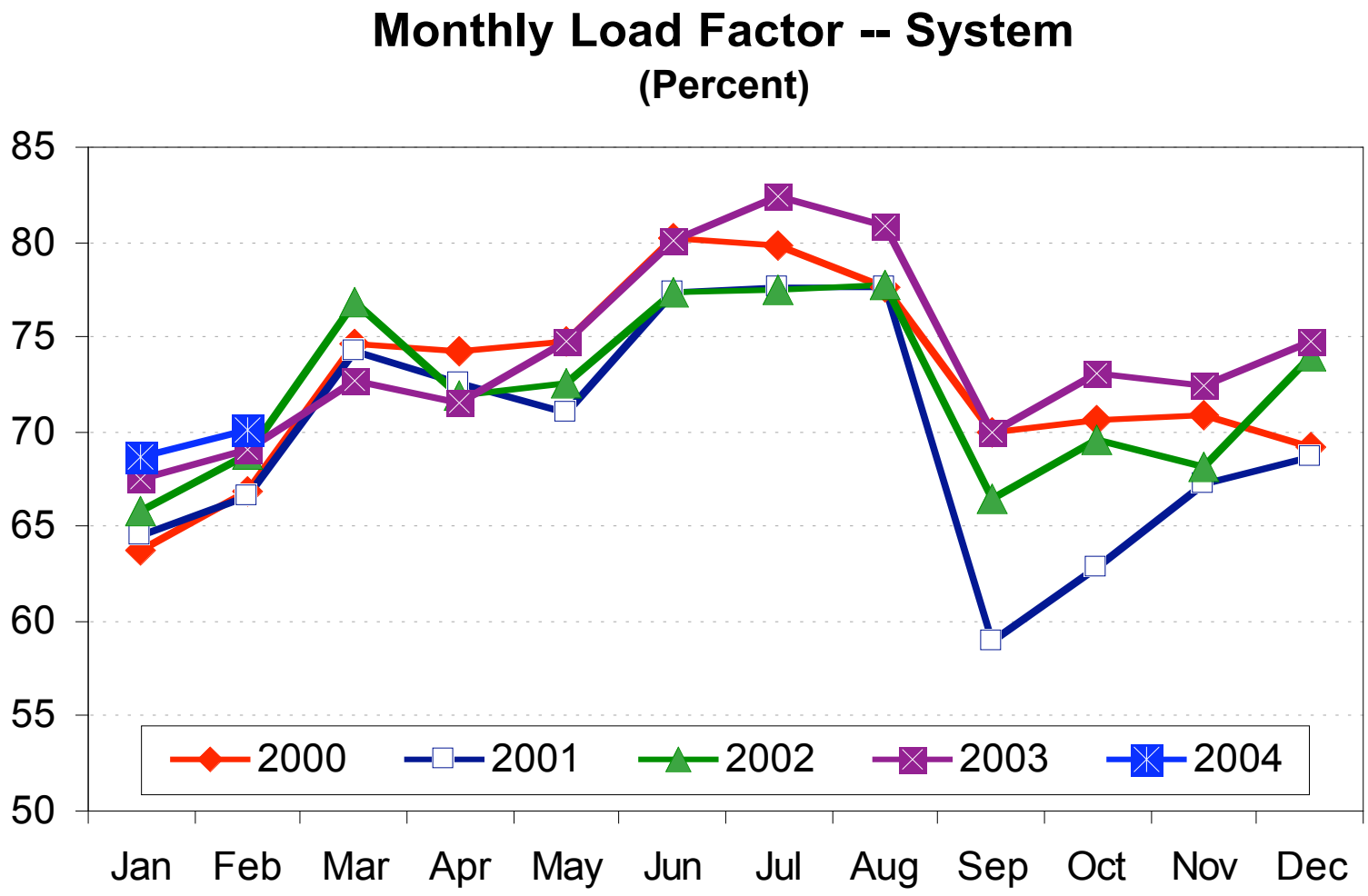
Source: Form41 data, all US carriers

US Domestic RPMs



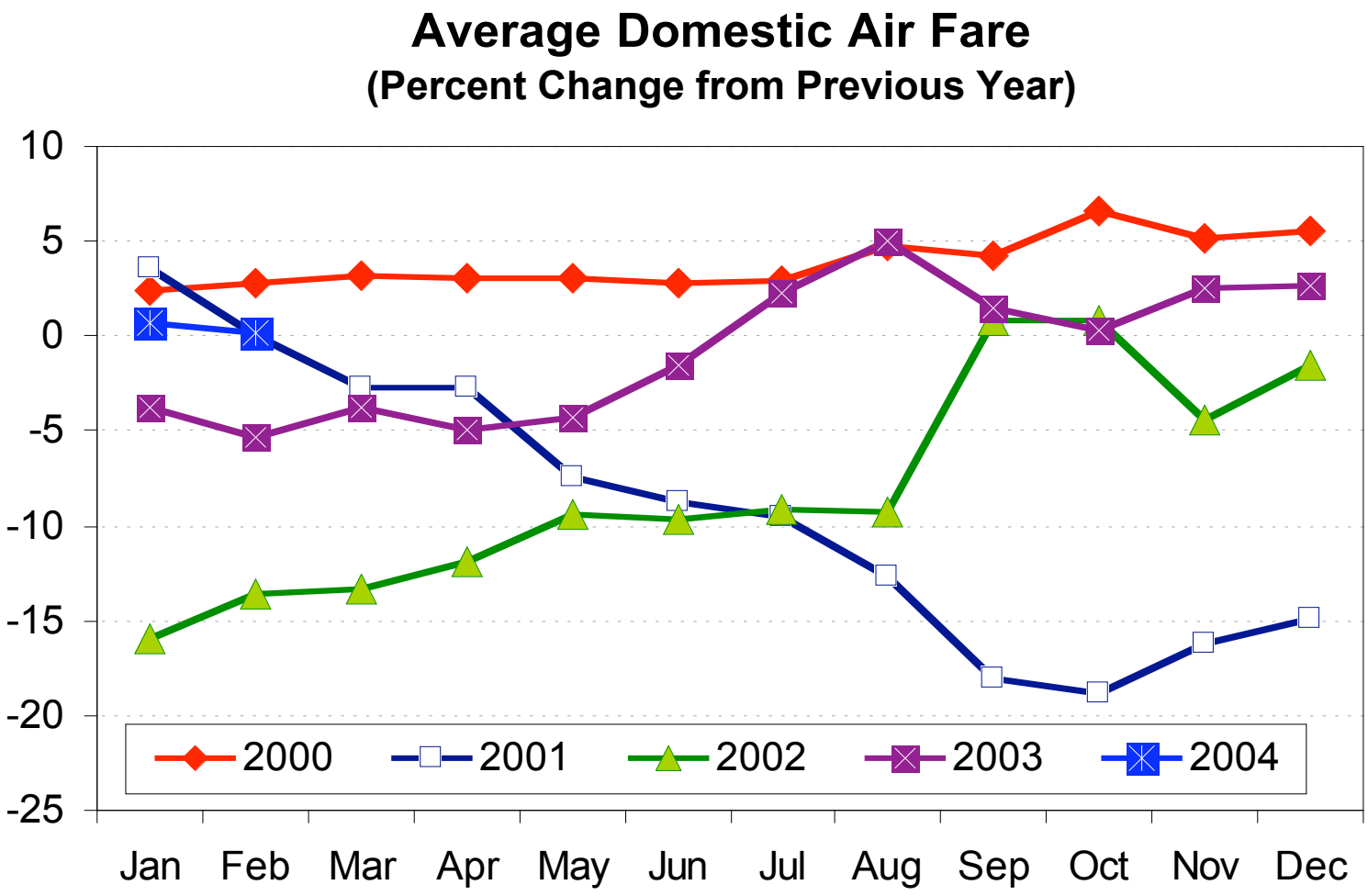
Source: ATA, US member airlines, scheduled mainline service

US Airline Load Factors 2000-2003



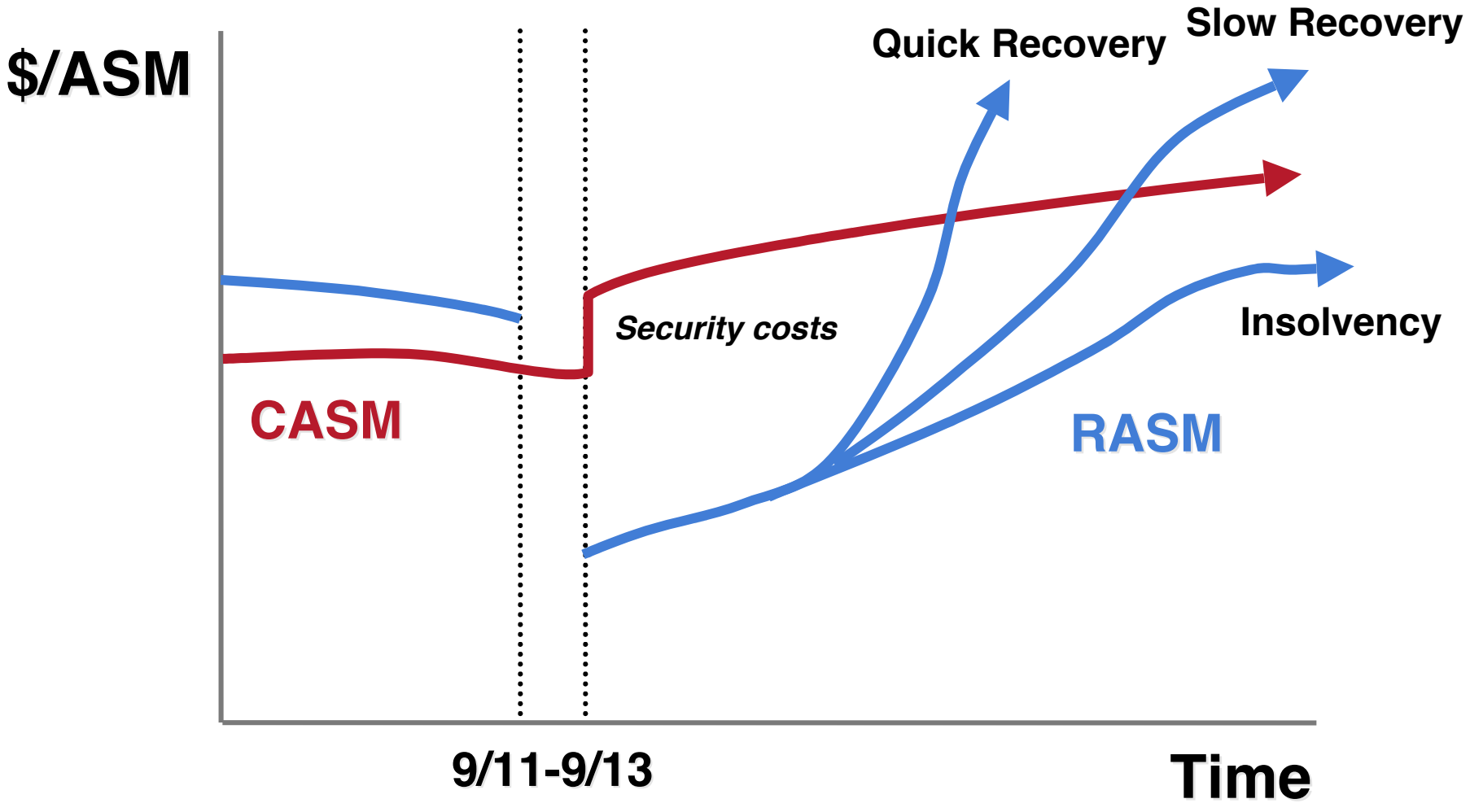
Source: ATA, US member airlines, scheduled mainline service

Annual Change in Average Domestic Fare (2000-2004)

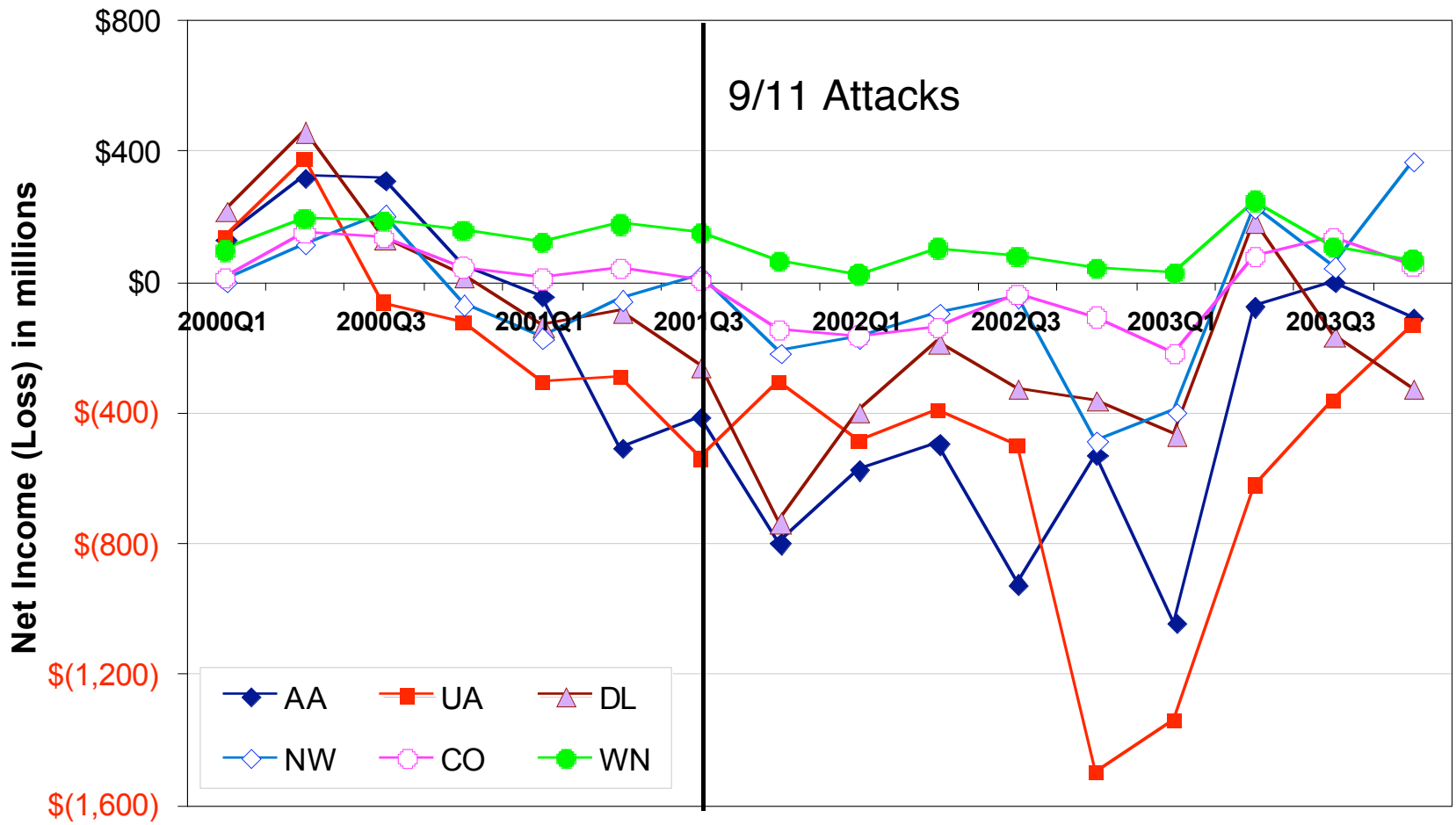


Source: ATA Monthly Airfare Report; eight US major airlines excluding Southwest (WN)

Airline Profitability Impact of Sept 11

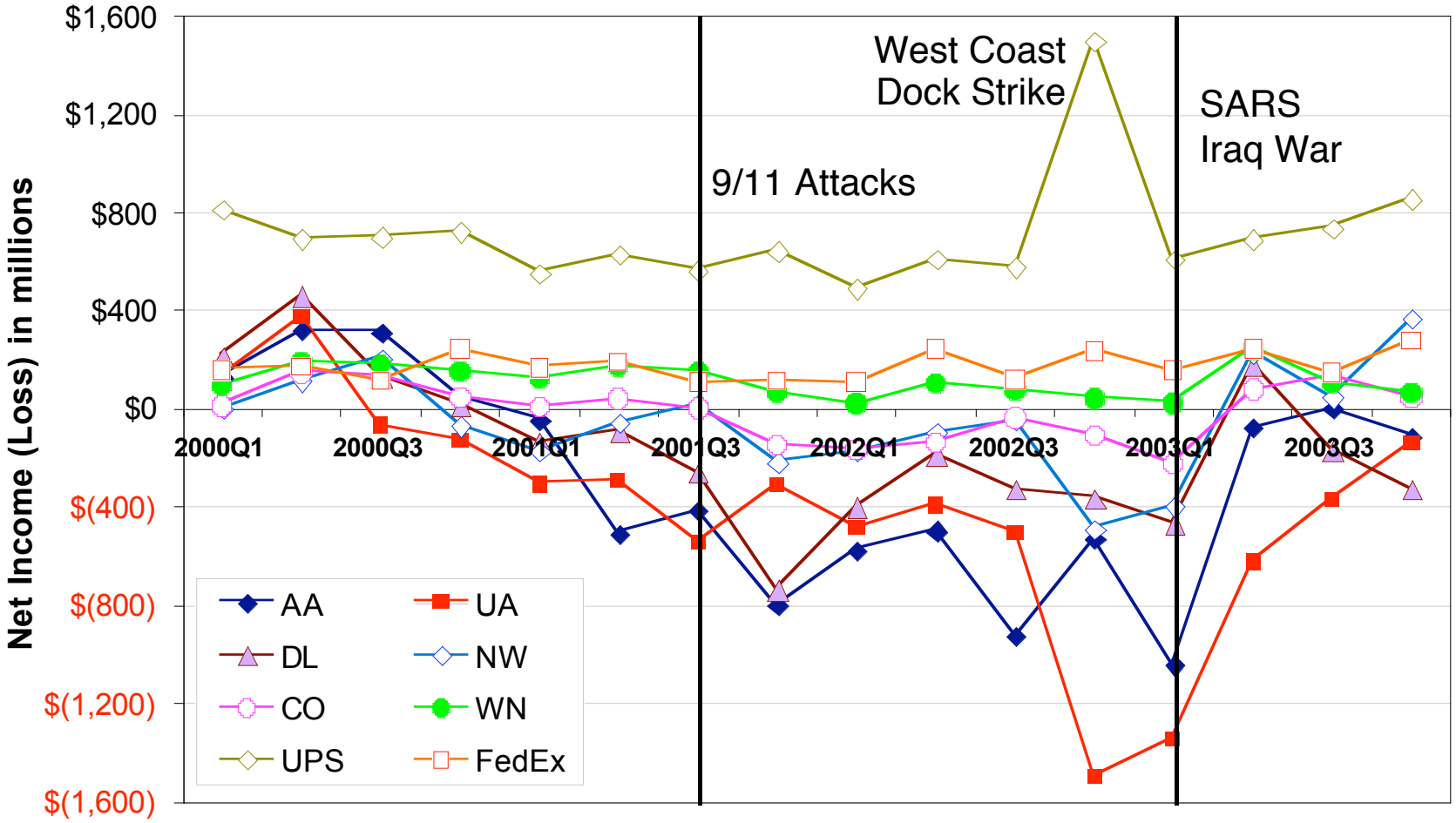


All Major Carriers On "Slow Recovery" Trajectory Except Southwest



Source: Airline reports

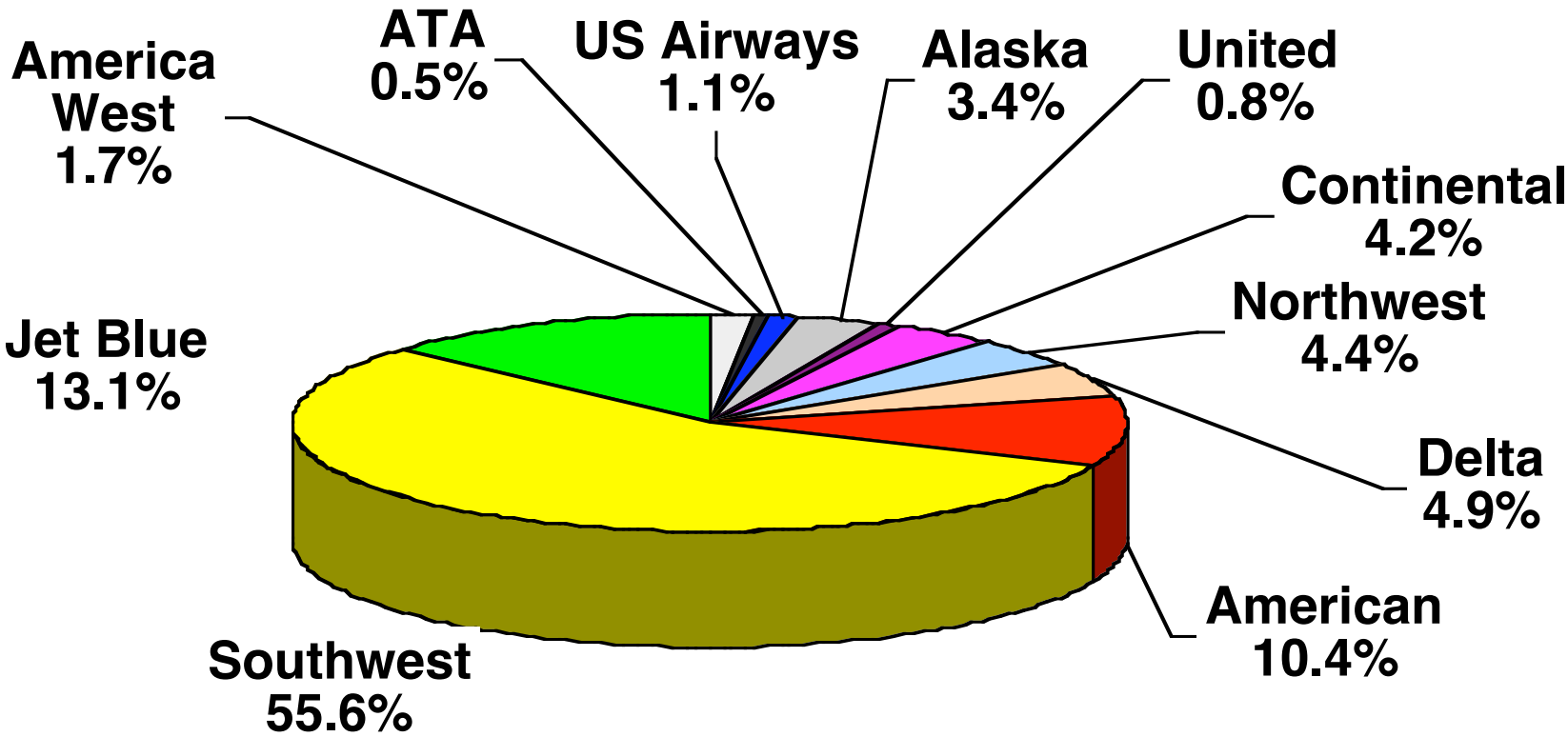
Operating Performance of Major Pax and Cargo Carriers



Source: companies' annual reports

Market Cap: US Majors, 4/7/04

With Jet Blue

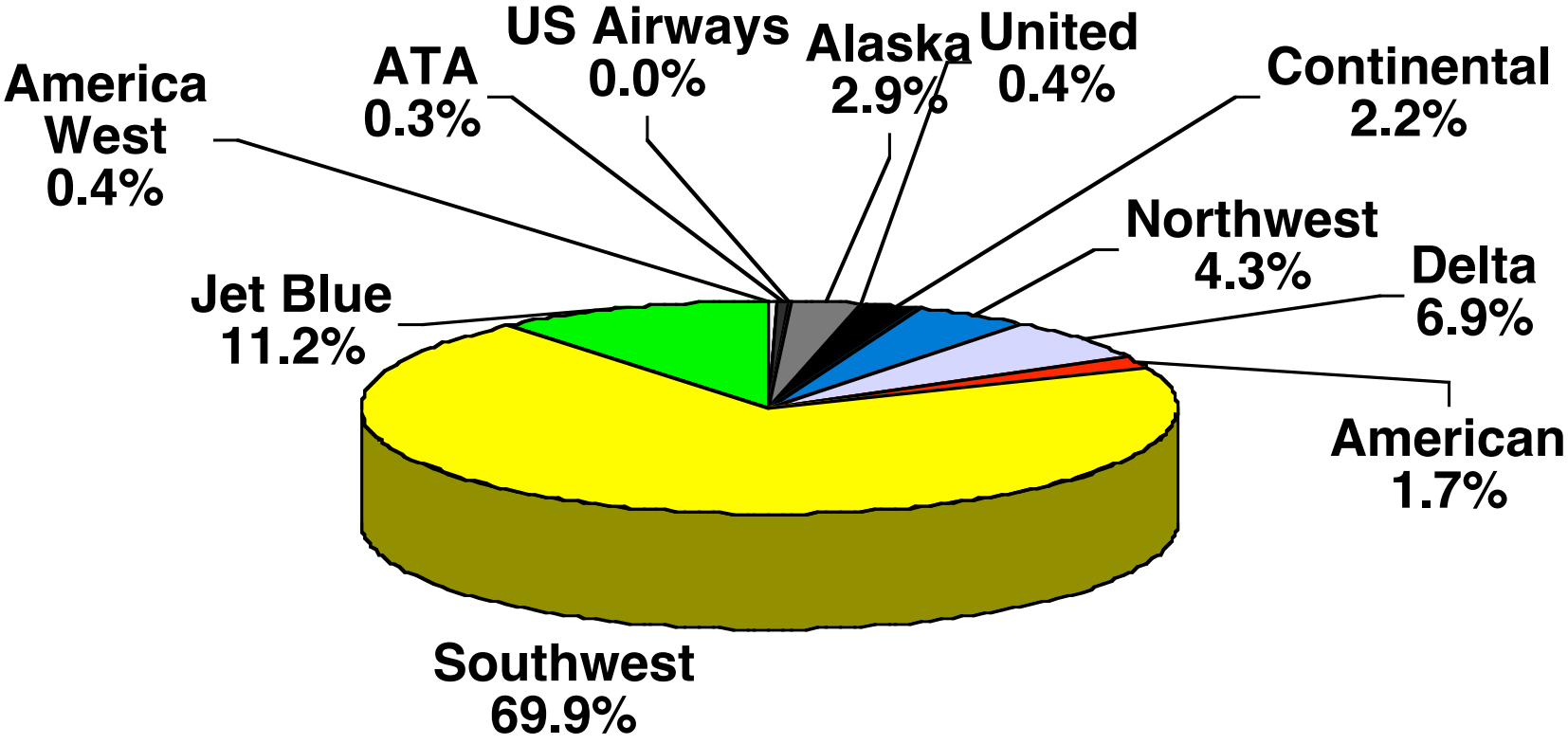


Total Market Cap: $21.3 billion

Source: Yahoo! Finance. Includes ATA

Market Cap: US Majors, 3/18/03

With Jet Blue

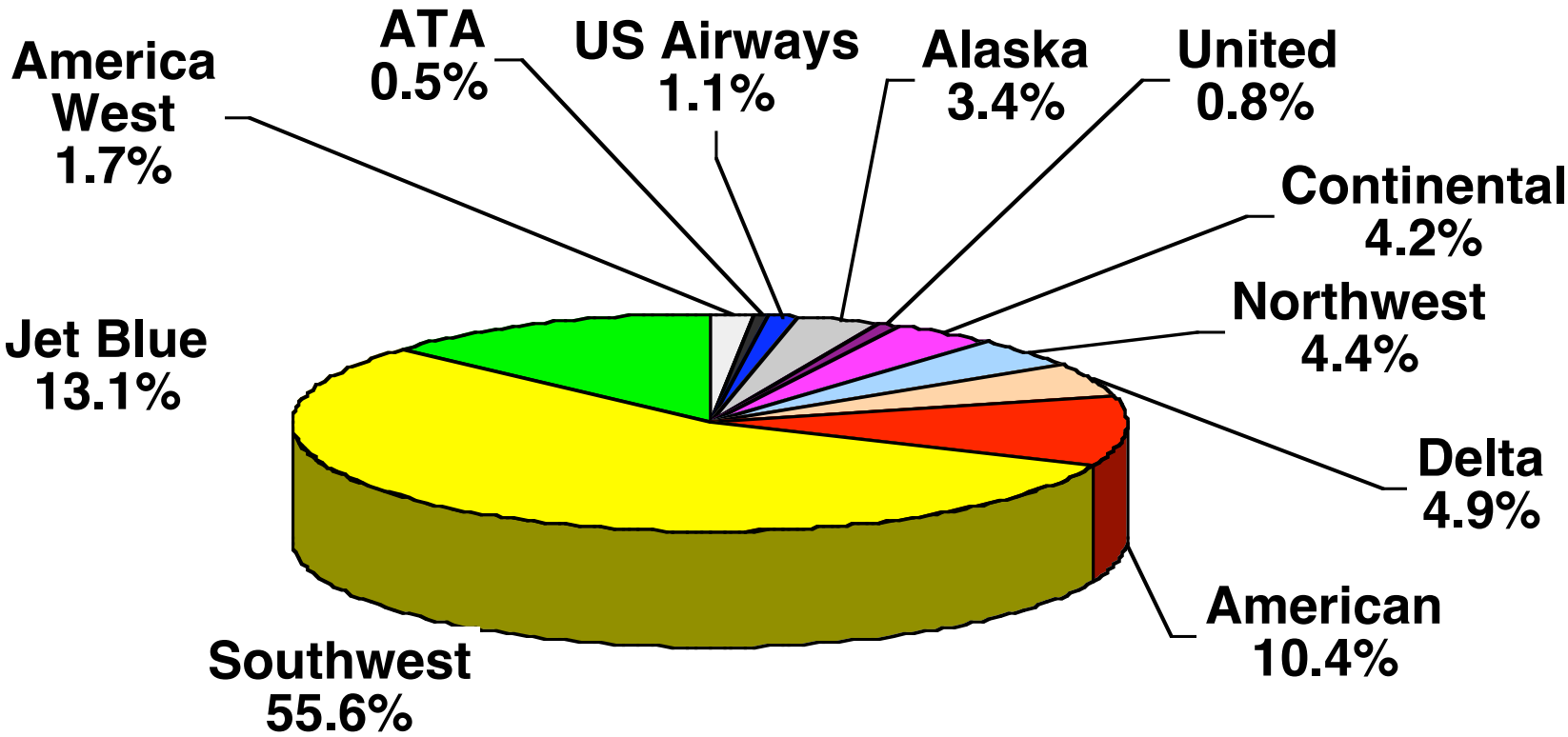


Total Market: $15.7 billion

Source: Yahoo! Finance. Includes ATA

Market Cap: US Majors, 4/7/04

With Jet Blue

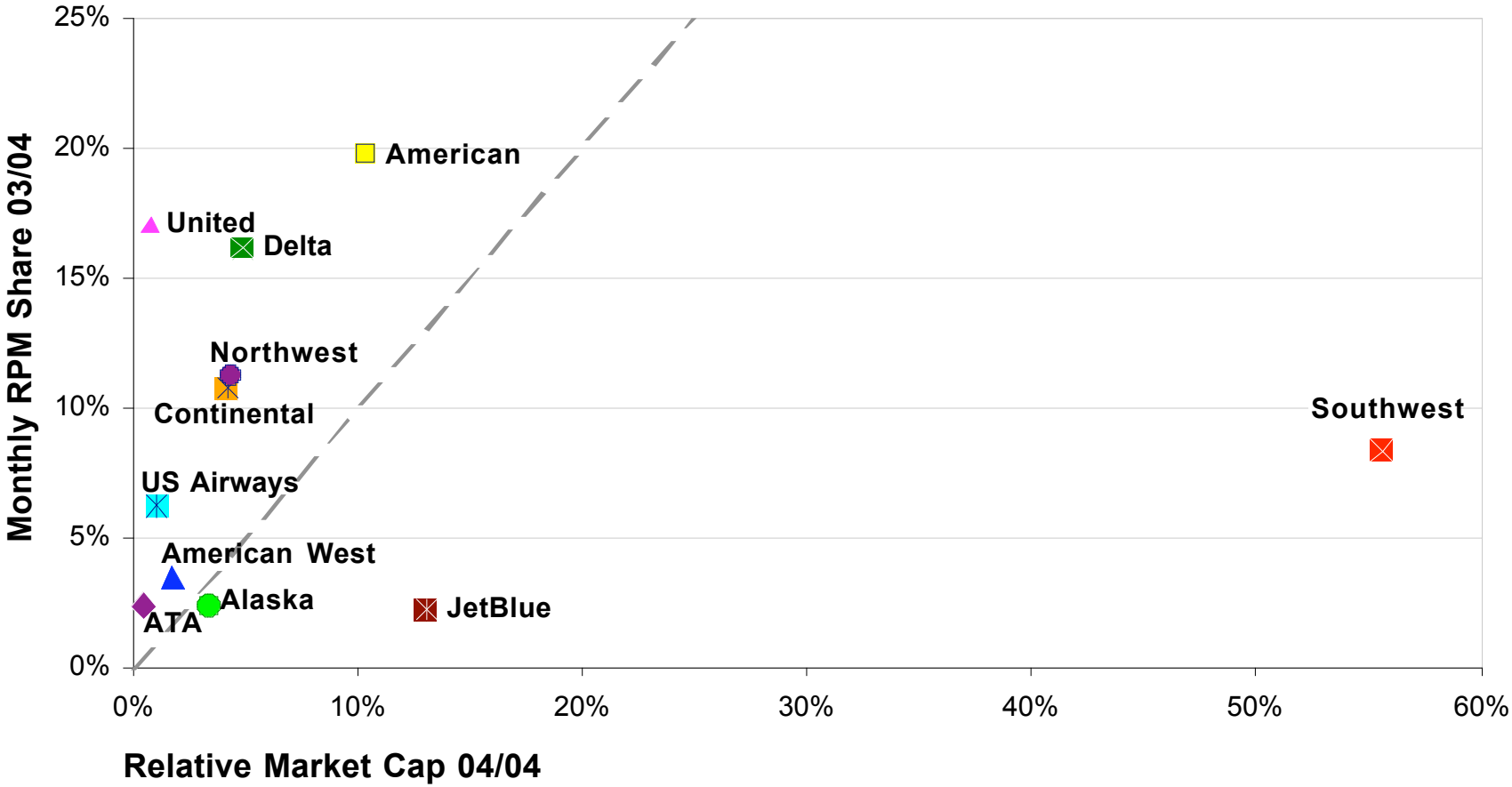


Total Market Cap: $21.3 billion

Source: Yahoo! Finance. Includes ATA

Current Market Cap vs. RPM Share

US Majors and ATA

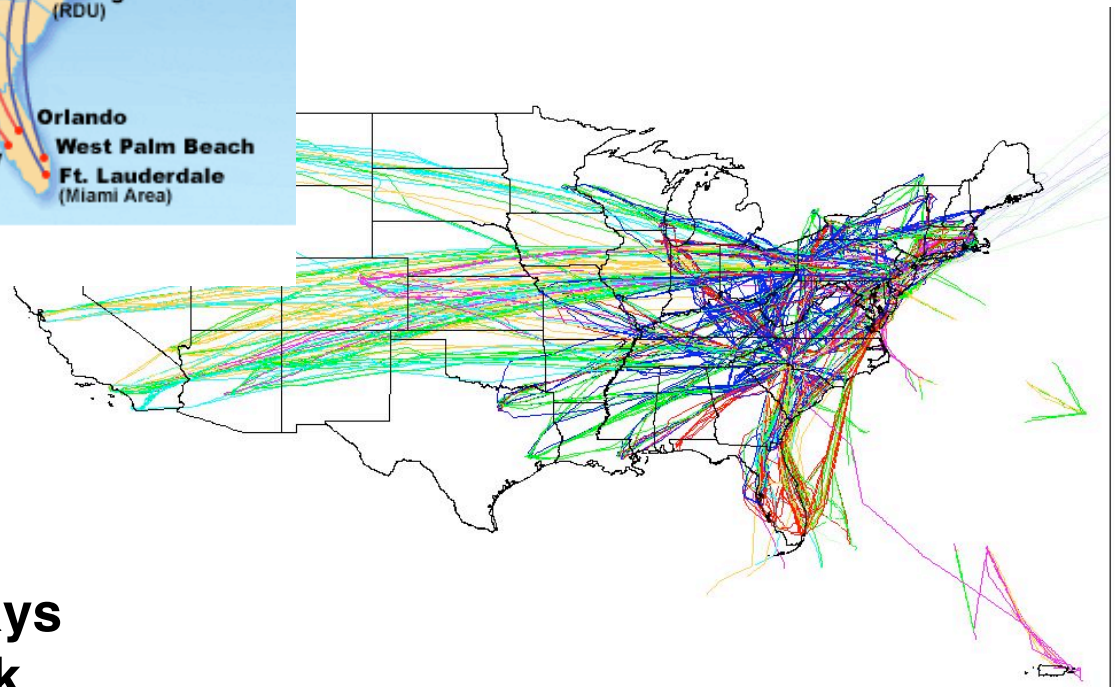


Network vs. Cost Efficiency Questions

Source: Yahoo! Finance and airline traffic reports

Weak Carriers Vulnerable to LCC Attack

Southwest PHL Entry



US Airways Network

Traffic between 2002-08-07 00:00:00 Coordinated Universal Time and 2002-08-08 00:00:00 Coordinated Universal Time
NW Corner: 6351N12642W / SE Corner: 1308N06317W
Scale: 0.26277125 pixels / nautical mile
Route lines colored by aircraft type
Position report points colored by <no color scheme>
Filtered by: [illegible]
SQL: actualdeptime >= '20020807' AND actualdeptime <= '20020808' AND (aircraftid like 'USAW')

Sources:http://www.southwest.com/cities/philadelphia.html, ETMS Data Analysis

Global Emergence of Low-Cost Carriers

Canada (5)

CanJet
HMY Airways
JetsGo Airlines
Westjet
Zip

USA (19, 4 in 2003/2004)

AirTran
Allegiant Air
American West
ATA
Frontier Airlines
Interstate Jet
JetBlue Airways
Midwest Express
Pan American
Southeast Airlines
Southwest Airlines
Spirit Airlines
Song
Sun Country Airlines
USA 3000 Airlines
Vacation Express
Ted
Independence Air
Virgin USA

Europe (58, 2 in 2004)

Aer Arann
Air 2000
Air Baltic
Air Berlin
Air Finland
Air Luxor Lite
Air Polonia
Air Scotland
Air Southwest
Air Wales
Alpi Eagles
Azzurra Air
Baboo
Basiq Air
Bexx Air
BMI Baby
British European
BudgetAir
Corendon
Deutsche BA
Duo
EasyJet
Evolavia
Excel Airways
Fairline Austria
German Wings
Germania Express
Globespan
Hapag Lloyd Express
Hellas Jet
Helvetic Airways
Iceland Express
Snalskjutsen
SnowFlake Airlines
Sterling
Sun Express
Swedline
ThomsonFly
V Bird
Virgin Express
VLM Airlines
VolareWeb
Windjet Vola
Smart Wings
Wizz Air

Africa (2)

1Time
Kulula

South America (3)

Bra
Gol
U Air

Asia/Pacific (20, 9 in 2004)

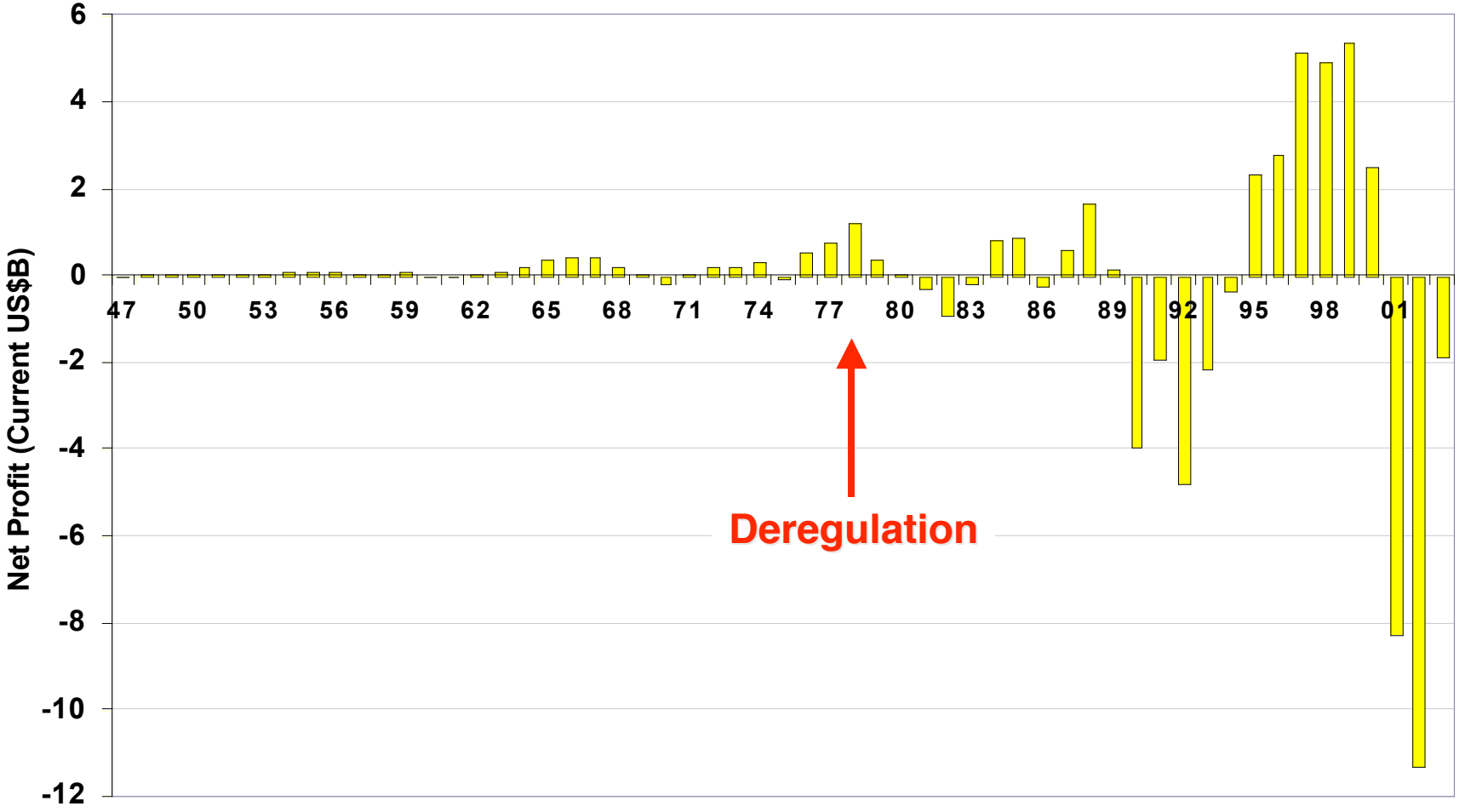
Air Arabia
Air Asia
Air Deccan
Athena Air Services
Citilink
Freedom Air
Lion Airways
One-Two-Go
Skymark Airlines
Skynet Asia Airways
Virgin Blue
Air One
BackpackersXpress
Jetstar
New LCC by Qantas
Nok Air
Pacific Blue
SkyAsia
Tiger Airways
ValuAir

Source: http://www.etn.nl/lcostair.htm, airline news

Total 107 LCCs, 15 in 2003/2004

Macro Scale Drivers
US Airline Net Profit

Cyclic Industry with Exponential Growth In Volatility Since Deregulation



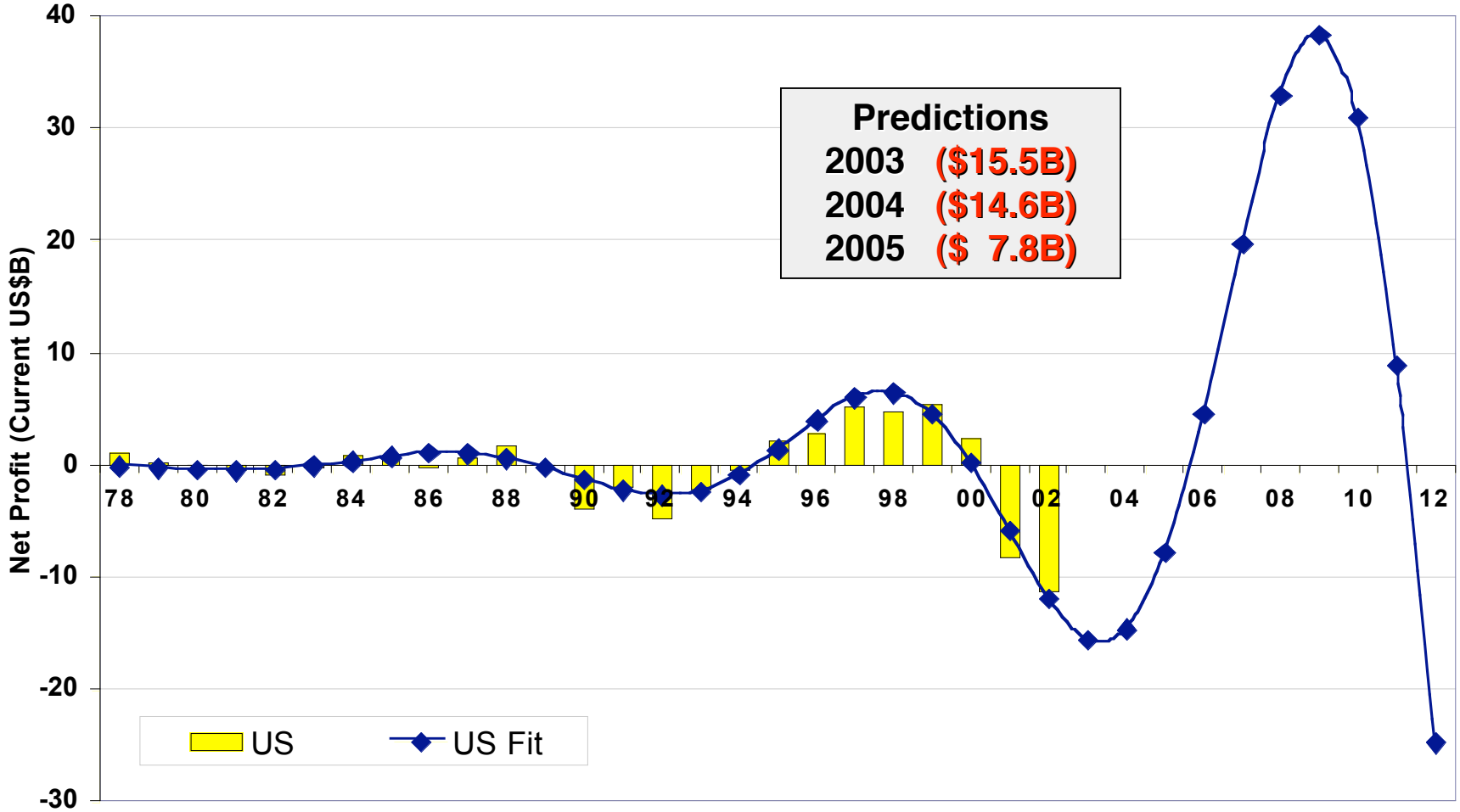
Source: ATA, Form41, US Airlines all services

NB: 2001 data includes Air Trans Stabilization Act receipts

US Airlines Net Profit Model - 2002

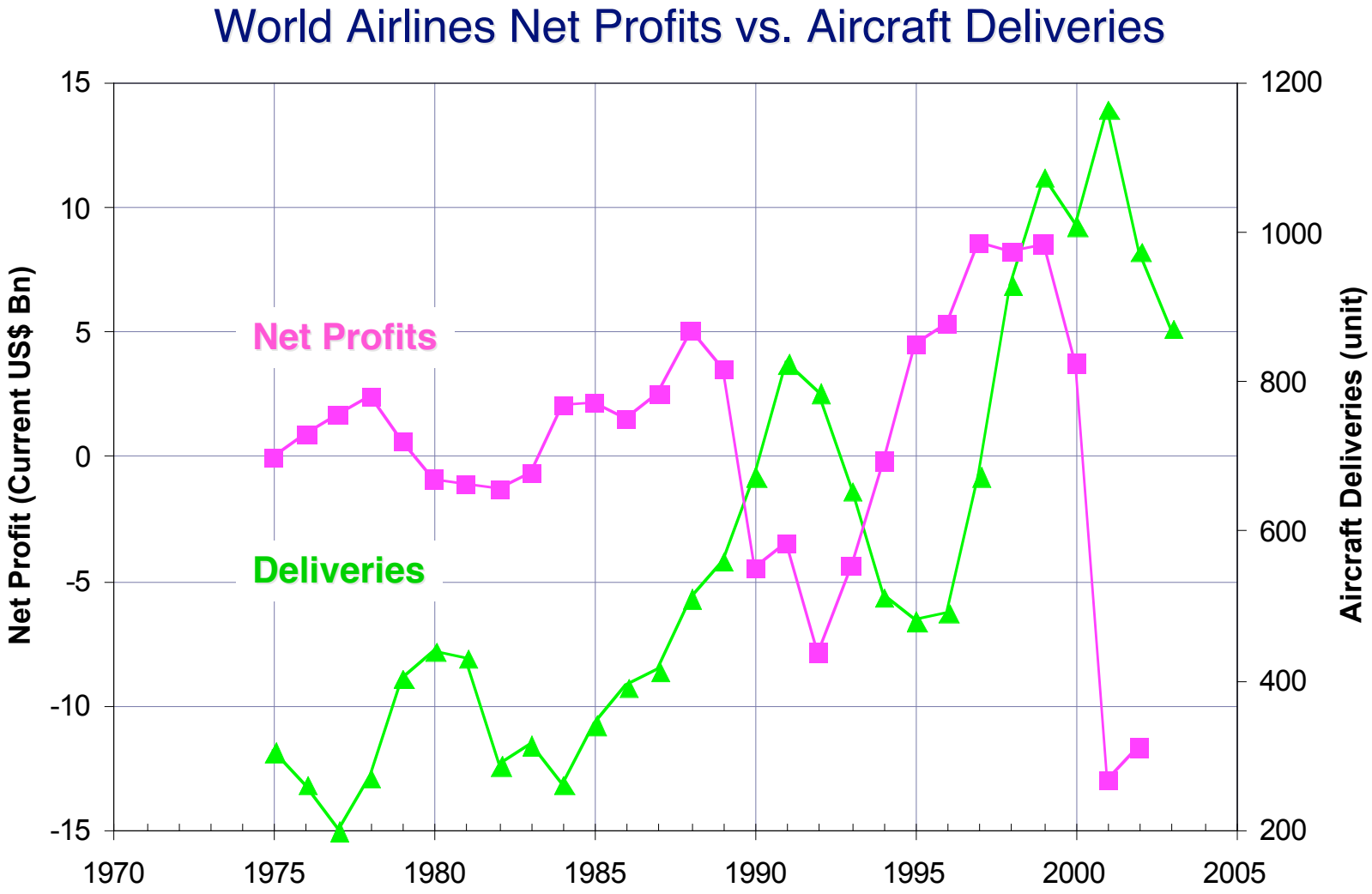
Best Fit of Undamped Oscillation

Cycle Period = 11.3 yr eFolding Time = 6.3 yr



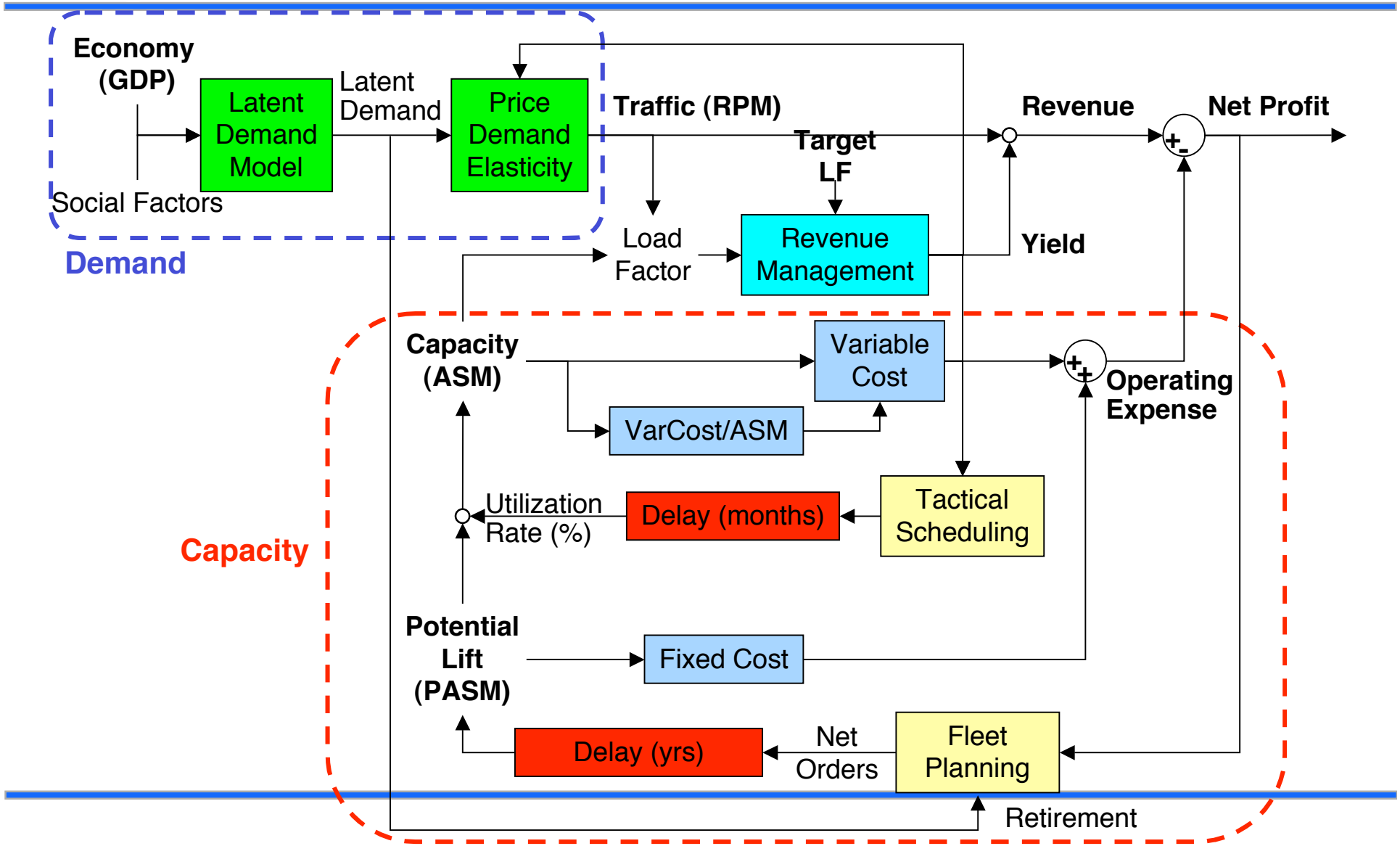
Net Profit and Aircraft Deliveries

Hypothesize that instability driven by capacity response phase lag

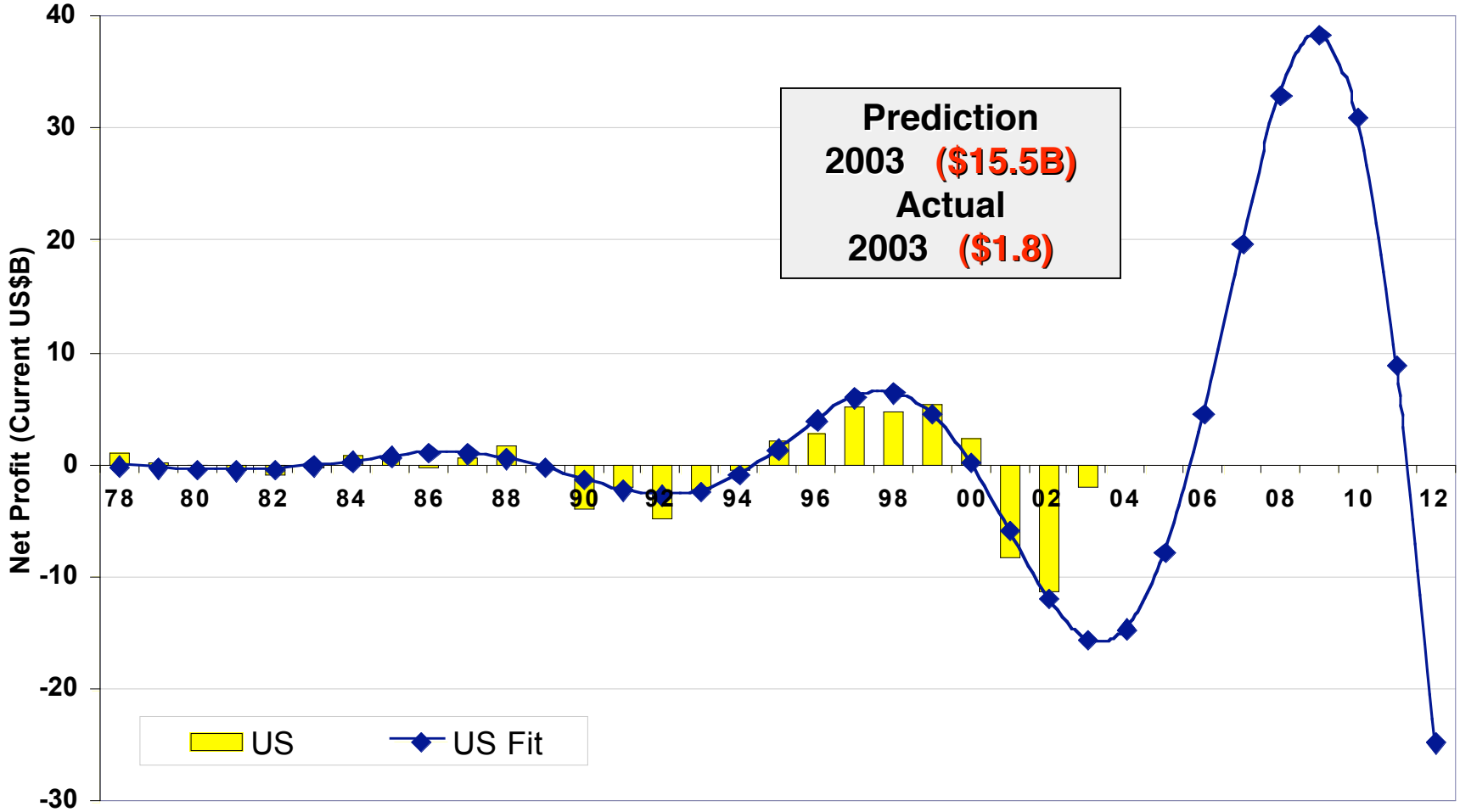


Source: ICAO data

Simple Conceptual Model for Capacity Effects



US Airline Performance Cycling Up Faster Than Predicted

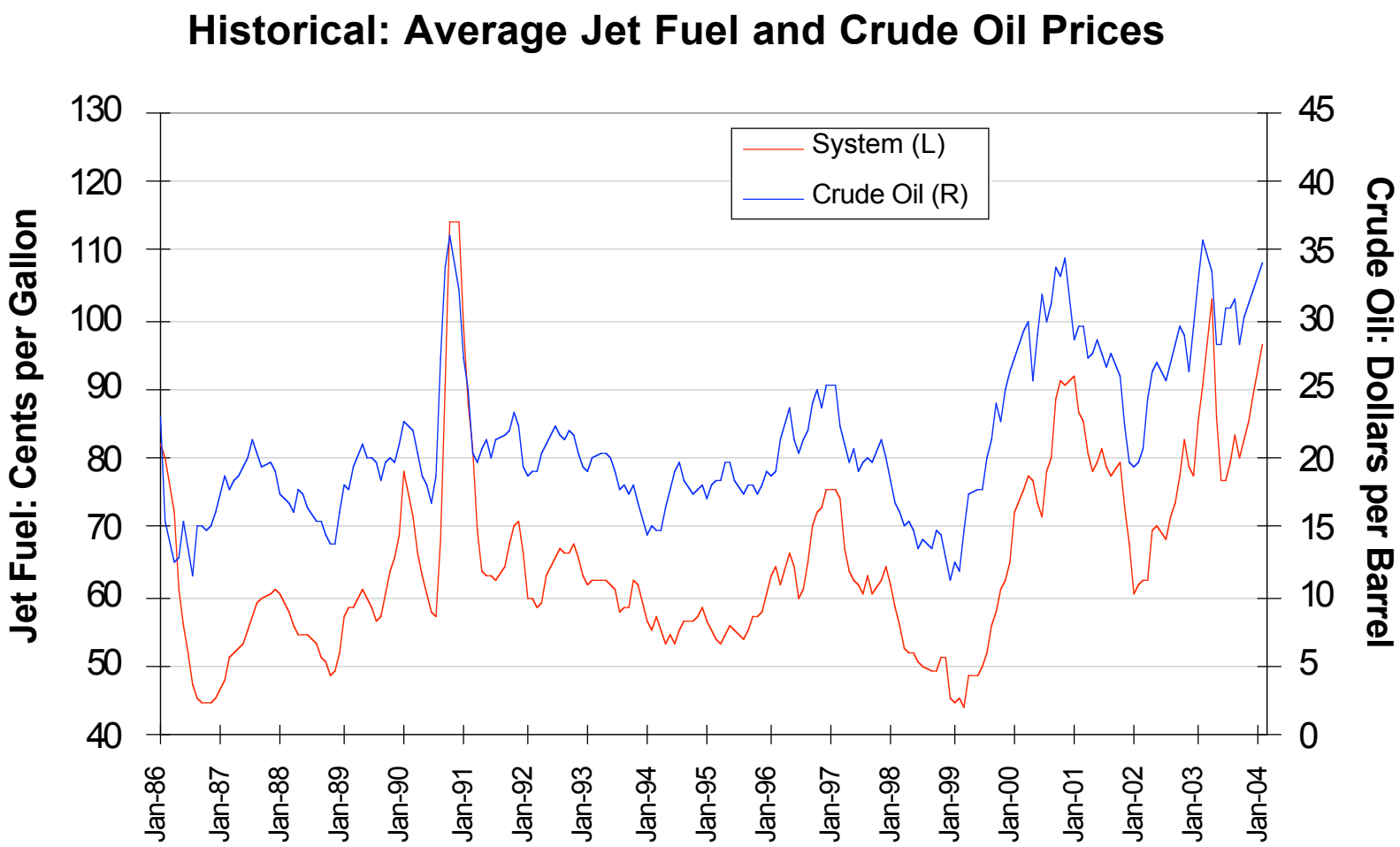


Profitability Improvement Factors

- **Cargo Airlines Profitable**
- **Yields Turned the Corner**
- **Wage Concessions**
  - US: $1 billion
  - UA: $2.56 billion
  - AA: $2 billion
- **Distribution Costs**
  - $1 billion
- **Operating Efficiencies**
  - $4 billion
- **Debt Restructuring & Chapter 11**
- **Pensions**
  - **(Pension Benefit Guaranty Corporation (PBGC))**
- **Security Costs and Insurance?**

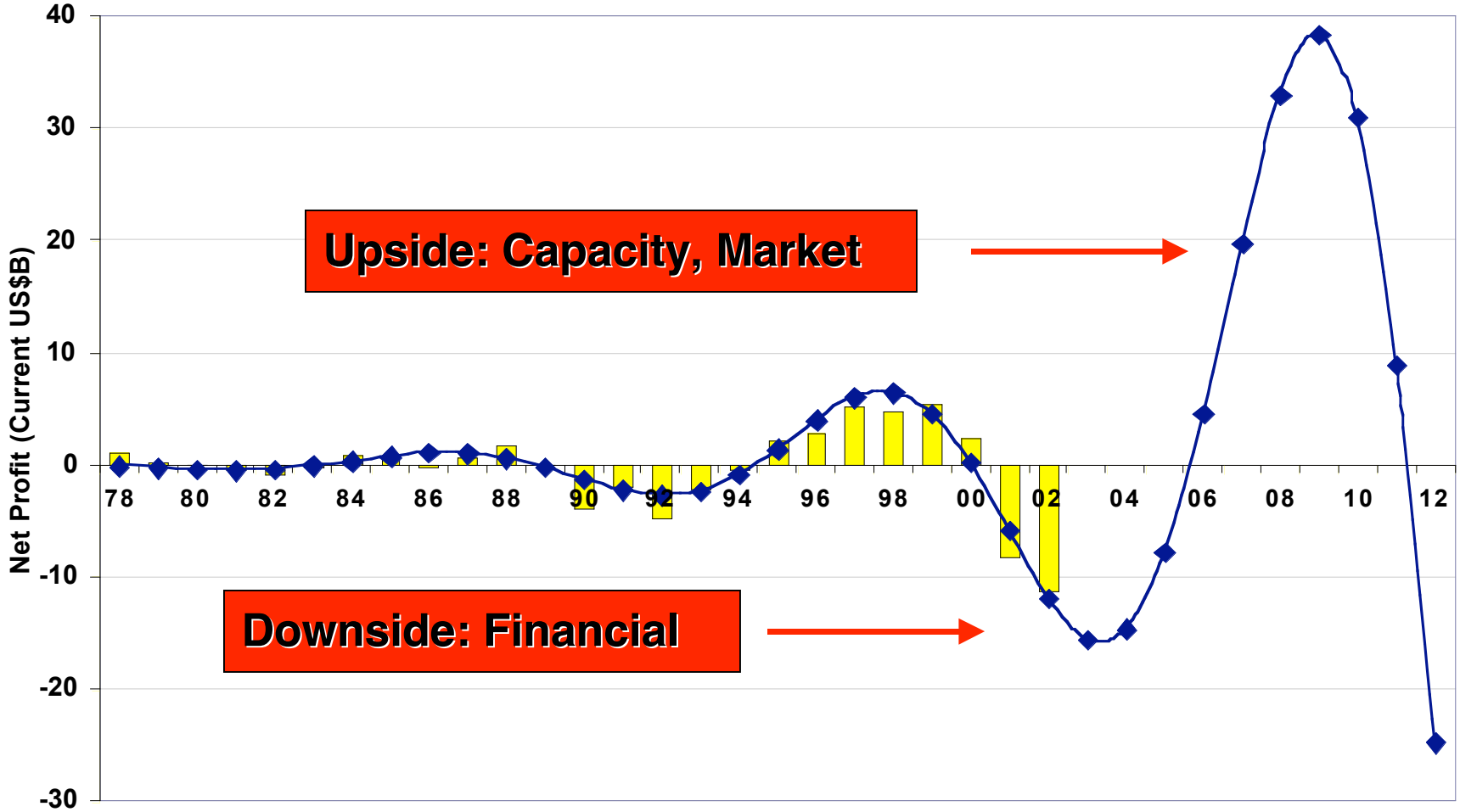
- **Fuel**

Trends in Fuel Price

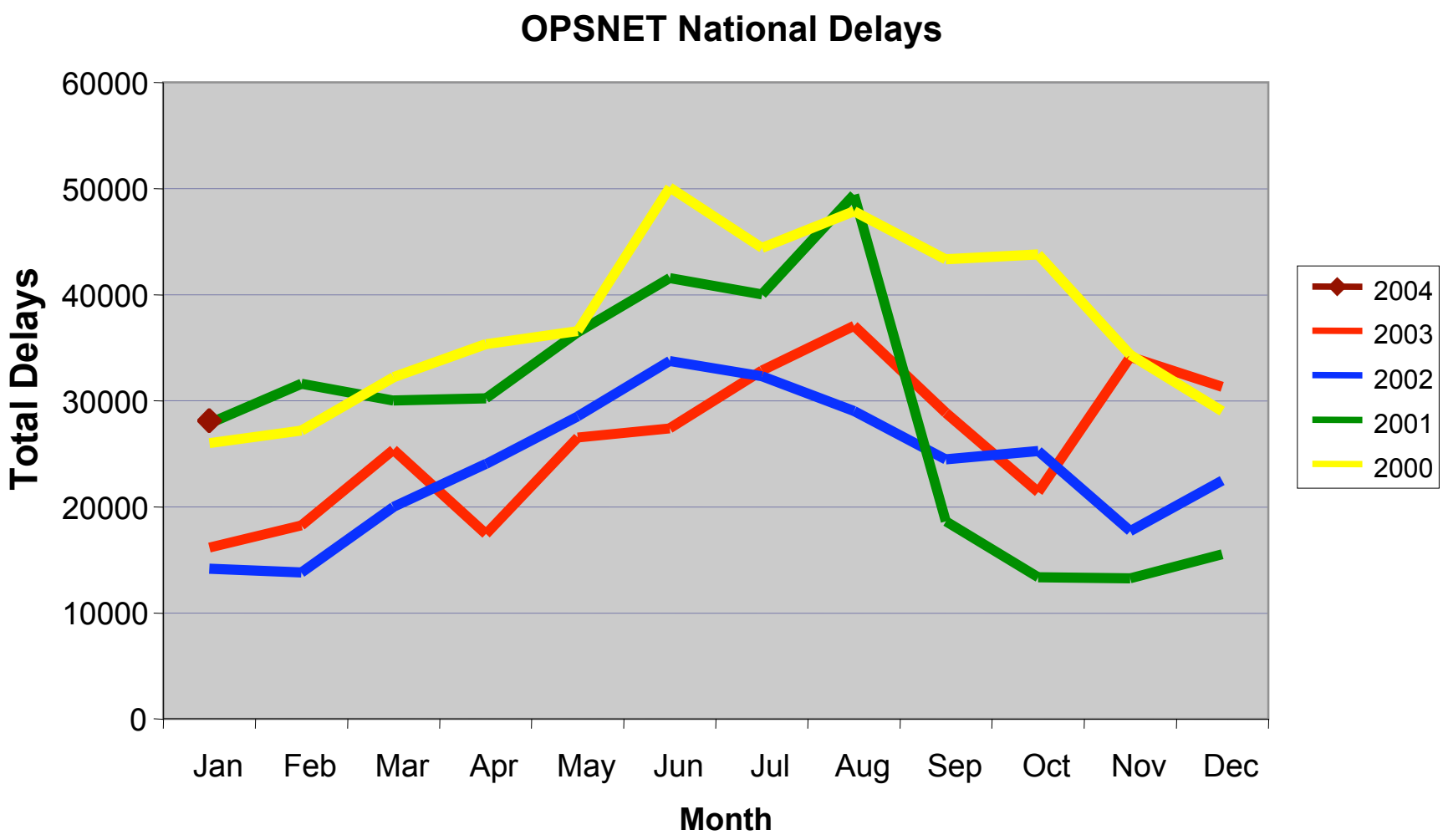


Source: ATA data; All US Majors, Nationals, Large Regional – All Services

Growth Limits
Constraints vs Damping

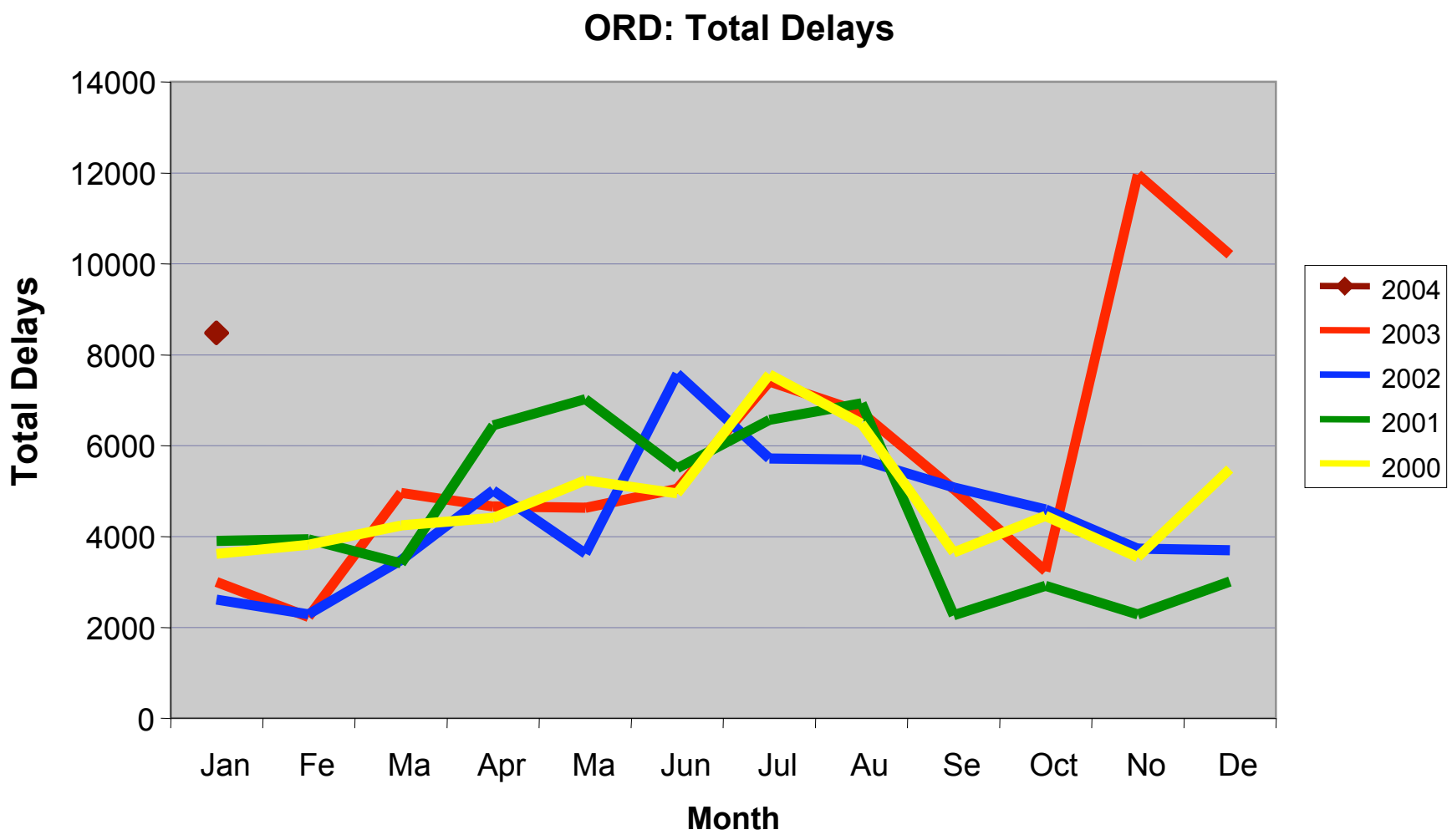


Flight Delays Reemerging



Source: FAA

Total Delays at Chicago O'Hare Intl



Source: FAA

FAA Air Traffic Responses

- **Air Traffic Organization Stood Up**
  - ❑ Russ Chew COO
  - ❑ Performance Based Organization
  - ❑ In Transition
- **Schedule Reductions at ORD**
  - ❑ “Voluntary” reduction
  - ❑ Collaborative Decision Making
    - ◆ Pilot Case
- **“Express Lanes” from Congested Core Systems**
  - ❑ Delay “peripheral” airports

New York Center Airspace

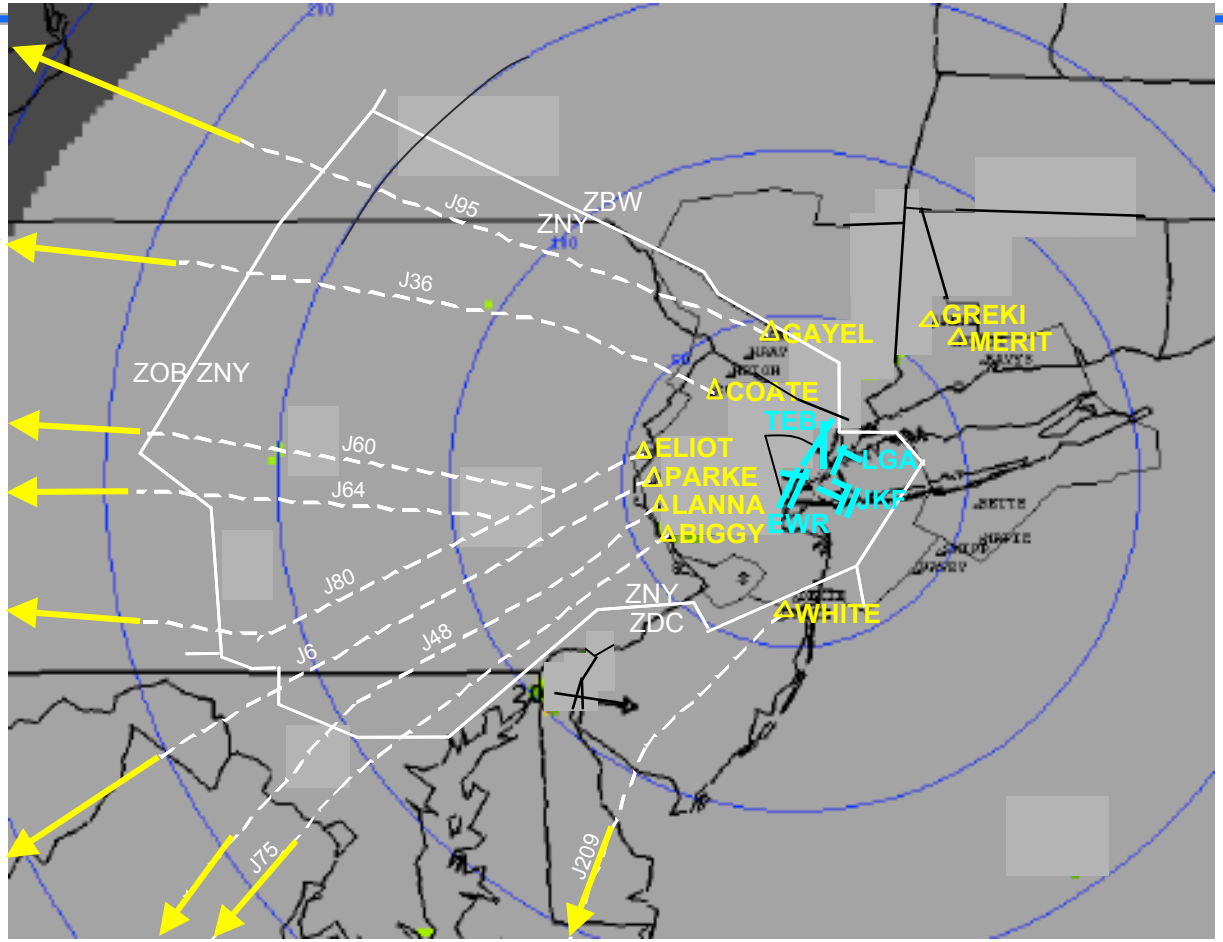
With Primary EWR Departure Fixes/Jet-routes

MSP, SEA
PDX, SLC
SFO

ELM, MKE
ORD

PIT, CLE
IND, MCI
DEN, PHX
LAS, LAX
HNL

IAD, BNA
DFW, SAN
MEX



YMQ
BVT

BOS
Europe

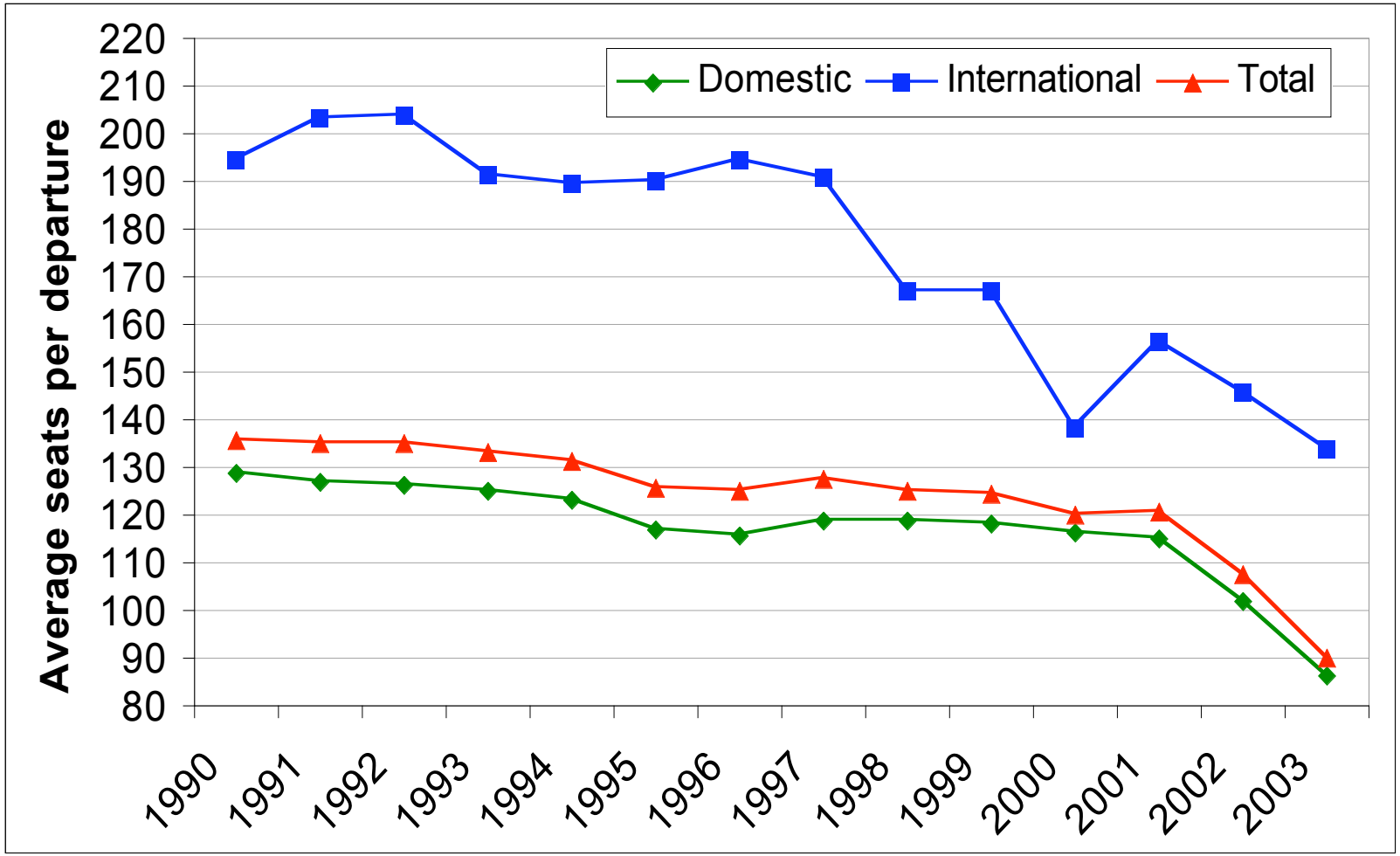
ATL, MSY, IAH

BWI, DCA,
GSO, CLT, TPA

RIC, ORF, CHS, MCO, PBI, MIA
Central and South America

Based on Lincoln Laboratory ITWS Map

Trends in Aircraft Size

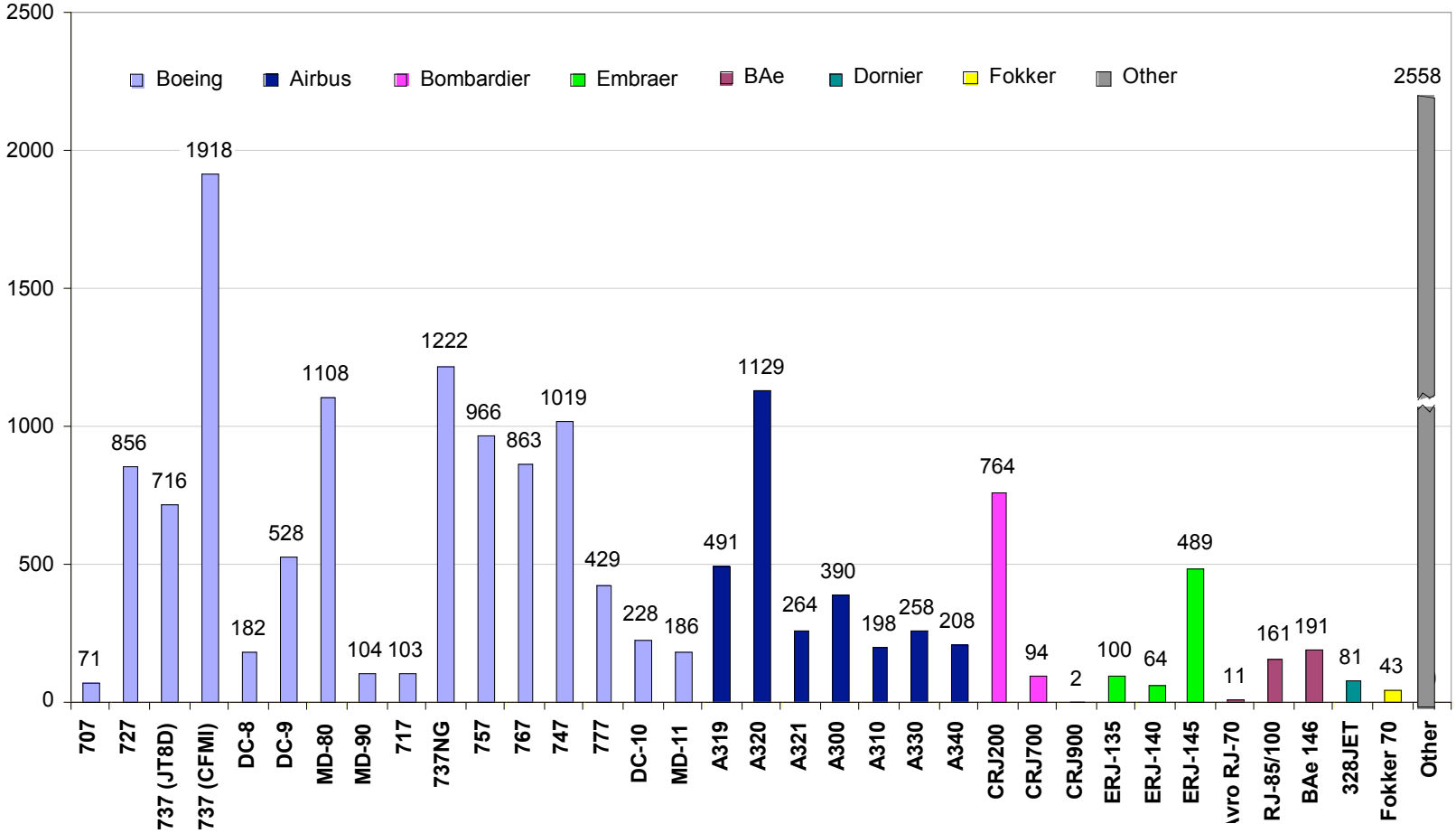


Data source: Form 41 Traffic data from Bureau of Transportation Statistics (includes Regional Jets and Turboprops)

World Jet Fleet Summary

(as of May 14, 2003)

Total 17,995 Jet Aircraft

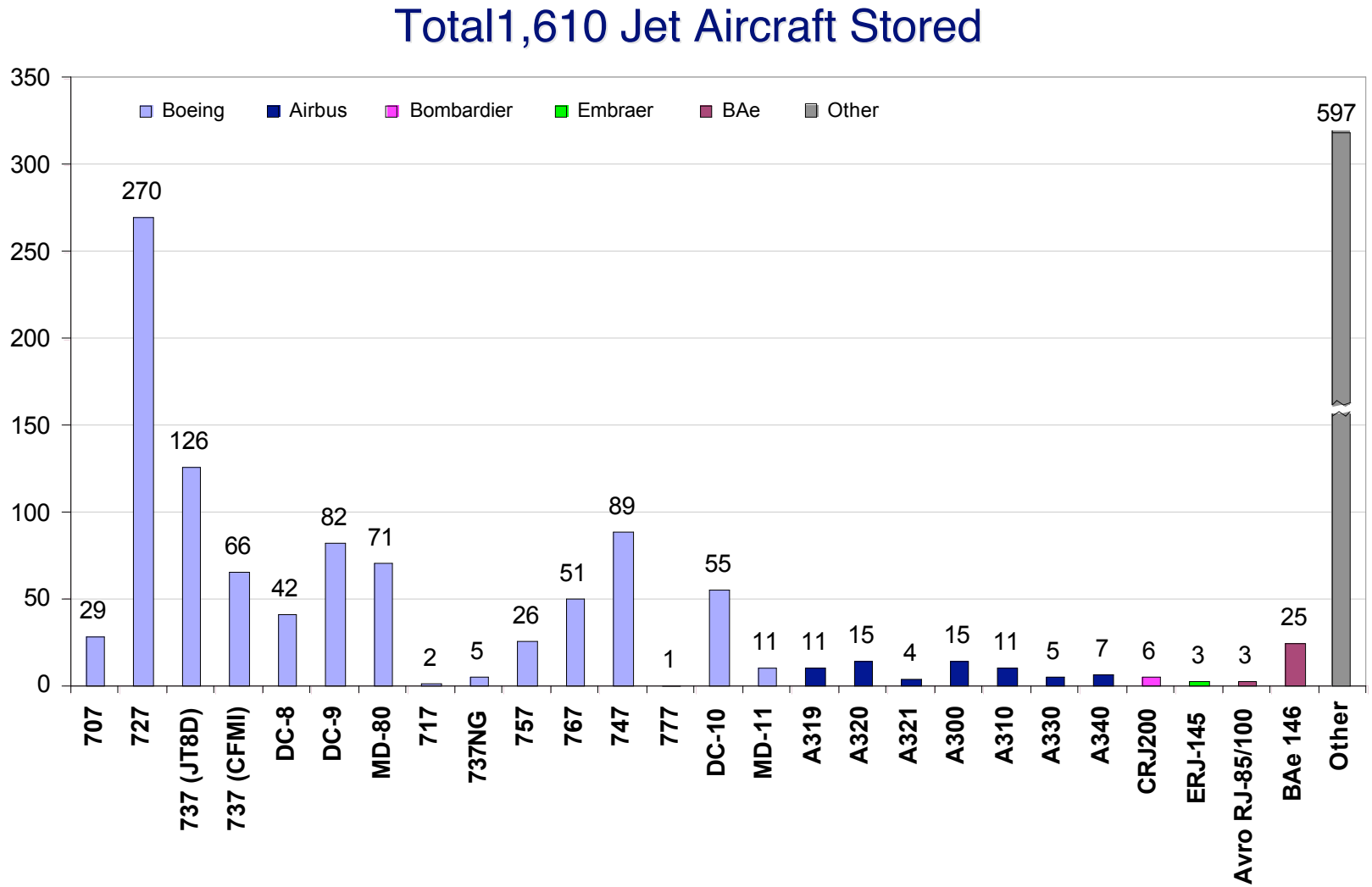


Others include L-1011, Fokker 100, and Russia/Ukraine a/c (Yak, IL, An, Tu).

Source: Airclaims, published by ATW, July 2003

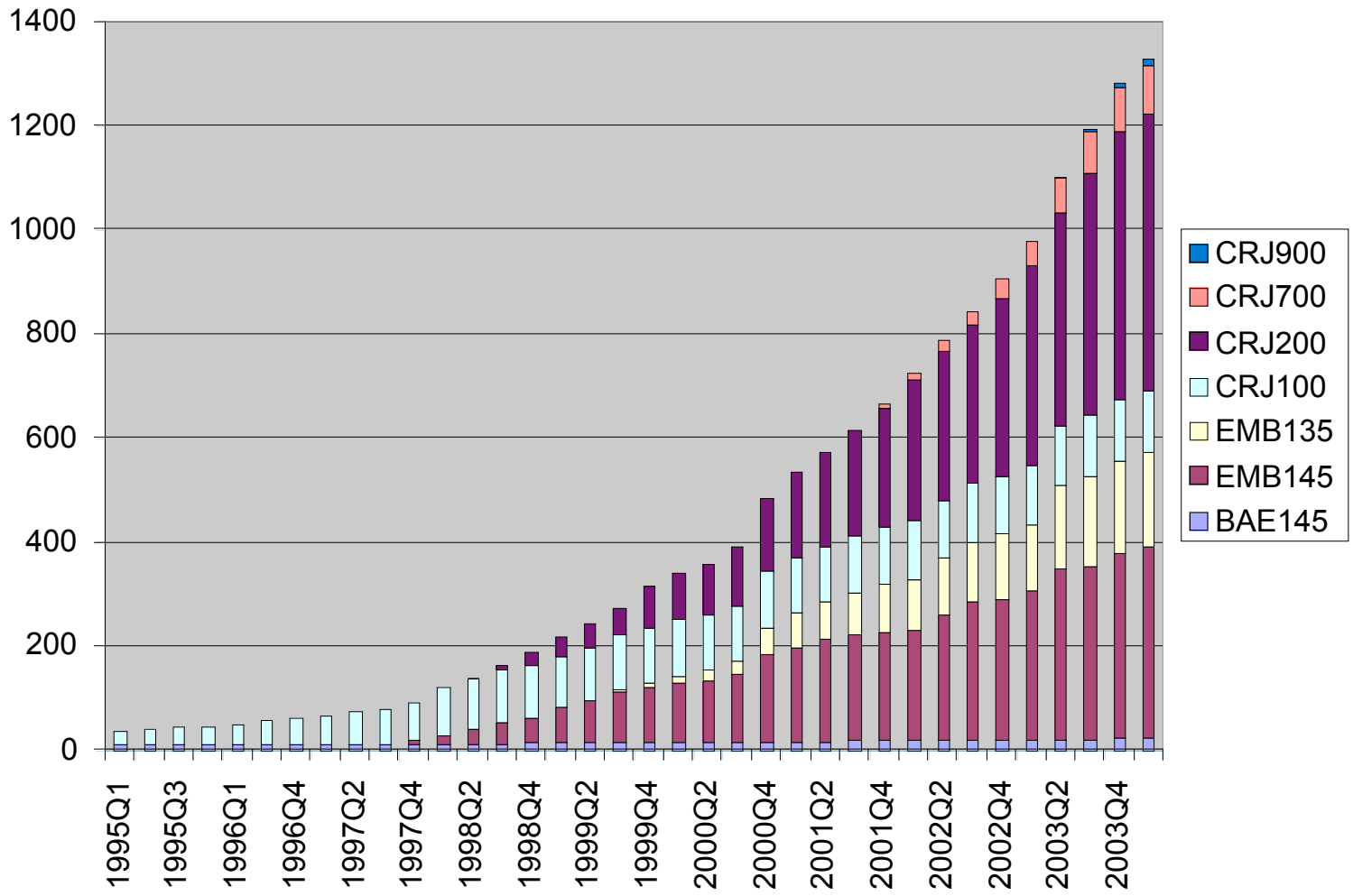
Worldwide Stored Jet Aircraft

(as of May 14, 2003)



Source: Airclaims, published by ATW, July 2003

U.S. Regional Jet Growth



Source: FAA registration data from 1995 until the present

Most Common Regional Jets

ERJ 145 (50 seats)

About 400 aircraft in national fleet

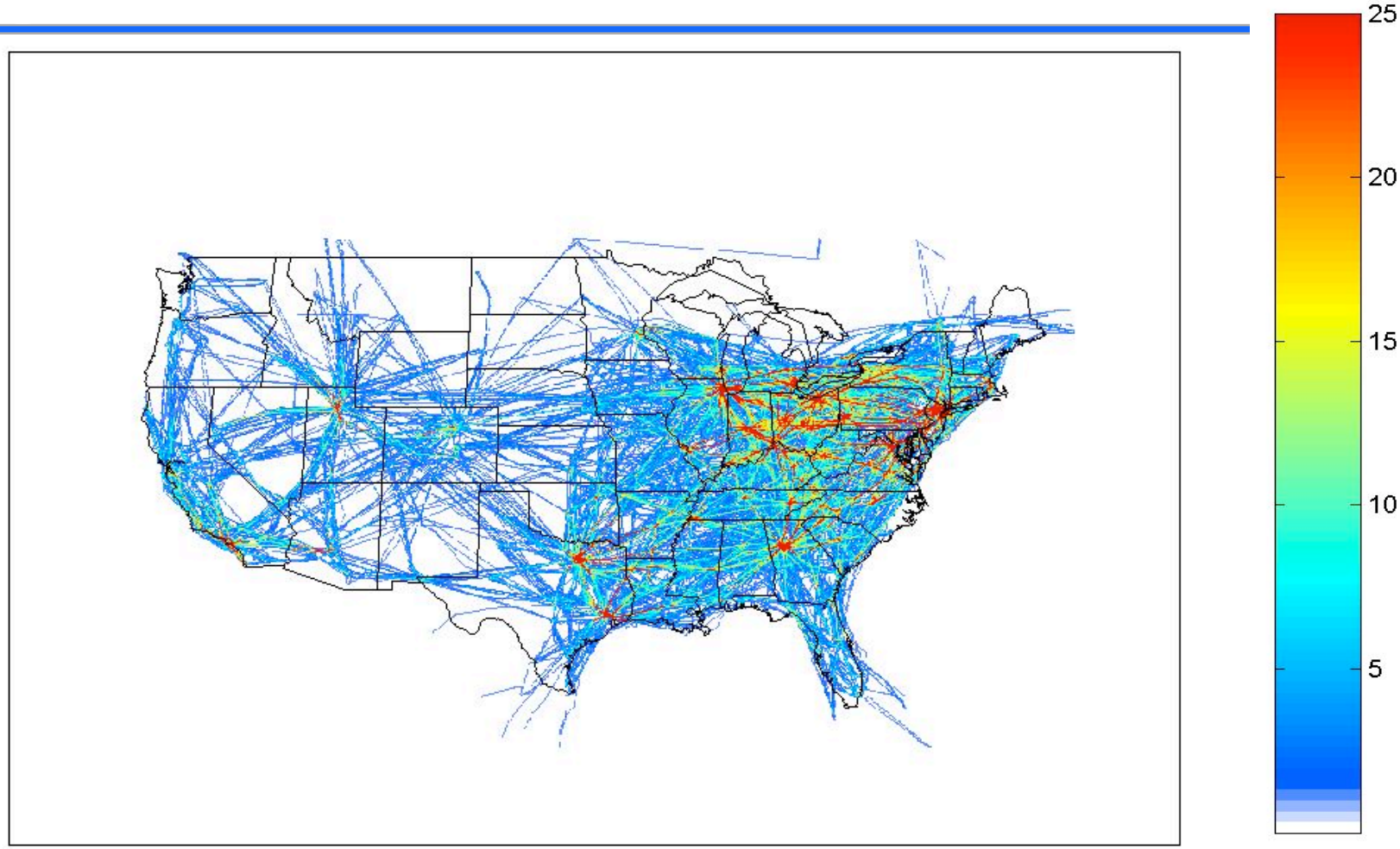
About 2000 daily flights in January 2003

CRJ 200 (50 seats)

About 400 aircraft in national fleet

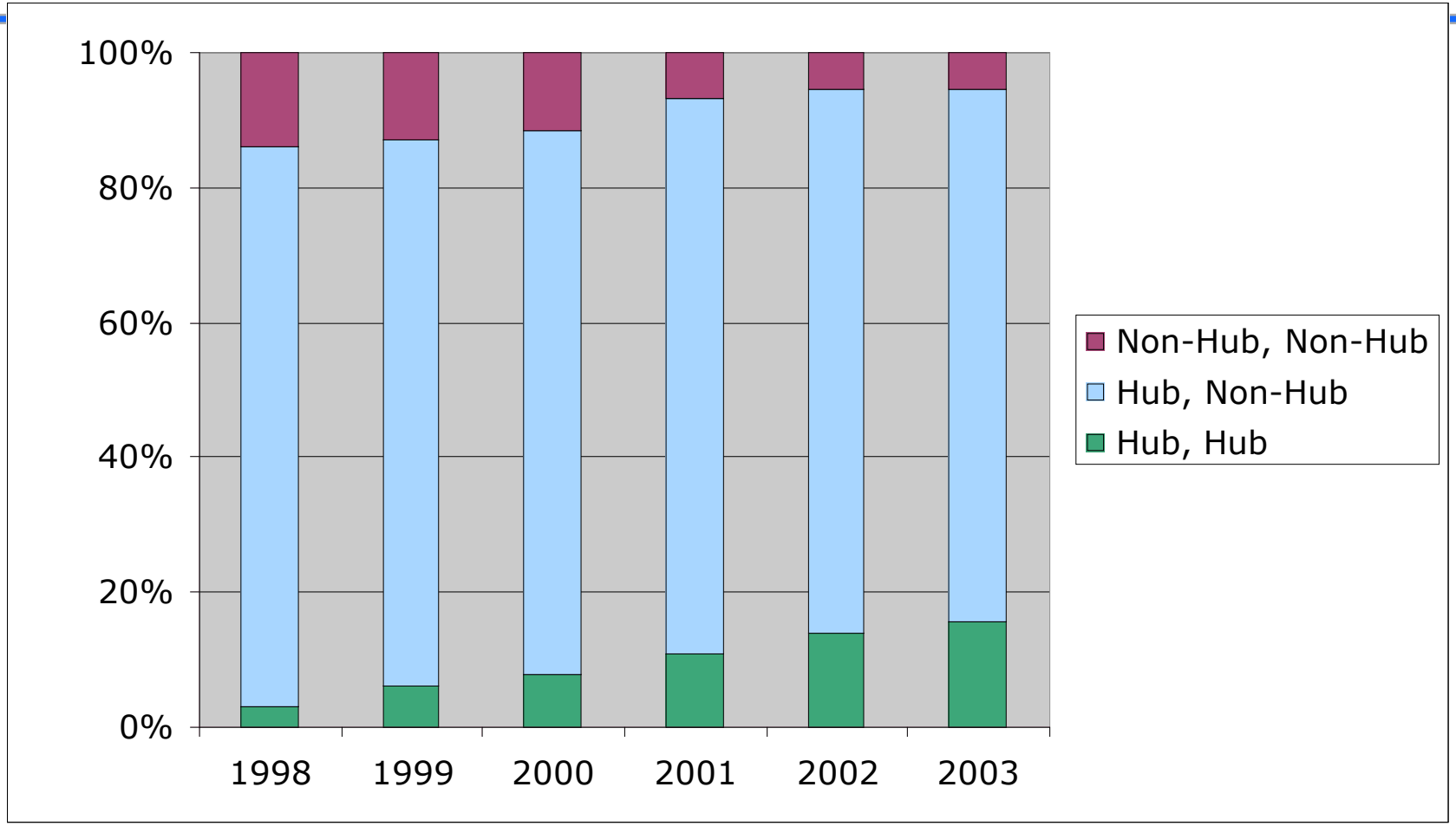
About 1500 daily flights in January 2003

Regional Jet Density Growth



Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jan
‘98				‘99				‘00				‘01				‘02		‘03

Significant Regional Jet Growth at Hub Airports

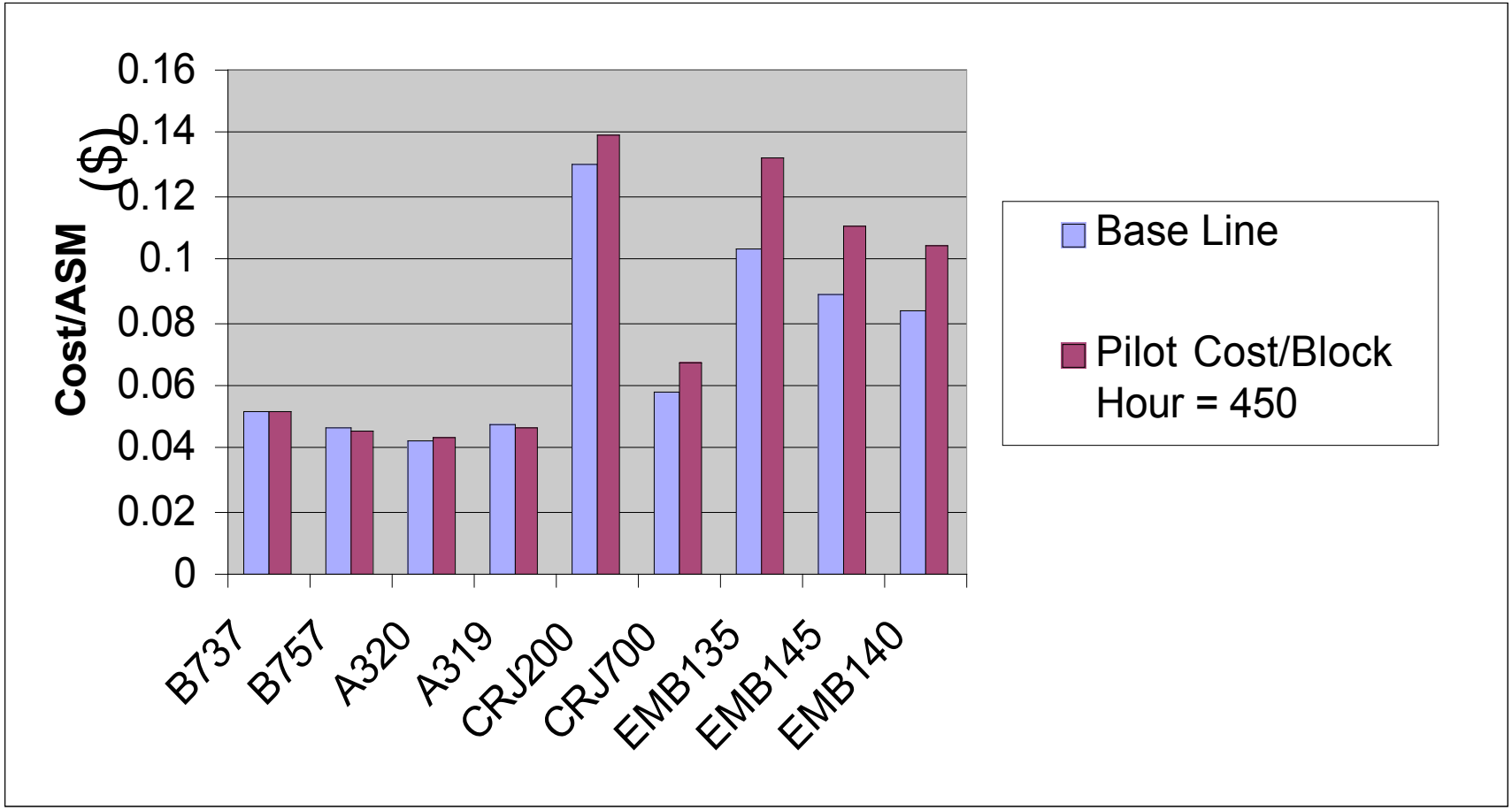


- **About 90% of regional jet flights depart from or arrive at a hub airport**

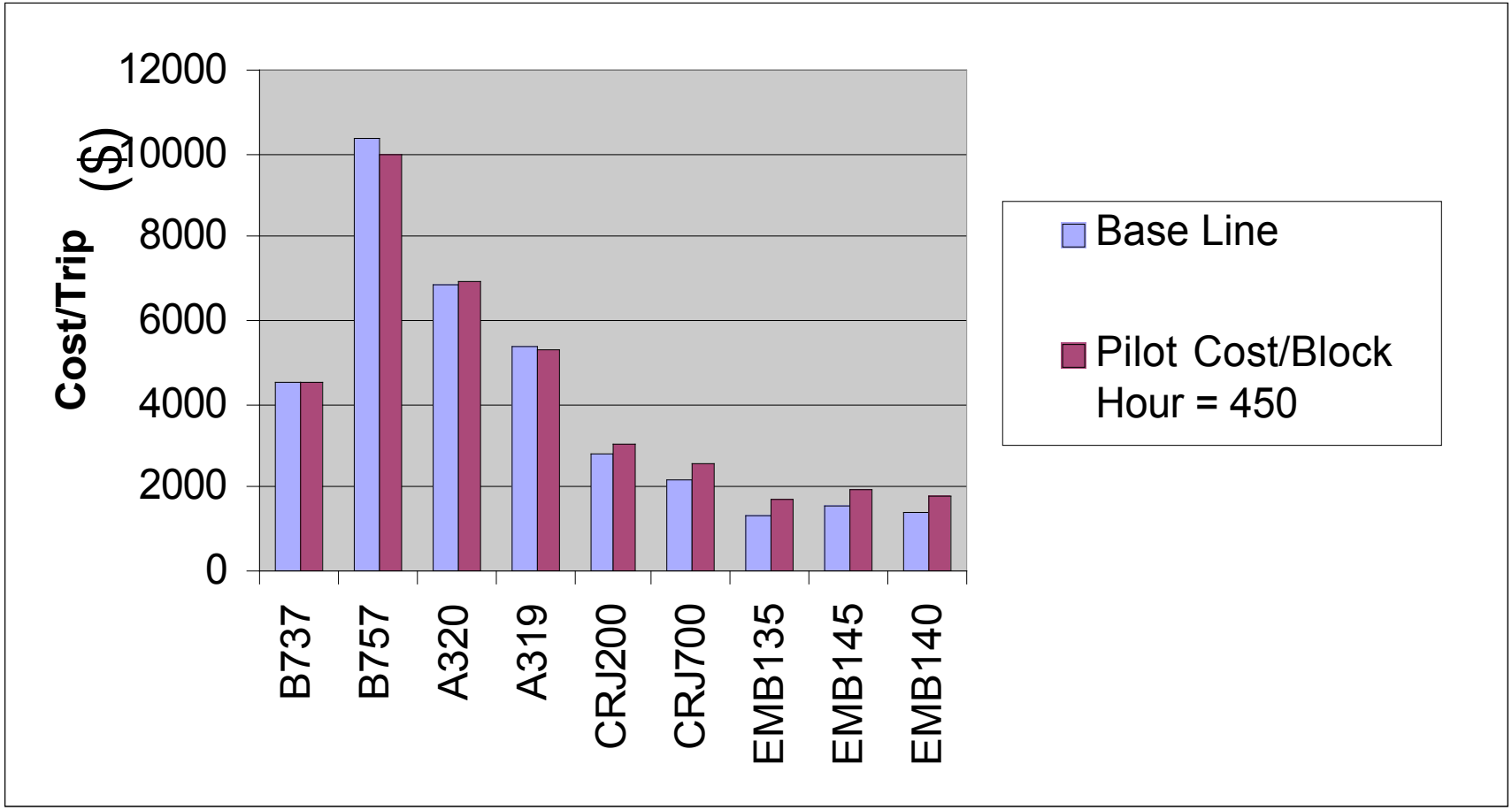
Form 41 Averages by Aircraft Type

Aircraft Type	Average Trip Length	Pilot Cost/Block Hour	Total Aircraft Operating Cost/ASM	Total Aircraft Operating Cost/Trip
B737	663	430	0.05	4505
B757	1236	547	0.05	10326
A320	1094	411	0.04	6836
A319	931	460	0.05	5359
CRJ200	459	287	0.13	2838
CRJ700	542	215	0.06	2214
EMB135	351	181	0.10	1341
EMB145	354	169	0.09	1572
EMB140	386	187	0.08	1412

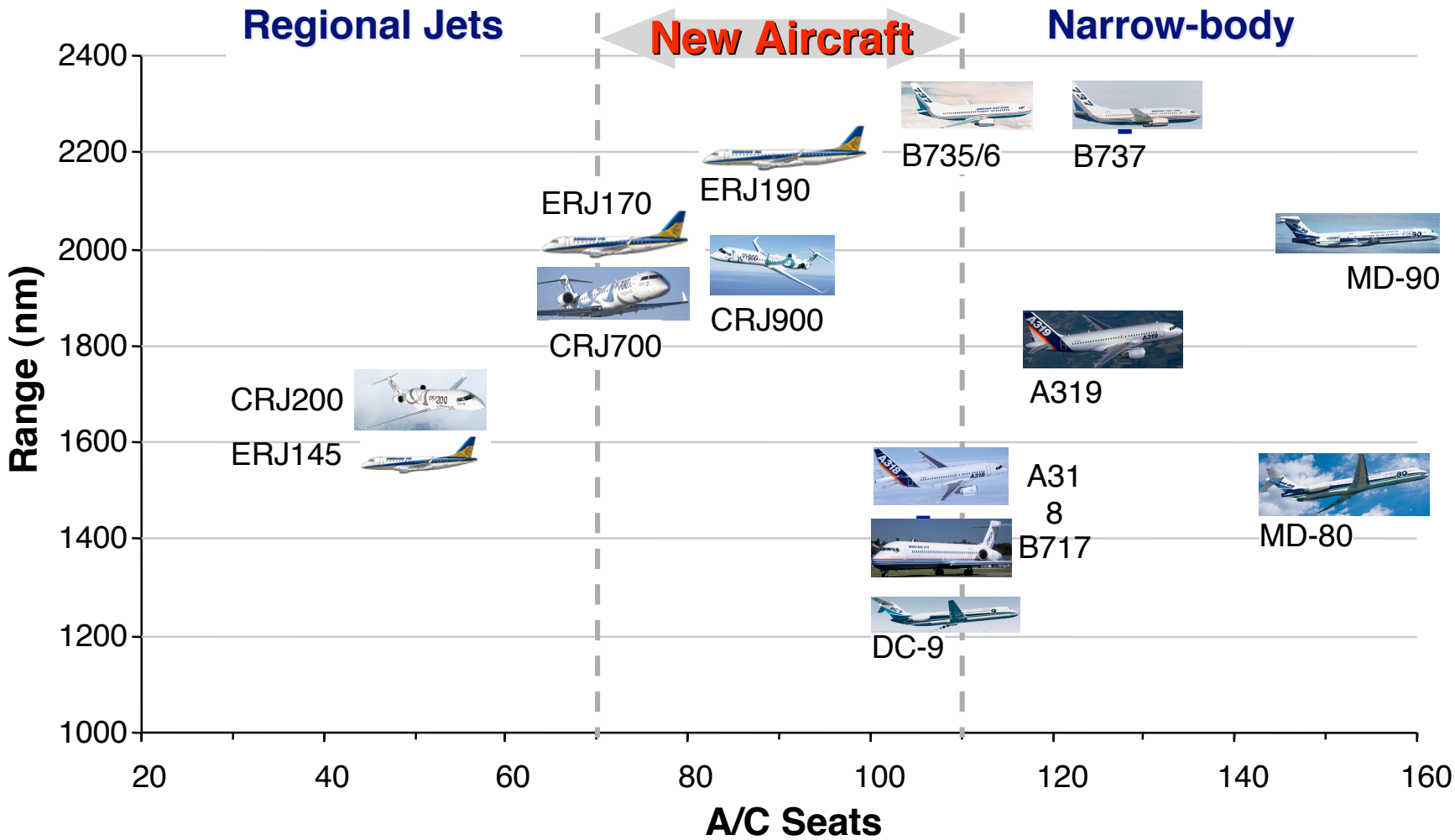
Total Operating Cost per ASM when Pilot Cost/Block Hour is Normalized to $450



Total Operating Cost per Trip when Pilot Cost/Block Hour is Normalized to $450



RJ-NB Boundary Blurred



Source: based on manufactures' a/c specifications. Full pax range of standard version

EMB 170

- **March Deliveries**
  - Lot
  - Alitalia
  - US Airways
- **Orders**
  - US Airways
    - 85

EMB 190

- **First Flight**
  - 3/12/04
- **Orders**
  - Jet Blue
    - 100
  - Air Canada
    - 45

A-380

- **A380 Baseline**
  - ❑ Shrink
  - ❑ Stretch
  - ❑ ER Variants
- **555 passengers (3 class)**
- **14,800km/8,000nm range**
- **Payload: 330,000lbs over 10,400km/5,600nm**
- **Rolls-Royce Trent 900 engines or GP7200 engines**

•http://www.airbus.com/

Boeing 7E7

- 200 pax
- 7800 nm range

- http://www.boeing.com/commercial/7e7/k62790.html

Small Turbofan Passenger Aircraft

Security?

Security?

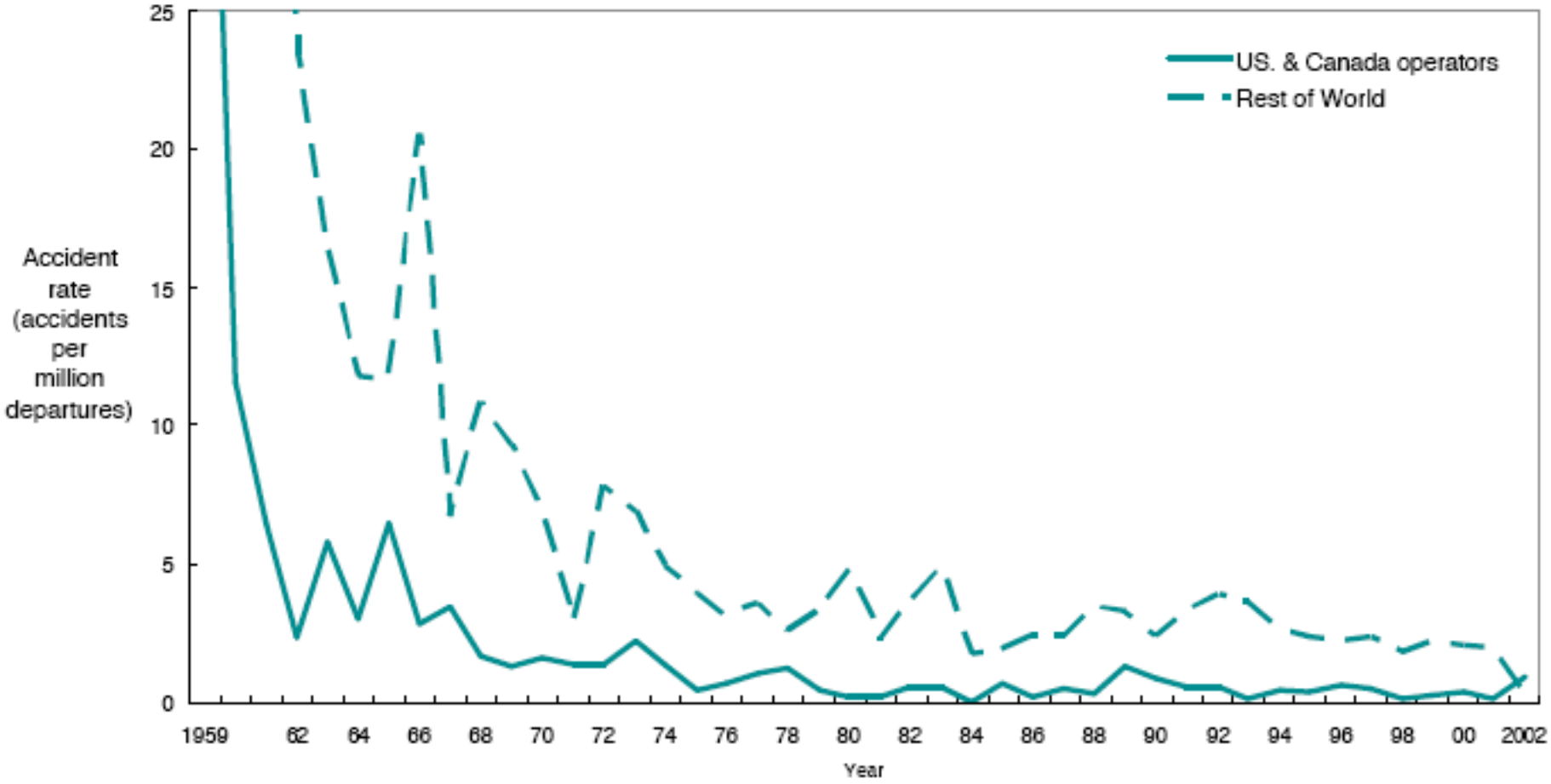
- Air Marshal Leaves Gun in Airport Restroom
  - Mon Apr 12, 2004 10:35 AM ET CHICAGO (Reuters) - A federal air marshal accidentally left her gun in a restroom beyond the security checkpoints at Cleveland Hopkins International Airport…the incident occurred about 4 p.m. on Thursday when the air marshal went to the restroom. While washing her hands, she placed her gun on a shelf, but forgot to take it with her when she left the room. Soon afterward, a passenger found the gun and informed an airline employee, who removed it and told police. The gun later was returned to the marshal.

Immigration

- **US-VISIT System**
  - Photo, Fingerprinting, Biometrics
  - Countries in the Visa Waiver Program: Andorra, Australia, Austria, Belgium, Brunei, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Liechtenstein, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Portugal, San Marino, Singapore, Slovenia, Spain, Sweden, Switzerland and the United Kingdom
- **Parity Programs**
  - Brazil, China

Safety Trend

Hull Loss and/or Fatal accidents - Worldwide Commercial Jet Fleet - 1959 through 2002



Source: Boeing 2001 Statistical Abstract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