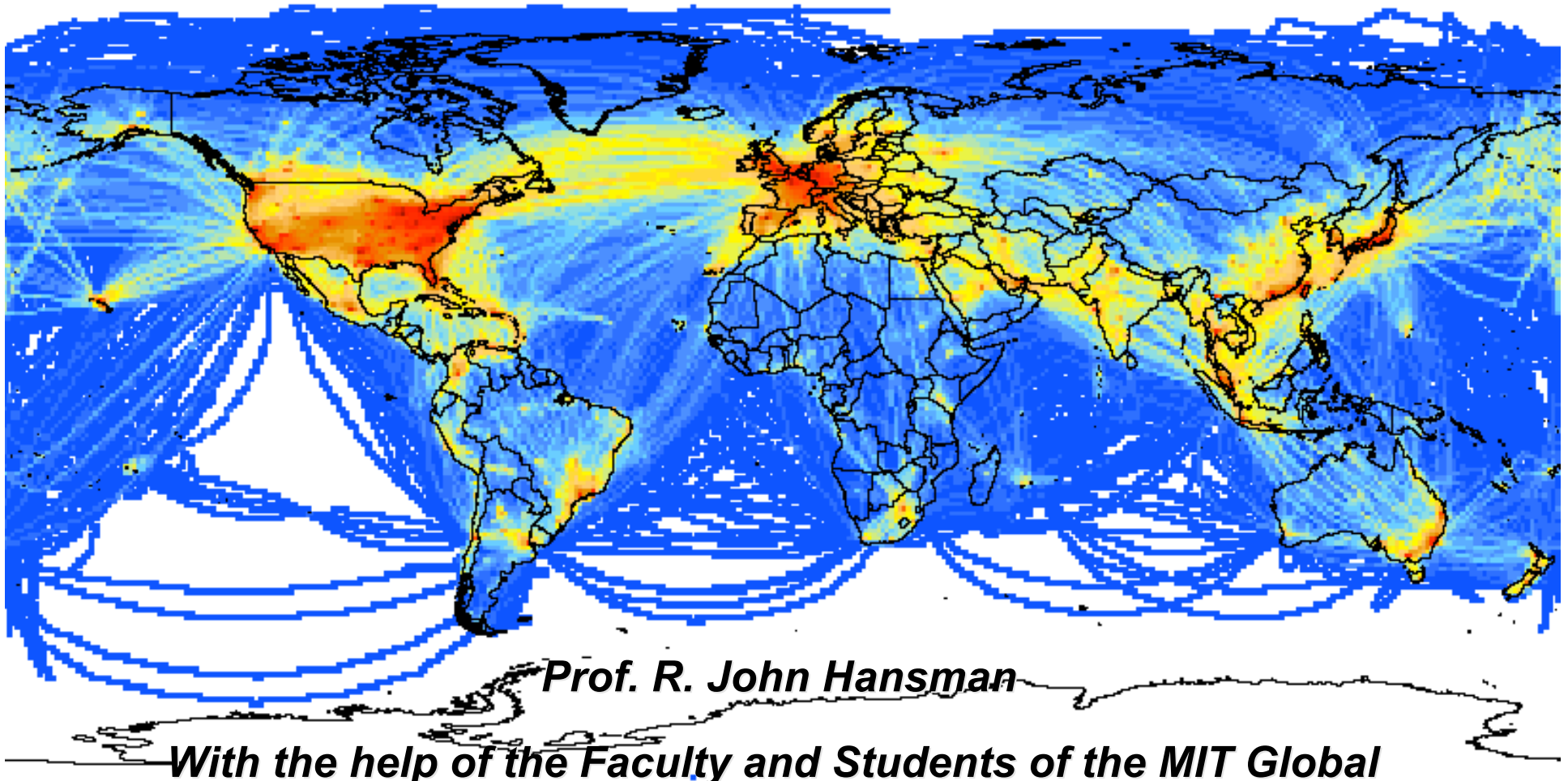




Overview of Recent Forces & Trends in the Airline Industry

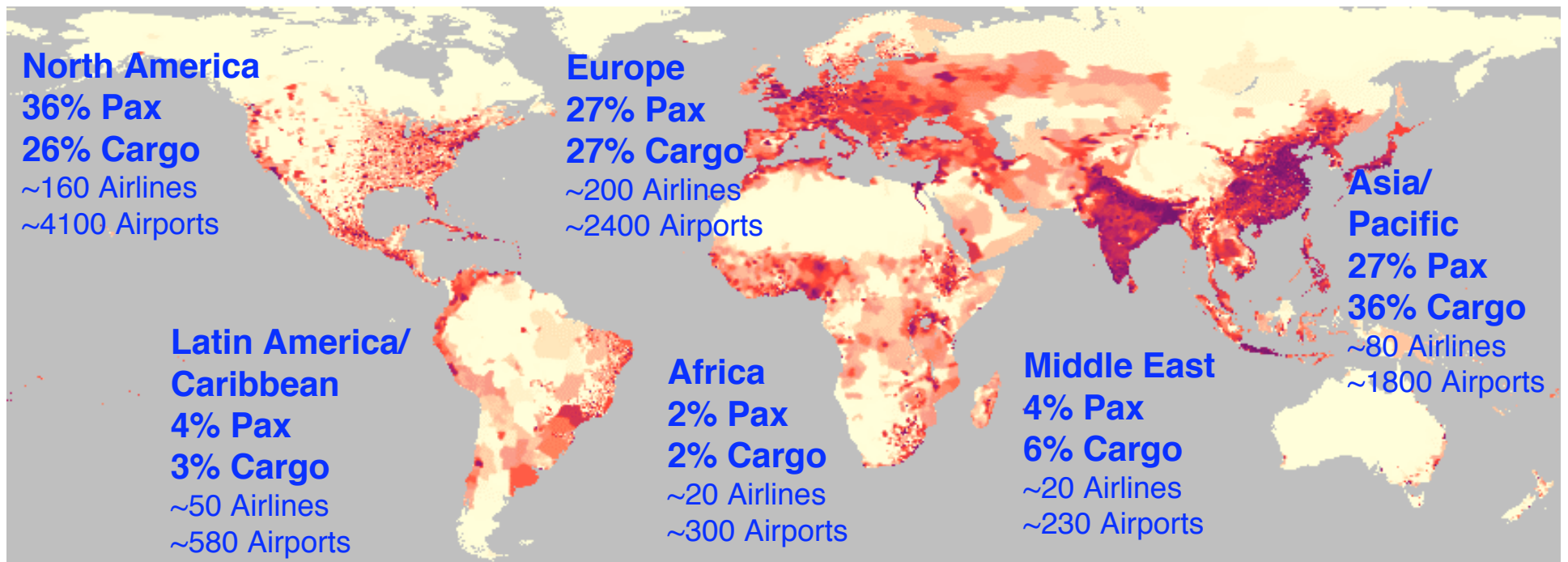


Prof. R. John Hansman

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



World Population Distribution & 2004 Air Transportation Activity



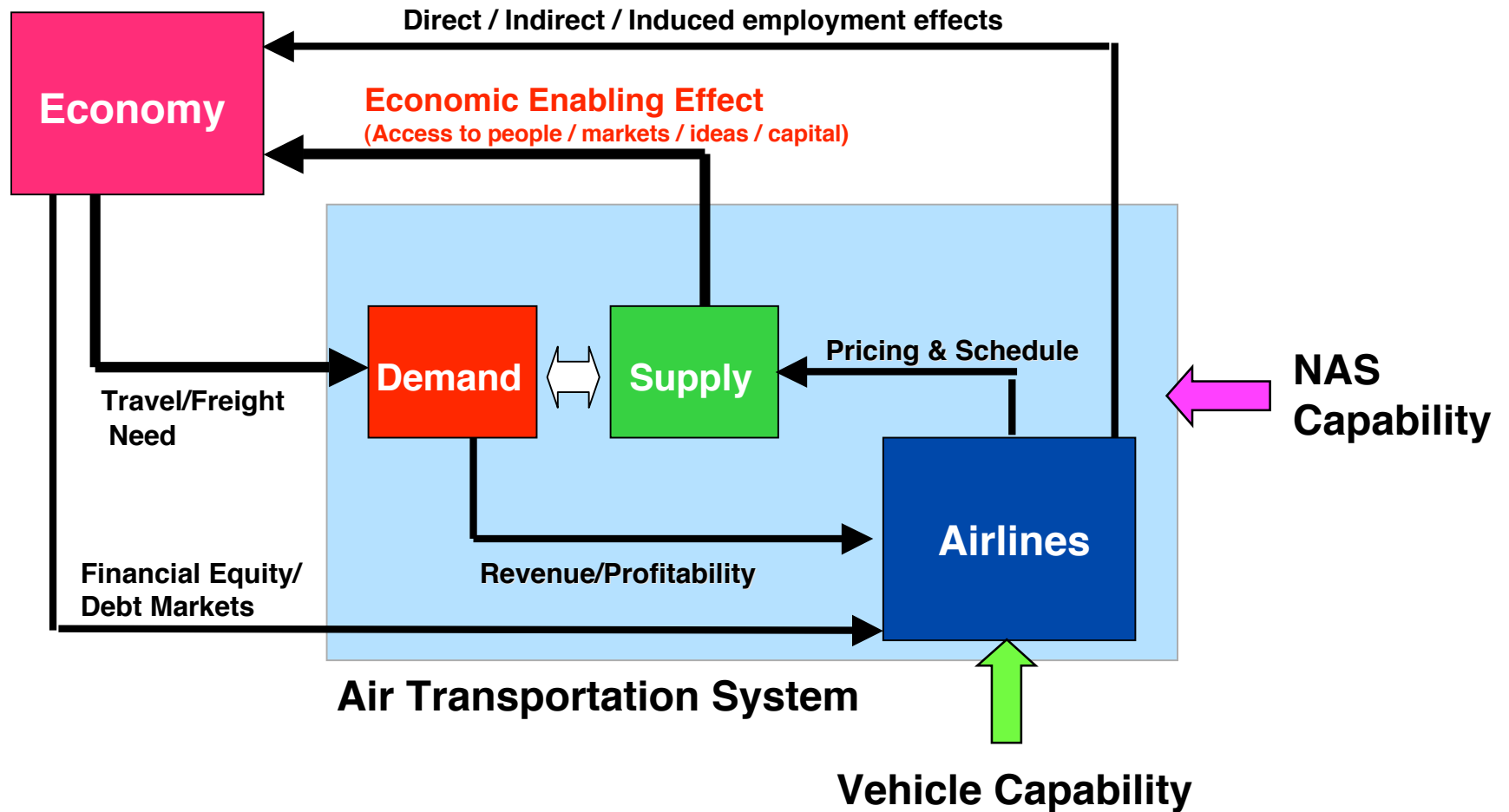
Data source: Population: [URL:<http://www.ciesin.org/datasets/gpw/globldem.doc.html>]

Air Transport: ICAO, R. Schild/Airbus

Passenger and freight traffic represent RPK and FTK share in 2004

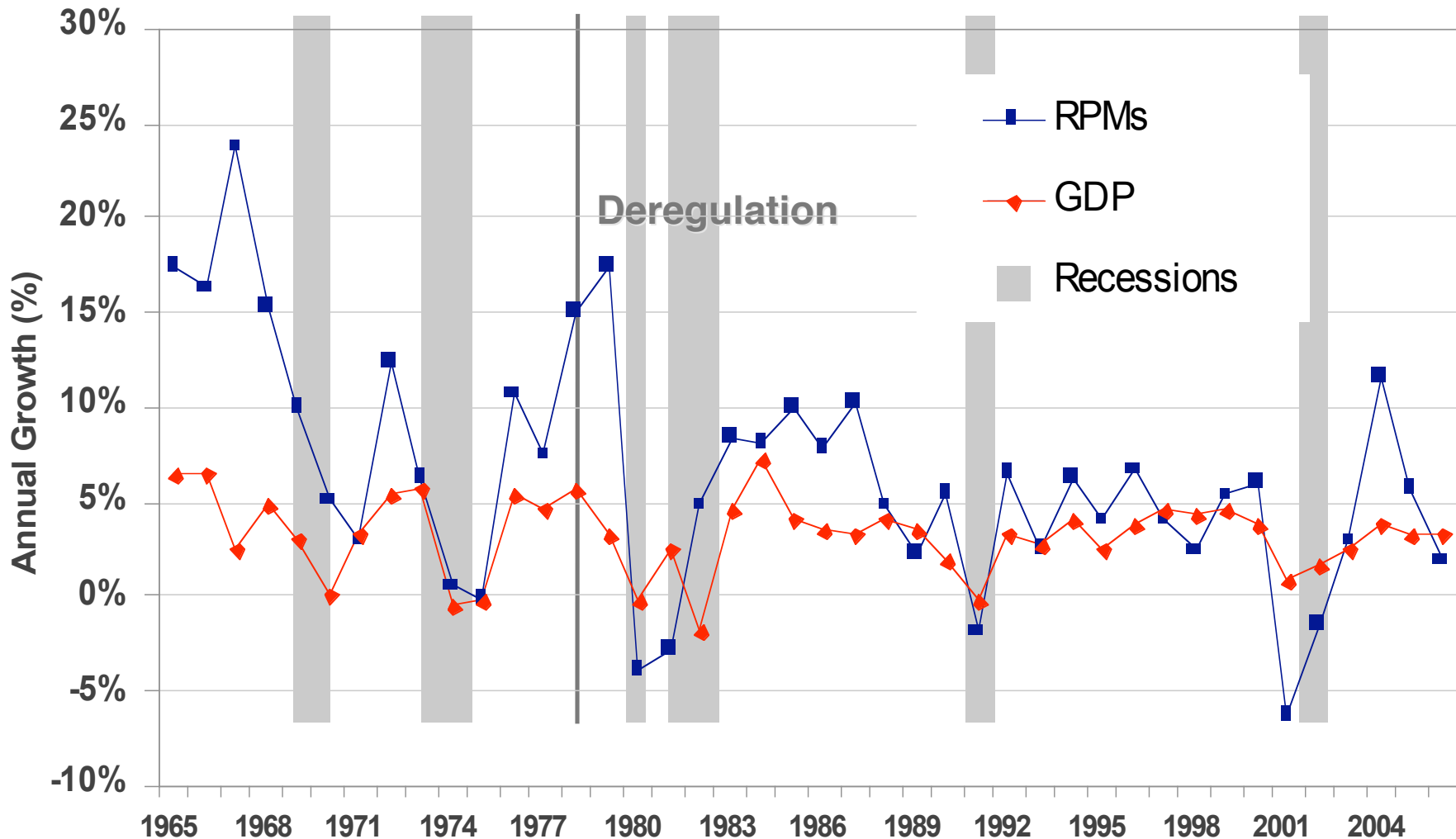


Relationship Between Economy and Air Transportation





Correlation Between US GDP and Passenger Traffic



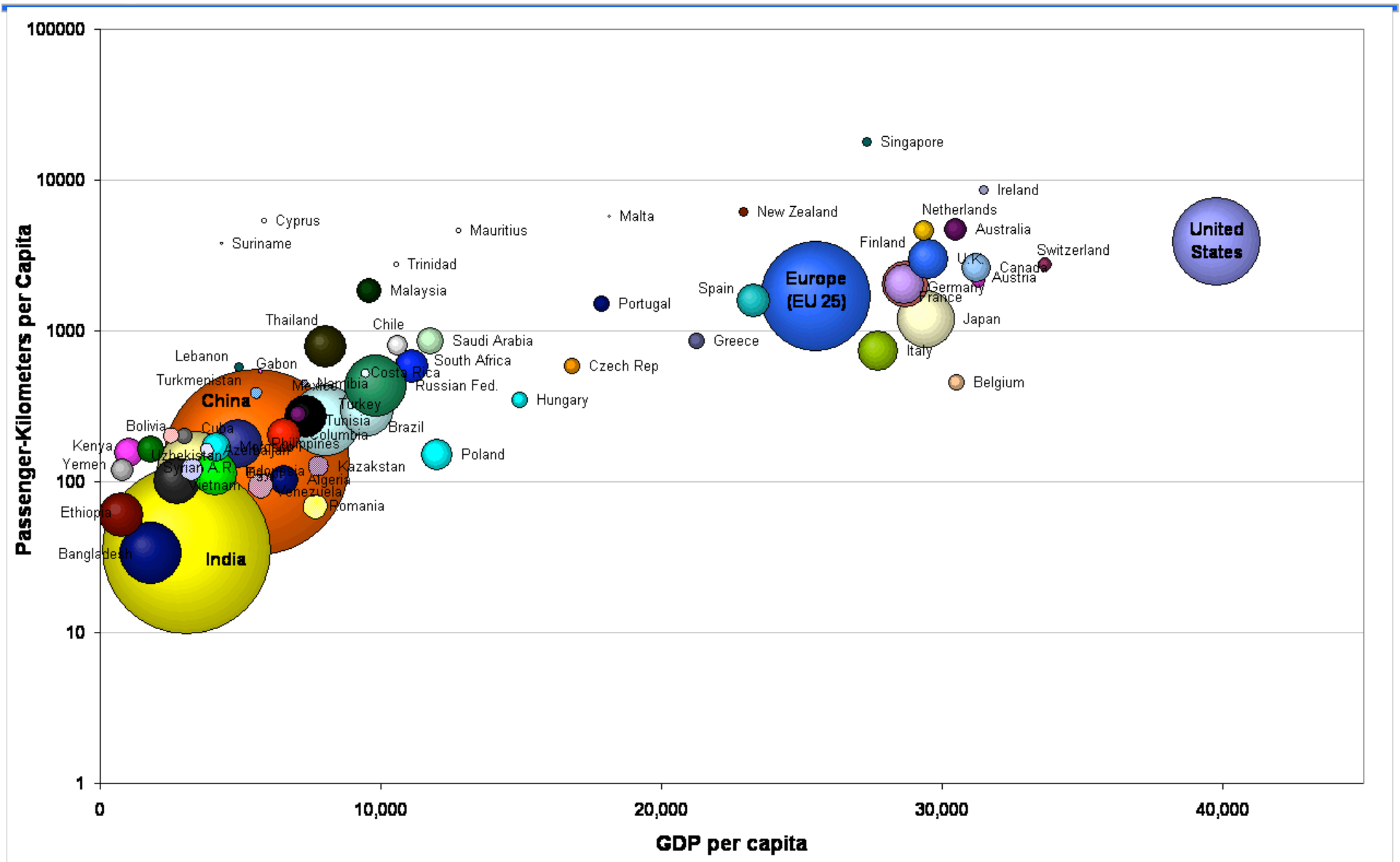
Data source: RPMs: Bureau of Transportation Statistics, (BTS)

GDP: US Bureau of Economic Analysis

Recession data: National Bureau of Economic Research



Air Transportation Markets 2004 Data





Key Forces

- **Travel Demand**
- **Market Expectations**
- **Competition**
- **Equity Markets - Cyclic Industry**
- **Capacity Limitations**
- **Fuel**
- **Labor**
- **Regulatory**
- **Environmental**
- **Information Technology**
- **Media**
- **Equity Markets**
- **Security Requirements**



Market Expectations

- **Safety/Security**
- **Service**
 - Schedule
 - Price
 - Frequent flyer / loyalty programs
 - Reliability
 - On-time performance
 - Service



Trend Time Scales

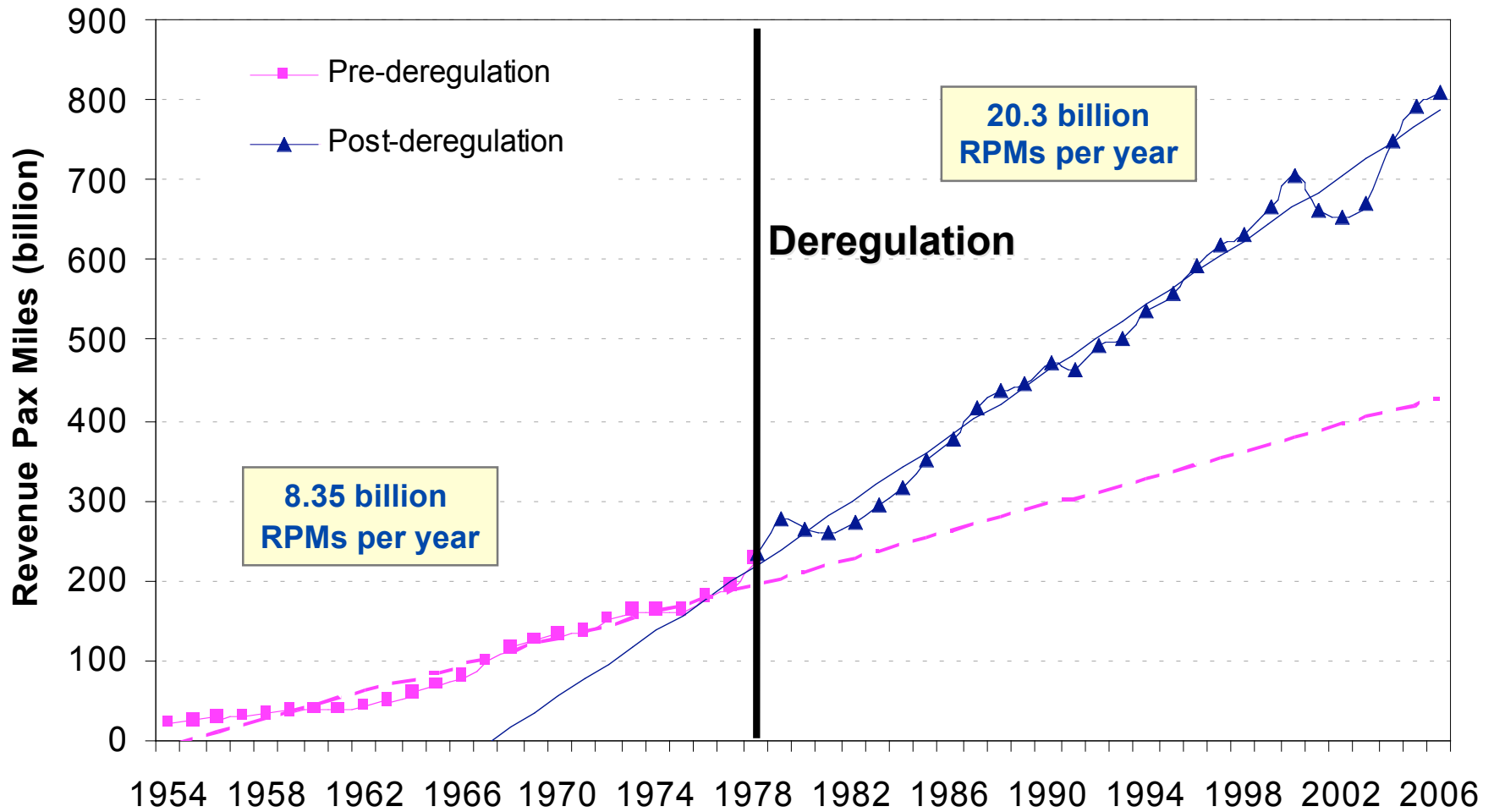
- **Long Term Macro Trends**
 - Since Deregulation (1978)

- **Medium Term Trends**
 - Since September 11, 2001



US Passenger Growth Trends Effect of De-Regulation

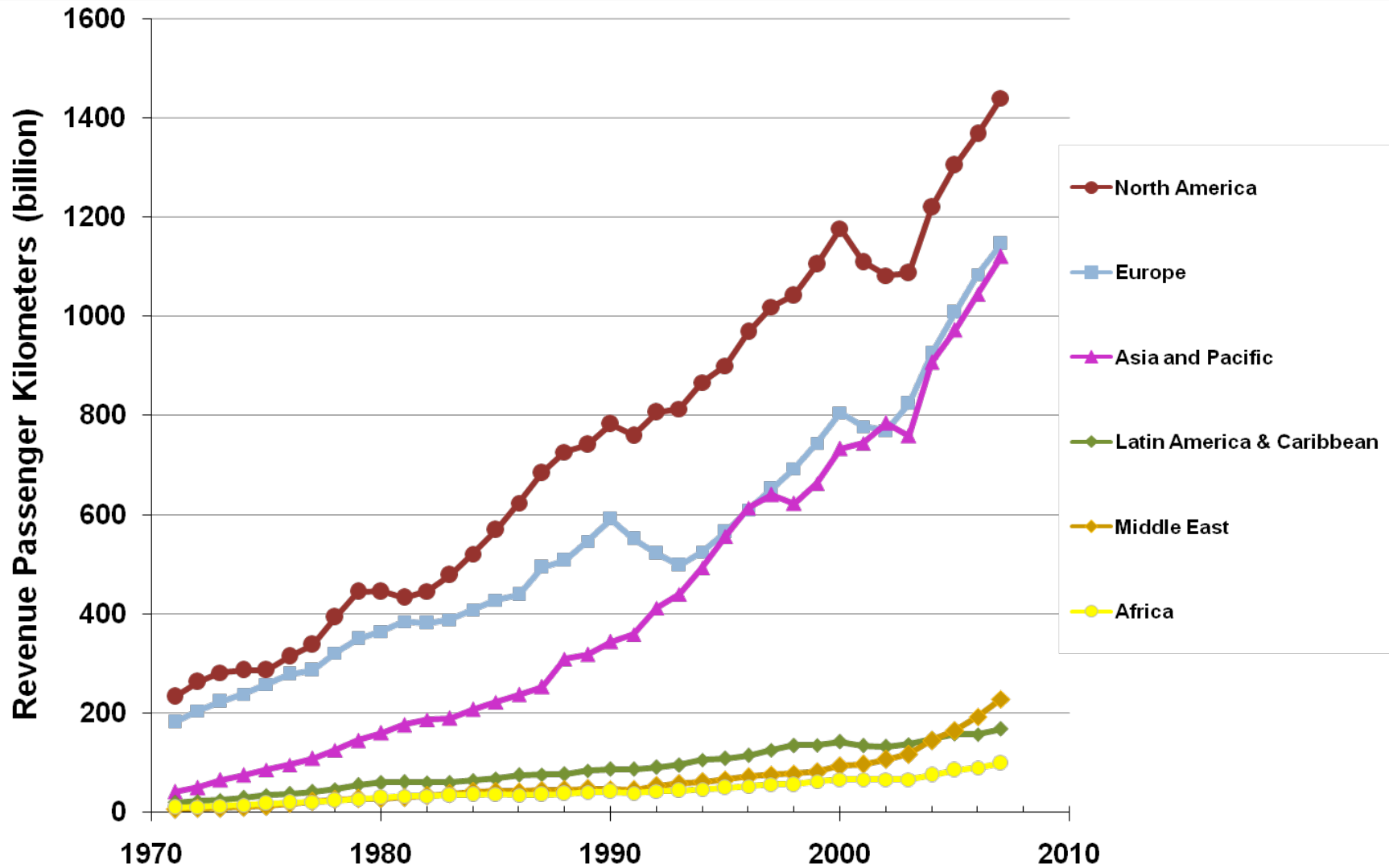
Scheduled Revenue Passenger Miles in US



Data source: Bureau of Transportation Statistics



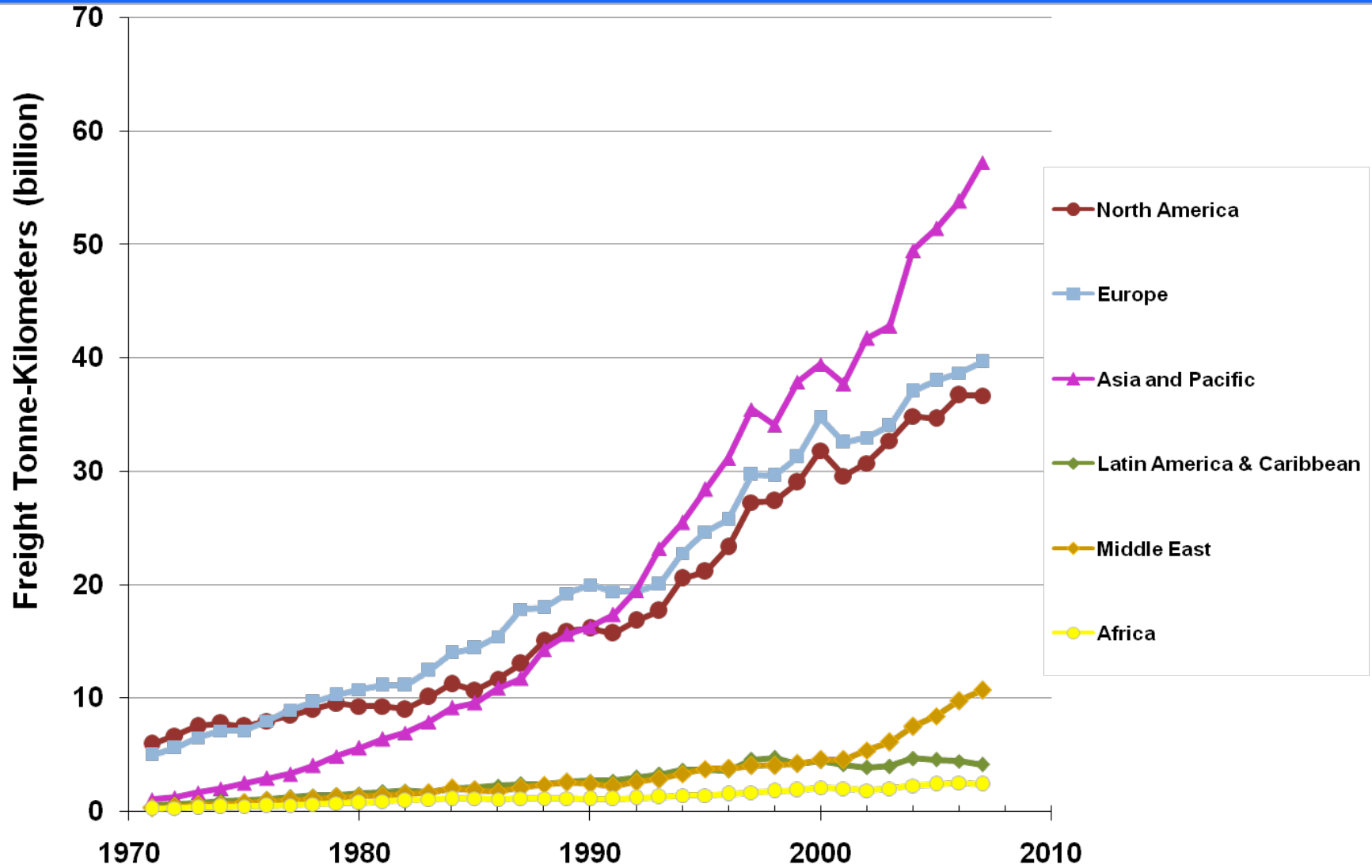
Passenger Traffic Trends (RPK) by World Region



Data source: ICAO, scheduled services of commercial air carriers (through 2006), IATA annual traffic growth data for year 2007 (Jan-Oct)



Freight Trends (FTK) by World Region



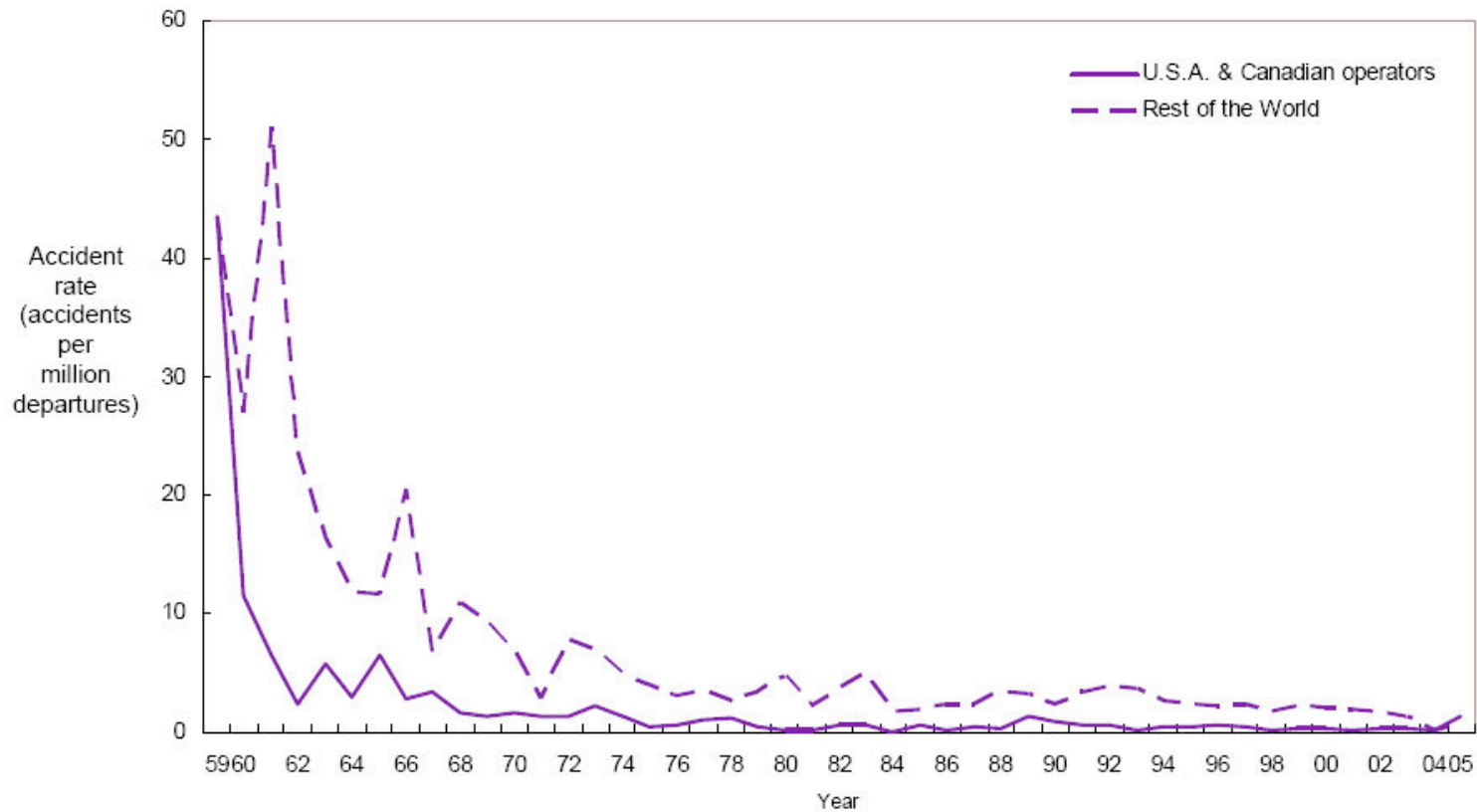
Data source: ICAO, scheduled services of commercial air carriers (through 2006), IATA annual traffic growth data for year 2007 (Jan-Oct)



Safety Trend

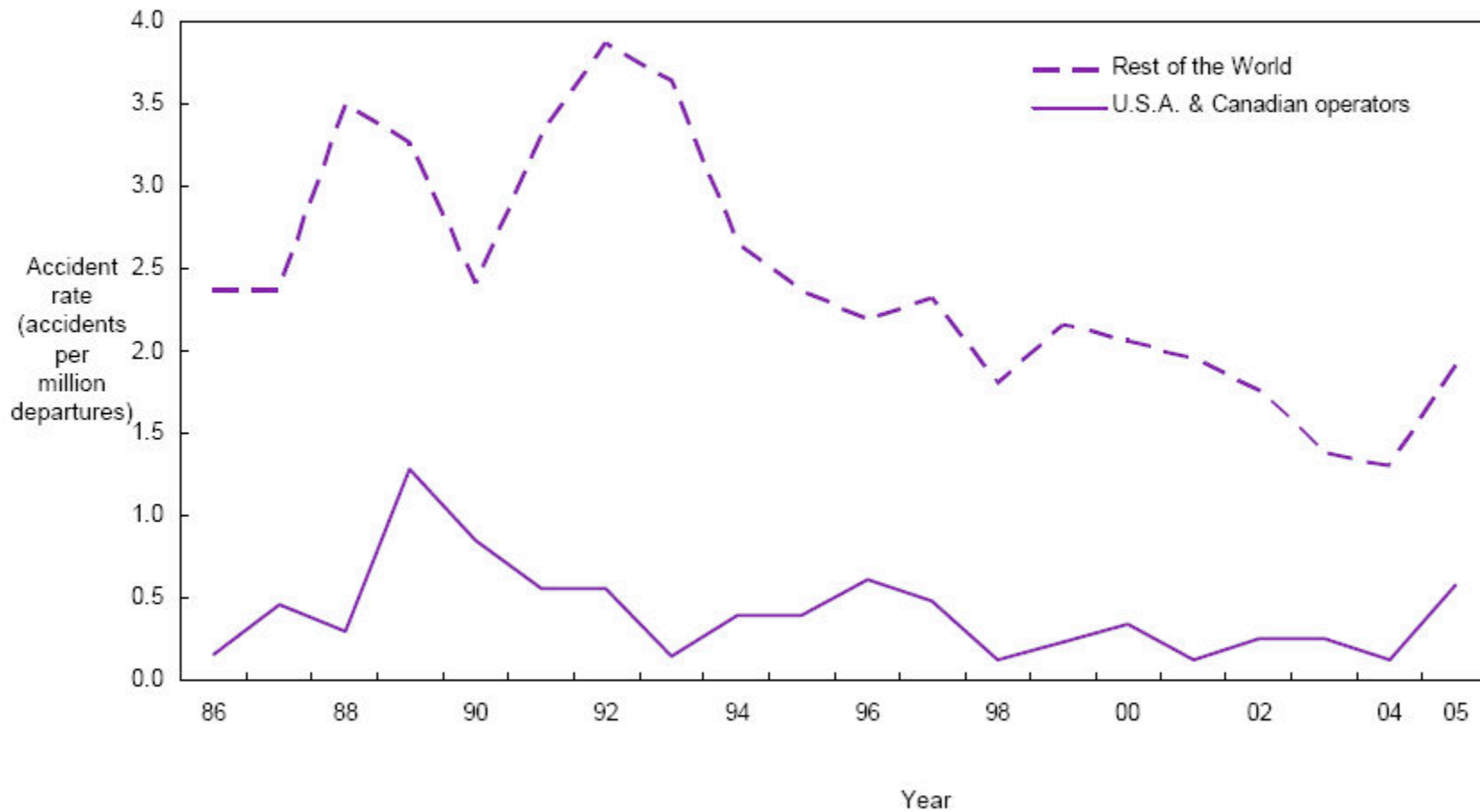
U.S.A. and Canadian Operators Accident Rates

Hull Loss and/or Fatal accidents – Worldwide Commercial Jet Fleet – 1959 through 2005



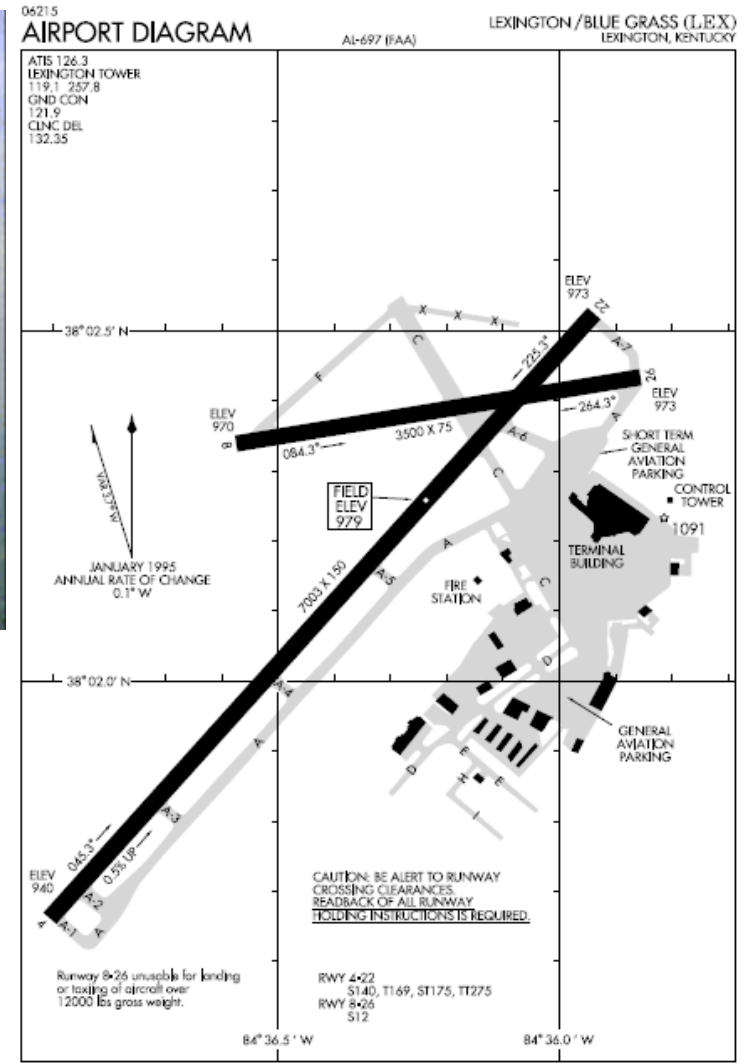
U.S.A and Canadian Operators Accident Rates

Hull Loss and/or Fatal accidents – Worldwide Commercial Jet Fleet – 1986 through 2005





Comair Accident 27 - Aug - 2006



AIRPORT DIAGRAM LEXINGTON, KENTUCKY
0921.5 LEXINGTON /BLUE GRASS (L,EX)



Sao Paulo Runway Overrun

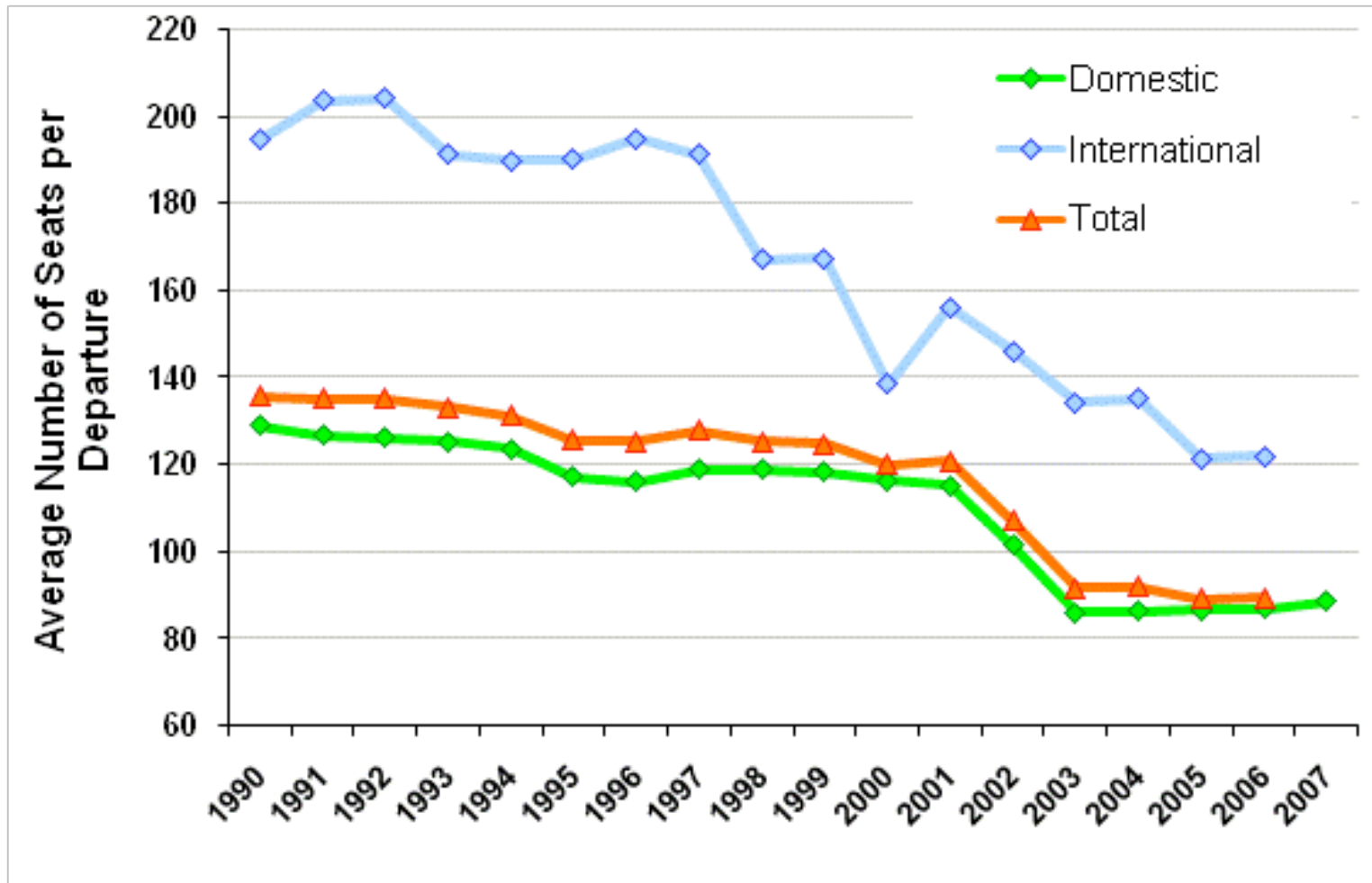
17 Jul 2007



Source: Intl Herald Tribune



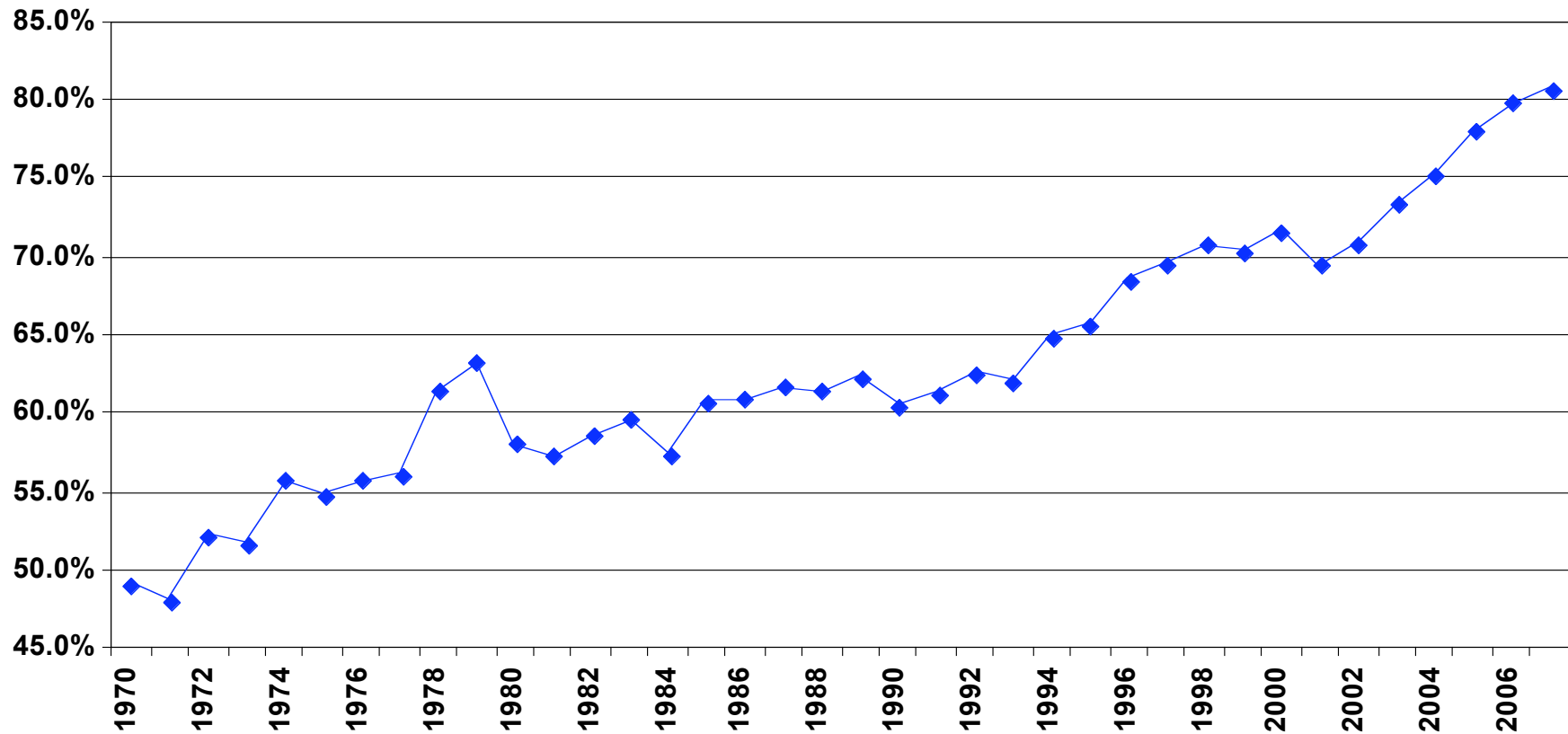
Trends in Aircraft Size



Data source: Form 41 Traffic data from Bureau of Transportation Statistics (US carriers)



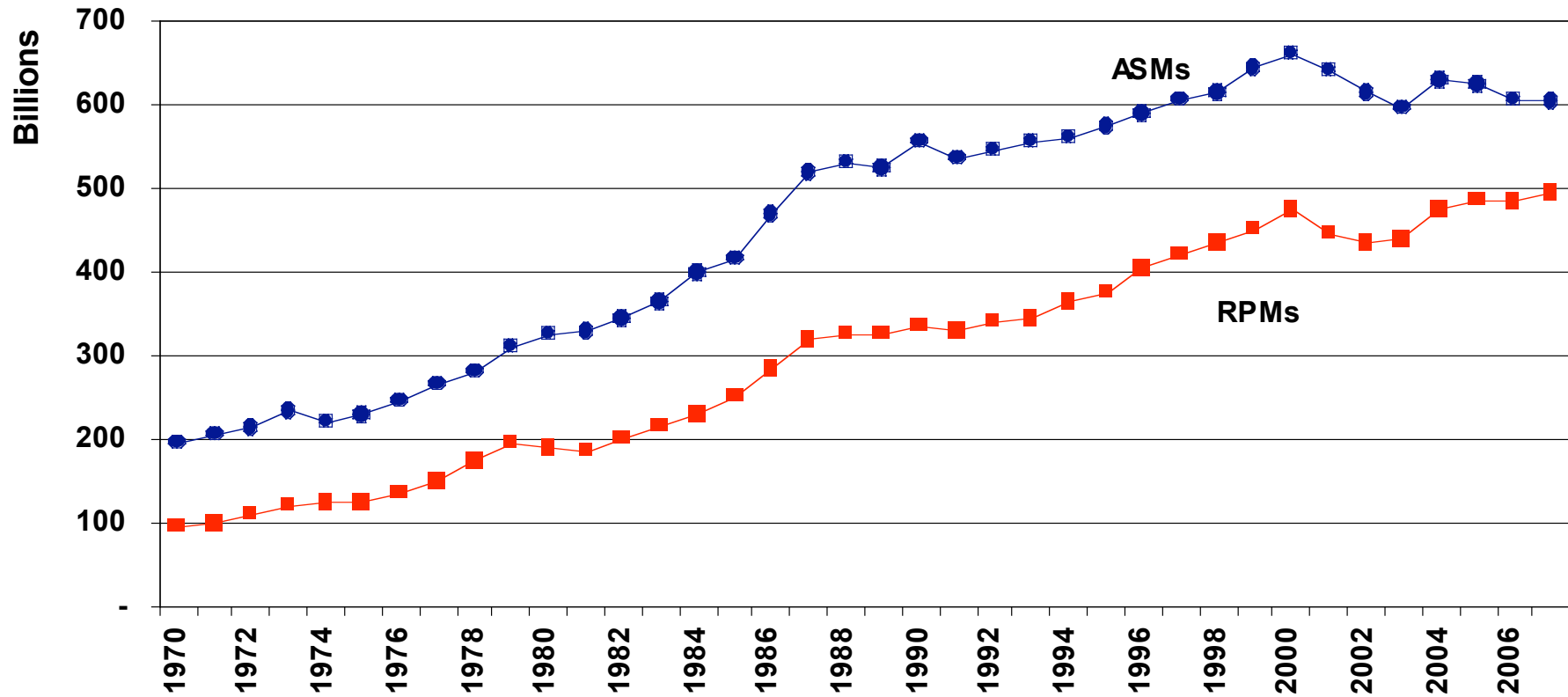
U.S. Domestic Average Load Factor



Data source: ATA, US member airlines, scheduled mainline service



U.S. Domestic ASMs and RPMs

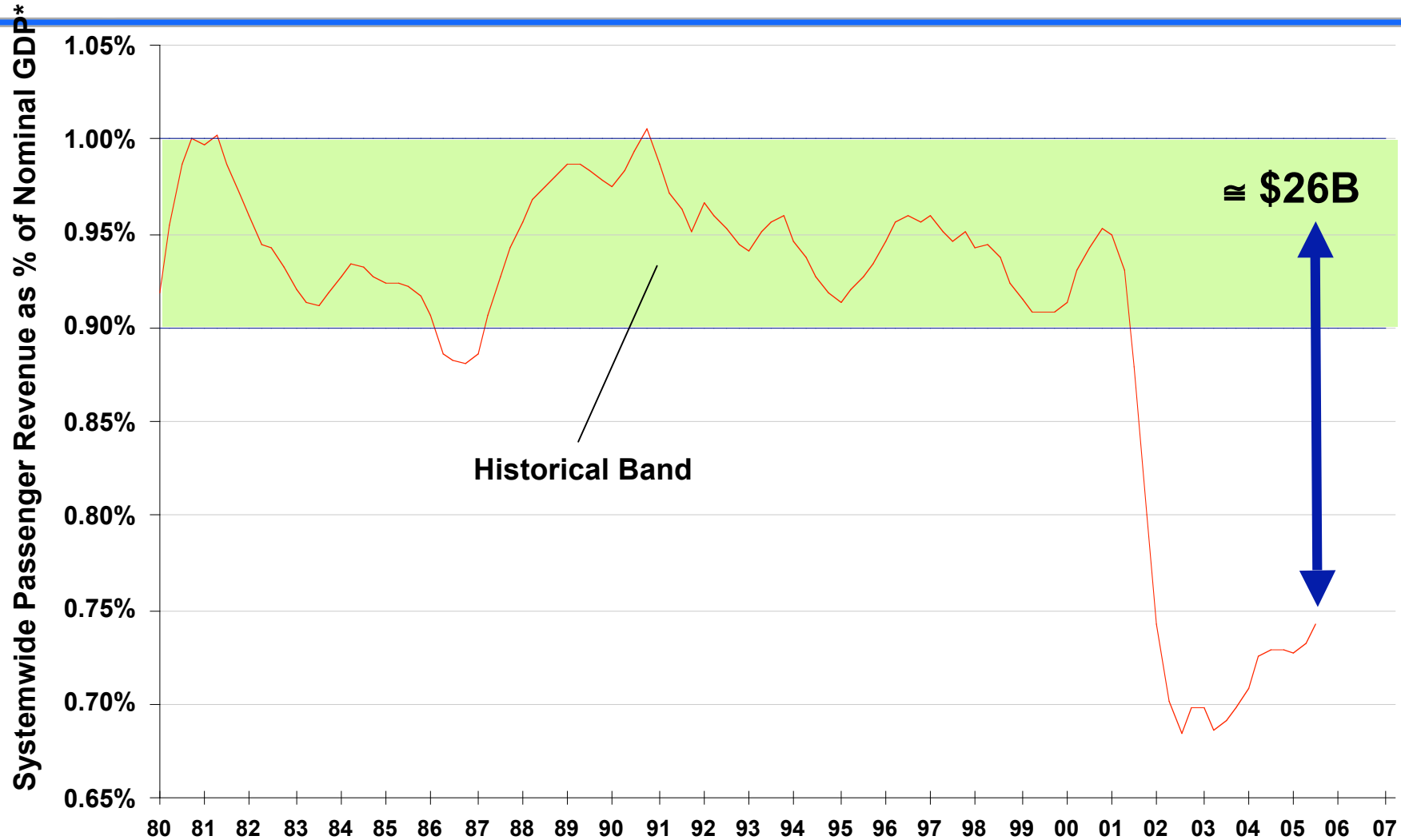


Data source: ATA, US member airlines, scheduled mainline service



Spending on Air Travel Has Fallen as % of U.S. Economy

Recent Quarters' Modest Recovery Still \$26B Short of Historical Norm



*Four-quarter rolling passenger revenue derived from government filings of passenger airlines whose annual operating revenues exceed \$100 billion

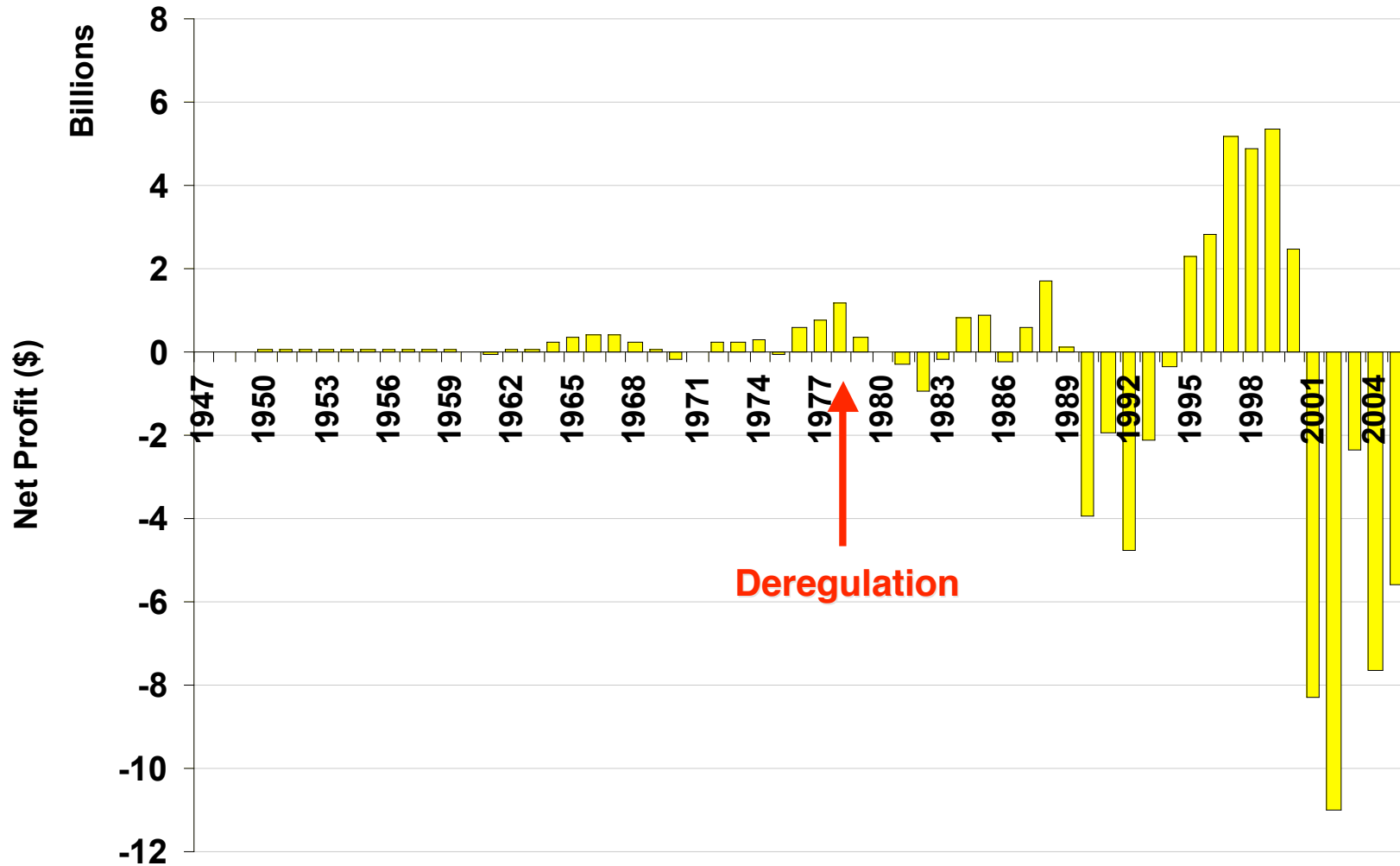
Sources: ATA Airline Cost Index; Bureau of Economic Analysis; U.S. Department of Transportation

Data source: ATA.



Macro Scale Drivers US Airline Net Profit

Cyclic Industry with Exponential Growth In Volatility Since Deregulation

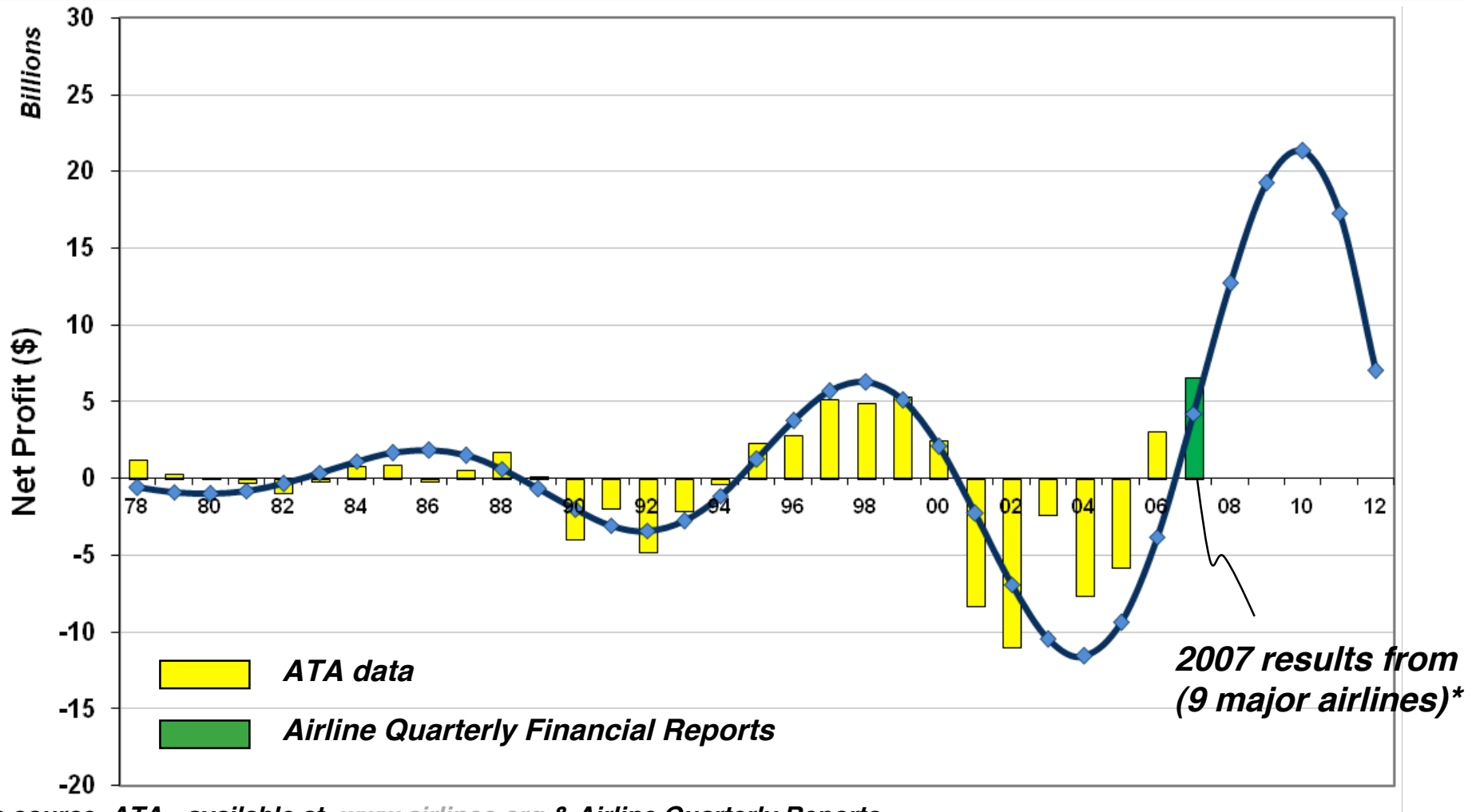


Data source: ATA Annual Revenue and Earnings - Net Profit and Loss



US Airlines Net Profit

Best Fit of Undamped Oscillation
 Cycle Period = 11.3 yr eFolding Time = 7.9 yr



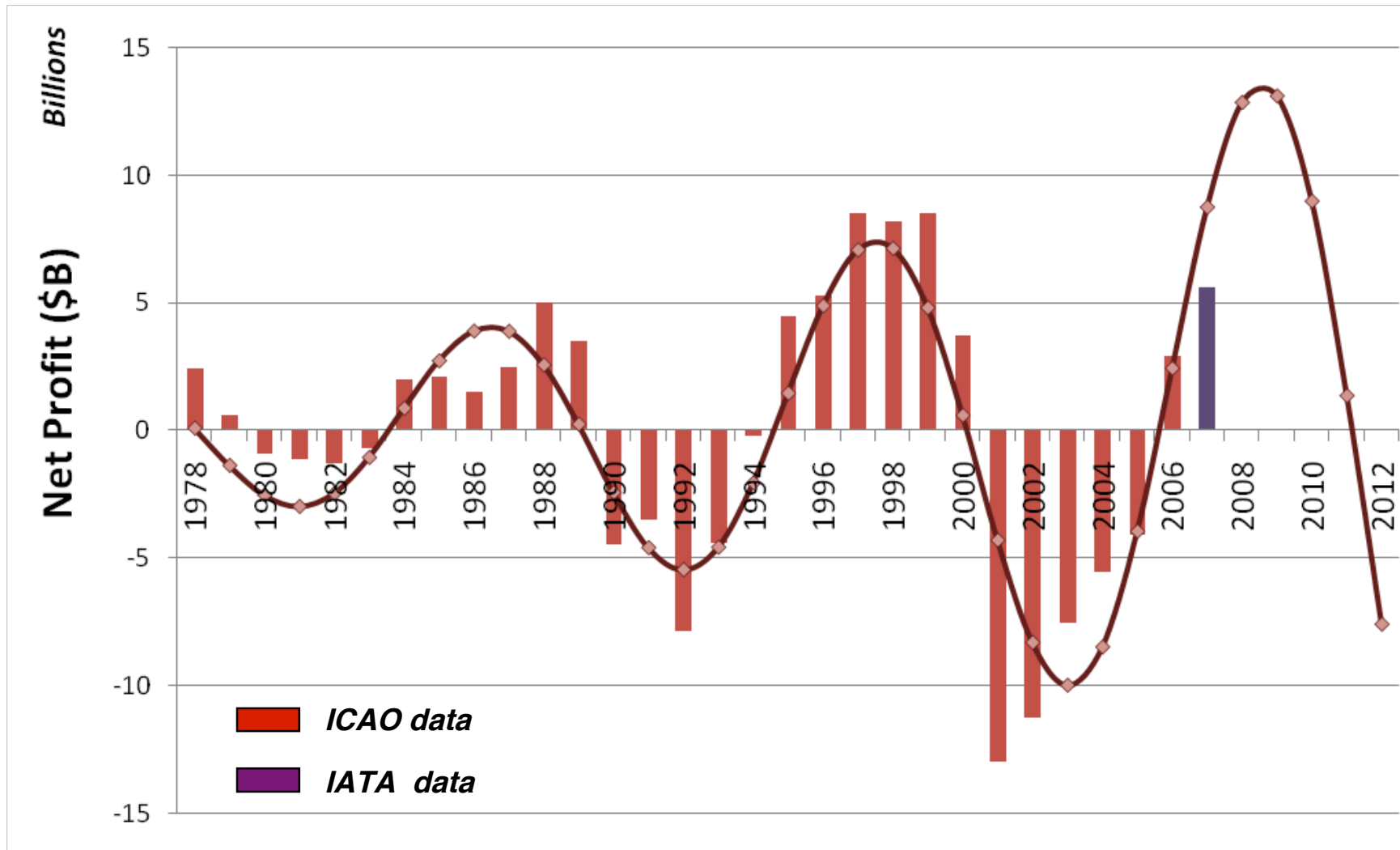
Data source: ATA - available at: www.airlines.org & Airline Quarterly Reports

*Note: Airlines; American Airlines, United Air Lines, Delta Air Lines, Northwest Airlines, Continental Airlines, US Airways, Southwest Airlines, JetBlue Airways, Alaska Airlines,
 Excludes; Continental airlines 2007 Q4 results, Includes: Delta Airlines & Northwest Airlines Q2 2007 reorganization items.



World Airlines Net Profit

historical data between 1978 to 2007 –
with projection to 2012



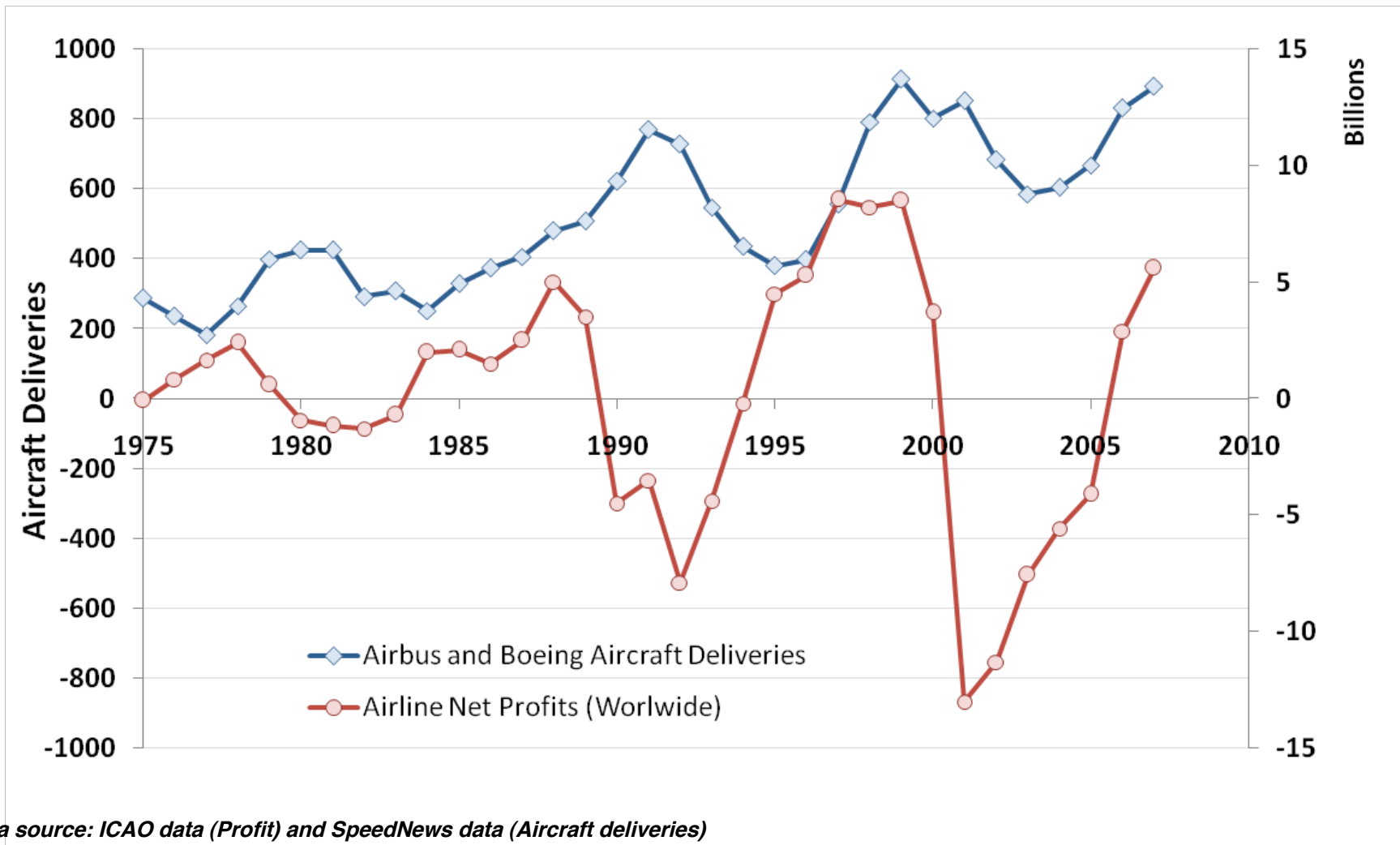
Data source: ICAO data (1978 to 2006) and IATA (2007)

Note: IATA represents 250 airlines comprising 94% of the international scheduled air traffic



Net Profit and Aircraft Deliveries

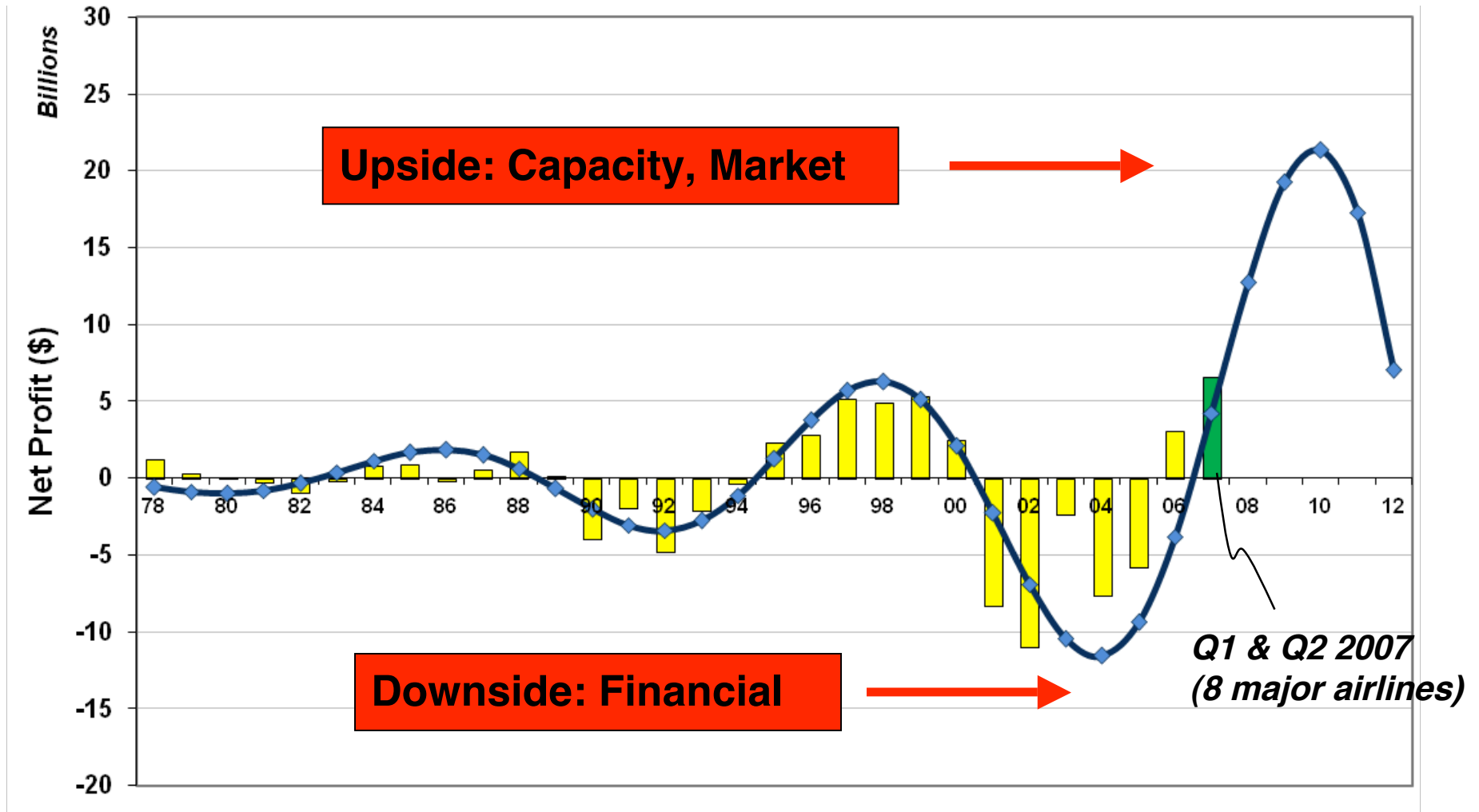
Hypothesize that instability driven by capacity response phase lag



Data source: ICAO data (Profit) and SpeedNews data (Aircraft deliveries)



Growth Limits Constraints vs Damping



Data source: ATA - available at: www.airlines.org & Airline Quarterly Reports

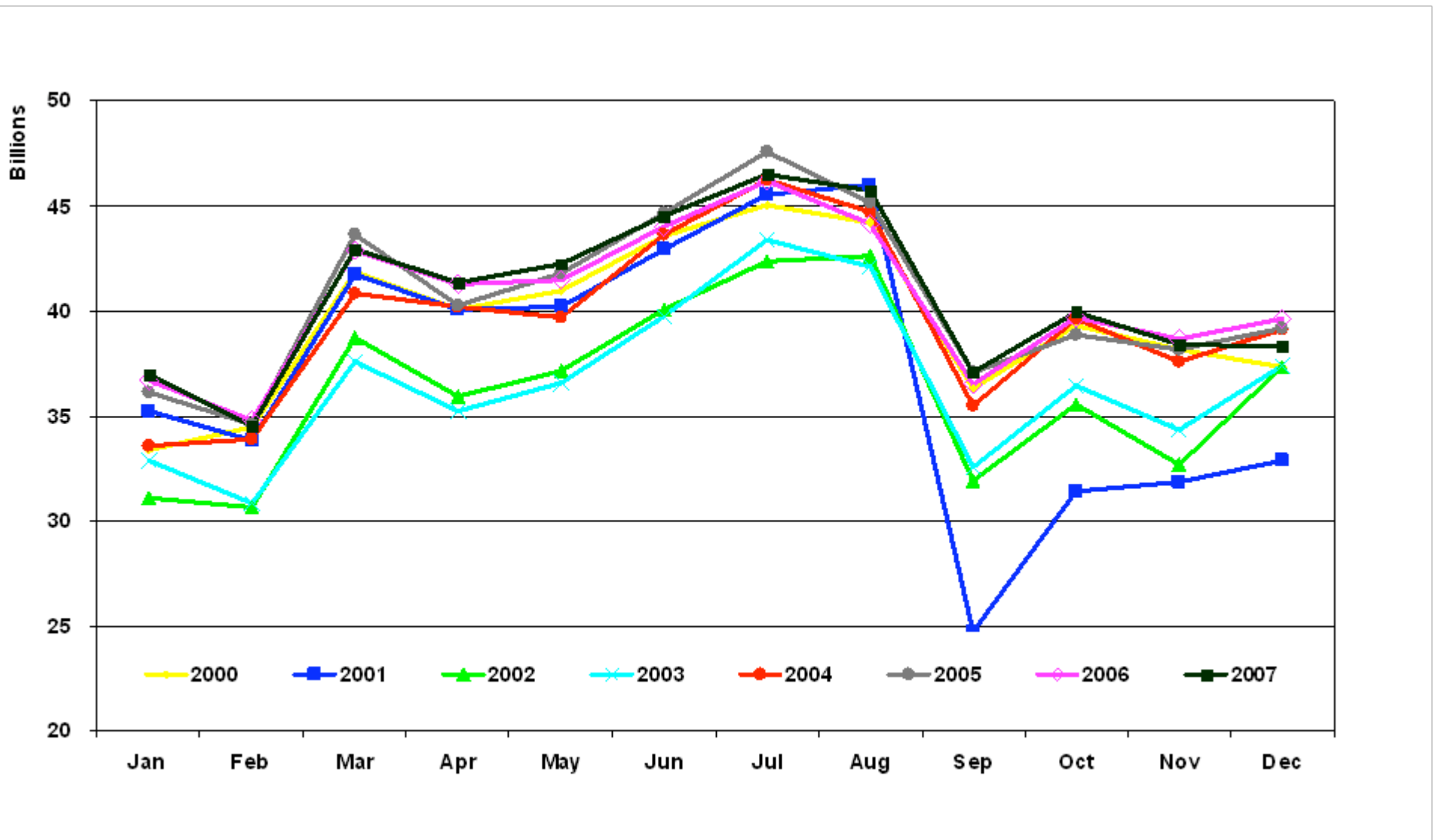


Medium Term Trends

- **Trends since Sept 11**
- **Economic Down Cycle**
- **Recovering**
- **Fuel Costs**
- **IT Effects**
- **Low Cost Carrier Envy**
- **Bankruptcies**
- **Labor Reductions and Givebacks**



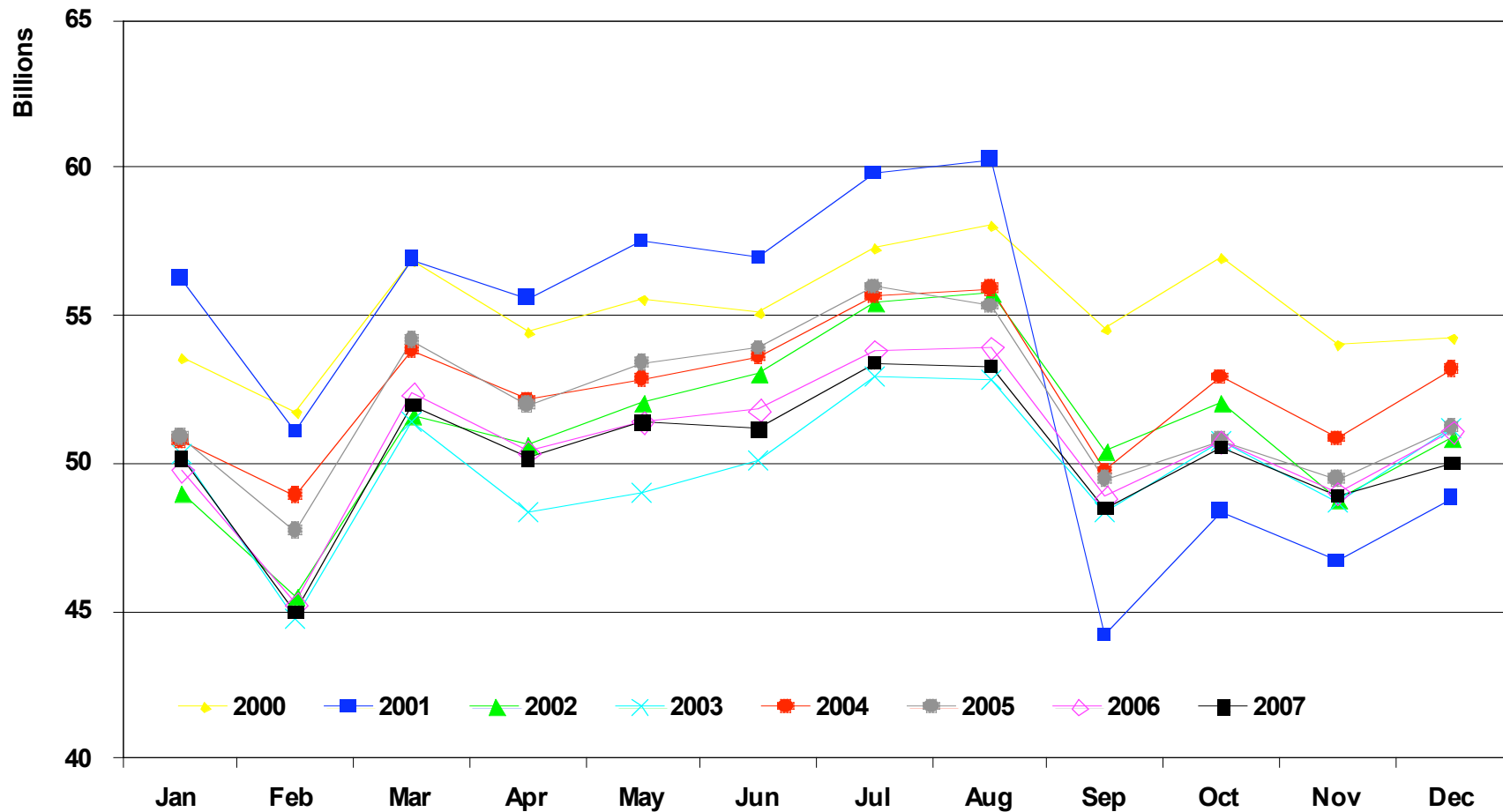
U.S. Domestic RPMs



Data source: ATA, US member airlines, scheduled mainline service



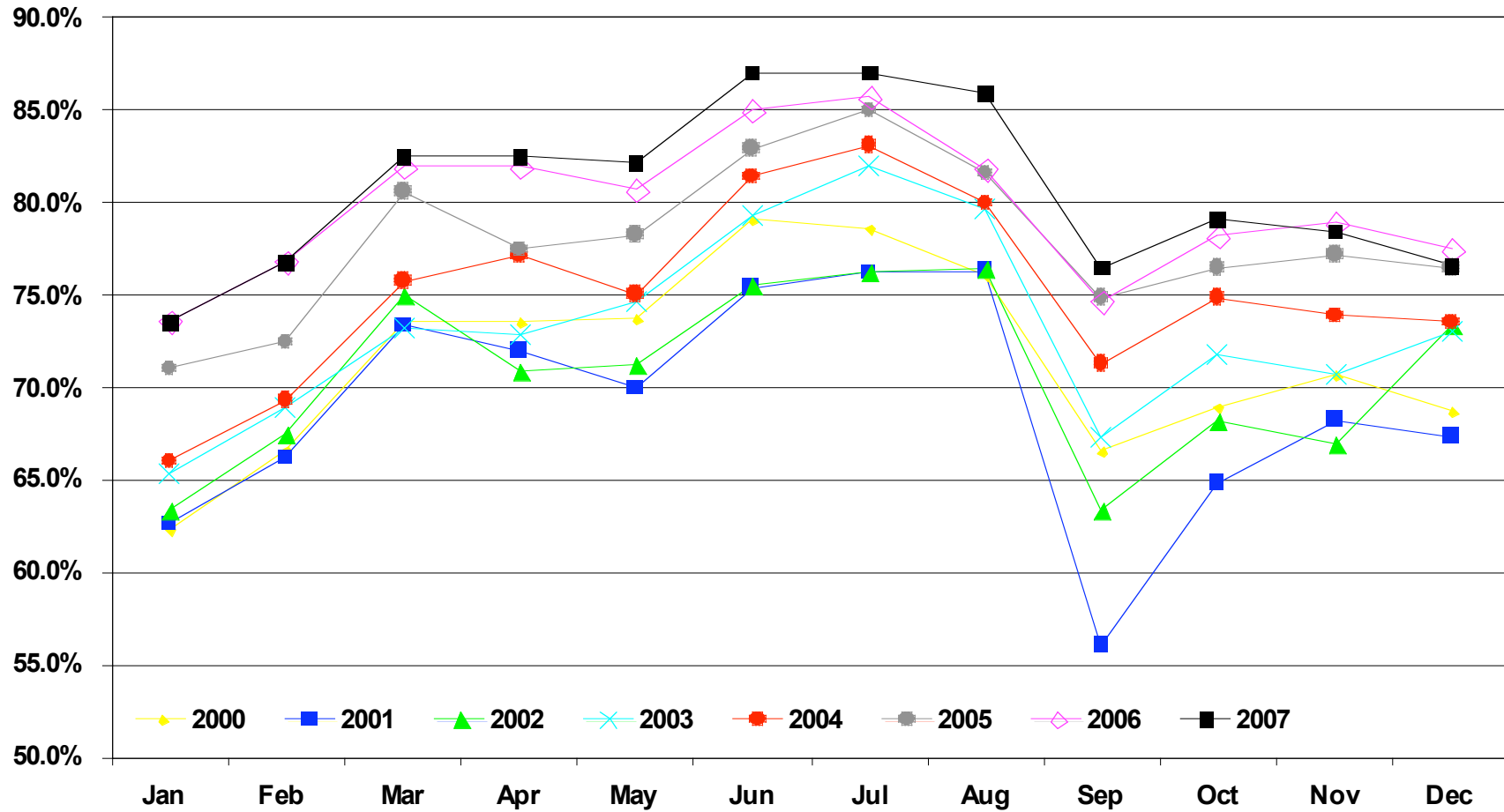
U.S. Domestic ASMs



Data source: ATA, US member airlines, scheduled mainline service



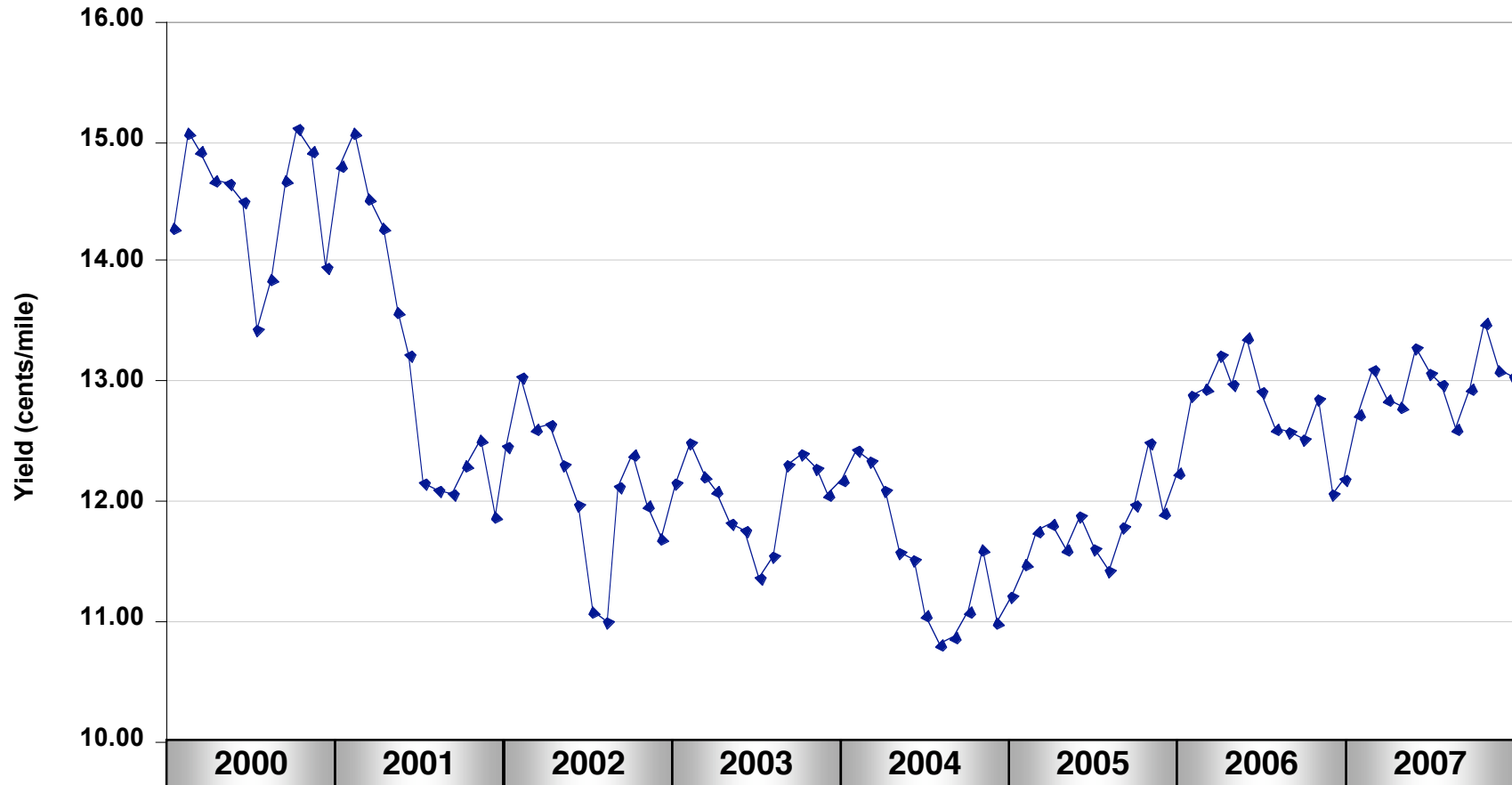
U.S. Domestic Load Factors



Data source: ATA, US member airlines, scheduled mainline service



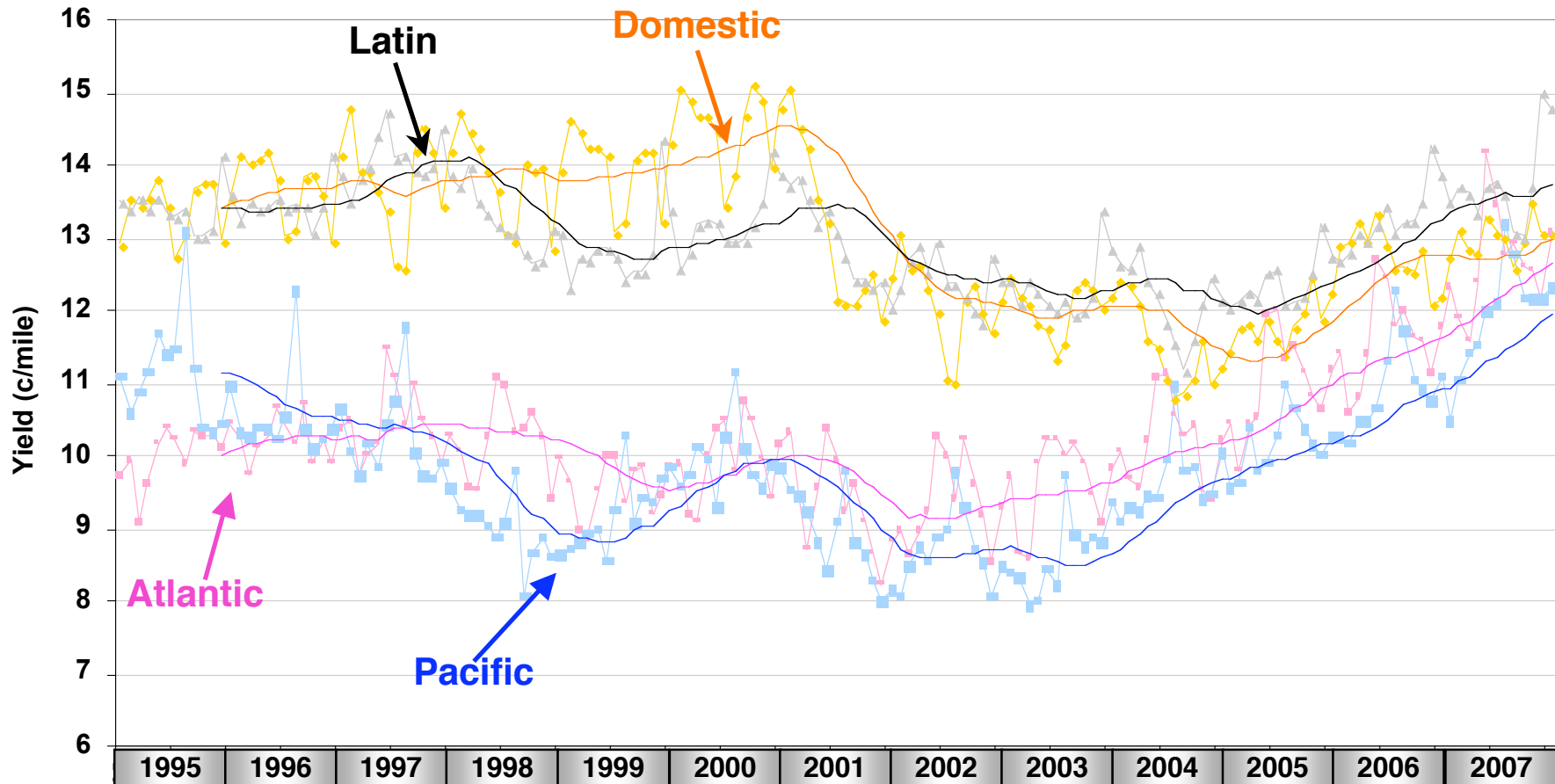
U.S. Average Domestic Yield



Data source: ATA Monthly Passenger Revenue Report, 7 US major airlines excluding Southwest (WN).



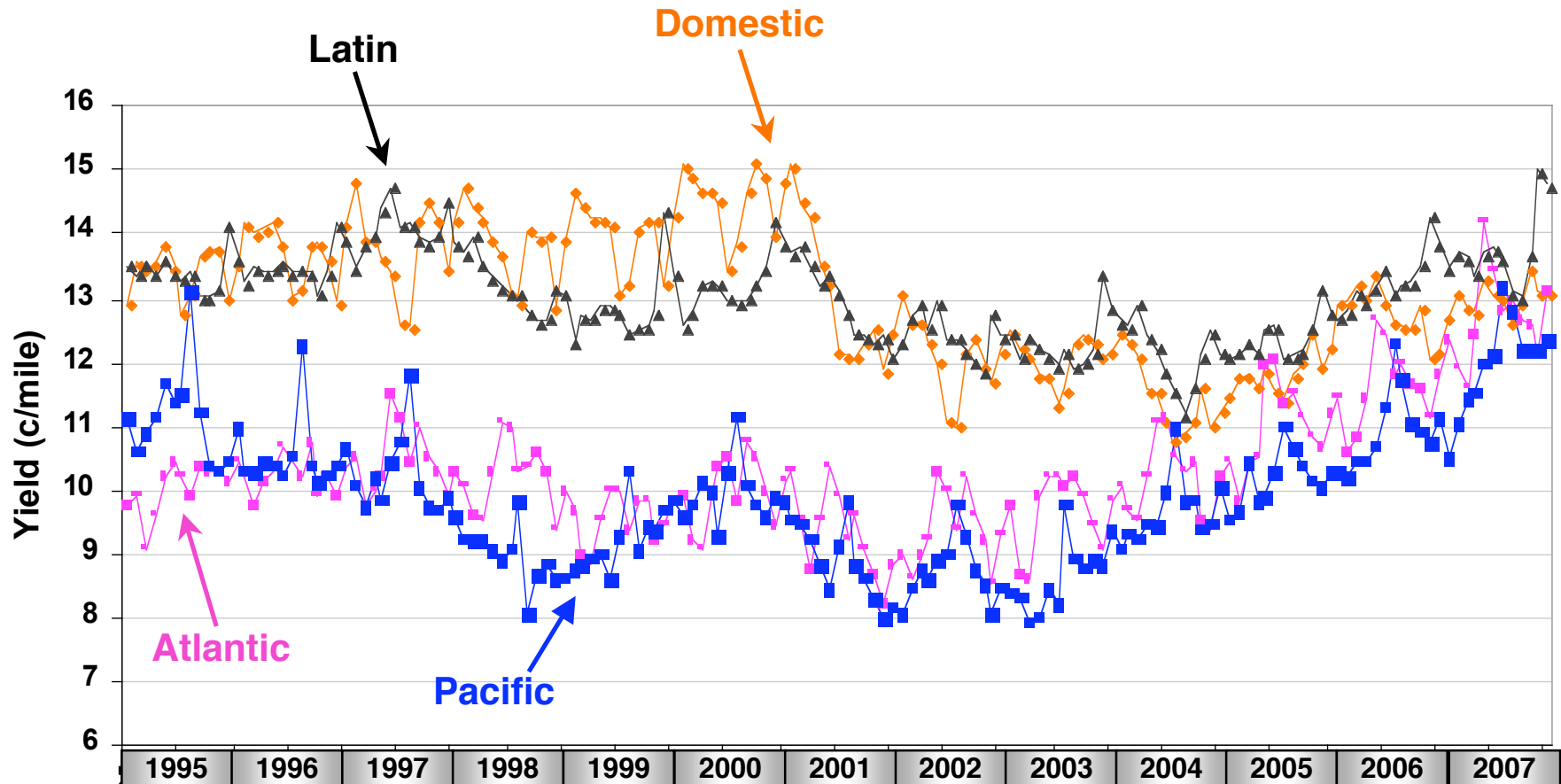
Historic Yield Trend 1995-2007



Data source: ATA Passenger Yield Report, 7 US major airlines excluding Southwest (WN).



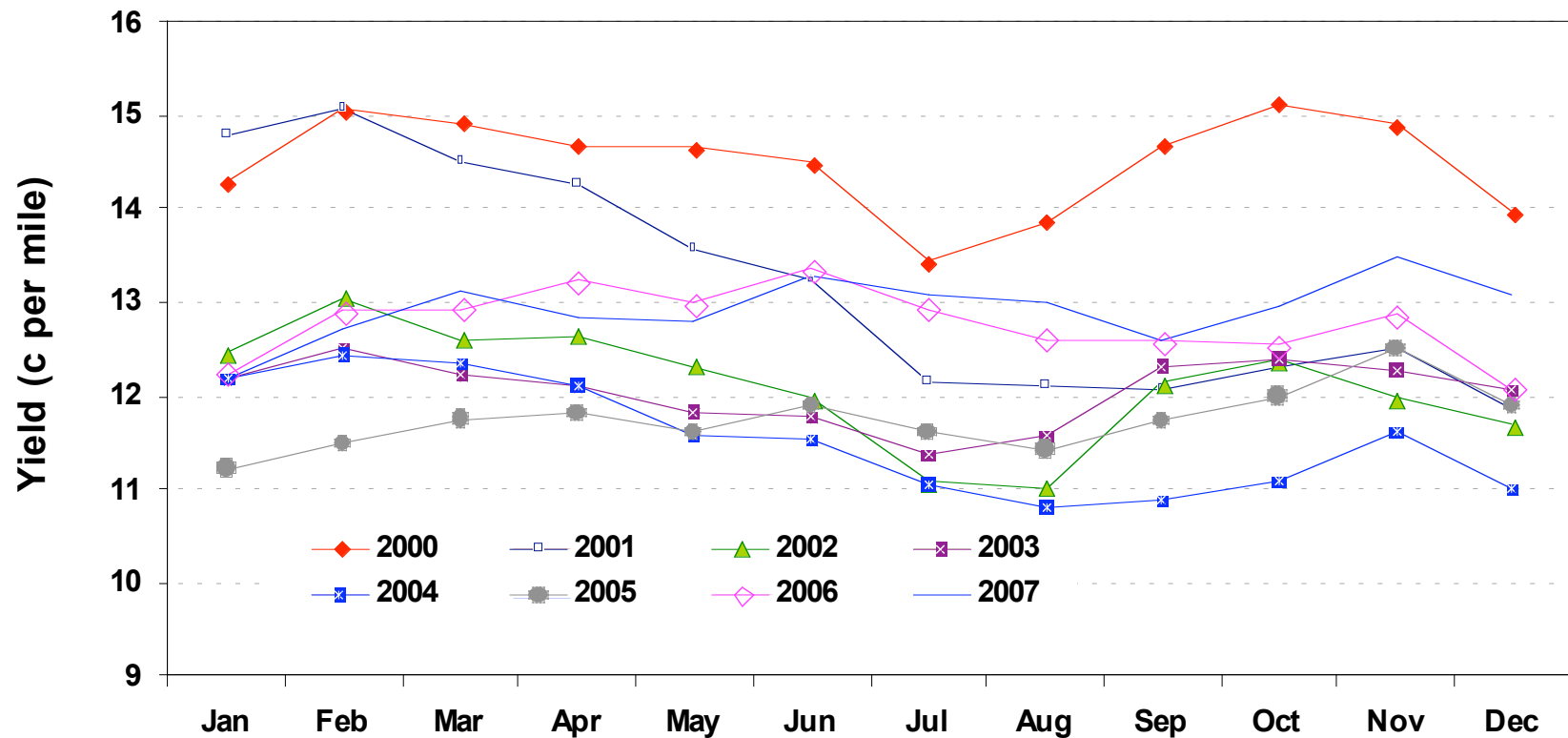
Historic Yield Trend 1995-2007



Data source: ATA Passenger Yield Report, 7 US major airlines excluding Southwest (WN).



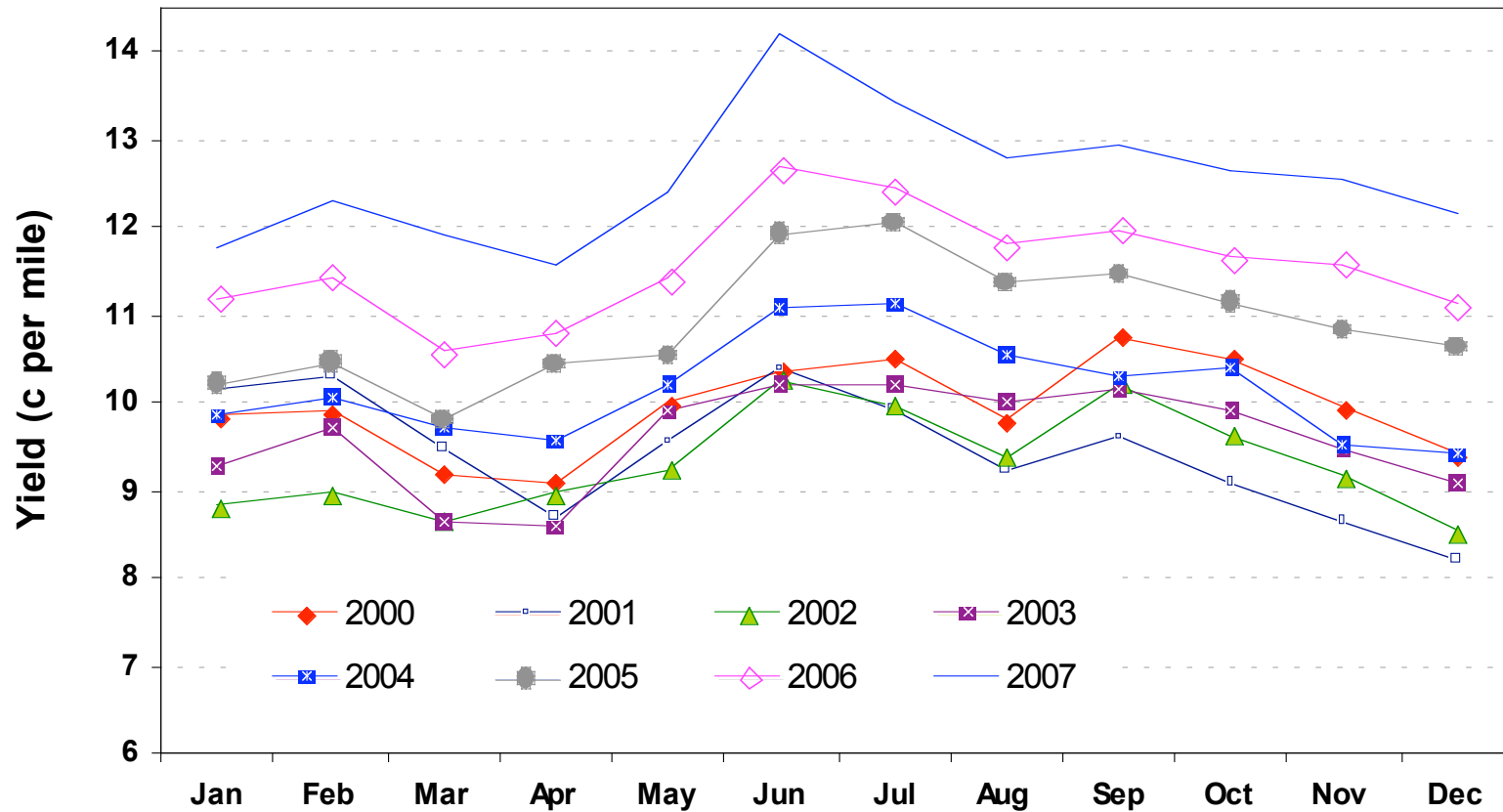
U.S. Domestic Yield 2000-2007



Data source: ATA Monthly Passenger Revenue Report, 7 US major airlines excluding Southwest (WN).



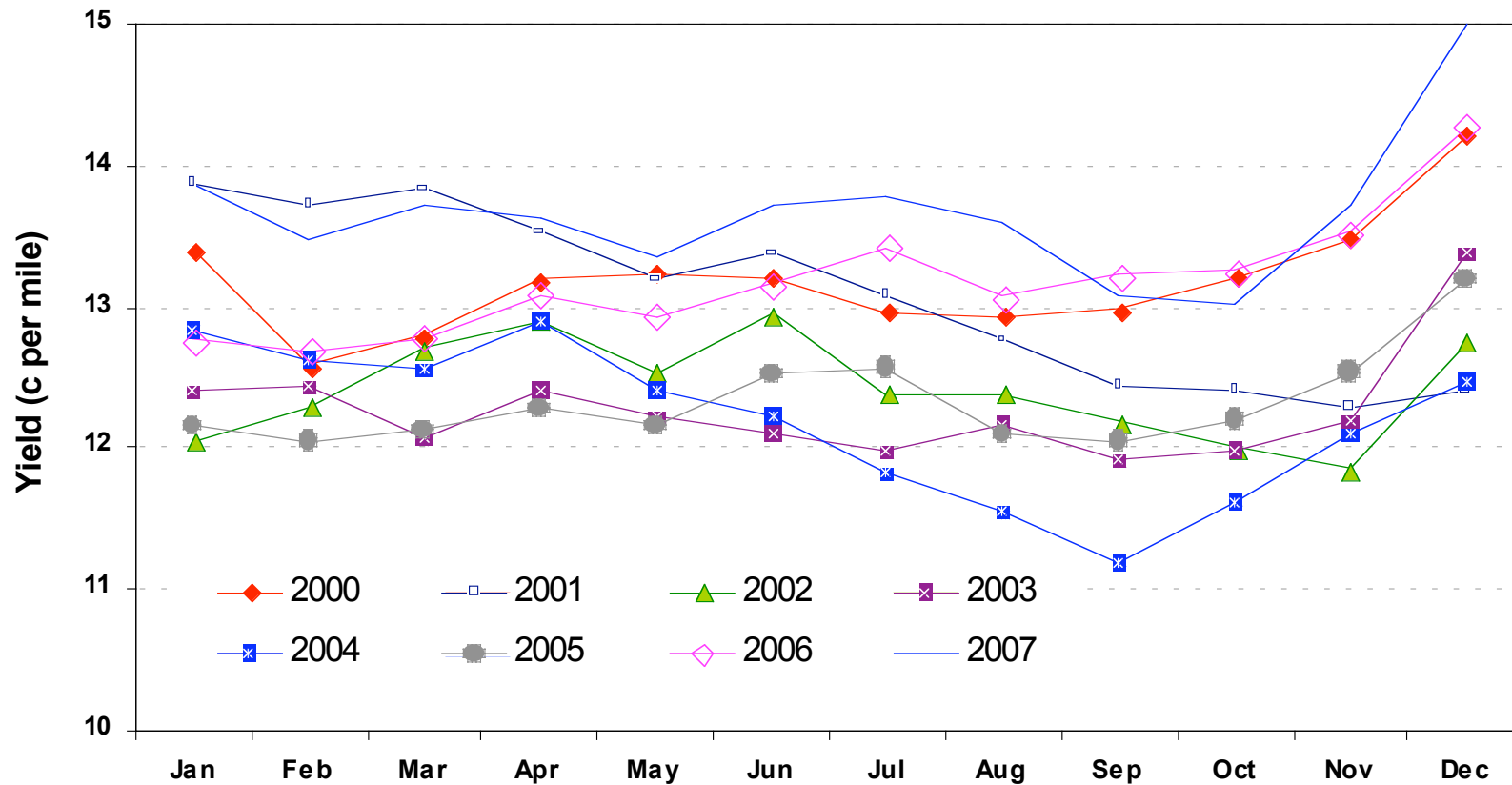
Atlantic Yield 2000-2007



Data source: ATA Monthly Passenger Revenue Report, 7 US major airlines excluding Southwest (WN).



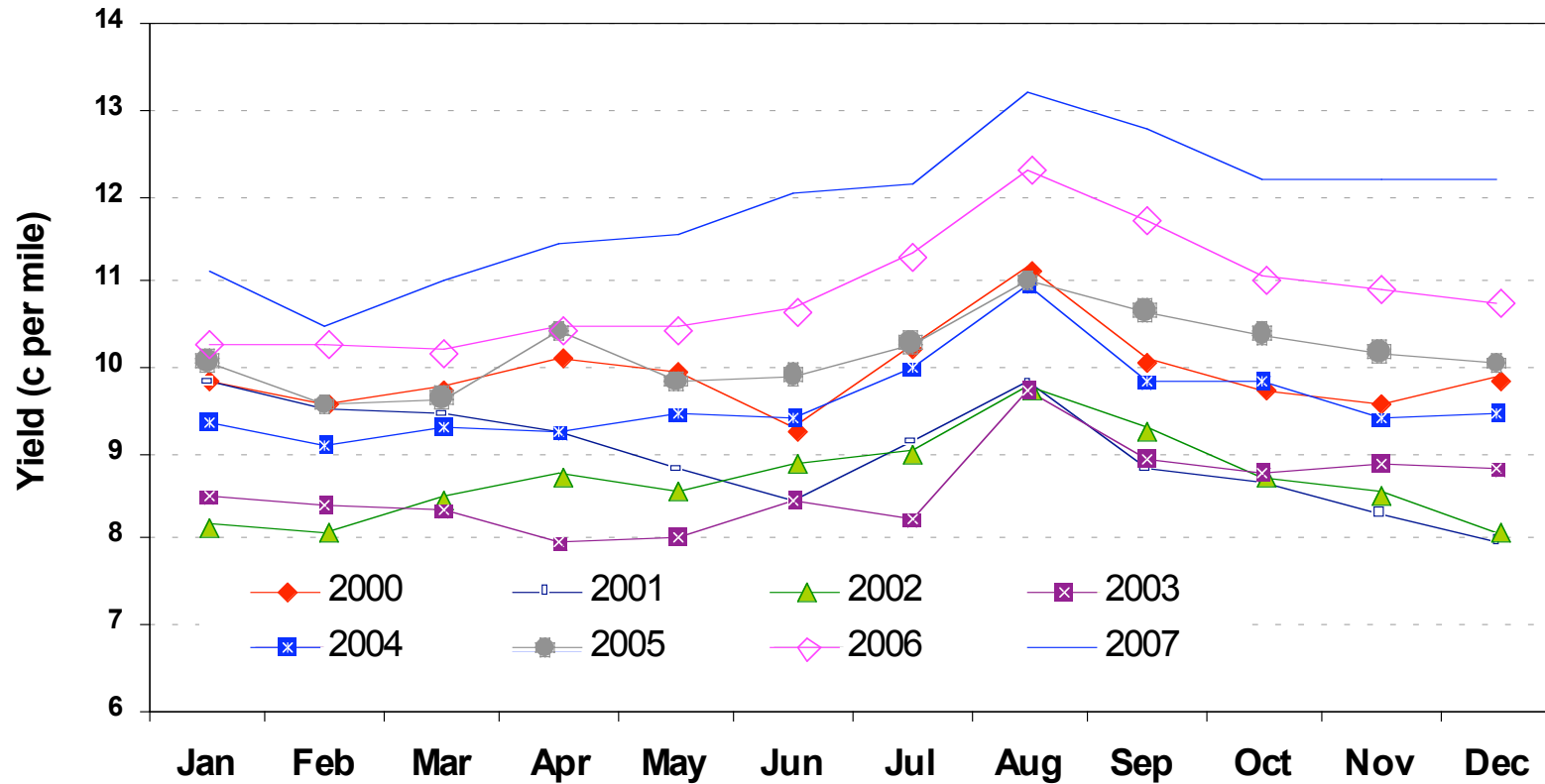
Latin Yield 2000-2007



Data source: ATA Monthly Passenger Revenue Report, 7 US major airlines excluding Southwest (WN).



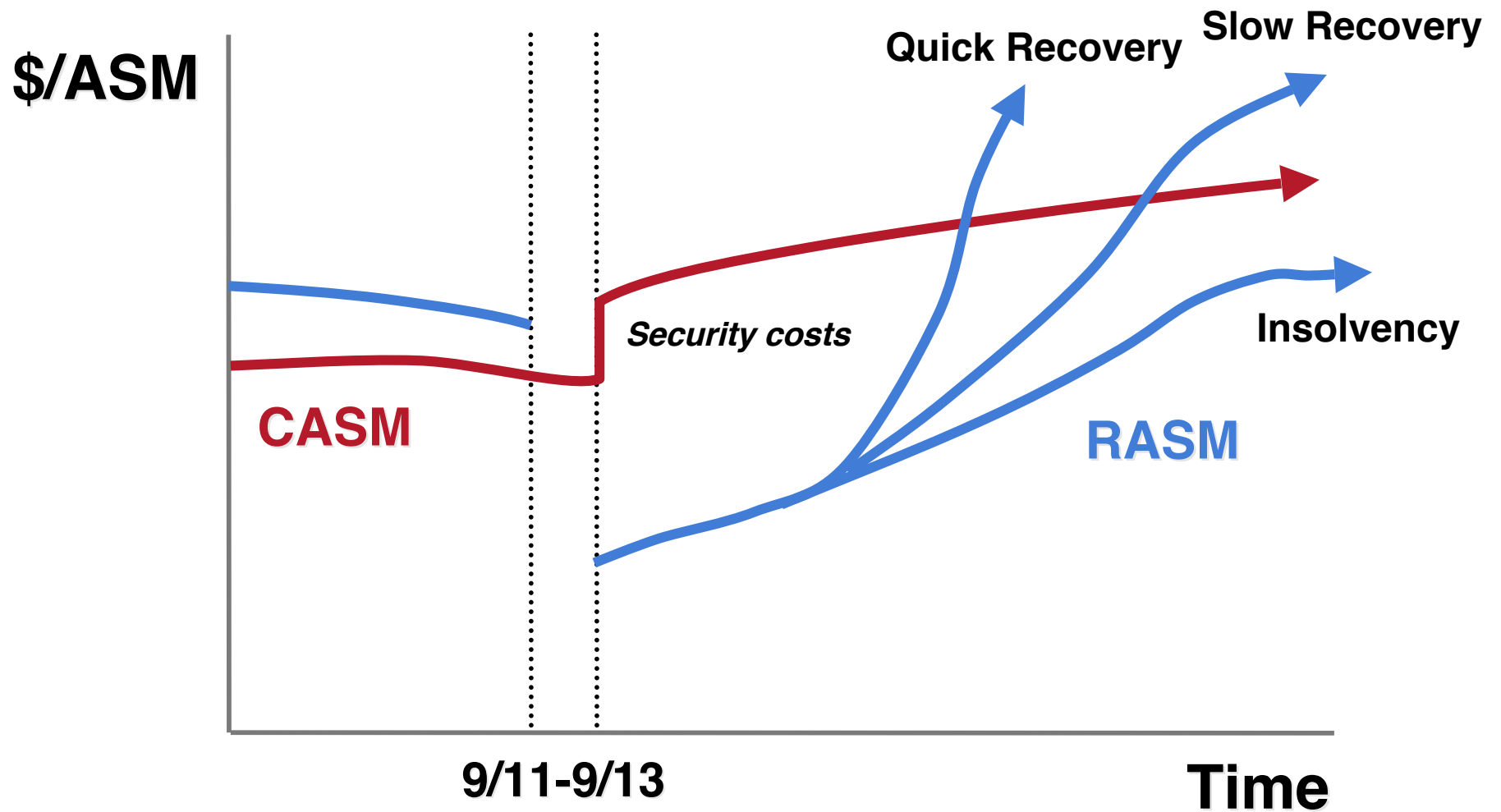
Pacific Yield 2000-2007



Data source: ATA Monthly Passenger Revenue Report, 7 US major airlines excluding Southwest (WN).

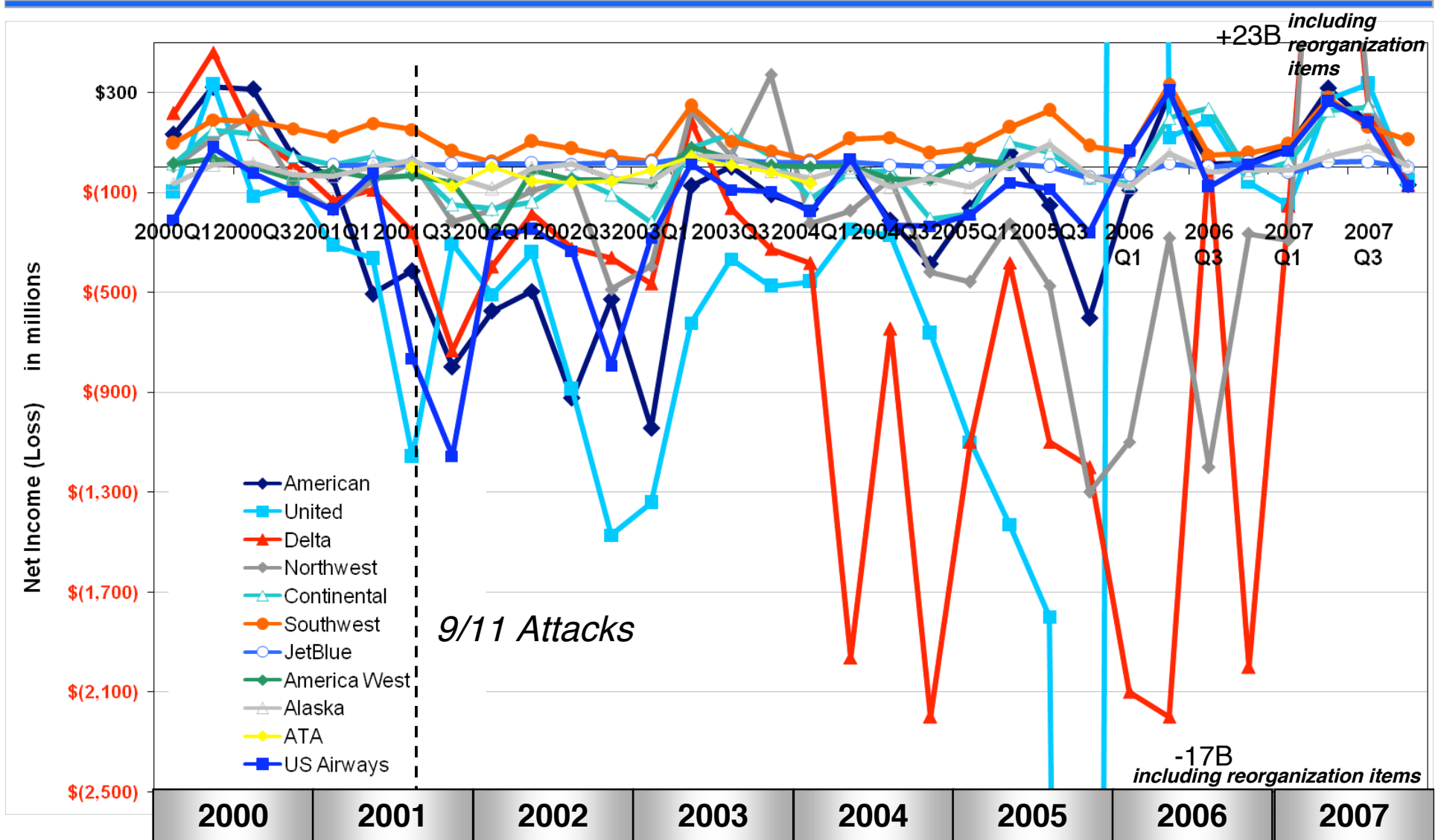


Airline Profitability Impact





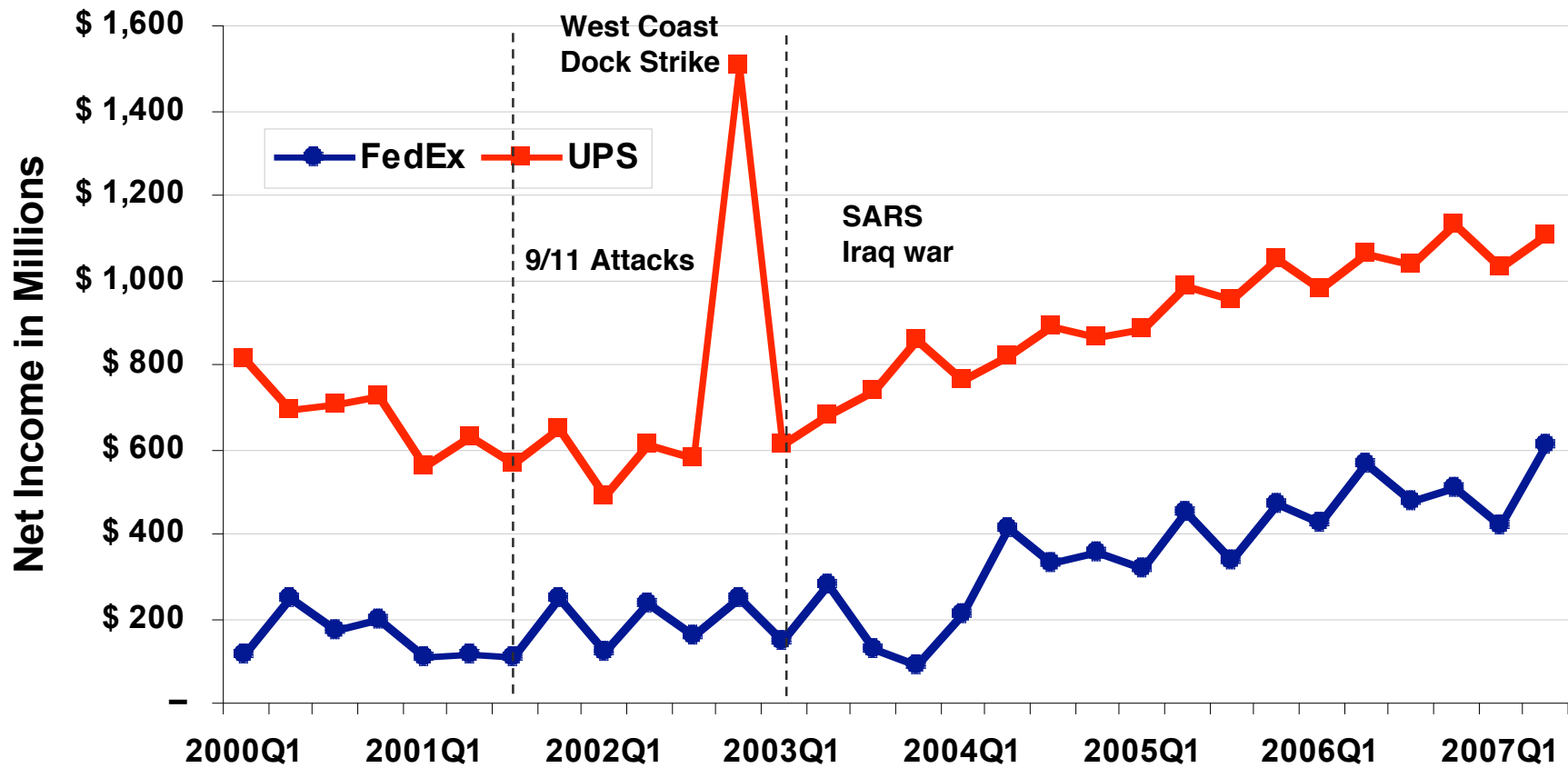
Airline Profits



Data source: Airline quarterly reports, profits and losses including reorganization items



Cargo Operations Profitable

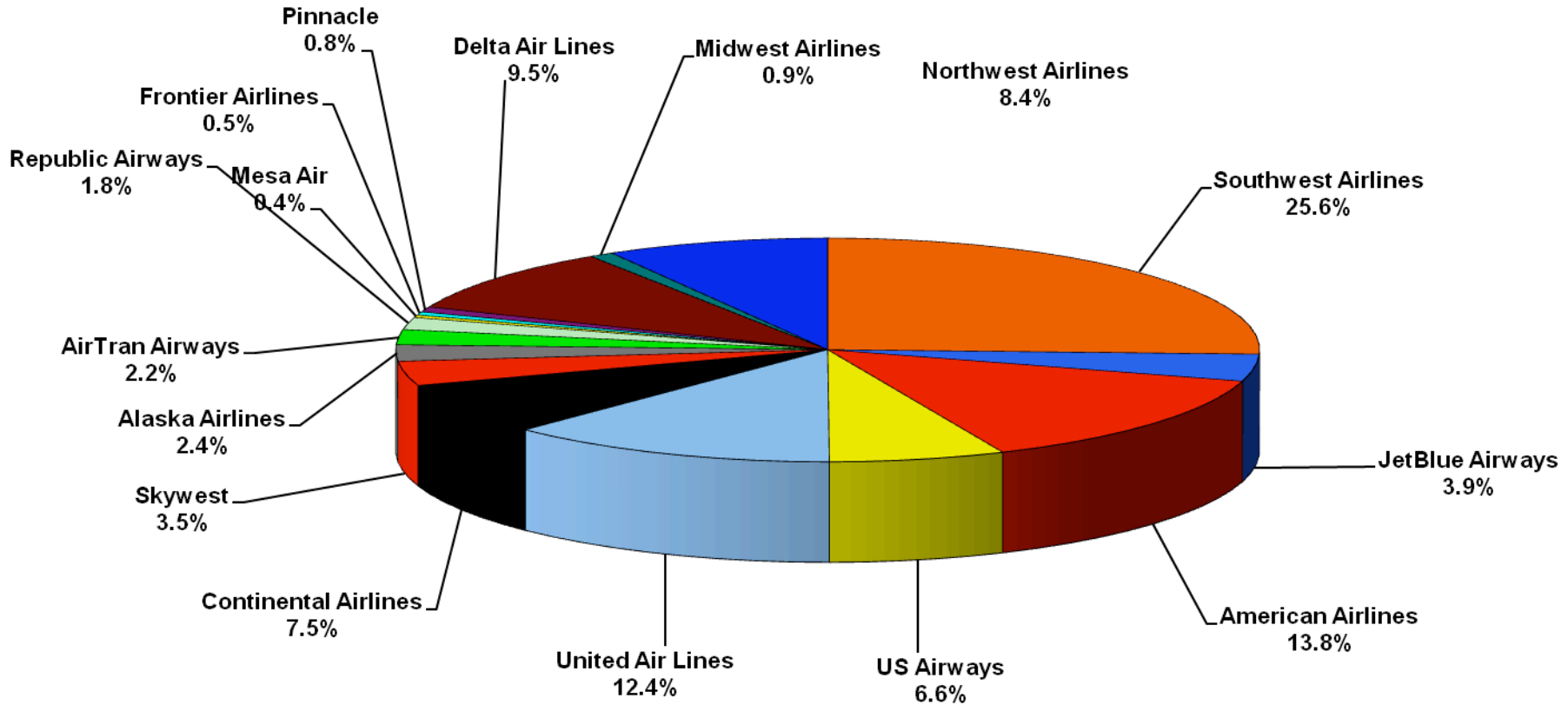


Data source: Companies' annual reports



Market Cap: US Majors

4-Sept-2007



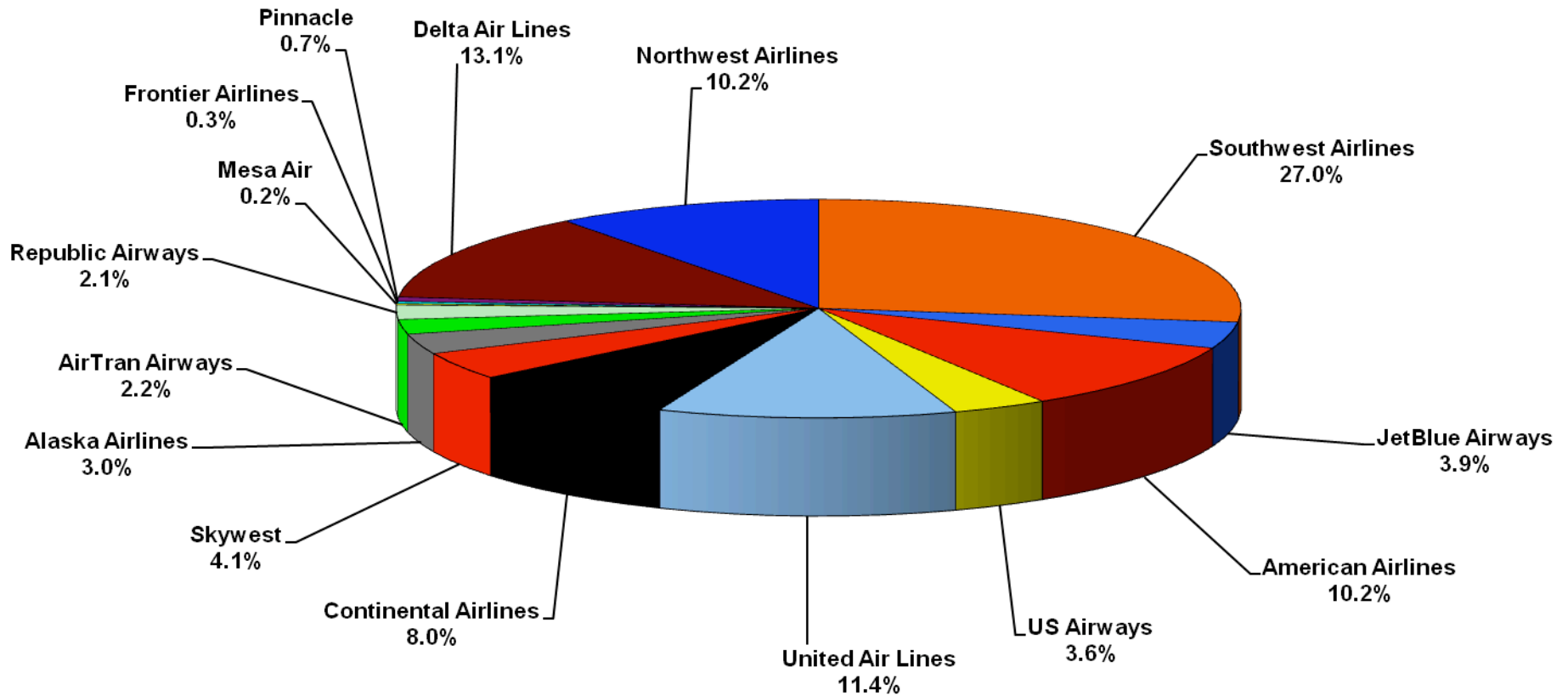
Total Market Cap: \$ 44.5 billion

Data source: Yahoo Finance.



Market Cap: US Majors

26-Feb-2008



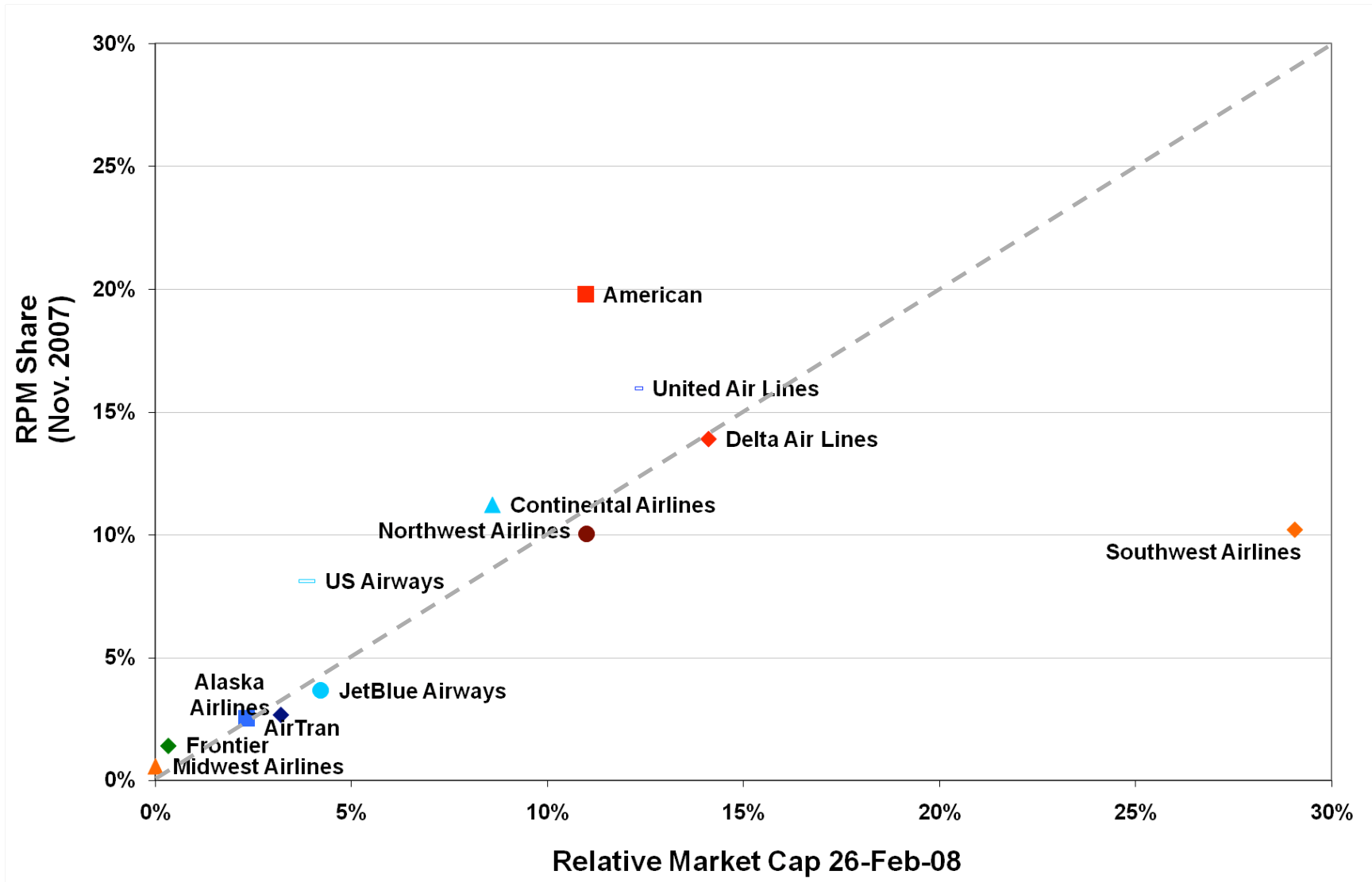
Total Market Cap: \$ 35.2 billion

Data source: Yahoo Finance.



RPM Share vs. Market Cap

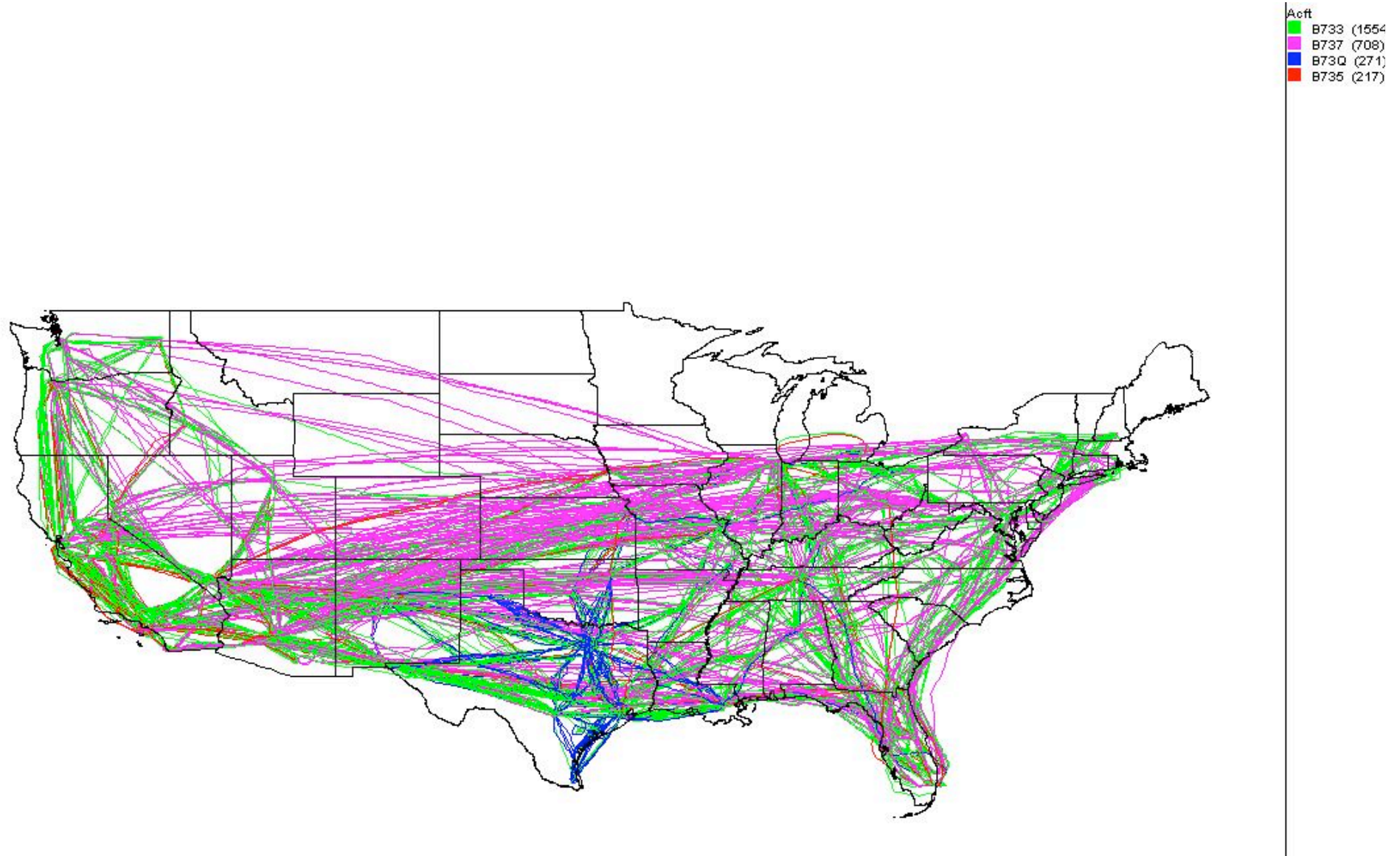
(RPMs: May 2007 / Market Cap: Sept 4th 2007)



Source: Yahoo! Finance and Bureau of Transportation Statistics

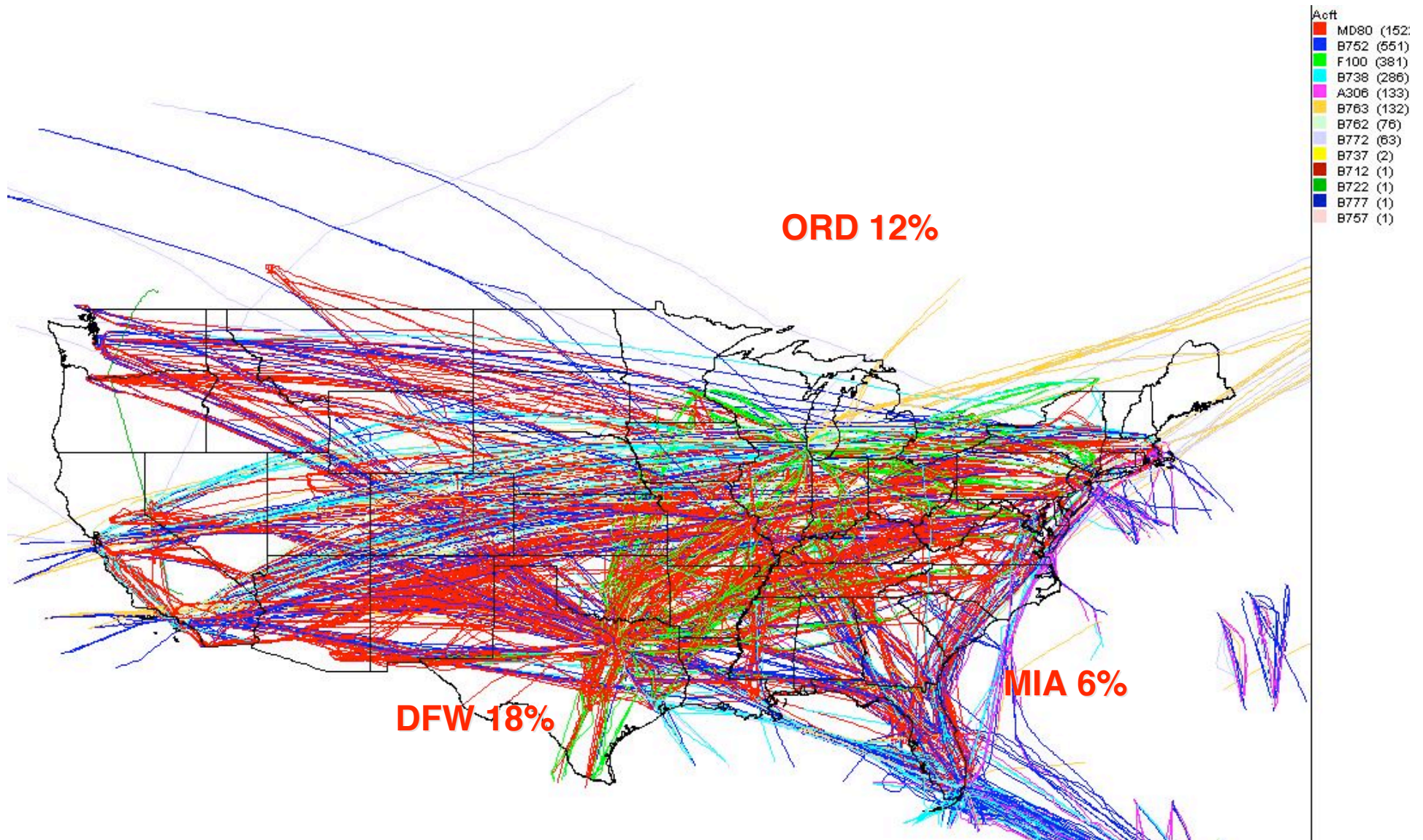


Southwest SWA Flights (8/7/02)



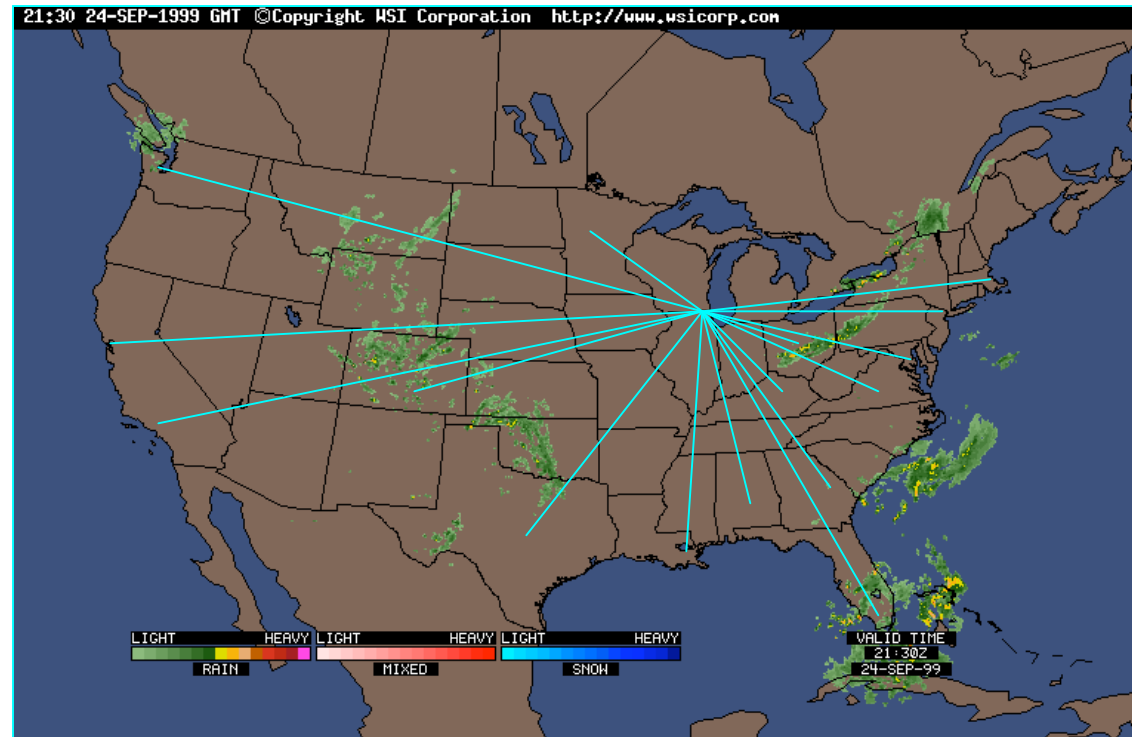


American AAL Flights (8/7/02)





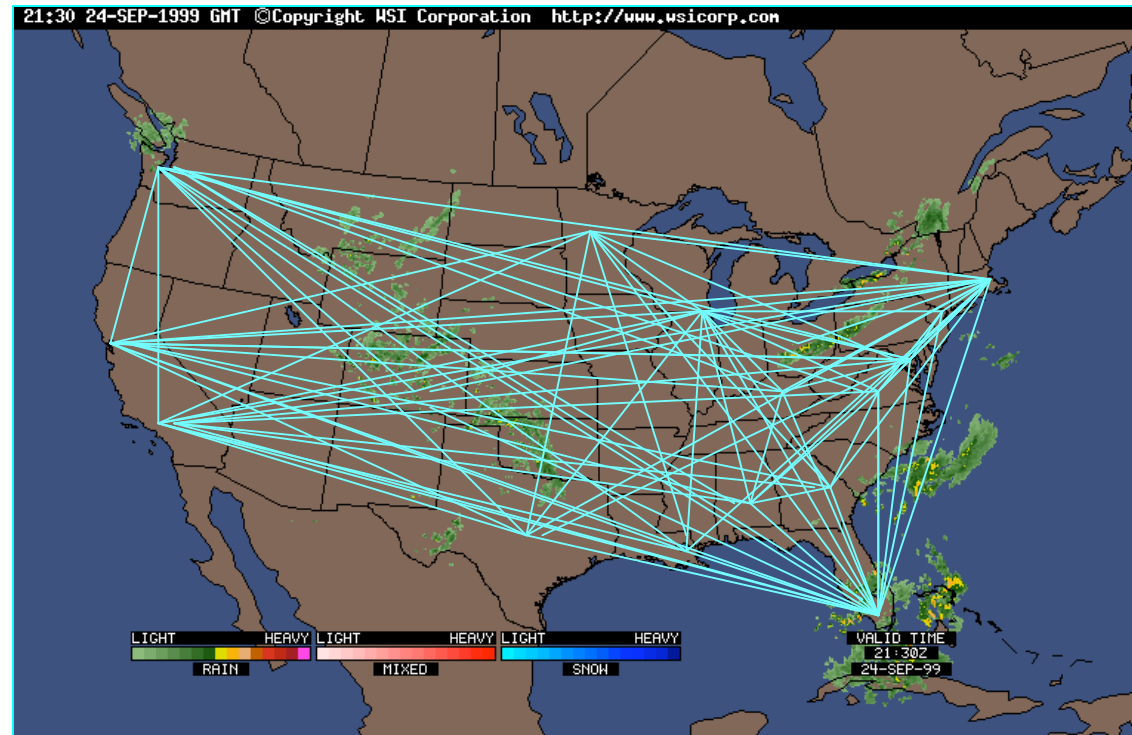
Hub and Spoke vs Direct Networks



Completely Connected Network = $2(N-1)$ Flights
(eg., 50 Airports, 98 Flights)



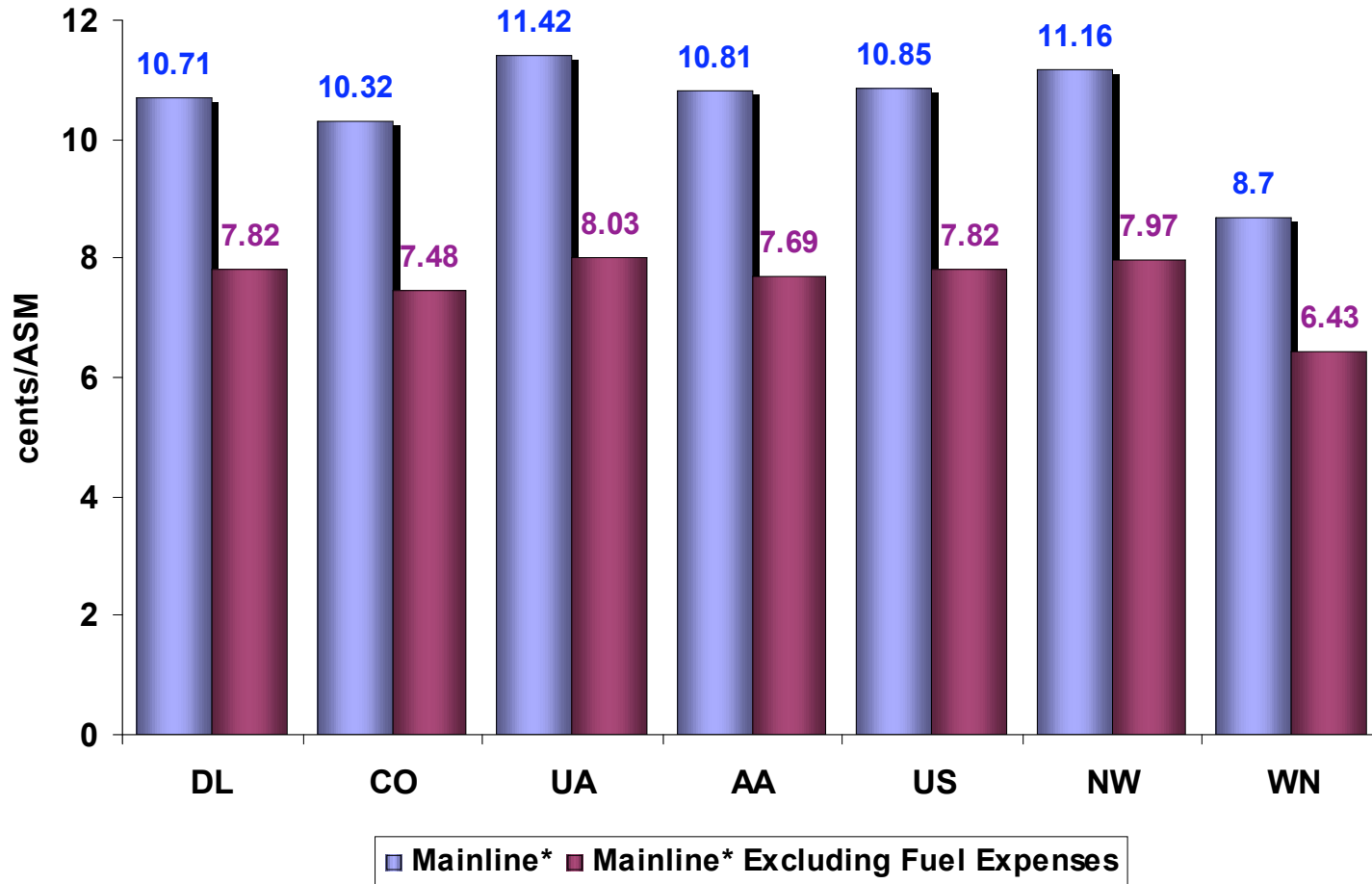
Fully Connected Network



Completely Connected Network = $N(N-1)$
(eg., 50 Airports, 2450 Flights)



US Carrier CASM for the First Quarter of 2006



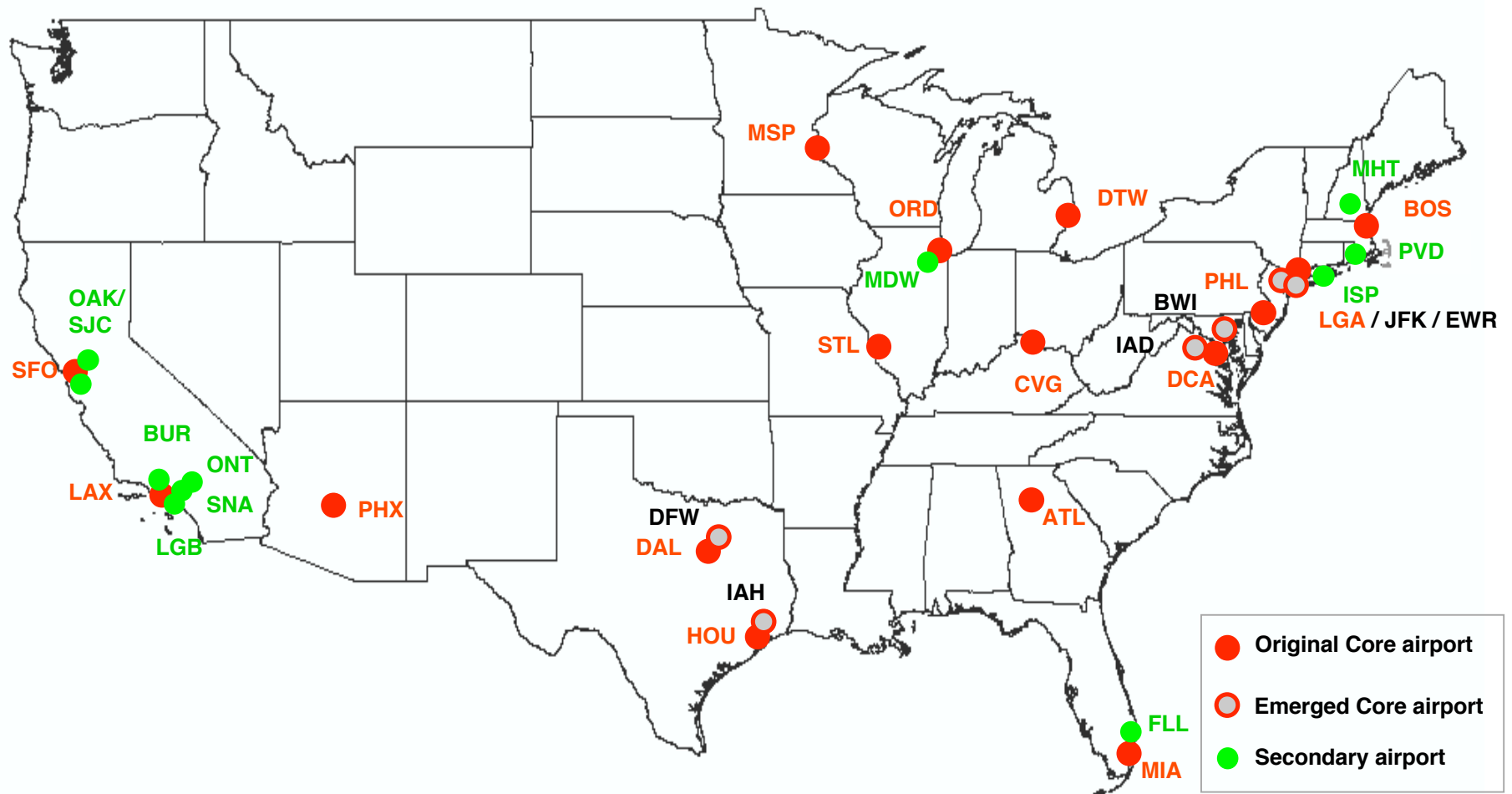
* Mainline CASM excluding special items, regional affiliates, UAFC

Data source: Company Press Releases



Emergence of Secondary Airports

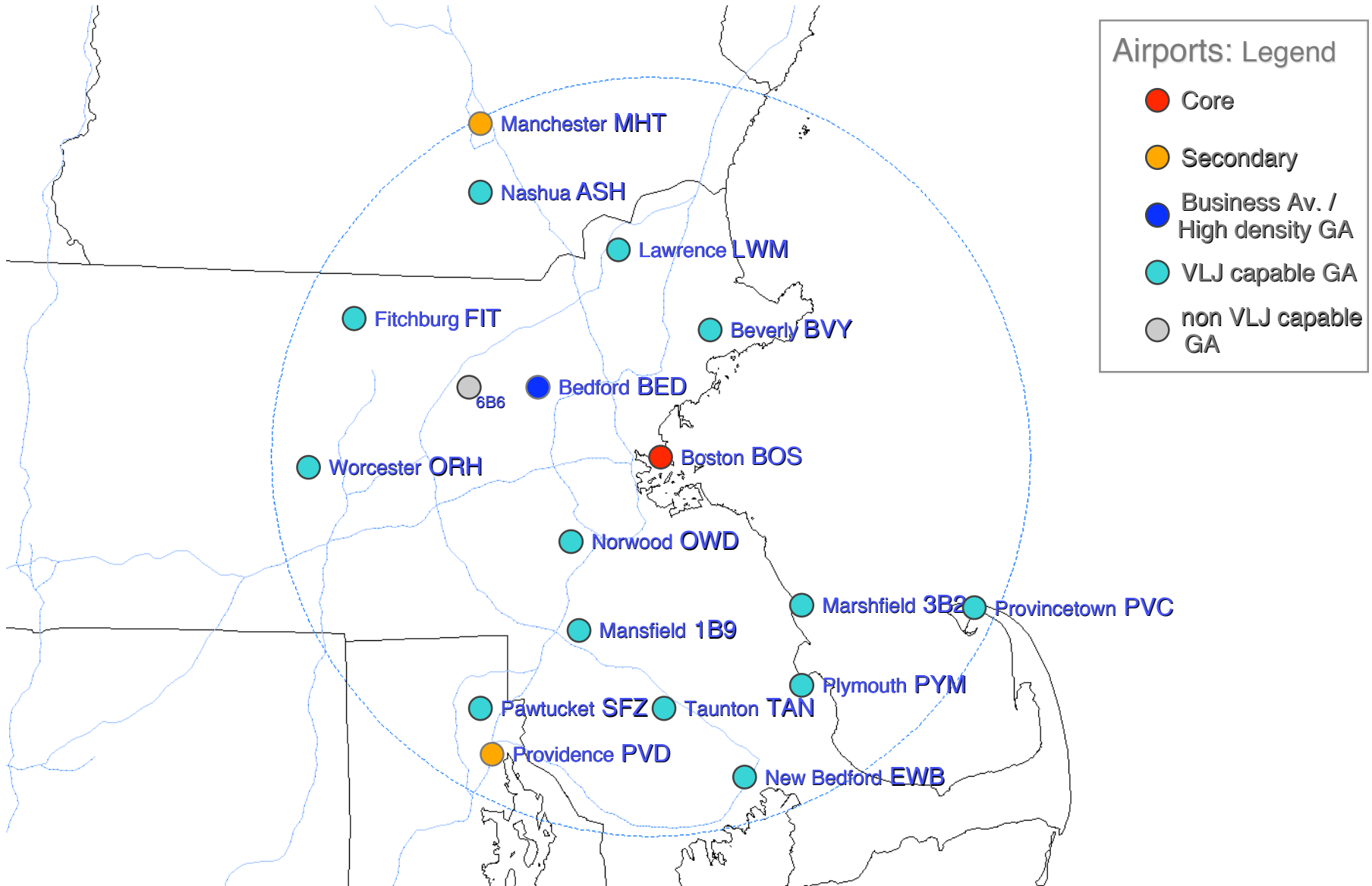
"Southwest Effect"





High Density Airport Systems

Boston Region





Low-Cost Carrier Envy

Emergence of LCCs

Canada (7, 1 in 2004)

CanJet
 HMY Airways
 JetsGo Airlines
 Tango Airlines
 Westjet
 Zip
Canada West

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 (60, 3 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
 EasyJet
 Evolavia
 Excel Airways
 Fairline Austria
 Fare4U
 German Wings
 Germania Express
 Globespan
 Hapag Lloyd Express
 Hellas Jet
 Helvetic Airways
 Iceland Express
 Ryanair
 Snalskjutsen
 Snowflake Airlines
 Sterling
 Sun Express
 Swedline
 ThomsonFly
 V Bird
 Virgin Express
 VLM Airlines
 VolareWeb
 Windjet Vola
Smart Wings
Wizz Air
Hop

Asia/Pacific (20, 8 in 2004)

Air Arabia
 Air Asia
 Air Deccan
 Athena Air Services
 Citilink
 Freedom Air
 Lion Airways
 One-Two-Go
 Skymark Airlines
 Skynet Asia Airways
Aero Asia
Awair
Spice Jet
 ValuAir
 Virgin Blue
Air Blue
Air One
BackpackersXpress
Jetstar
Nok Air
Pacific Blue
SkyAsia
Tiger Airways
Spring
Kingfisher
Jazeera Airways

Hi Fly
Fly Me
Fly Nordic
Air Service +
Blue1
Blue Air
Central Wings
Dau Air
Iceland Express
Monarch
My Air
Scand Jet
Transavia
Vueling
Inter Sky
Jet 2
LTU
Meridiana

Inter continental LCCs

Air Madrid
 Condor
 East Jet
 LTU
 Martinair
 Zoom Airlines

South America (3)

Bra
 Gol
 U Air

Africa (2)

1Time
 Kulula

Legend:
 New in 2003 / 2004
 New in 2005 / 2006



Low-Cost Carrier Envy (or not)

Emergence of LCCs

Canada (7, 1 in 2004)

CanJet
 HMY Airways
 JetsGo Airlines
 Tango Airlines

Westjet
 Zip
 Canada West

Europe (60, 3 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
 EasyJet
 Evolavia
 Excel Airways
 Fairline Austria

Fare4U
 German Wings
 Germania Express
 Globespan
 Hapag Lloyd Express
 Hellas Jet
 Helvetic Airways
 Iceland Express
 Ryanair
 Snalskjutsen
 SnowFlake Airlines
 Sterling

Sun Express
 Swedline
 ThomsonFly
 V Bird
 Virgin Express
 VLM Airlines
 VolareWeb
 Windjet Vola
 Smart Wings
 Wizz Air
 Hop

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

Asia/Pacific (20, 8 in 2004)

Air Arabia
 Air Asia
 Air Deccan
 Athena Air Services
 Citilink
 Freedom Air
 Lion Airways
 One-Two-Go
 Skymark Airlines
 Skynet Asia Airways
 Aero Asia
 Awair
 Spice Jet

ValuAir
 Virgin Blue
 Air Blue
 Air One
 BackpackersXpress
 Jetstar
 Nok Air
 Pacific Blue
 SkyAsia
 Tiger Airways
 Spring
 Kingfisher
 Jazeera Airways

Hi Fly
 Fly Me
 Fly Nordic
 Air Service +
 Blue1
 Blue Air
 Central Wings
 Dau Air
 Iceland Express

Monarch
 My Air
 Scand Jet
 Transavia
 Vueling
 Inter Sky
 Jet 2
 LTU
 Meridiana

South America (3)

Inter continental LCCs

Air Madrid
 Condor
 East Jet
 LTU
 Martinair
 Zoom Airlines

Bra
 Gol
 U Air

Africa (2)

1Time
 Kulula

Legend:

New in 2003 / 2004

New in 2005 / 2006

Not Operating



Competition

- **Brutally Competitive Business**
 - Inter-Airline
 - Automobile and other Surface Modes
- **Historical Focus on high yield travelers shifted**
- **Gaming**
 - Schedule
 - Performance Index Gaming
- **Alliances**
 - Code Share Based
 - Network power
 - Virtual mergers to overcome international restrictions
 - Operating Benefits (not yet realized)
 - Varying Commitments



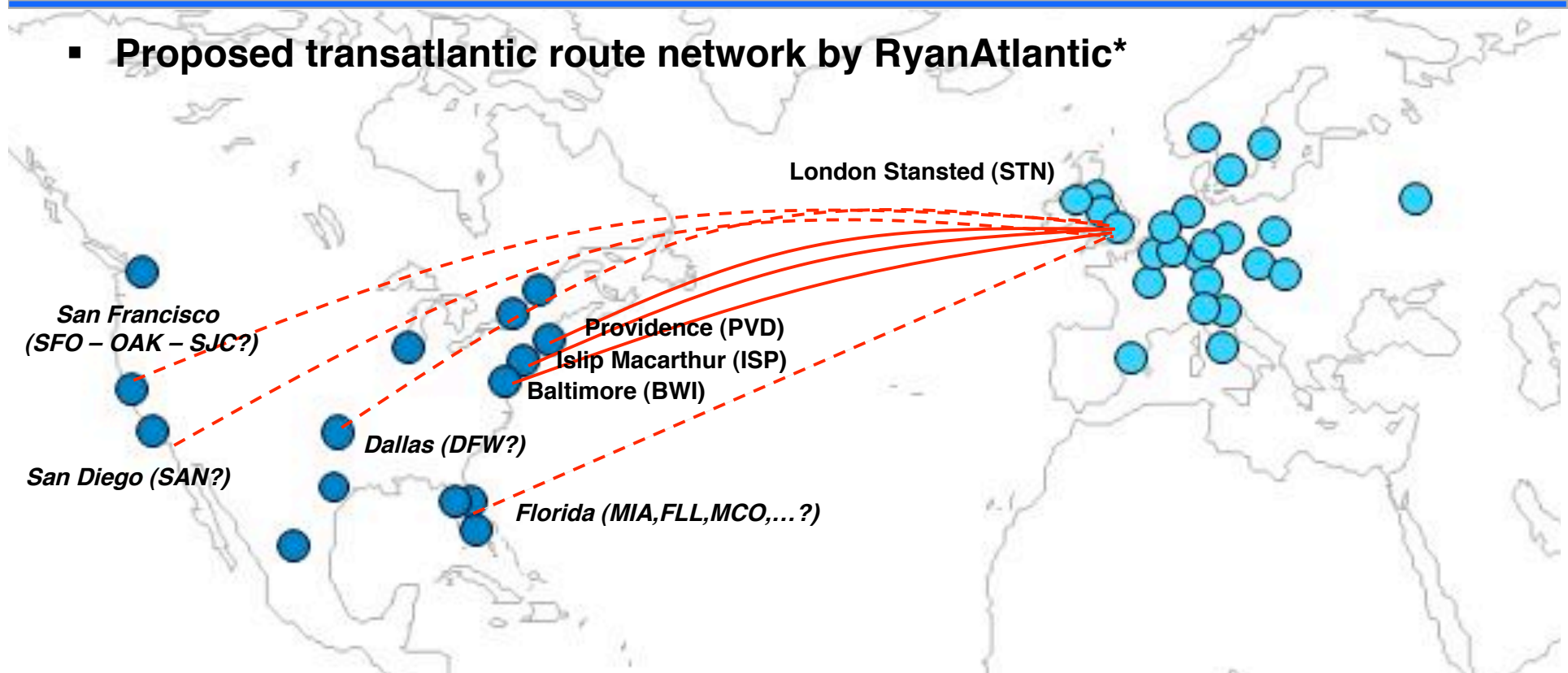
EU-US Open Skies Agreement

- **On April 30, 2007 E.U. and U.S. signed a preliminary Open Skies accord**
 - Allows EU airlines to operate direct flights between U.S. and any EU country (and some others)
 - Allows U.S. airlines reciprocal right, and ability to fly between EU city-pairs
 - Agreement will replace 22 bilateral air service agreements currently in place between the U.S. and the Member States
 - Implications for **Alliance Anti-Trust Immunity**
 - In effect **March 30, 2008**
- **E.U. has made liberalized foreign control a prerequisite for a permanent agreement**
 - U.S. domestic market lucrative as standalone and hub-feeder
 - Cabotage rights only granted to U.S. Incorporated airlines
 - U.S. incorporation requires meeting ownership caps
 - Without control, network composition cannot be shaped
 - Match EU's 49% foreign control restriction



The North Atlantic: Market for Low Cost Carrier Expansion

- Proposed transatlantic route network by RyanAtlantic*



- Development of international parallel networks
- Phenomenon observed within the United States and Europe with the development on point-to-point parallel networks (between secondary airports) by Southwest and Ryanair

* Data source: Article from USA today April 12 2007, http://blogs.usatoday.com/sky/2007/04/ryanair_ceo_tal.html,



Airline Alliances

US DOT Antitrust Immunity



Star Alliance

- Adria Airways (JP)
- Air Canada (AC)
- Air New Zealand (NZ)
- ANA (NH)
- Asiana Airlines (OZ)
- Austrian Airlines (OS)
- Blue1 (KF)
- **bmi (BD)**
- Croatia Airlines (OU)
- LOT Polish Airlines (LO)
- **Lufthansa (LH)**
- **SAS (SK)**
- Singapore Airlines (SQ)
- South African (SA)
- Spanair (JK)
- Swiss Intl Air Lines (LX)
- TAP Portugal (TP)
- Thai Airways Intl (TG)
- Turkish Airlines (TK)
- **United (UA)**
- US Airways (US)



Oneworld

- **American Airlines (AA)**
- **British Airways (BA)**
- Cathay Pacific (CX)
- **Finnair (AY)**
- Iberia (IB)
- Japan Airlines (JL)
- **LAN (LA)**
- Malév (MA)
- Qantas (QF)
- Royal Jordanian (RJ)



SkyTeam

- Aeroflot (SU)
- Aeroméxico (AM)
- **Air France (AF)**
- **Alitalia (AZ)**
- Continental (CO)
- **Czech Airlines (OK)**
- **Delta (DL)**
- **KLM (KL)**
- Korean Air (KE)
- **Northwest (NW)**

Existing Immunity

Immunity Application In Progress



LCC Shift to Major Airports



Southwest PHL Entry

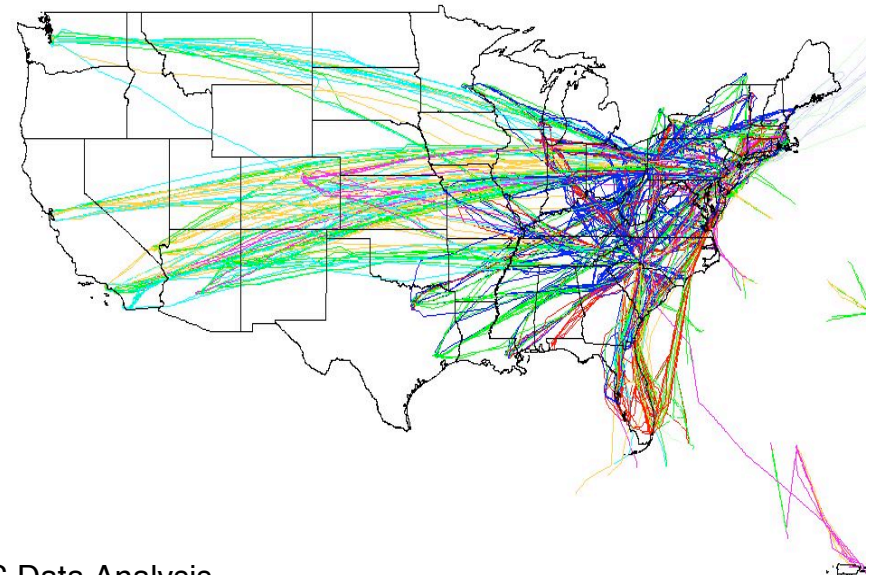
Service since May 9, 2005:

Chicago (Midway)	\$ 79	one-way
Las Vegas	\$ 99	one-way
Orlando	\$ 79	one-way
Providence	\$ 29	one-way

US Airways match many of Southwest's fares with its own new, less restricted "GoFares."

Both airlines offer the lowest available fares on many competing routes.

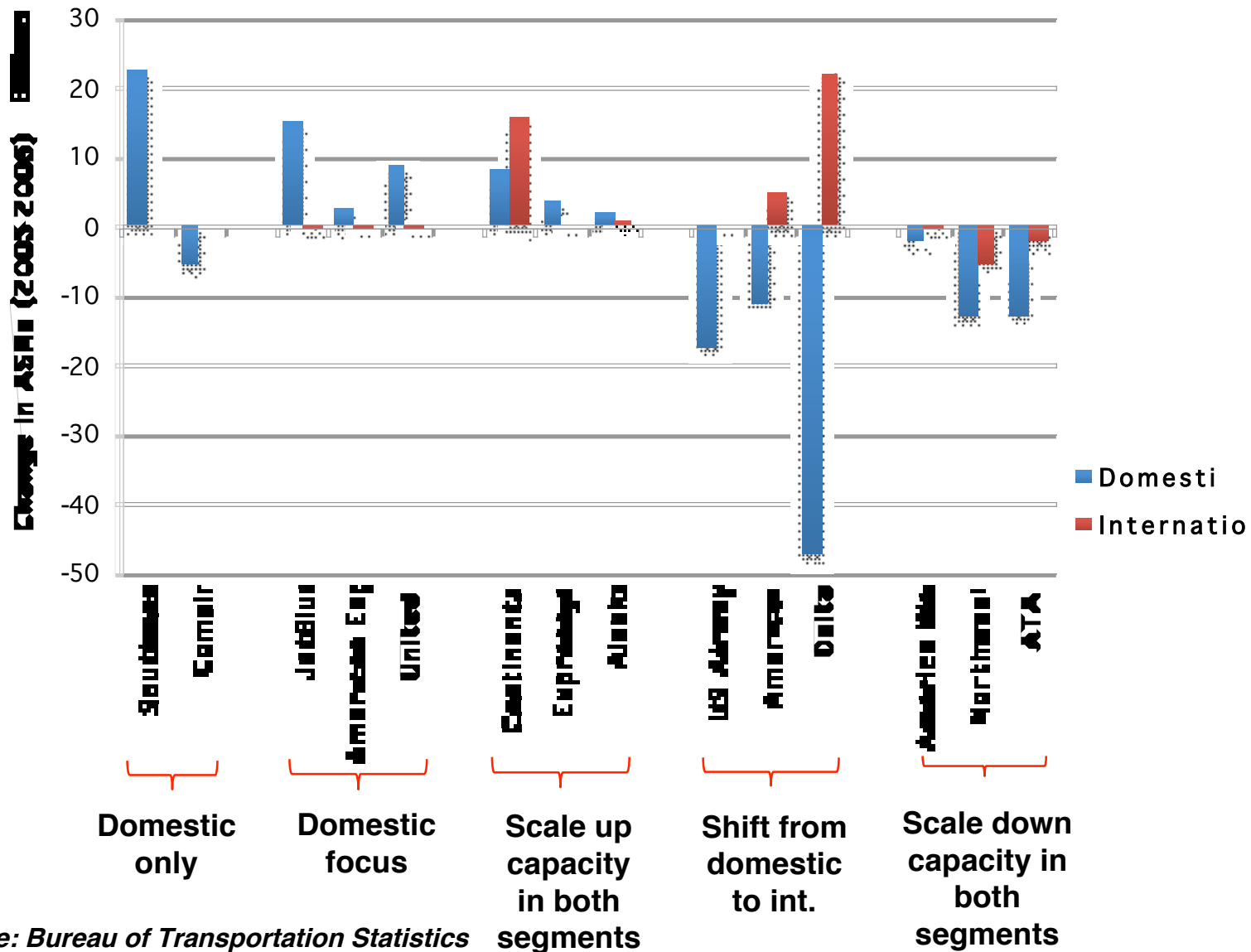
US Airways Network





Capacity Allocation Strategies

(Domestic vs. International ASMs – from 2005 to 2006)



Data source: Bureau of Transportation Statistics

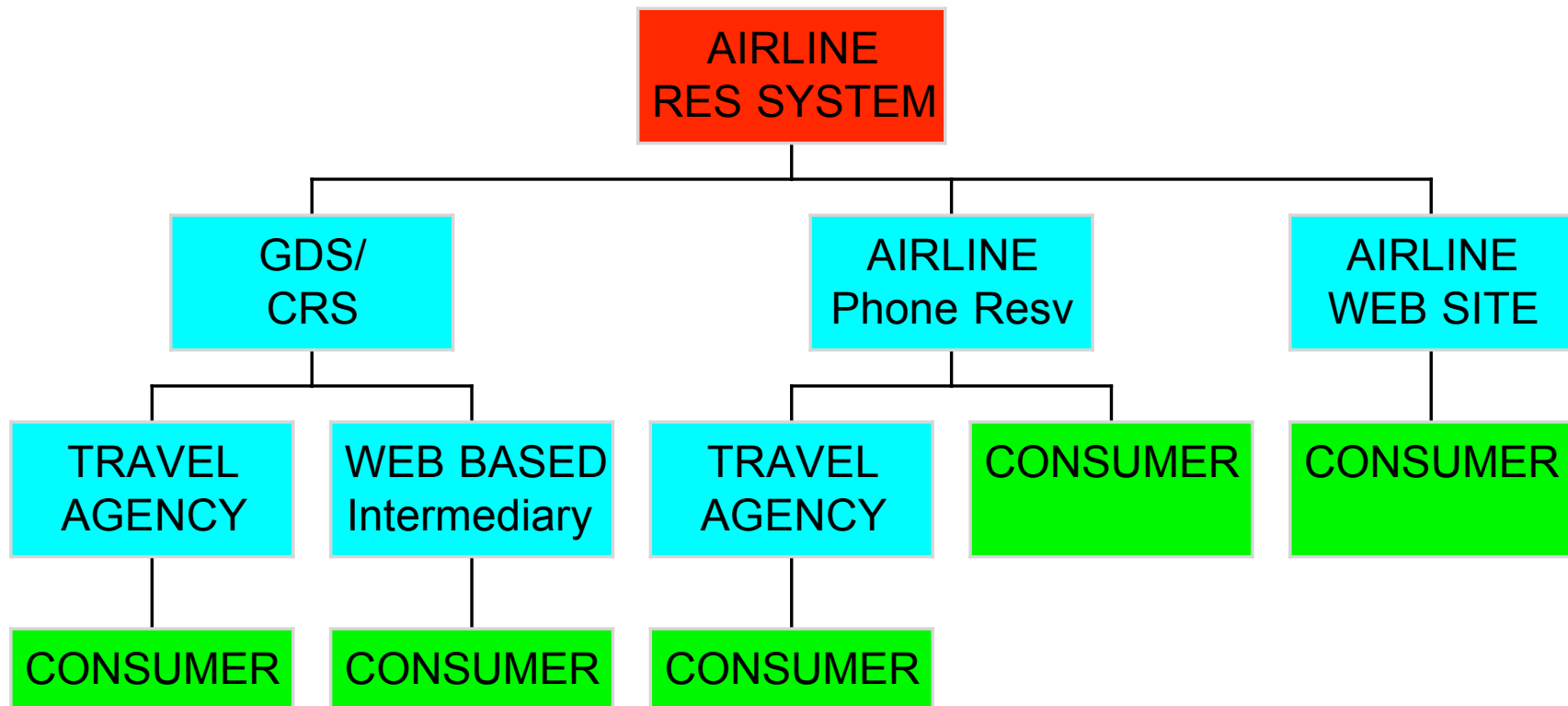


Consolidation Trend

- **Recent International Consolidation**
 - Air France and KLM
 - Air France and Alitalia ??
 - Lufthansa and Swiss
 - China Southern and China Northern and Xingiang
 - Cathy Pacific and Dragon
- **Recent US Consolidation**
 - USAir and America West
- **Merger Discussions**
 - Delta and Northwest
 - Potential for Additional Reactionary Moves
- **International Strategic Investment**
 - Lufthansa and JetBlue
 - Virgin and Virgin America



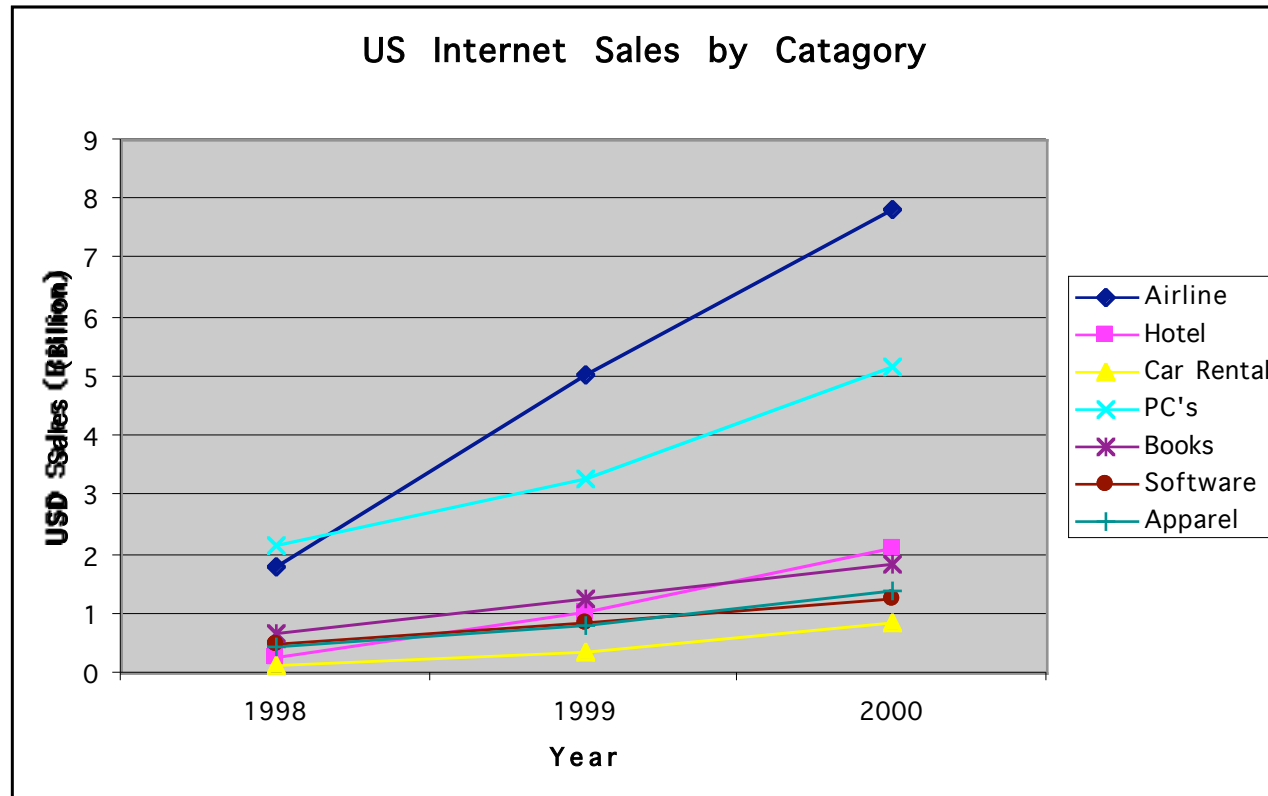
Principal Airline Distribution Channels



Significant Growth In Web Booking
Change in Airline Scheduling (e.g. rolling hubs)
IATA Push for 100% electronic tickets



Distribution



- - Reduction in commissions to travel agents
- - Shift to e-tickets (additional charges for paper tickets)
- - Increased restrictions on low fares (USAir charges)

Source: 2000 US Statistical Abstract



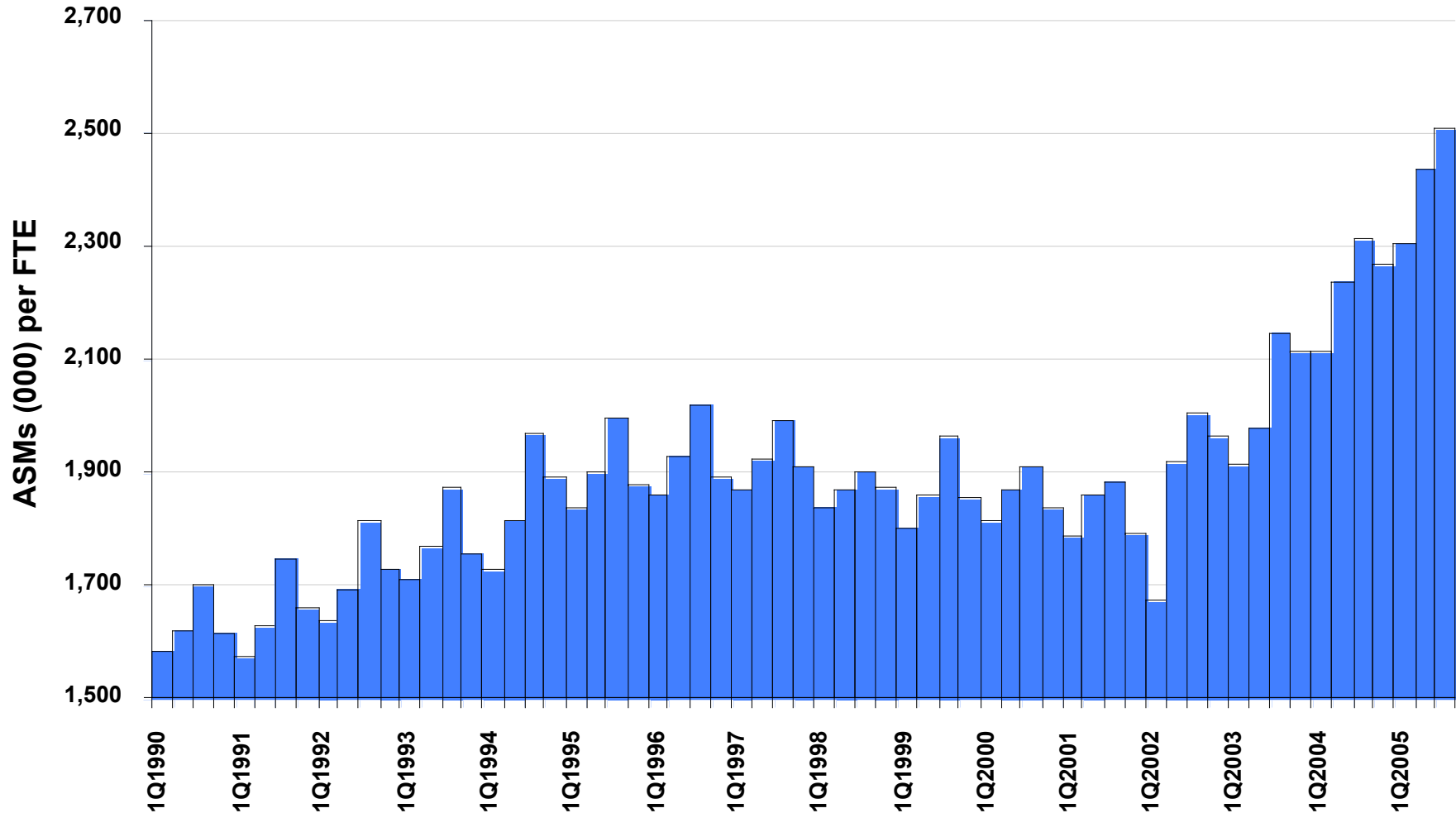
Electronic Processing

- **Airline Tickets #1 Web Product by Value**
 - Browser 1st page effect on marketing
- **Increase in e-Tickets**
 - Cost Savings
 - Charge for Paper Tickets
 - Interlining of e-Tickets
 - 40% in 2005
- **IATA Target**
 - 70% in 2006
 - 100% e-tickets by end of 2006
- **CAPPS II**





Productivity Improvements Driving Cost Relief Network Restructuring, Work Rules, Human Capital, Outsourcing, Technology

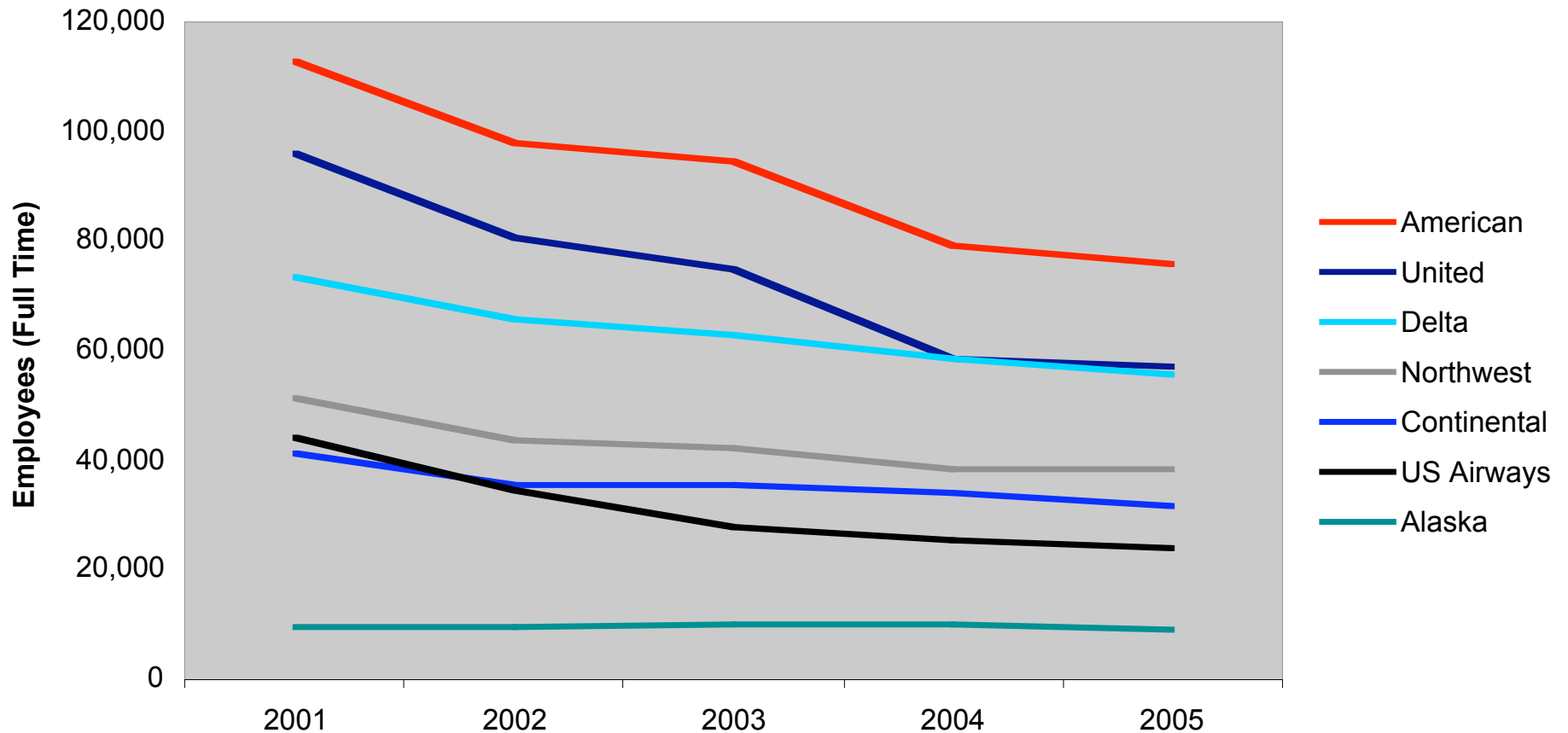


Source: ATA US Airline Cost Index: Major & National Passenger Carriers, Q3 2005



Employees Full Time: US Network Carriers 2001-2005

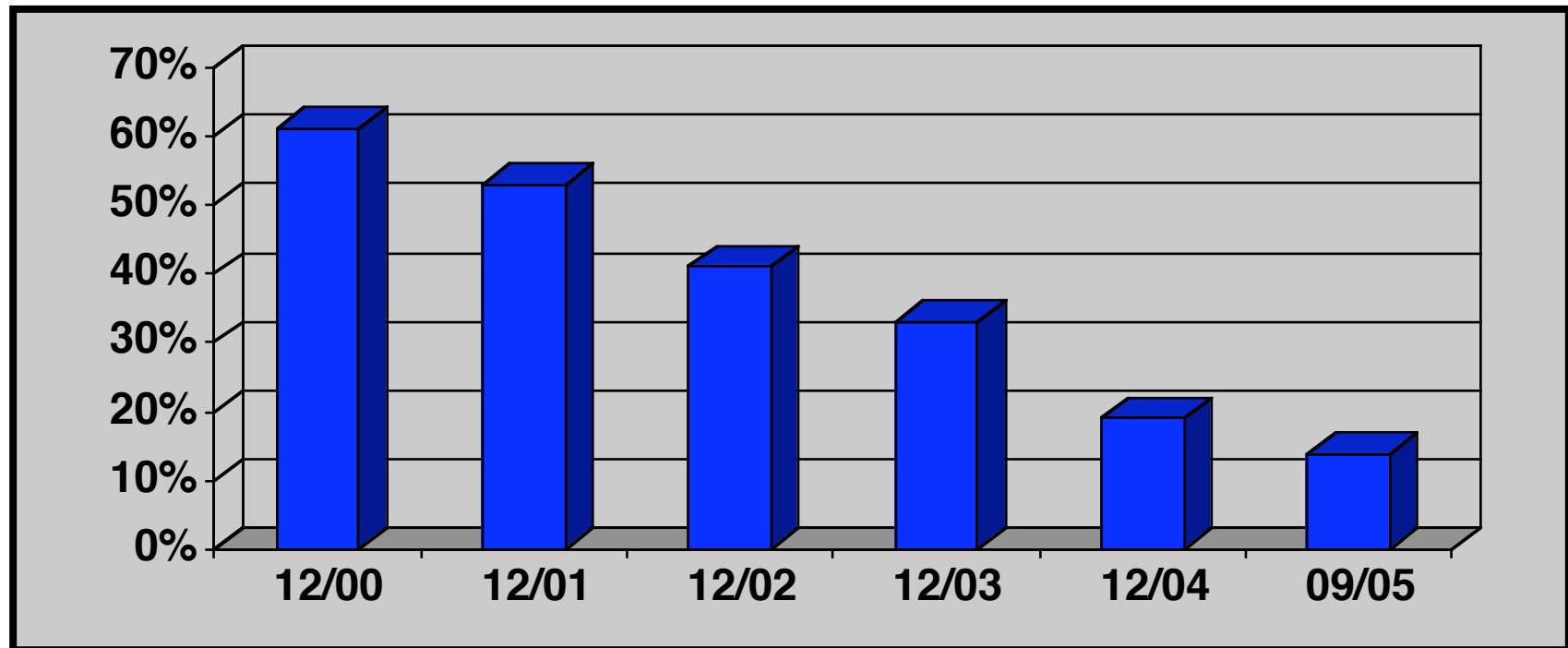
US Network Carrier Employees



**Job cuts continue: United announced 1000 last
week 6/15/06**



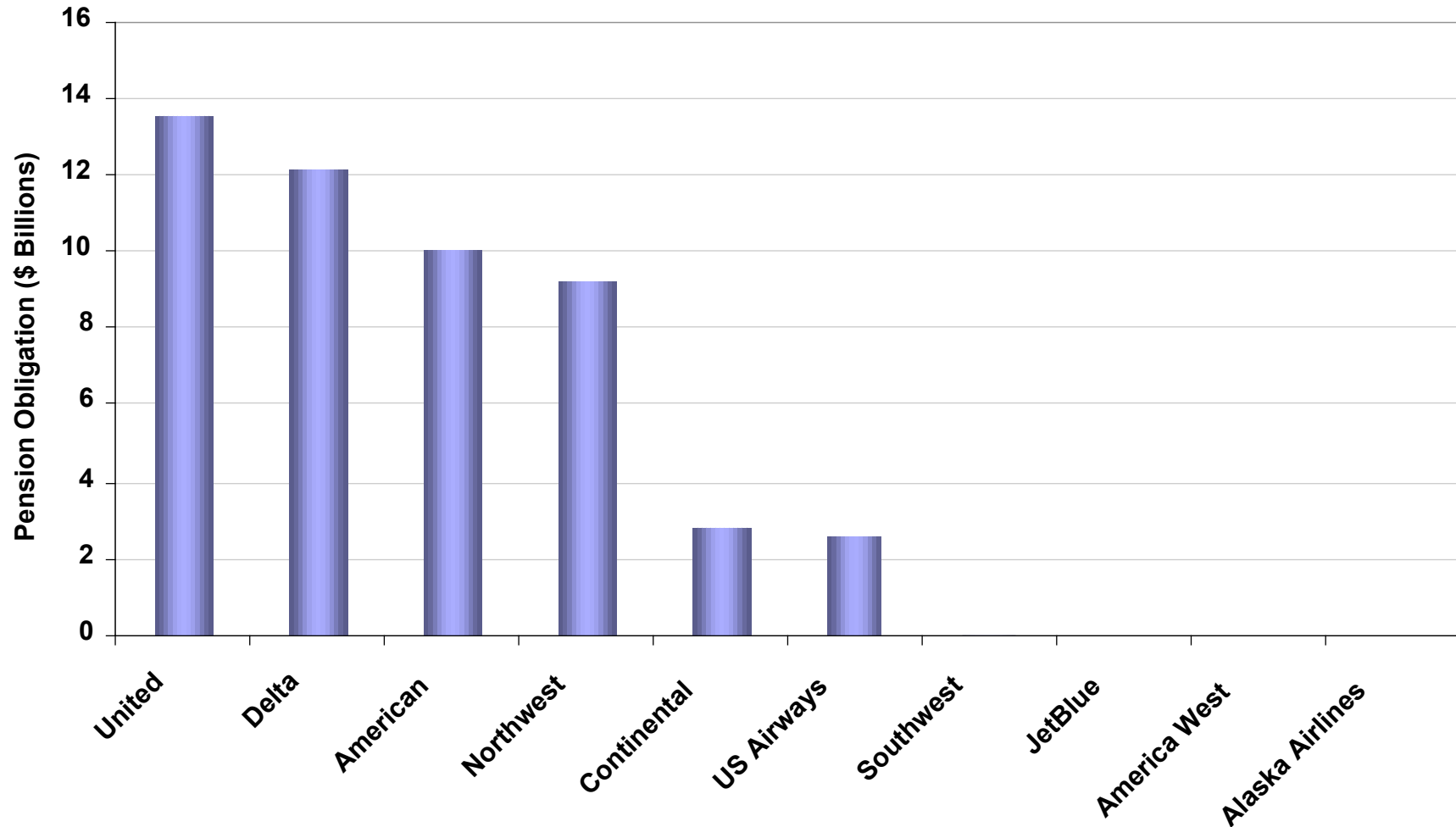
Positive Views of Employee Morale



Source: The Wilson Center for Public Research, Inc. – based on 150,674 interviews conducted with pilots or flight attendants from 1/1/2001 to 9/20/2005



Pension Obligations at the end of year 2004

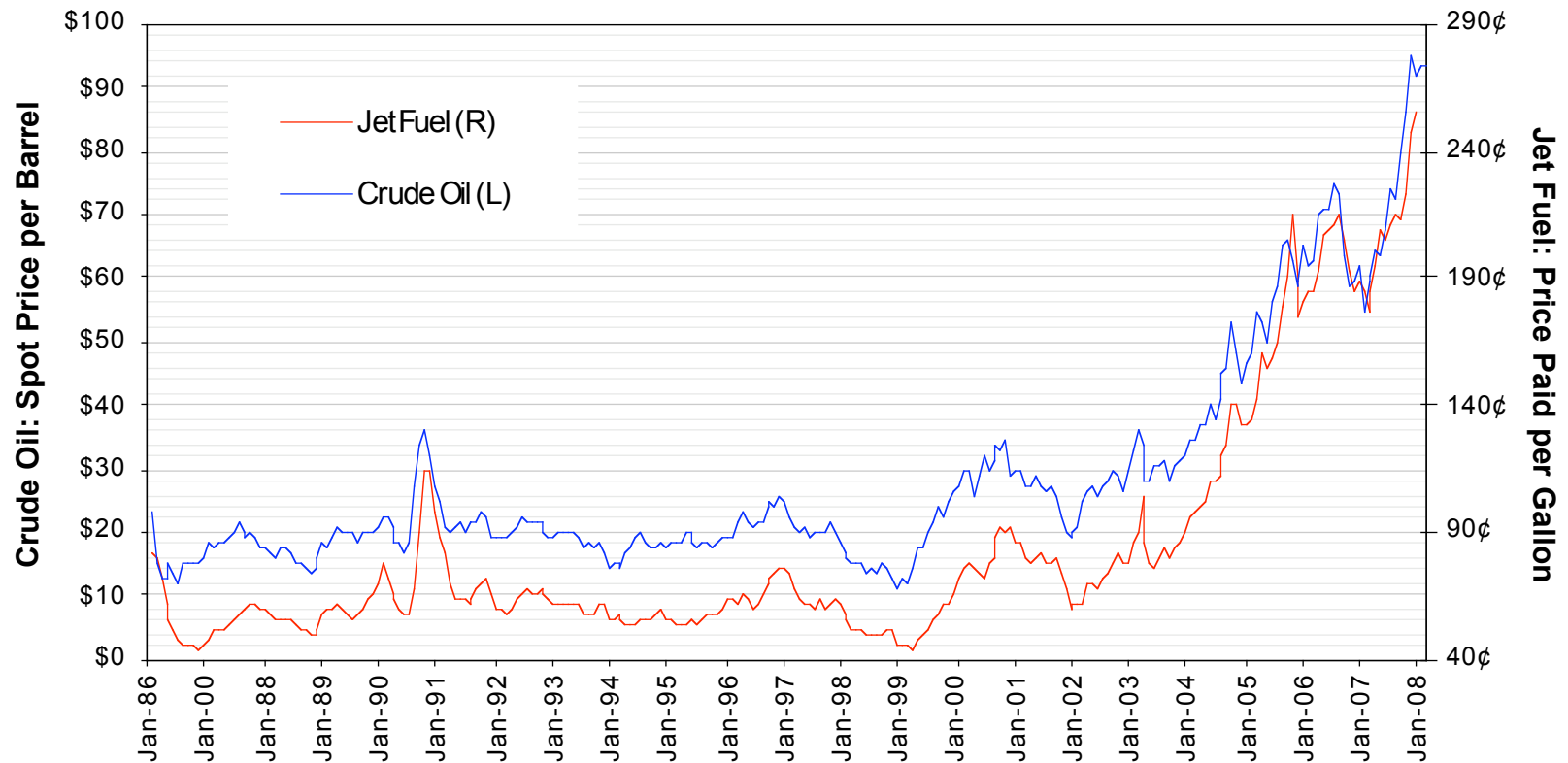


Source: Airlines Annual Financial Reports (US airways (successor company) figure corresponds to year 2003)



Trends in Fuel Price

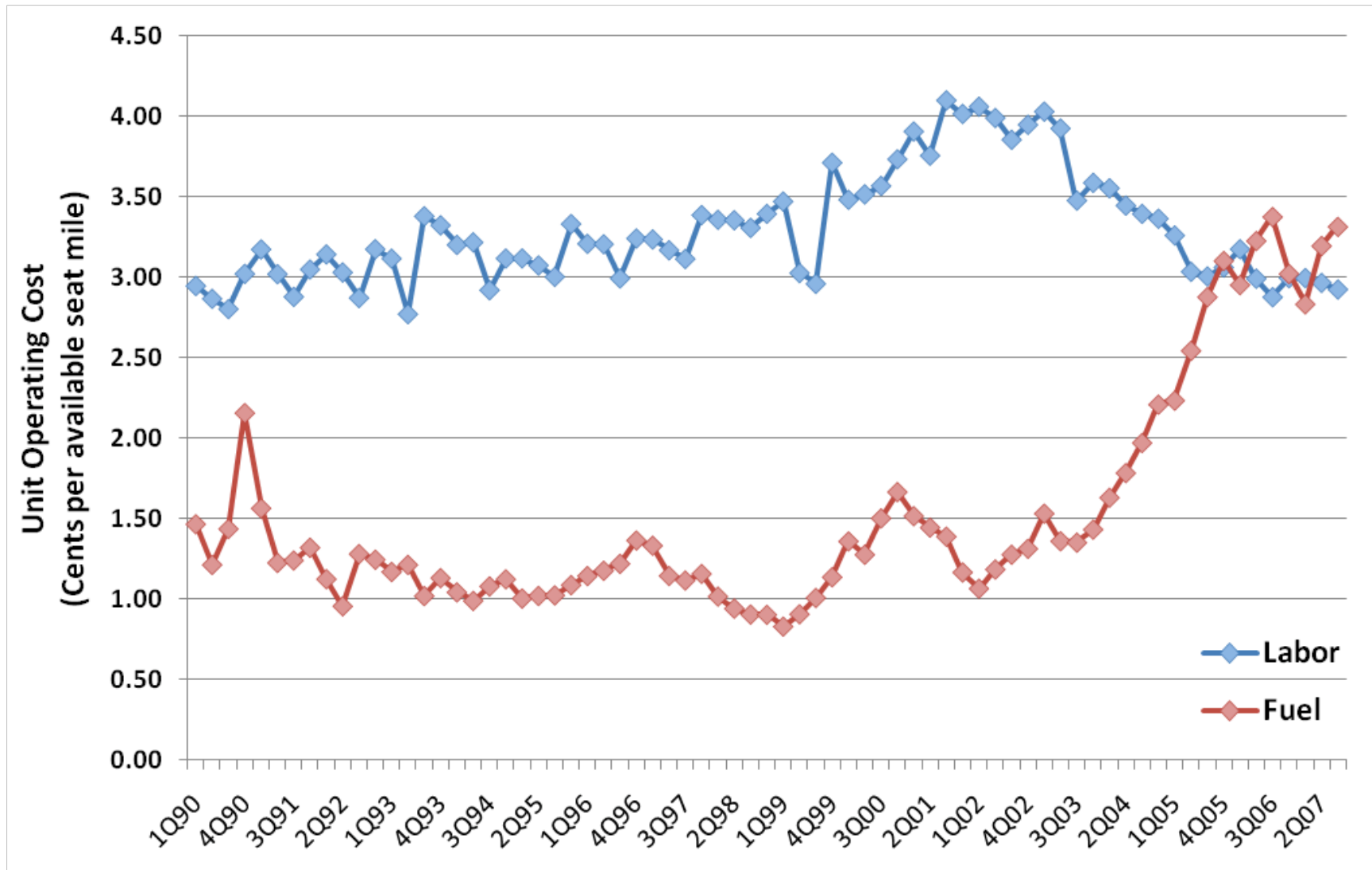
Average Crude Oil and Jet Fuel Prices



Data source: ATA: Fuel Cost and Consumption (oil data through Feb 2008, jet fuel data through Dec 2007)



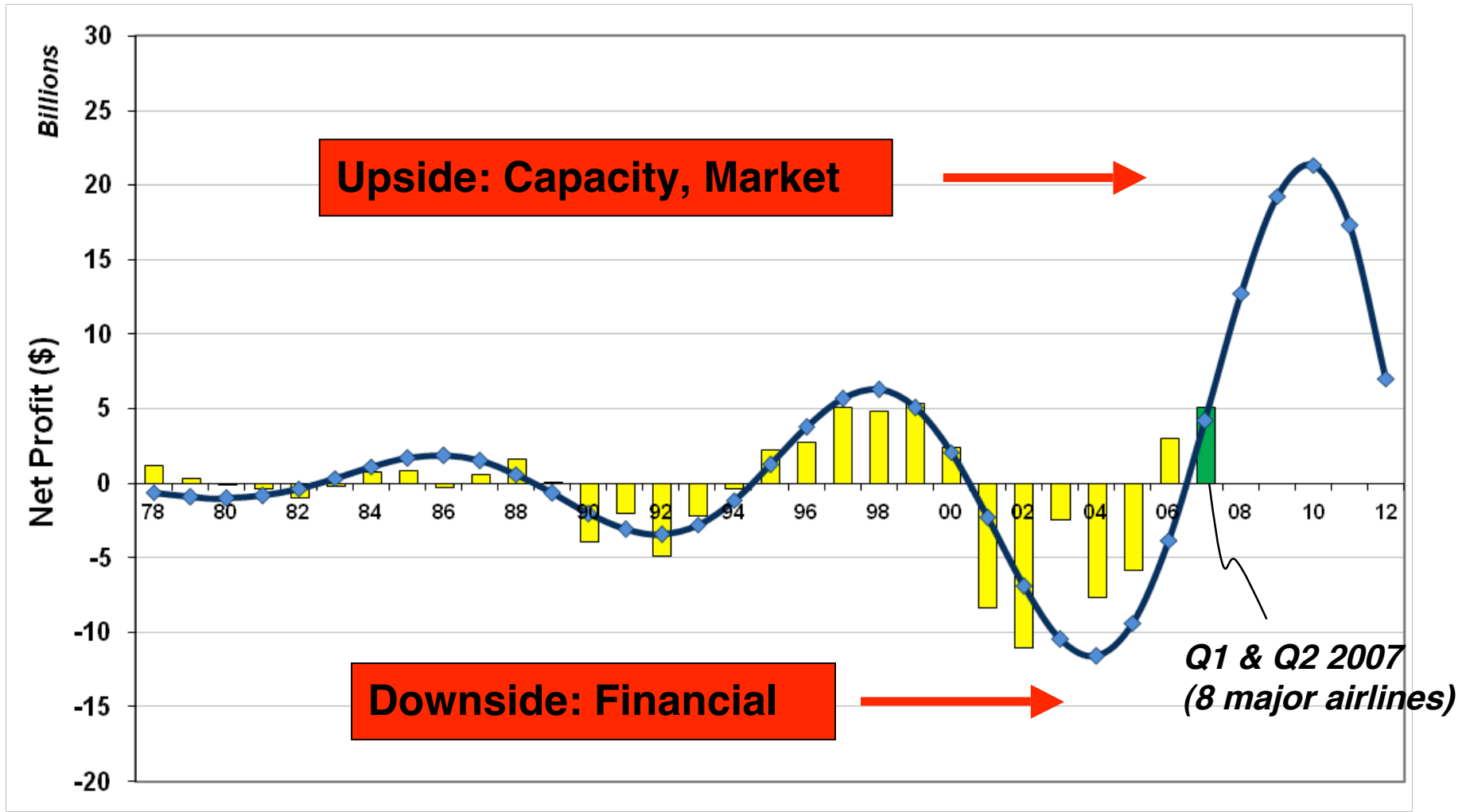
Unit Costs for Labor and Fuel



Data source: ATA U.S. Airline Cost Index, through 4th Quarter 2007



Growth Limits Constraints vs Damping

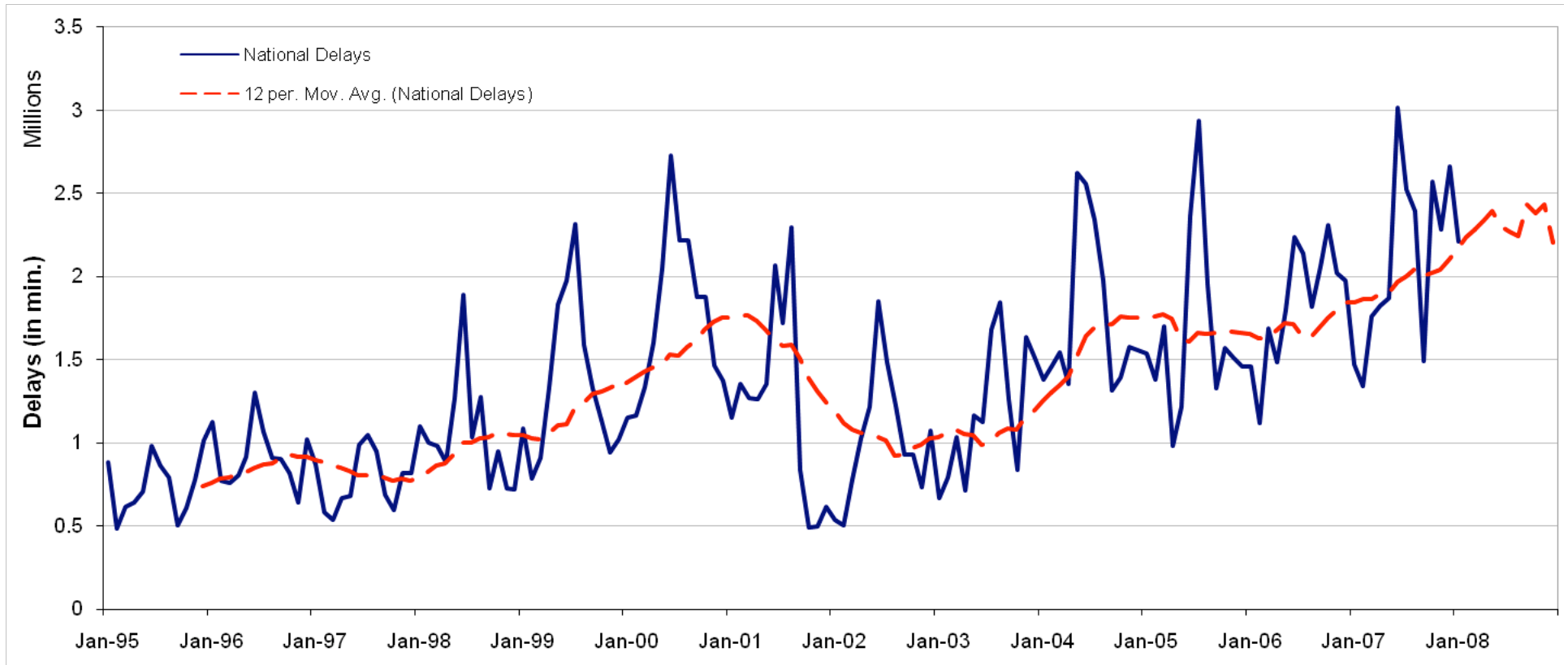


Data source: ATA - available at: www.airlines.org & Airline Quarterly Reports



US Flight Delays

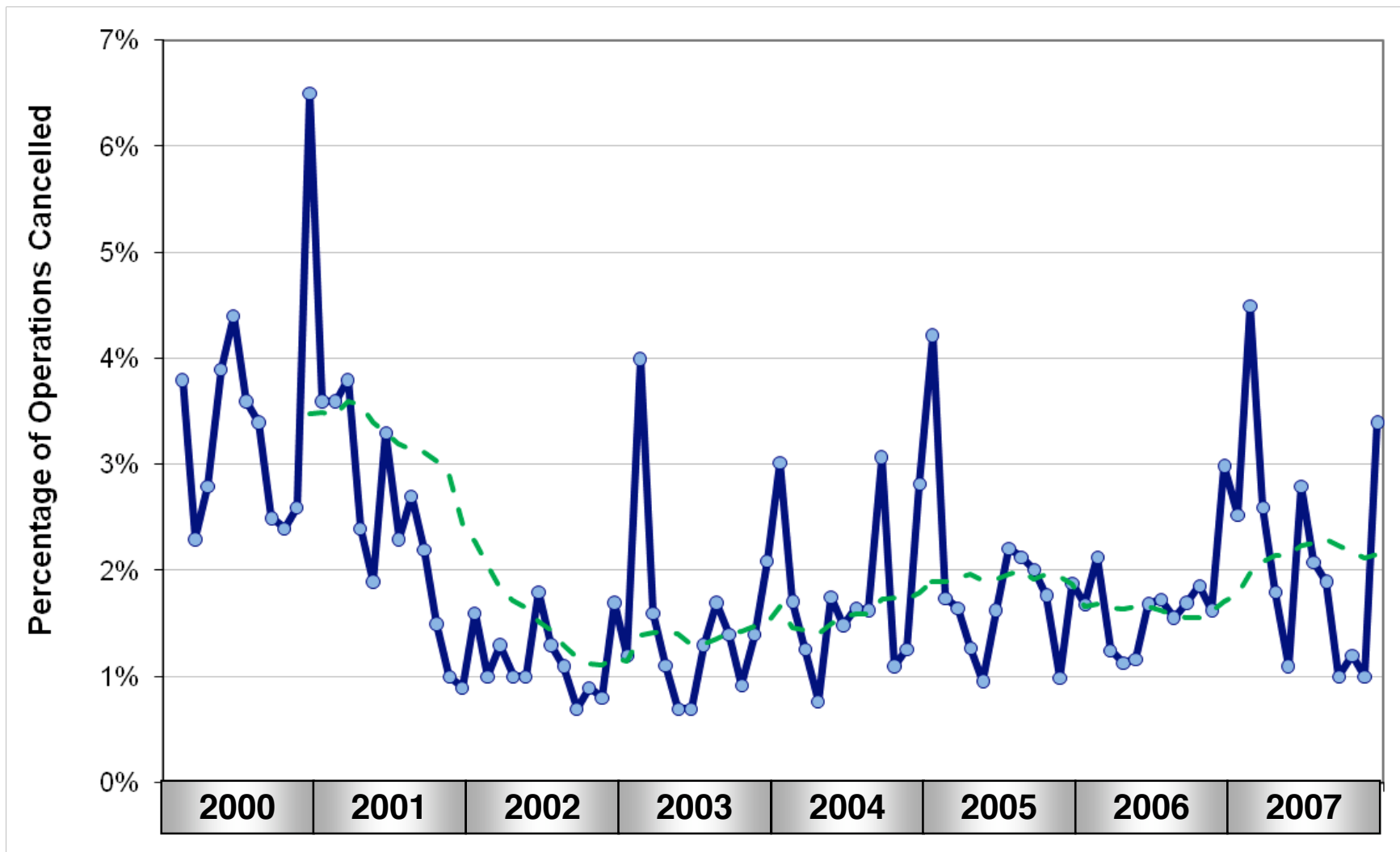
from 1995 to 2007



Data source: FAA Operational Network (OPSNET)



Flight Cancellations from 2000 to 2007 (by month)



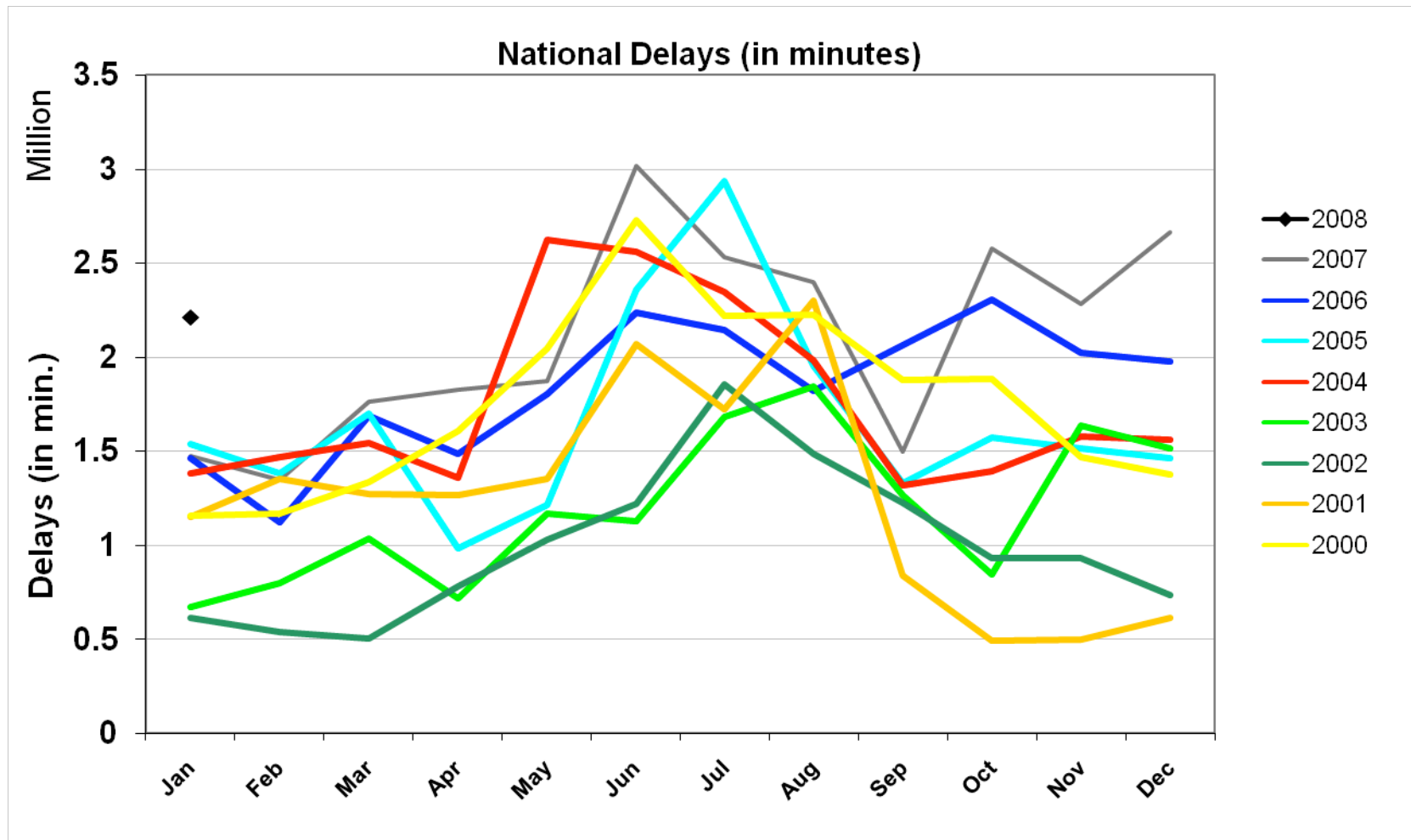
Source: DOT, Air Travel Consumer Report, <http://airconsumer.ost.dot.gov/> & BTS On Time Performance data

(top 11 airlines from 2000 to 2002, top 20 airlines from 2003 to 2007)



US Flight Delays

from 2000 to 2008

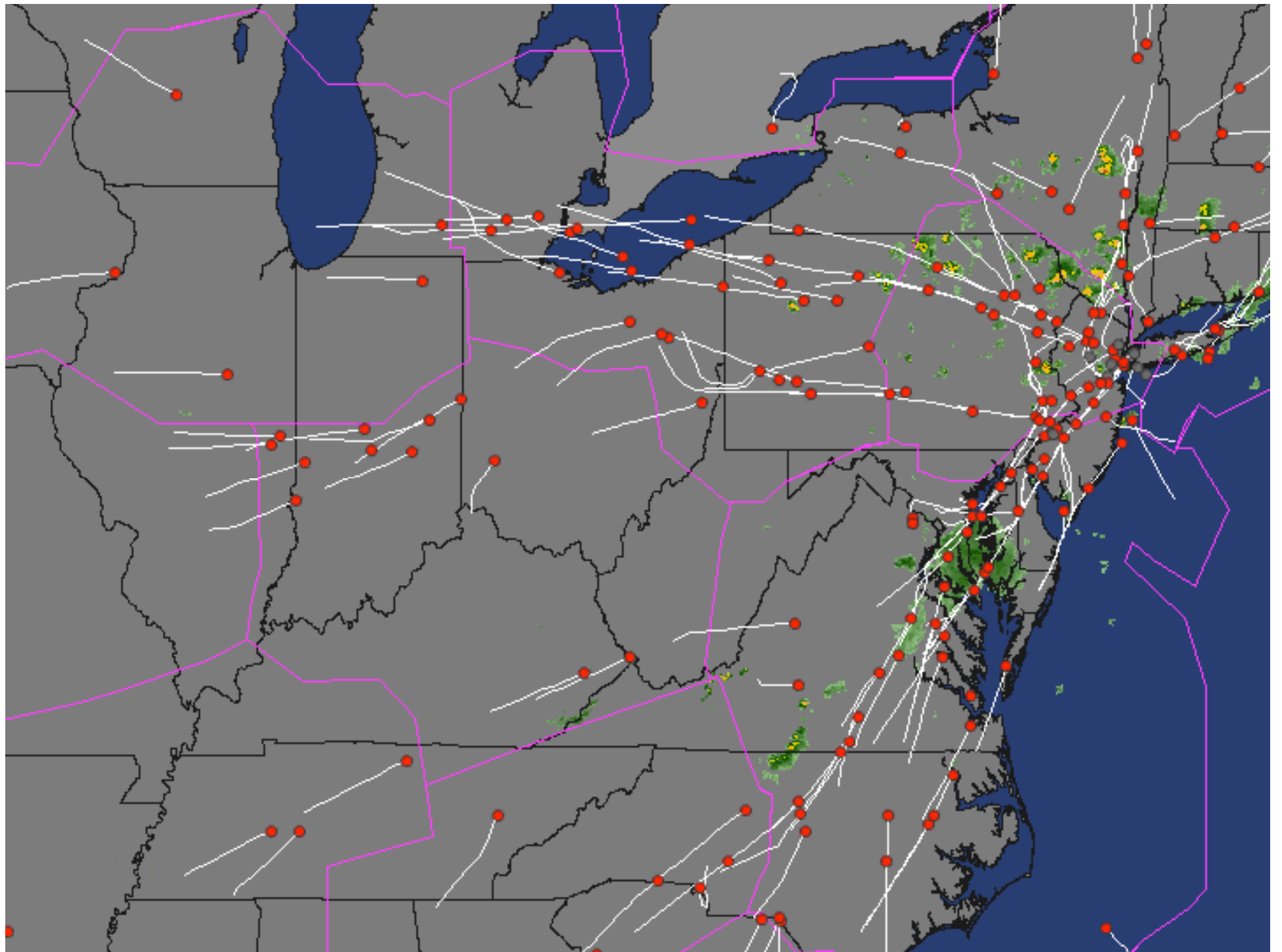


Source: FAA OPSNET data



Capacity Limit Factors

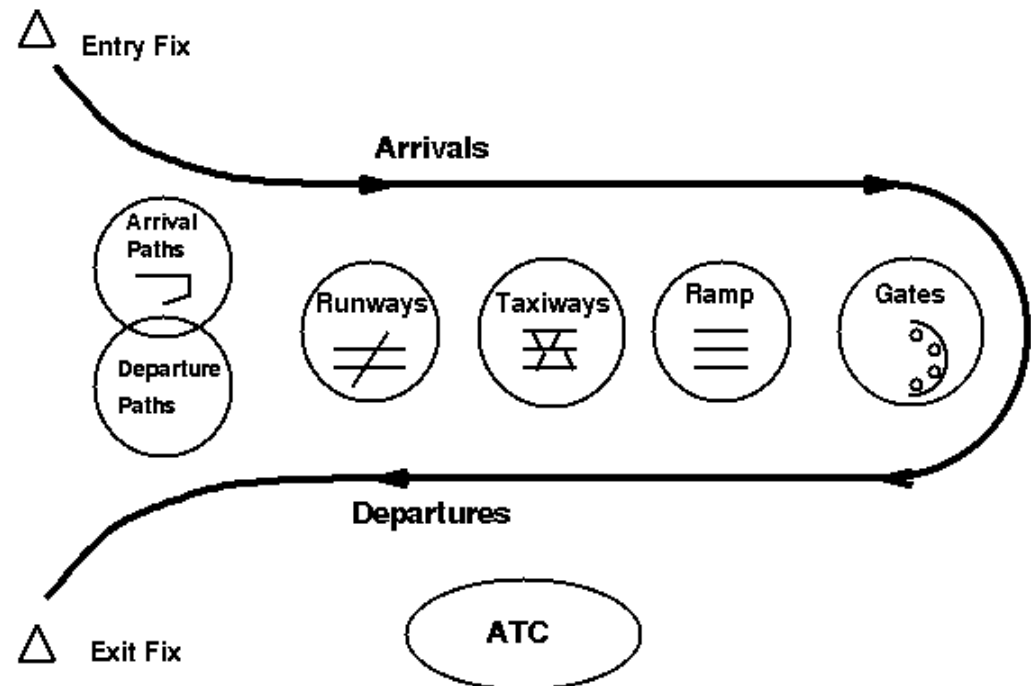
- **Airport Capacity**
 - Runways
 - Gates
 - Landside Limits (including Security)
 - Weather
- **Airspace Capacity**
 - Airspace Design
 - Controller Workload
 - Balkanization
- **Demand**
 - Peak Demand
 - Hub & Spoke Networks
- **Environmental Limits**
 - Noise (relates to Airport)
 - Emissions (local, Ozone, NOX, CO2)





Airport System Capacity Limit Factors

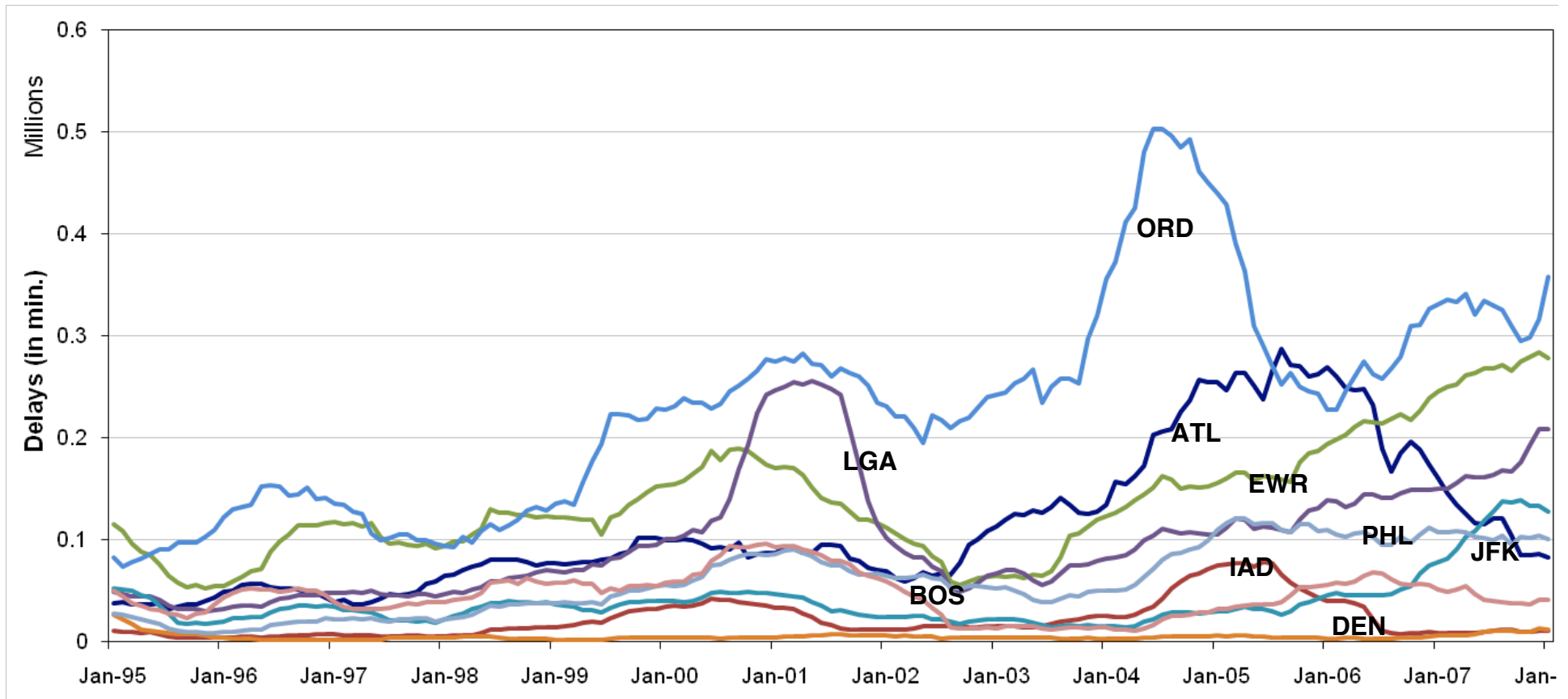
- **Runways**
- **Weather**
 - Capacity Variability
 - Convective Weather
- **Landside Limits**
 - Gates
 - Terminals & Security
 - Road Access
- **Downstream Constraints**
- **Controller Workload**
- **Environmental**
 - Community Noise
 - Emissions
- **Safety**





Flight Delays* (9 US airports) from 1995 to 2007

* Note: 12 month moving average

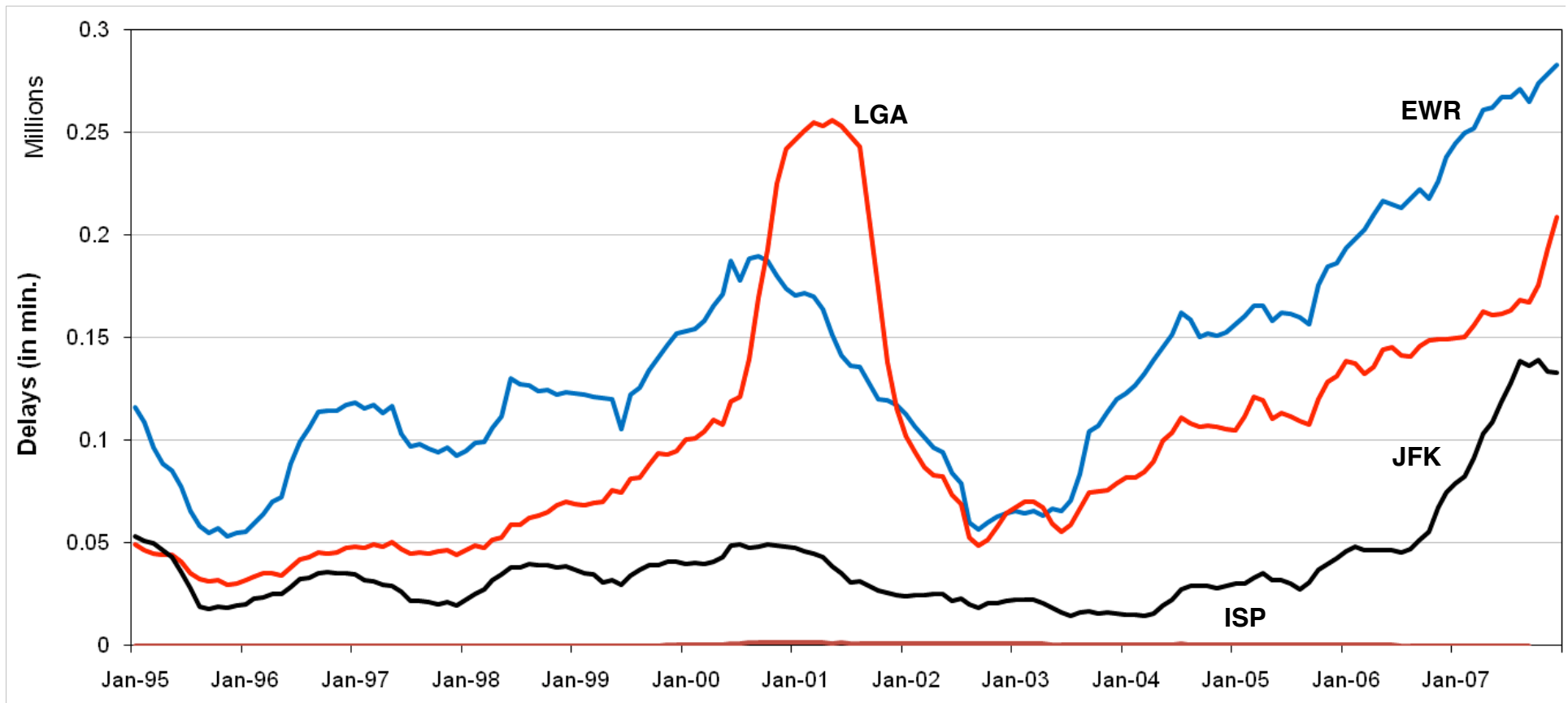


Data source: FAA Operational Network (OPSNET)



New York Airport Flight Delays* from 1995 to 2007

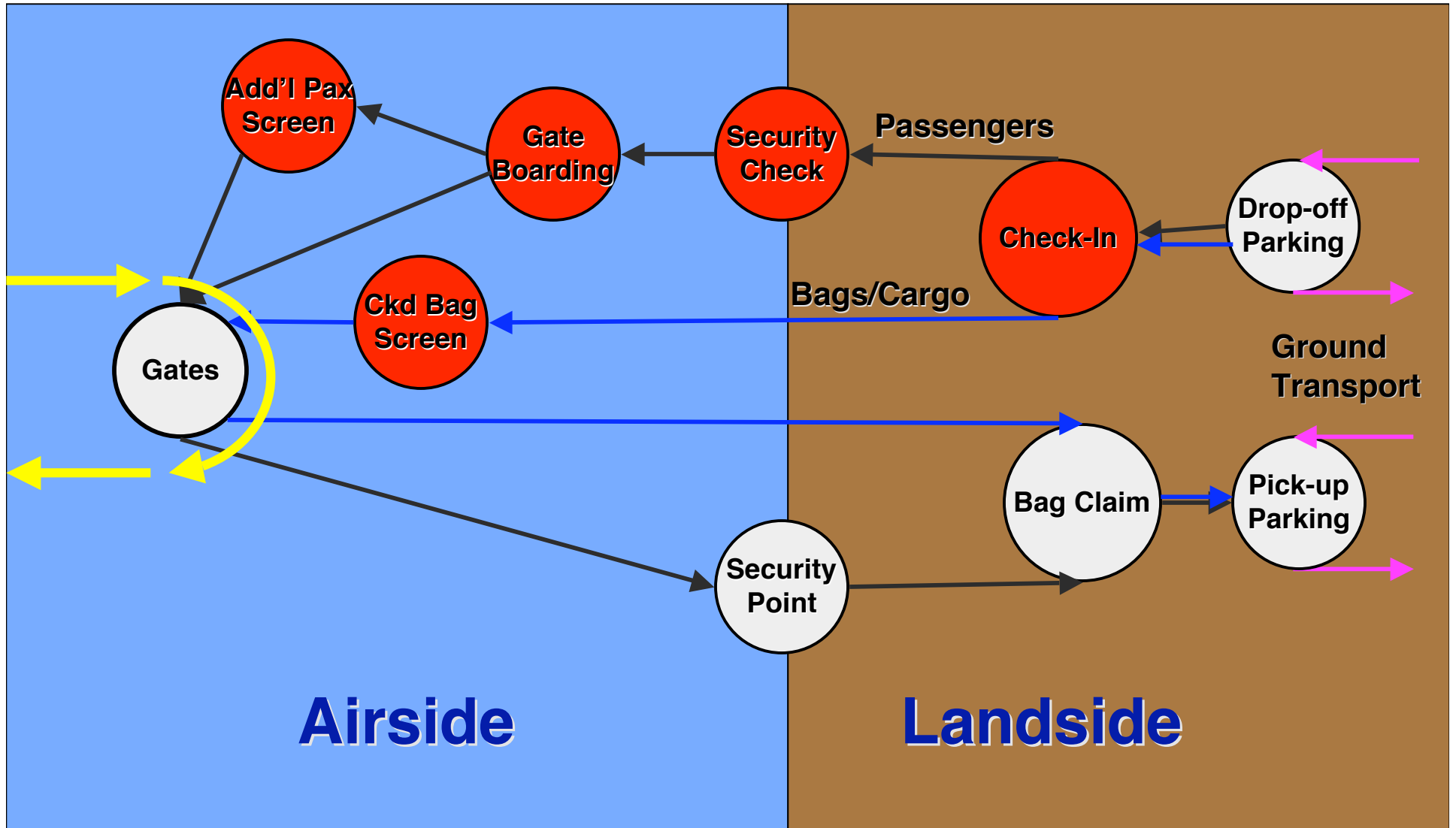
* Note: 12 month moving average



Data source: FAA Operational Network (OPSNET)



Key Terminal System Flows (adaptive system - impedance matching)





CTX 9000 Explosive Detector



500 Bags/hr



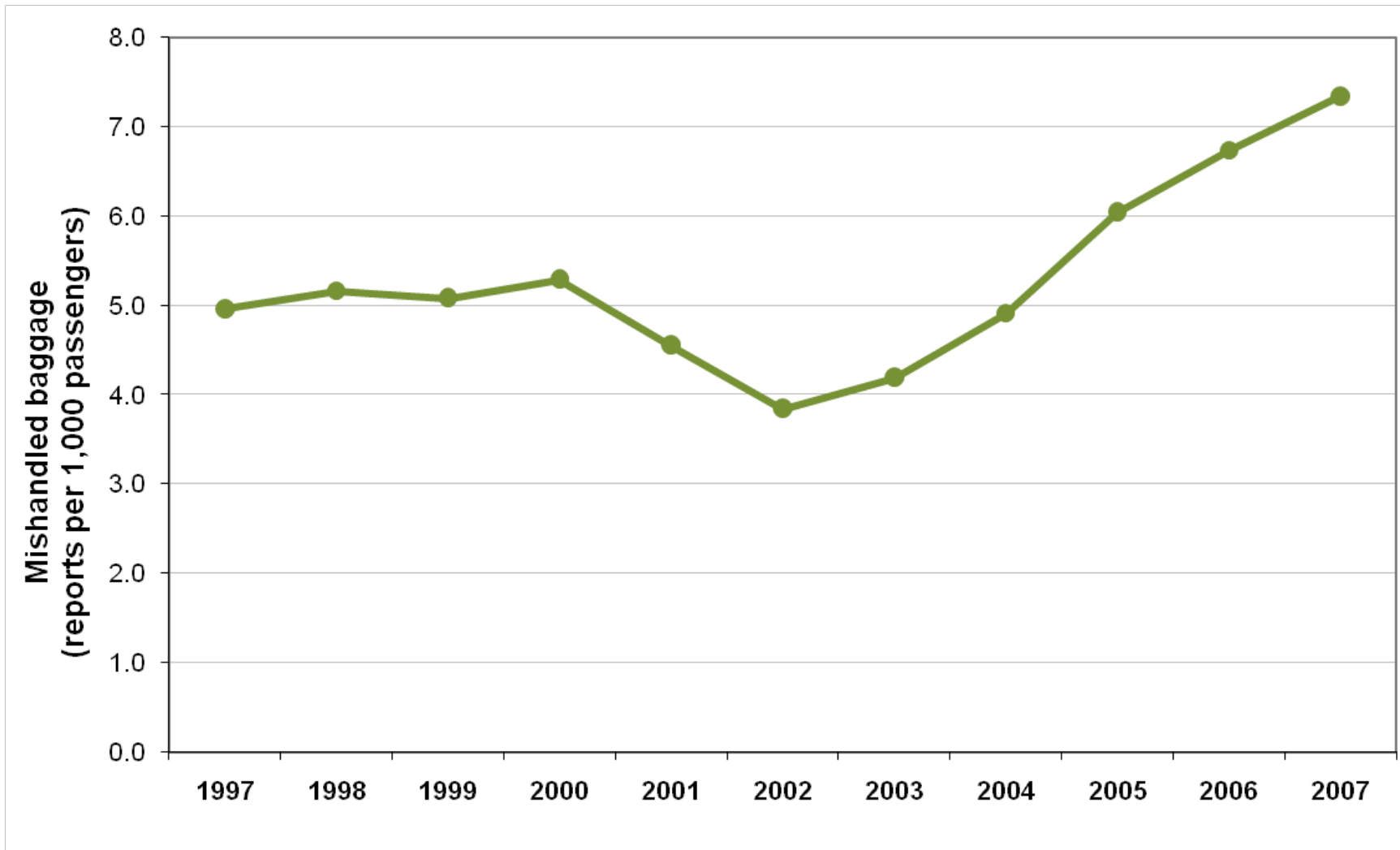
Aviation Remains Perceived Target Expanding Security Burden



NO LIQUIDS OR GELS OF ANY KIND WILL BE PERMITTED IN CARRY-ON BAGGAGE. THESE ITEMS MUST BE IN CHECKED BAGGAGE. This includes all beverages, shampoo, suntan lotion, creams, tooth paste, hair gel, and other items of similar consistency. Read our [Permitted and Prohibited Items list](#) for more information.



Mishandled Baggage from 1997 to 2007*

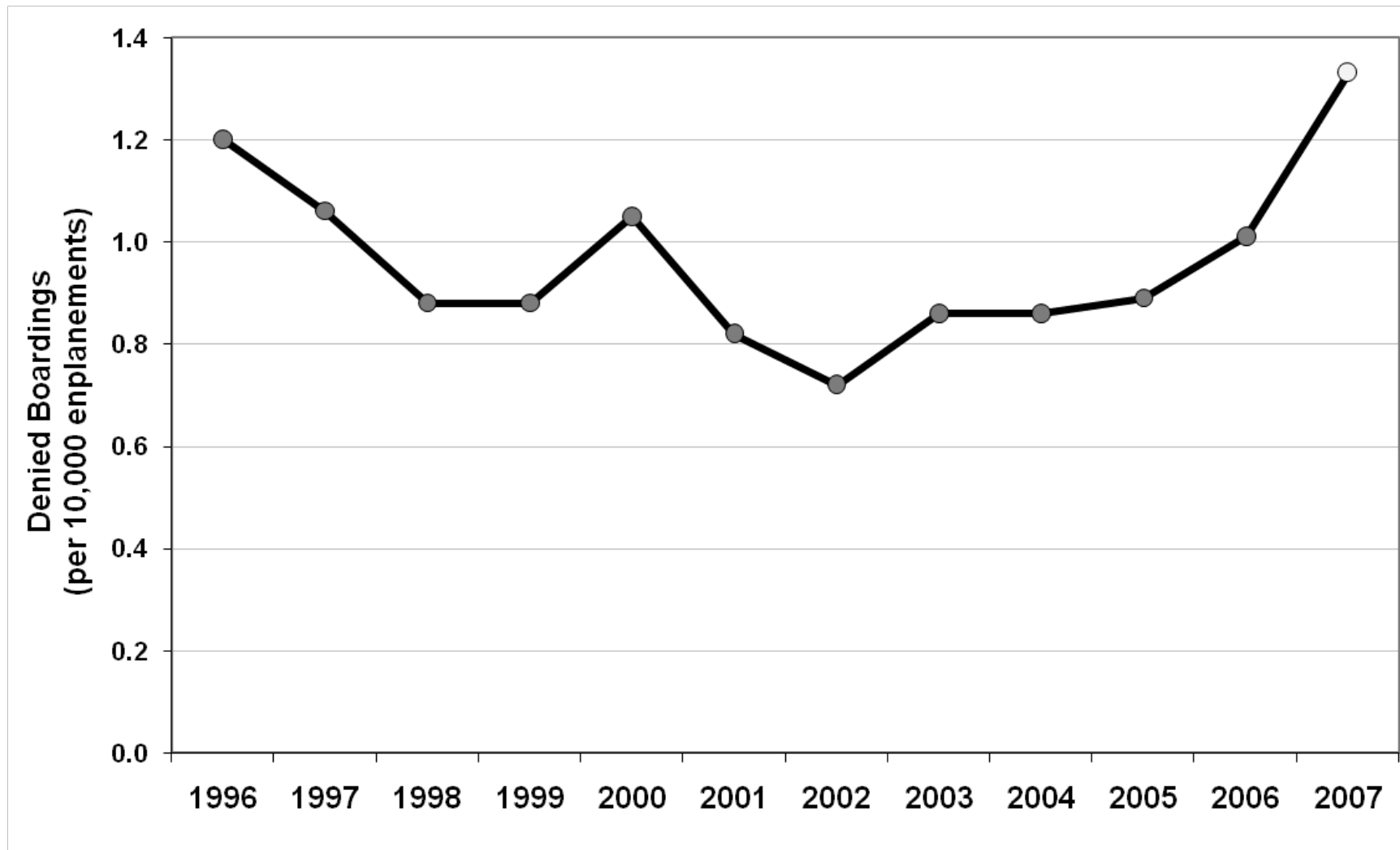


Note: 2007 data point for January to June 2007

Data source: DOT Aviation Consumer Protection Division, available at: <http://airconsumer.ost.dot.gov/>



Denied Boardings (DB's) from 1996 to 2007*

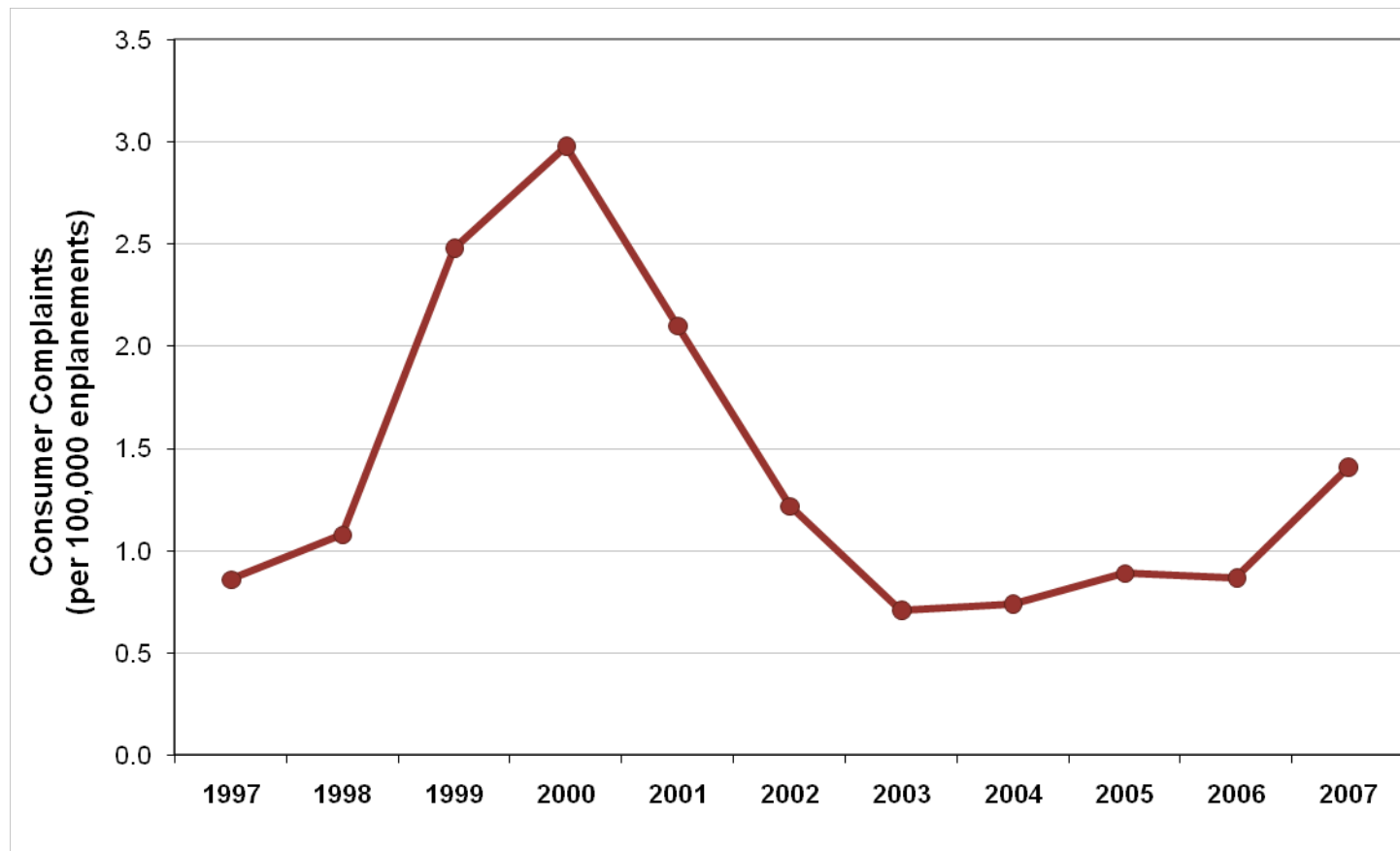


Note: 2007 data point represents average denied boarding (per 10,000 enplanements) for January to June 2007

Data source: DOT Aviation Consumer Protection Division, available at: <http://airconsumer.ost.dot.gov/>



Consumer Complaints from 1997 to 2007*



Note: 2007 data point represents average consumer complaints (per 100,000 enplanements) for January to March 2007

Data source: DOT Aviation Consumer Protection Division, available at: <http://airconsumer.ost.dot.gov/>



Other Threats

Portable SAMs

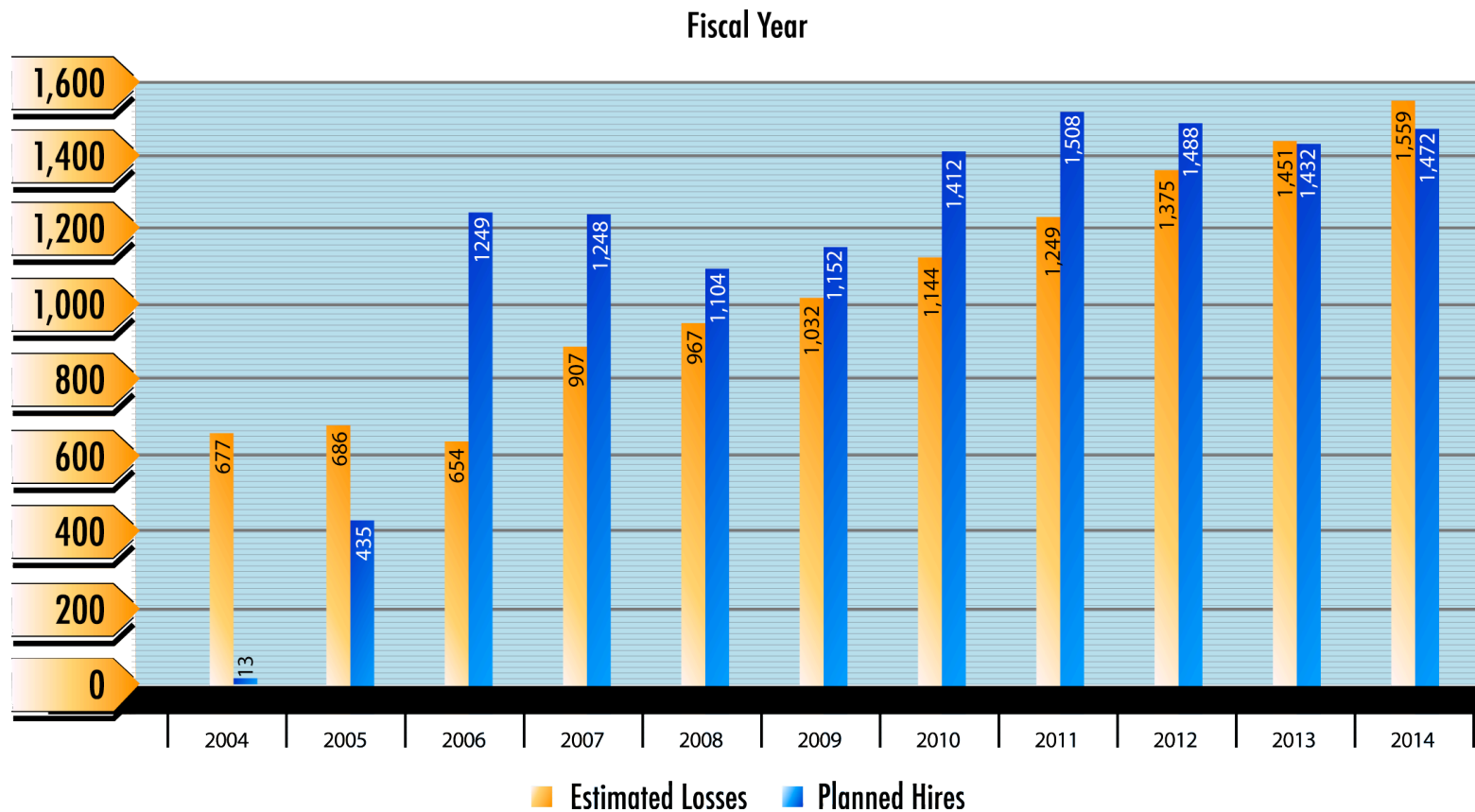
SAM-7 Fired at Arkia Airlines B757-300 Mombassa Kenya, Nov 2002





Air Traffic Controller Staffing

ATO Hiring Forecast vs. Losses



Time to CPC (Certified Professional Controller)

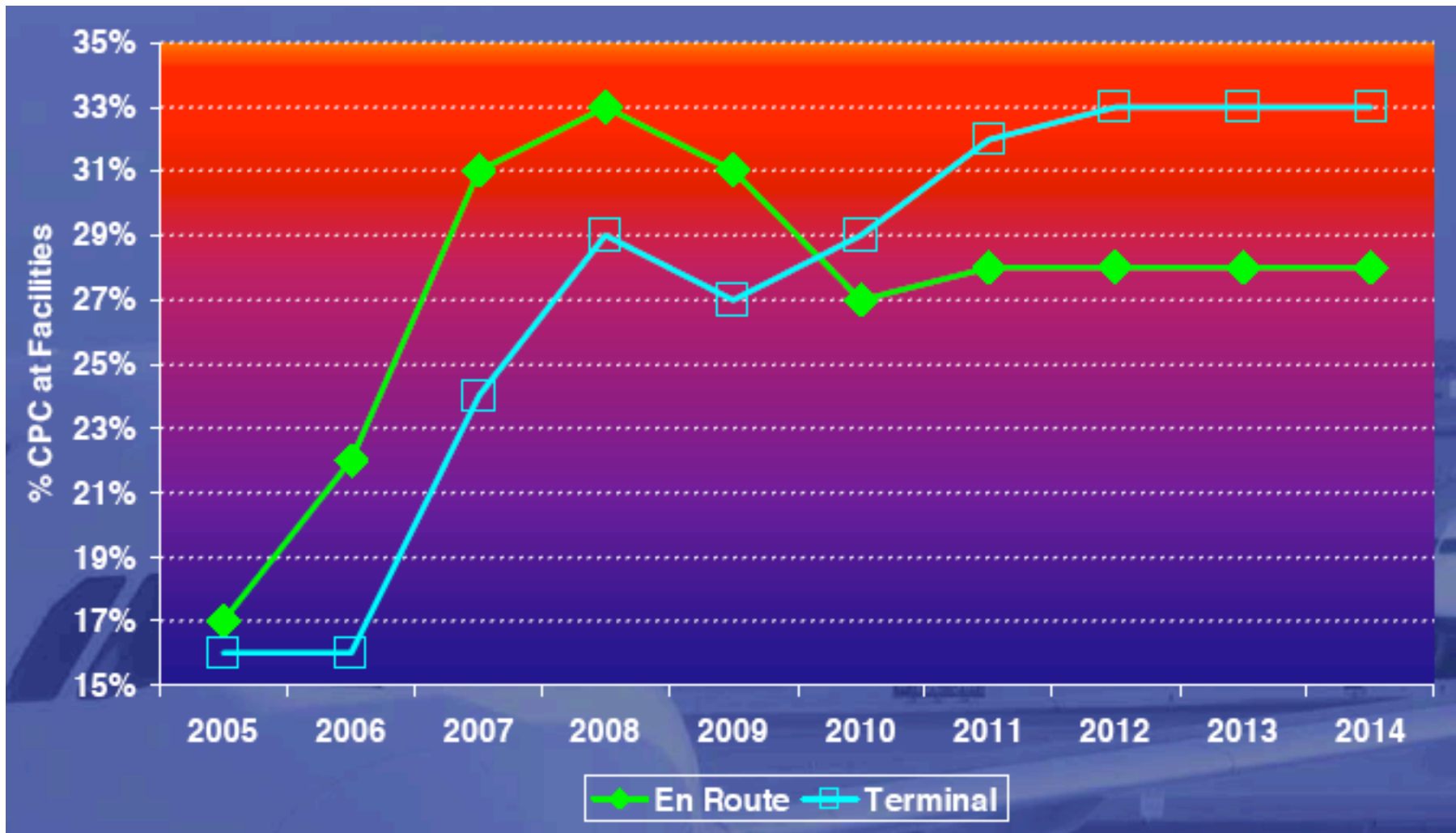
Terminal; 8 - 24 months

Enroute: 36 - 60

Source: *Air Traffic Controller Workforce Plan - 2004*



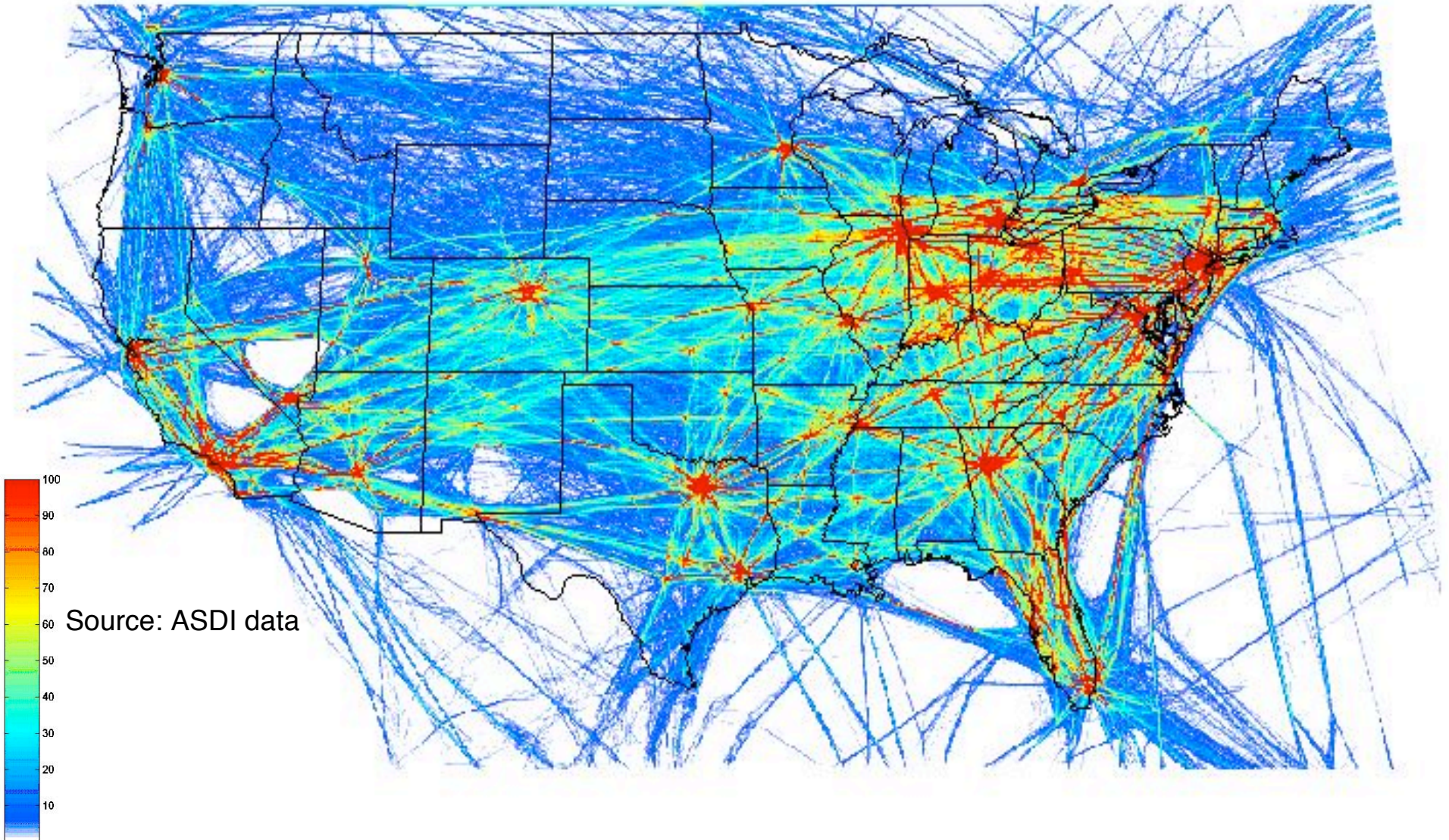
Projected % Developmental Controllers



From: ATCS Workforce Plan Briefing



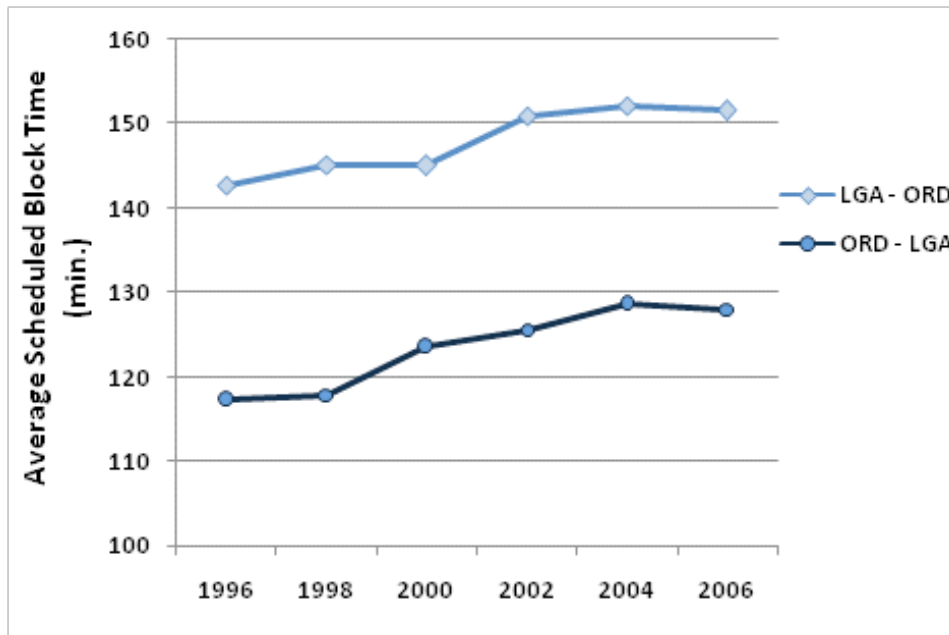
Congestion Driven Schedule Creep



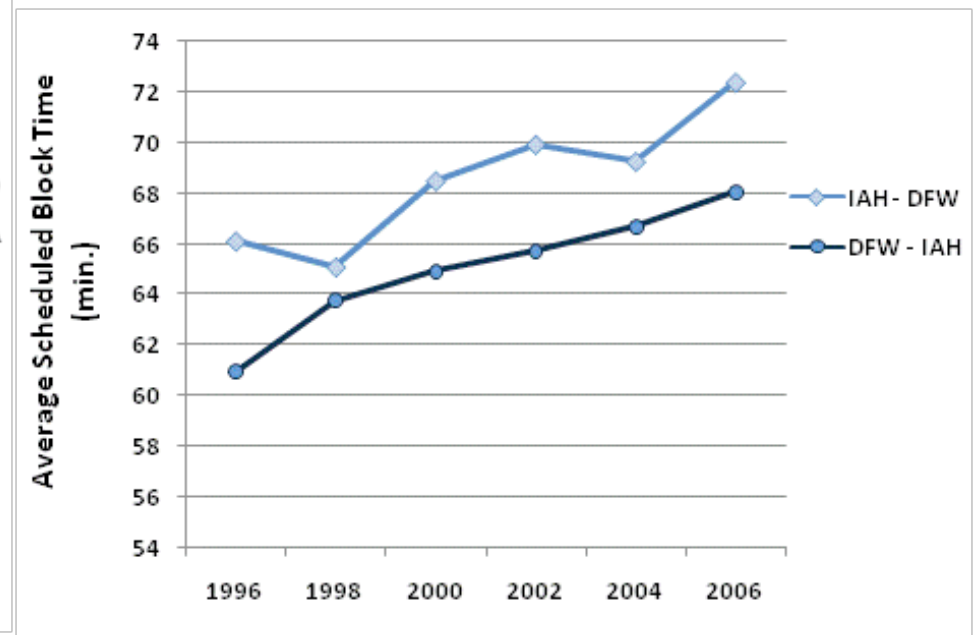


Historical Evolution of Scheduled Block Time (Month of April / from 1996 to 2006)

NY La Guardia – Chicago O’Hare



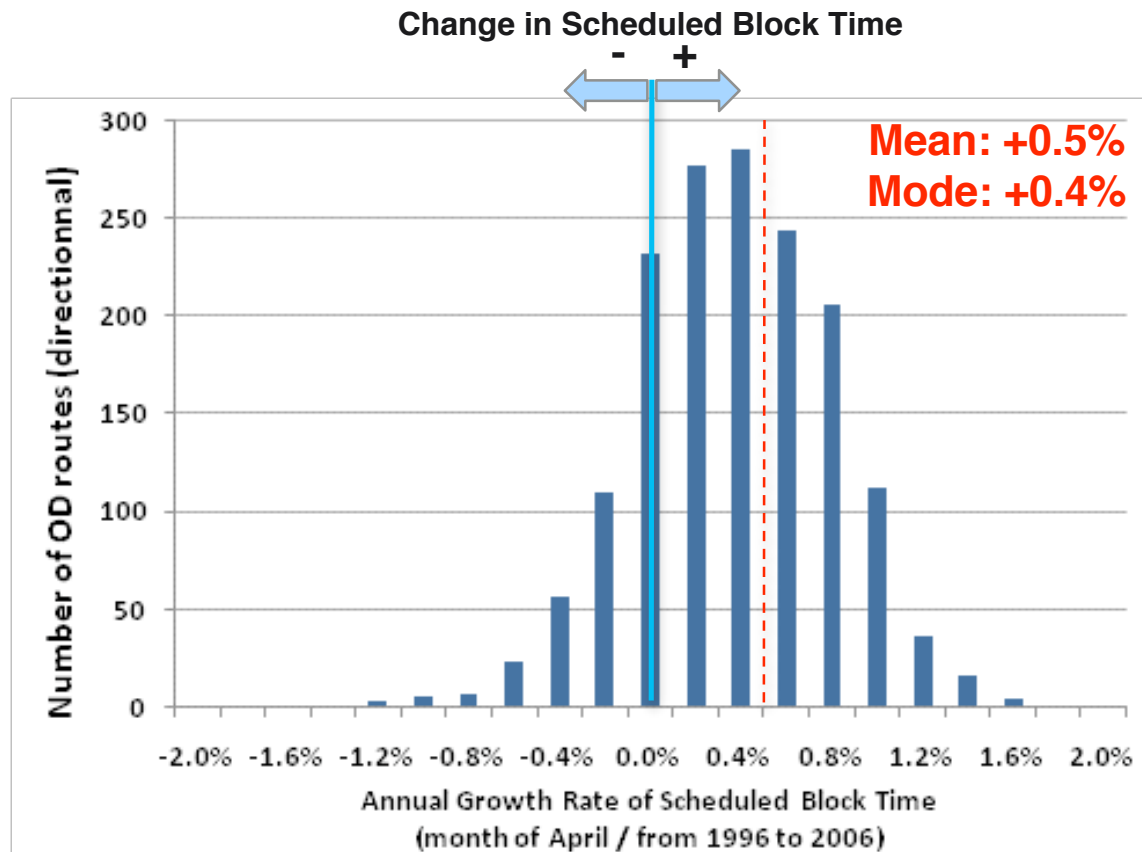
Houston – Dallas





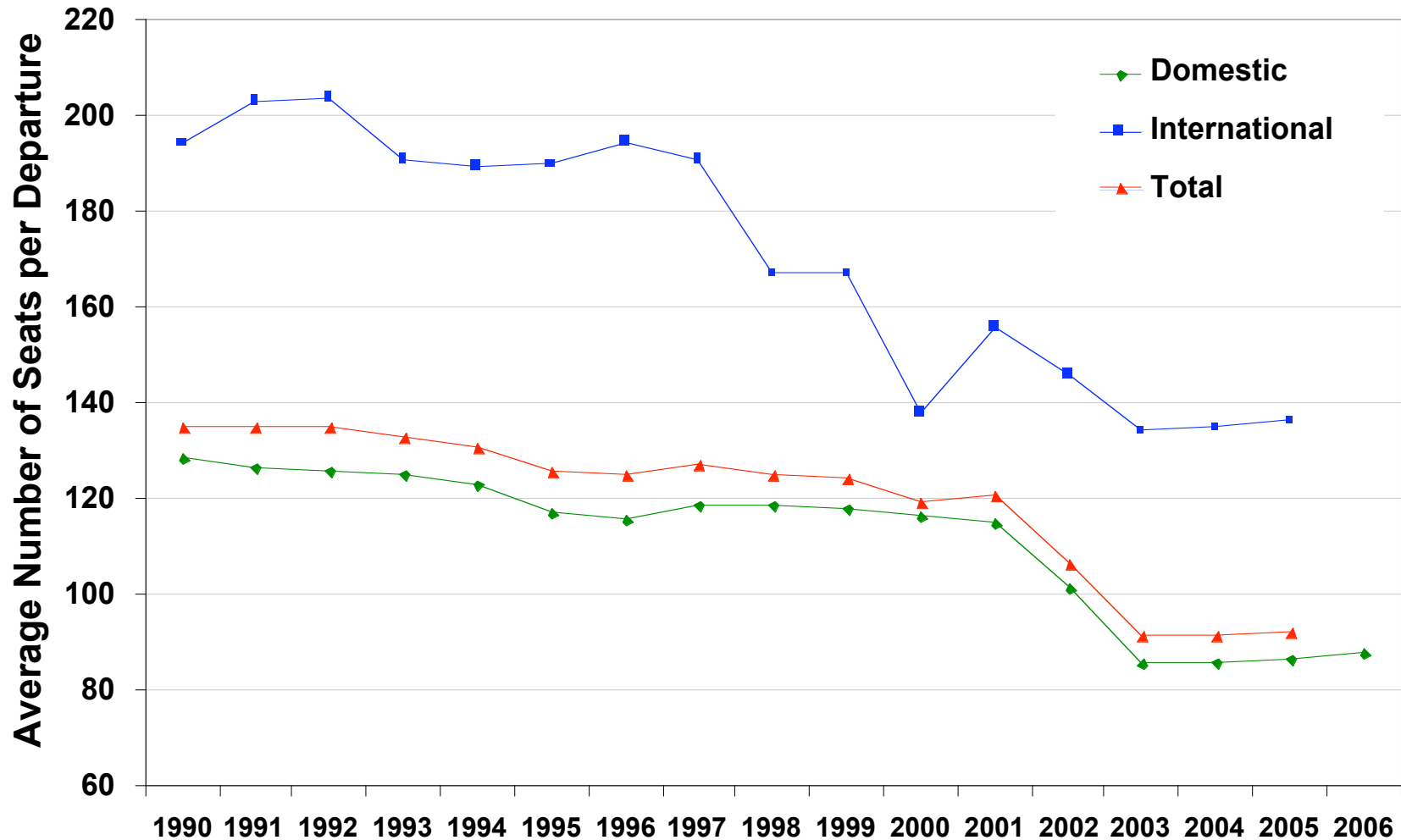
Annual Growth Rate of Scheduled Block Time (top 1950 OD routes)

- Analysis based on top 3000 OD routes (US Domestic – by US carriers)
- Filtered down to 1950 OD routes with uninterrupted service between 1996 and 2006 (April)
- OD routes covering 76% of total passengers in the U.S. in 2006





Trends in Aircraft Size



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



Most Common Regional Jets

ERJ 145 (50 seats)



About 400 aircraft in national fleet
About 2000 daily flights in January 2003

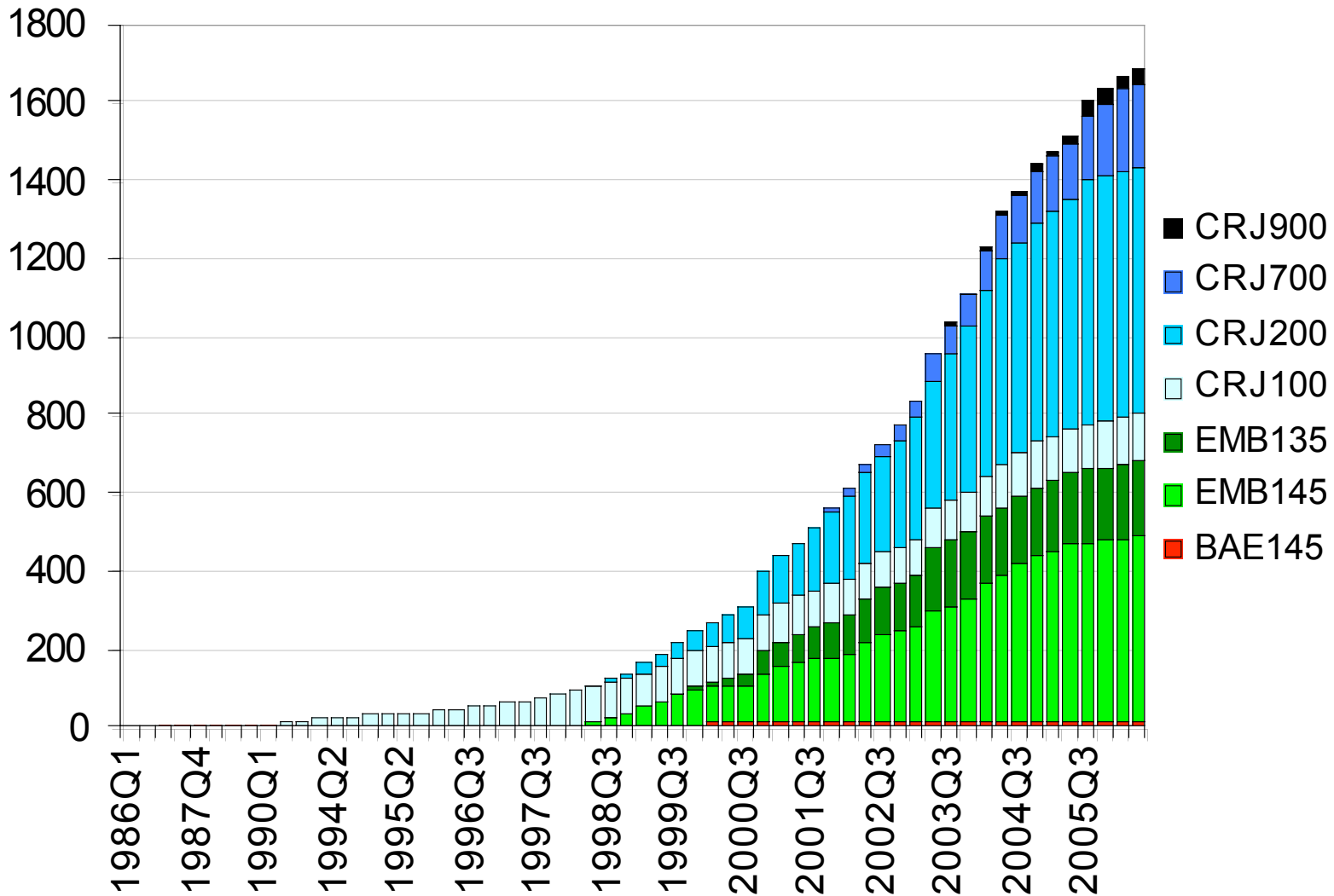
CRJ 200 (50 seats)



About 400 aircraft in national fleet
About 1500 daily flights in January 2003

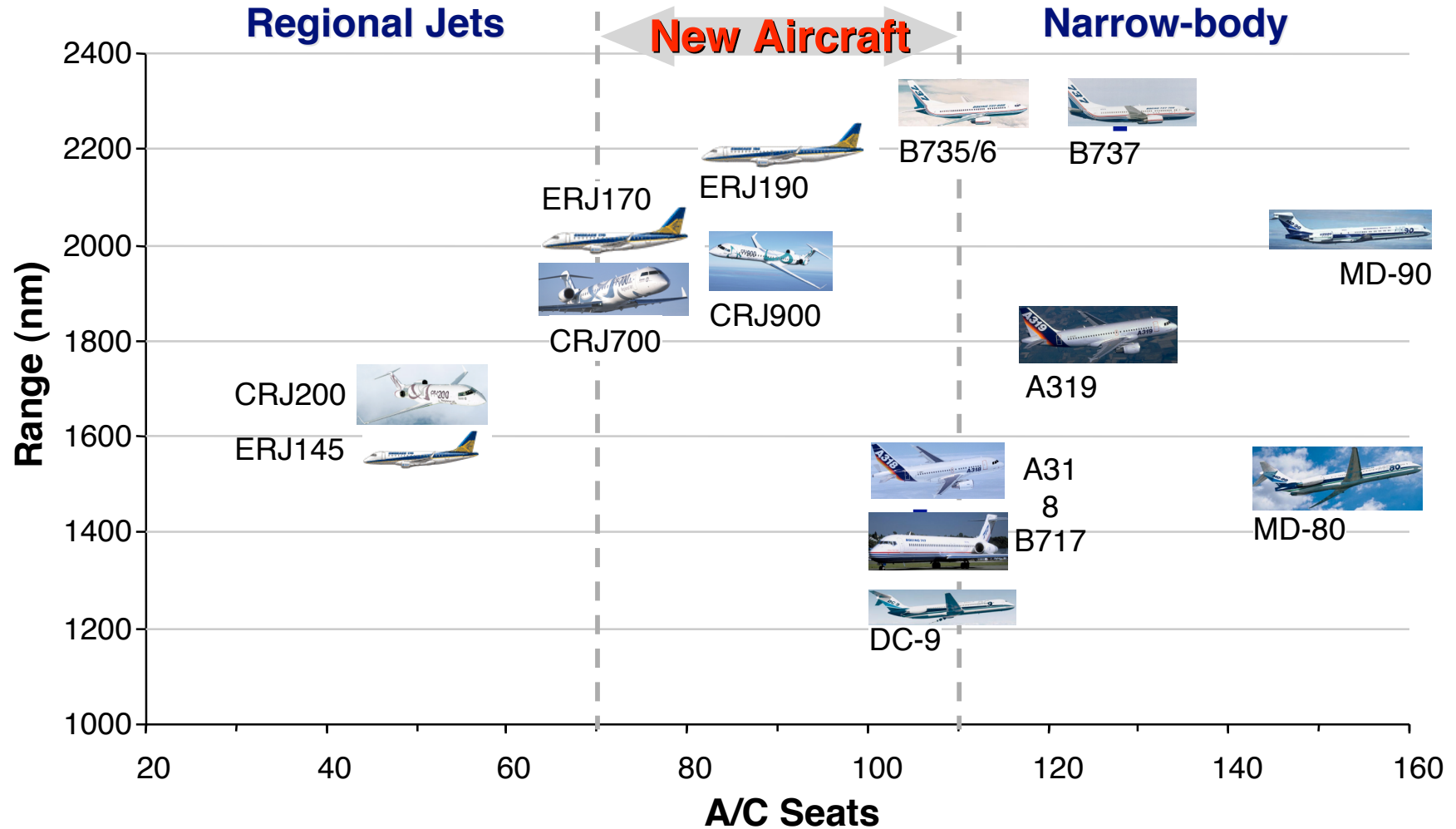


U.S. Regional Jet Growth



Source: FAA registration data from 1995 until the present

RJ-NB Boundary Blurred



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



EMB 190 Jet Blue Delivery (10/05)





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/>



A-380





B-787



-300 (290-330 pax) (3000-3500 nm)

-800 (210-250 pax) (8000-8500 nm)

-900 (250-290 pax) (8600-8800 nm)

“All New” A350

Not your fathers A330



250-300 Seats

7500-8800 nm Range

Source: <http://www.airbus.com>

13 Orders Prior to Paris Air Show



High Fuel Price Favoring Turboprops



	ATR42/72*	Bombardier Q series**
Backlog (firm orders)	179	100

* as of Aug 2nd 2007

** as of April 30th 2007



Very Light Jets

Small turbofan aircraft



Eclipse500
Eclipse Aviation



Mustang
Cessna



Adam700
Adam Aircraft



Phenom-100
Embraer



ProJet
Avocet Aircraft



D-Jet
Diamond Aircraft



Epic LT
Epic



HondaJet
Honda



Safire26
Safire Aircraft



Excel Sport Jet



Spectrum 33



Eviation EV-20

Aircraft characteristics*

- Passengers: **4 to 8**
- Acquisition price: **\$m 1.4 to 3.6**
- Cruise speed: **340 to 390 kts**
- Operating ceiling: **41,000ft to 45,000ft**
- Range: **1100 to 1750 NM**
- Take off field length: **2200ft to 3400ft**

Orders

- Eclipse: **2300**
- Adam: **75**
- Mustang: **330+**

** for twin-engine VLJs (excludes D-Jet)*



Regulatory Factors

- **De-Regulation (Re-Regulation)**
- **FAA Reauthorization**
- **Open Skies**
- **Airport Demand Management (LGA-ORD)**
- **Operating Regulations**
- **Security**
- **Performance Monitoring**
 - Data Quality Concerns
- **Passenger Bill of Rights**
- **Anti-Trust Considerations Changing**
 - Mergers (AA-TWA, UAL-US, Am West-US))
 - E-Commerce (Orbitz)



FAA Reauthorization '07

- **FAA Reauthorization bill: deadline Sept. 30, 2007**
- **Funding Modernization (NGATS)**
- **Contributions from the general fund? (18% > 50%)**
- **The “battle” over user fees:**
 - Airlines vs Business Aviation

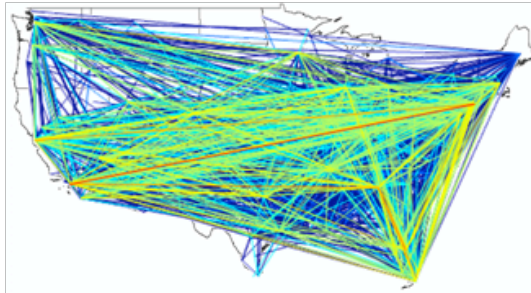
<u>Tax</u>	<u>Rate</u>	<u>Percentage of Total Tax Collections in FY 2004</u>
Ticket Tax	7.5% on Airfares	49.7%
Segment Tax	\$3.20 per Flight Segment	19.6%
Rural Airport Tax	7.5% on Airfares from Rural Airports	0.8%
Waybill Tax	6.25% on Price of Freight and Mail Transferred by Air	5.4%
GA and Jet Fuel	GA Fuel: 19.3 cents/gallon Jet Fuel: 21.8 cents/gallon	1.9%
Commercial Jet Fuel	4.3 cents/gallon	5.8%
International Departures/Arrivals	\$14.10 per international departure/arrival	14.4%
Alaska/Hawaii Tax	\$7.00 per domestic departure/arrival to Alaska or Hawaii	0.8%
Frequent Flyer Tax	7.5% on proceeds of third party sales of frequent flyer miles	1.6%
Total		100%

Source: FAA

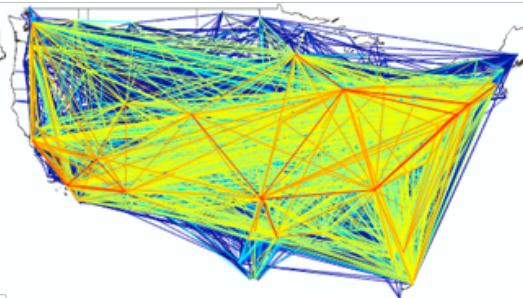


U.S. Air Transportation Networks

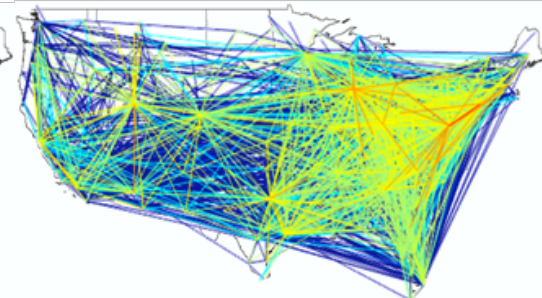
Wide Body Jets



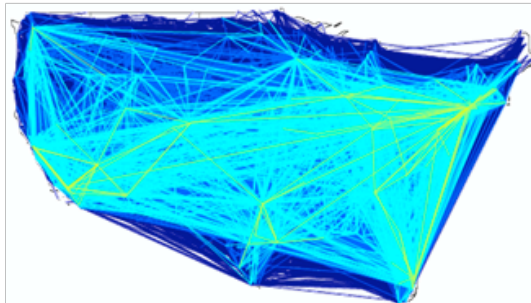
Narrow Body Jets



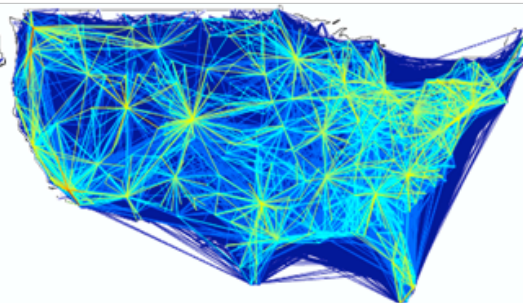
Regional Jets



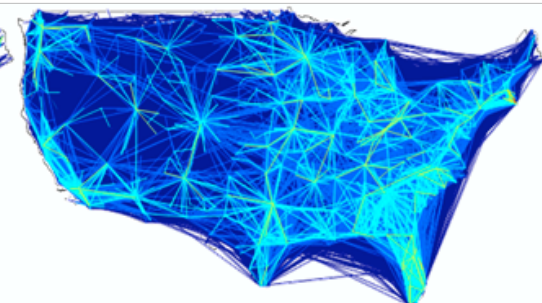
Business Jets



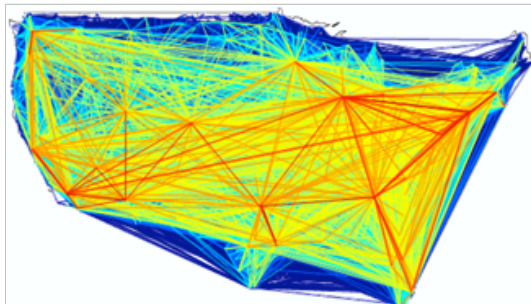
Turboprops



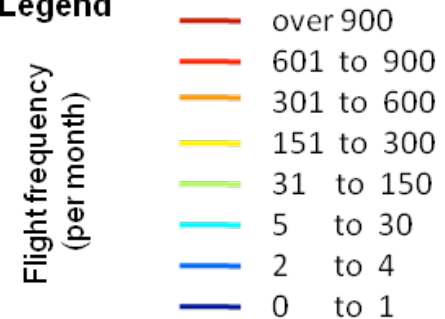
Light Piston



U.S. Air Transportation Network (all aircraft types)



Legend

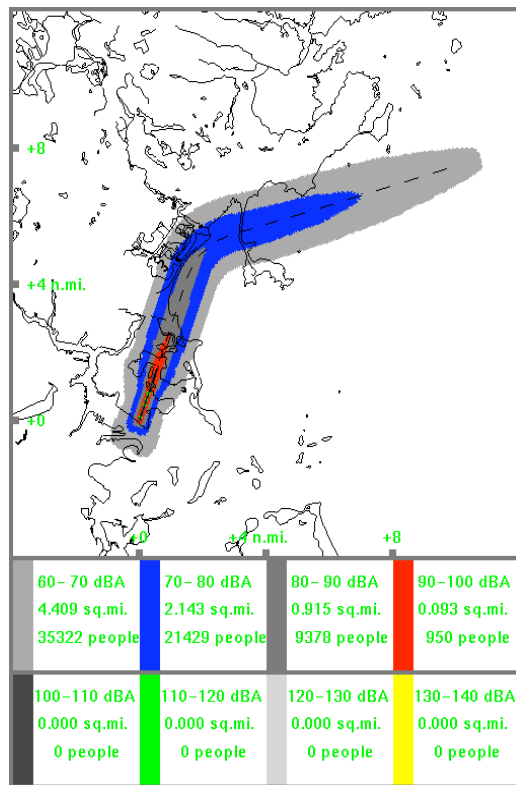


Data source: FAA ETMS Sept. 30th 2004 to Oct. 1st 2005



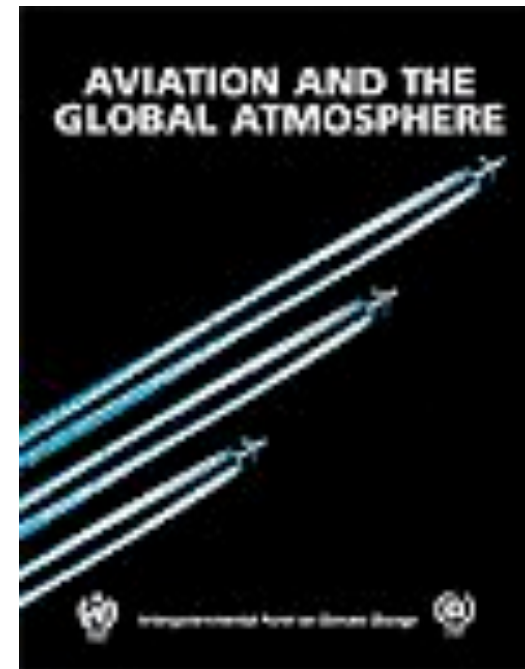
Environmental Issues

Noise



- Stage 4 (Equipment)
- Airports (Capacity)

Emissions



Intergovernmental Panel on Climate Change



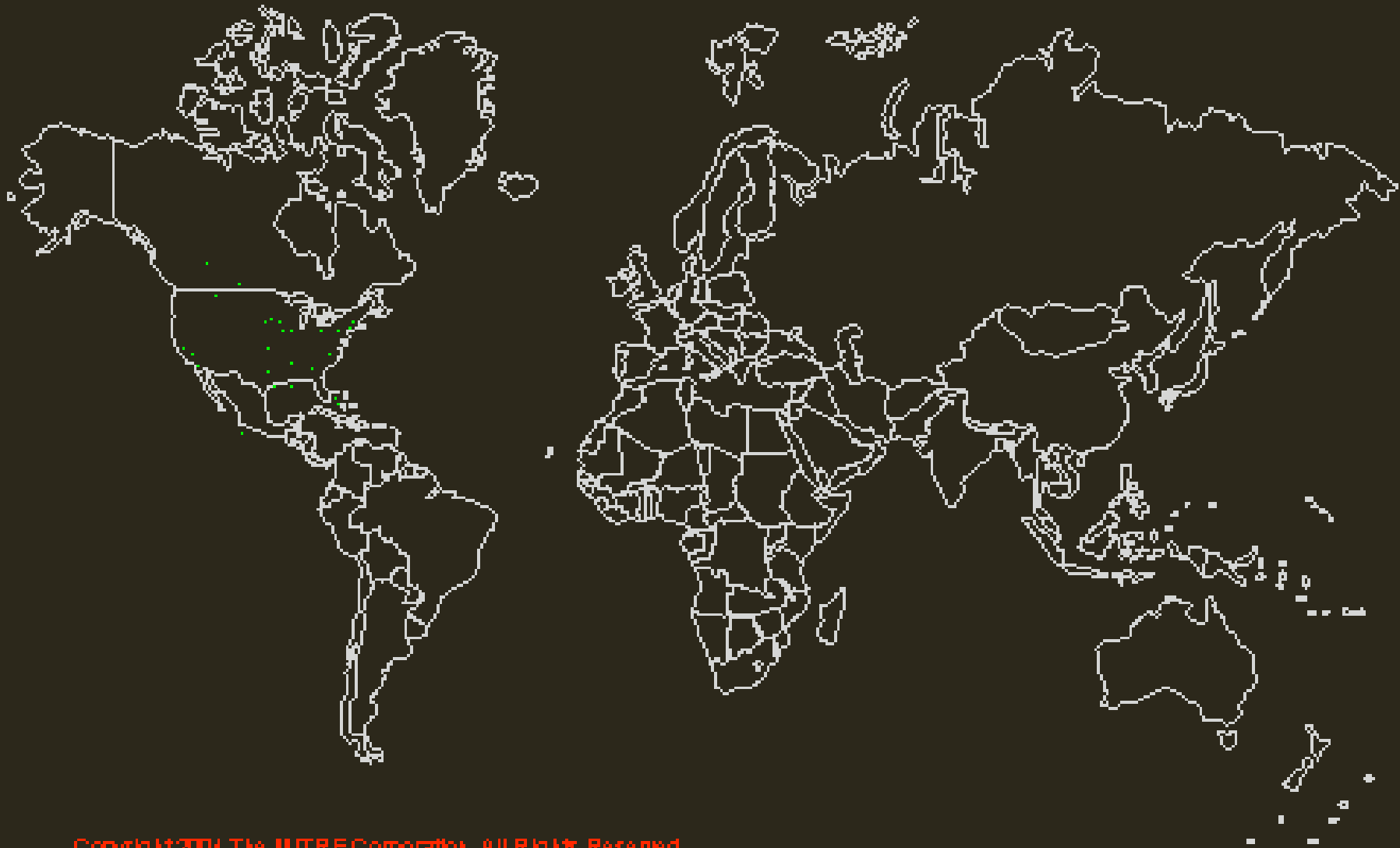
Media

- **Drives Public Perception**
 - Risk
 - Delays
 - Expectations
- **Drives Public Policy**
 - Congress - FAA - NTSB
- **Shorter Reaction Timescale**
 - CNN, Web
 - Proliferation of Digital Cameras and Distribution
 - eg Concorde Photographs



Concorde Accident





Copyright 2004 The MITRE Corporation, All Rights Reserved.