Overview of Recent Trends in the Airline Industry

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Traffic Source: Sage Analysis courtesy Prof. Ian Waitz

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World Population Distribution and Air Transportation Activity

Air Transport Source: ICAO, R. Schild/Airbus
Passenger and freight traffic represent RPK and FTK share in 2002
Conceptual Model

Economy

Direct / Indirect / Induced employment effects

Economic Enabling Effect
(Access to people / markets / ideas / capital)

Demand

Supply

Travel/Freight Need

Financial Equity/Debt Markets

Air Transportation System

Airlines

Pricing & Schedule

Revenue/Profitability

Vehicle Capability

NAS Capability

NAS

Vehicle Capability

MIT ICAT

Air Transportation System
Correlation Between US GDP and Scheduled Passenger Traffic

Source: US BEA and BTS data; Recession data from National Bureau of Economic Research
Air Cargo and GDP (Mainland China)

Relationship between carried air cargo and GDP

Carried Air Cargo (000 tonne) vs. GDP (1978 RMB Bn)

Data points from 1990 to 2002 are plotted on the graph.
US Passenger Growth Trends
Effect of De-Regulation

Scheduled Revenue Passenger Miles in US

Source: BTS data
European Passenger Growth Trends
Effect of De-Regulation

Scheduled Revenue Passenger-Kilometers in Europe

Source: ICAO data
Asian Passenger Growth Trends

Scheduled Revenue Passenger-Kilometers in Asia

Source: ICAO data
RPK by Region

Scheduled Revenue Passenger-Kilometers by Region

Source: ICAO, scheduled services of commercial air carriers
Freight Trends by Region

Freight Tonne-Kilometers by Region

Source: ICAO, scheduled services of commercial air carriers
US Airlines Net Profit Model

Best Fit of Undamped Oscillation

Cycle Period = 11.3 yr      eFolding Time = 6.3 yr

Predicted Losses
2003   $15.6 B
2004   $15.0 B
2005   $8.4 B
World Airline Net Profit Model
Best Fit of Undamped Oscillation
Cycle Period = 10.8 yr  eFolding Time = 8 yr

Predicted Losses
2003  $21.5 B
2004  $18.1 B
2005  $ 6.7 B

Net Profit (Current US$B)

World  World Fit
Hypothesize that instability driven by capacity response phase lag
Growth Limits
Constraints vs Damping

Upside: Capacity, Market

Downside: Financial
Medium Term Trends

• Trends since Sept 11

• Economic Down Cycle

• Capacity Reductions
  - Rolling Hubs
  - Regional Jet Usage

• Web Effects

• Low Cost Carrier Envy

• Bankruptcies

• Labor Reductions and Givebacks
US Domestic RPMs

Source: ATA, US member airlines, scheduled mainline service
US Airline Load Factors 2000-2003

Monthly Load Factor -- System
(Percent)

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

CASM
RASM

Security costs

Quick Recovery
Slow Recovery
Insolvency

$/ASM

9/11-9/13

Time
Air Transportation Stabilization Act
Internationally Seen as Bailout for US Airlines

- CASM
- RASM

9/11-9/13
12/31

Time

$/ASM

Quick Recovery
Insolvency
Slow Recovery
Aviation Disaster Relief
All Major Carriers On “Slow Recovery” Trajectory Except Southwest and Cargo

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
Current Market Cap vs. RPM Share
US Majors and ATA

Network vs Cost Efficiency Questions

Source: Yahoo! Finance and airline traffic reports
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)
Global Emergence of Low-Cost Carriers

Canada (5)
CanJet
HMY Airways
JetsGo Airlines

USA (19, 4 in 2003/2004)
AirTran
Allegiant Air
American West
ATA
Frontier Airlines
Interstate Jet
JetBlue Airways
Midwest Express
Pan American
Southwest Airlines

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

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

South America (3)
Bra
Gol
U Air

Africa (2)
1Time
Kulula

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

Total 107 LCCs, 15 in 2003/2004
US Airline Performance Cycling Up Faster Than Predicted

Prediction
2003 ($15.5B)
Actual
2003 ($1.8)
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

Historical: Average Jet Fuel and Crude Oil Prices

Source: ATA data; All US Majors, Nationals, Large Regional – All Services
Capacity and Delays
US Air Traffic Density (11/14/02)
Flight Delays Reemerging

OPSNET National Delays

Source: FAA
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**
Passenger Hassle Increased Delays Variable
Airport as an Adaptive System
CTX 9000 Explosive Detector

500 Bags/hr
Example EDS Before Ticketing Check In

Source: Transsolutions Website
Other Threats
Portable SAMs

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

Total 1,610 Jet Aircraft Stored

Source: Airclaims, published by ATW, July 2003
Emergence of Regional Jets

ERJ 145 (50 seats)  CRJ 200 (50 seats)
U.S. Regional Jet Growth

Source: FAA registration data from 1995 until the present
DFW Departures

January 1998

January 2003

Turboprop and Regional Jet Catchment Basin (500 nm)

Narrow Body Jet Catchment Basin (2400 nm)

Turboprop Catchment Basin (500 nm)

Regional Jet Catchment Basin (1700 nm)

Narrow Body Jet Catchment Basin (2400 nm)
Source: based on manufactures’ a/c specifications. Full pax range of standard version
• March Deliveries
  - Lot
  - Alitalia
  - US Airways

• Orders
  - US Airways
    - 85
• 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
Boeing 7E7

- Boeing 7E7 Baseline (20% fuel efficiency gain)
  - Short Range Version
  - Stretch Version
- Seating: 200 passengers in three-class configuration 300+ in single-class configuration
- Range: 7,800 nautical miles (14,500 km)
- WingSpan: 193 feet (59 meters)
- Length: 182 feet (56 meters) Cruise
- Speed: Mach 0.85 Cargo
- Capacity After Passenger Bags: 5 pallets + 5 LD3s
- Maximum Takeoff Weight: 452,500 lbs
- Program Milestones:
  - Authority to offer: Late 2003/Early 2004
  - Assembly start: 2006
  - First flight: 2007
  - Certification/Entry into service: 2008

http://www.boeing.com/commercial/7e7/k62790.html
Small Turbofan Passenger Aircraft

- Eclipse Jet
- Cessna Mustang
- Adam 700
- Honda Jet
Williams F22 Engine

- Derivative of Cruise Missile engine
- Automotive mass production techniques
- 700 lb thrust
- 14.5 inches diameter
- Low cost
- Originally planned for Eclipse Jet
- Reliability issues

- Other comparable engines
  - PW Canada PW 615F (1350 lb thrust) - Mustang
  - Honda-GE HF 118 (1650 lb thrust) - Honda Jet
Electronic Processing

- **Airline Tickets #1 Web Product by Value**
  - Browser 1st page effect on marketing
- **Increase in e-Tickets**
  - Interlining of e-Tickets
- **Kiosk check-in**
- **CAPPS II**
Distribution

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

Safety Trend

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

Source: Boeing 2001 Statistical Abstract