Airline Industry Trend Update

Prof. R. John Hansman

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

Prof. R. John Hansman

rjhans@mit.edu

Traffic Source: Sage Analysis courtesy Prof Ian Waitz

* Presentation for Educational Use Only
Freight Tonne Kilometers (FTK) by World Region

Data source: ICAO for 1970 to 2009
Relationship Between Economy and Air Transportation

Direct / Indirect / Induced employment effects

Economy

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

Demand

Supply

Pricing & Schedule

Travel/Freight Need

Financial Equity/Debt Markets

Revenue/Profitability

Airlines

Air Transportation System

NAS Capability

Vehicle Capability
Correlation Between US GDP and Passenger Traffic

Data source:
- GDP: US Bureau of Economic Analysis through Q1 2009
- Recession data: National Bureau of Economic Research
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
U.S. Airlines Net Profit
Best Fit of Undamped Oscillation –
Cycle Period = 11.3 yr

Data source: ATA – available at: www.airlines.org (accounting for 89 airlines) & Airline Quarterly Reports (Net Profits and Losses Exclude Special Items)

World Airlines Net Profit

Historical data

IATA (Forecast)

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

Data source: ICAO data (1978 to 2008) and IATA (2009-2010) Forecast from March 2010
World Airlines Net Profits vs. Aircraft Deliveries

Phase Lag between Airline Net Profits & Aircraft Deliveries: Hypothesize that instability driven by capacity response phase lag

Data source: ICAO data (Profit) and SpeedNews data (Aircraft deliveries)
U.S. Domestic ASMs and RPMs


Note: Data for 2010 - Jan to Feb. - from DOT Form 41 available from BTS – Projected to full year 2010 based on Jan-Feb. data.
Load Factor Trends

US Domestic


Note: Data for 2009 - Jan to May - from DOT Form 41 available from BTS
Historic Yield by Region

Data source: ATA Passenger Yield Report. Data through March 2010
U.S. Airline Quarterly Profits

Data sources: Airline Quarterly Reports (Net Profits and Losses Include Special Items)
Market Cap: US Majors
October 28th 2010

Total Market Cap: $43 billion

Data source: Google Finance.
RPM Share vs. Market Cap

Data Source: Google Finance for Market Cap data and Bureau of Transportation Statistics for RPM data
Market Cap: US Majors
26-May-2005

Total Market Cap: $21.2 billion

Data source: Yahoo Finance
Consolidation Trend

- Recent US Consolidation
  - Southwest and AirTran (pending)
  - United and Continental (approved)
  - Delta and Northwest (Oct 09)
  - USAir and America West
  - Potential for Additional Reactionary Moves

- Recent International Consolidation
  - Lufthansa and Austrian
  - Air France and KLM
  - Air France/KLM and Alitalia (25% ownership)
  - Lufthansa and Swiss
  - China Southern and China Northern and Xingjiang
  - Cathy Pacific and Dragon
  - BMI and Lufthansa

- International Strategic Investment in US Carriers
  - Lufthansa and JetBlue
  - Virgin and Virgin America
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
  o 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
  o Match EU’s 49% foreign control restriction
## Airline Alliances

### US DOT Antitrust Immunity

#### Star Alliance
- Adria Airways (JP)
- Aegean Airlines (A3)
- Air Canada (AC)
- Air New Zealand (NZ)
- ANA (NH)
- Asiana Airlines (OZ)
- Austrian Airlines (OS)
- Blue1 (KF)
- bmi (BD)
- Brussels Airlines (SN)
- Continental (CO) NEW
- Croatia Airlines (OU)
- LOT Polish Airlines (LO)
- Lufthansa (LH)
- SAS (SK)
- Shanghai Airlines (FM)
- Singapore Airlines (SQ)
- South African (SA)
- Spanair (JK)
- Swiss Intl Air Lines (LX)
- TAM Airlines (JJ)
- 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)
- Mexicana (MX)
- Qantas (QF)
- Royal Jordanian (RJ)

#### SkyTeam
- Aeroflot (SU)
- Aeroméxico (AM)
- Air Europa (UX)
- Air France (AF)
- Alitalia (AZ)
- China Southern Airlines (CZ)
- Czech Airlines (OK)
- Delta (DL)
- Kenya Airways (KQ)
- KLM (KL)
- Korean Air (KE)
- TAROM (RO)
- Vietnam Airlines (VN)

#### Prior Immunity
- Immunity Application In Progress or Recently Approved

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*Data Source: Wikipedia, BTN Online*
Crude Oil and Jet Fuel Price Trends

Fuel and Labor Unit Cost Trends

*US Data*

Data source: ATA U.S. Airline Cost Index,
Upward Trend in Ancillary Revenues
(20 largest US Carriers)

Source: BTS Form 41 schedules P-12 and T-2 for the 20 largest U.S. airlines
Ancillary revenue includes only: baggage fees, reservation change fees and miscellaneous operating revenue (the method used by the BTS)
Revenue from seating assignments and on-board sales of food, drink, pillows, blankets, entertainment, or any other ancillary items is NOT included
Proportion of Revenue from Ancillary Sources (20 largest US Carriers)

Source: BTS Form 41 schedules P-12 and T-2 for the 20 largest U.S. airlines

Ancillary revenue includes only: baggage fees, reservation change fees and miscellaneous operating revenue (the method used by the BTS)
Revenue from seating assignments and on-board sales of food, drink, pillows, blankets, entertainment, or any other ancillary items is NOT included
Trends in Ancillary Revenue Breakdown
(20 largest US Carriers)

Source: BTS Form 41 schedules P-12 and T-2 for the 20 largest U.S. airlines
Ancillary revenue includes only: baggage fees, reservation change fees and miscellaneous operating revenue (the method used by the BTS)
Revenue from seating assignments and on-board sales of food, drink, pillows, blankets, entertainment, or any other ancillary items is NOT included
Labor Productivity Trends

US Data

Data Source: ATA US Airline Cost Index: Major & National Passenger Carriers, Q2 2010
Electronic Distribution and 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
  - Domestic 40% in 2005 to 97% in 2008

- **IATA**
  - Only e-tickets after June 1 2008
  - 94% of Intl Passengers

- **CAPPS II**
Increased Price Transparency
U.S. and Canadian Operators Accident Rates by Year

Annual fatal accident rate (accidents per million departures)

Year

1989 Through 2008

Rest of the world
U.S. & Canadian operators

2008 STATUTORY SUMMARY, JULY 2009
USAir 1549
15 - Jan - 2009
Colgan Air
12 – Feb - 2009

Crew Issues
  Training
  Commuting and Fatigue
  Compensation ($16K - $20K)
  Professionalism
Regional Airline Trends

- **Increasing Coverage in Domestic Markets**
  - US Example
    - 50% Departures
    - 25% Passengers
    - Sole service (400 communities)

- **Increasing Safety Scrutinity**
  - NTSB Hearing (Oct 2010)
  - Congressional & Media Pressure
  - Training and Crew Rest Actions

- **Implications for Code Share Partners**

Source: AP  Data Source: BTS: T-100 Domestic Market and Domestic Segment
Air France 447
27 - Aug - 2009

Source: BBC
Yemenia 626
30 – June - 2009

- Airbus A310-300
  - 19 year old airframe
- 152 Fatalities, 1 Survivor
- Night approach to runway 20
  - Good visibility
- Complex “circling” approach

Approximate accident location

Wind from South
Gust ing up to 38 kt.
• 90 fatalities

• Boeing 737-800
  ▪ 8 year old airframe

• Contact lost at 9000ft, shortly after departure from Beirut International Airport

• Thunderstorm activity in the area
Afriqiyah Airways 771
12 - May - 2010

- 103 fatalities, 1 survivor
- A330-200
  - Airframe < 1 year old
- Crashed on approach to Tripoli international airport
- Poor visibility (dust/mist) on approach?
Airblue 202
28 July, 2010

- 152 fatalities
- A-321-231
- Islamabad, Pakistan
- CFIT on circling approach
Security (Passenger)

- Overall security processes have increased
- Some efficiency improvements
- TSA Workforce issues
Security (Cargo)

- Yemen Bomb Plot (9/28/10)
  - UPS (East Midlands) and FedEx (Dubai) Aircraft Involved
  - Re-evaluation of 9/3/10 UPS (Dubai) Take-off Accident

- Implications for Air Cargo Security Requirements
  - 100 % Belly Freight Screen (August 2010)
  - Certified Shipper Programs at Risk
  - Potential for 100% Screen Requirement
  - Lack of standard international procols

- Need to Balance Real vs Perceived Risk
Flight Delay Trends

US Data

Data source: FAA Operational Network (OPSNET)
Flight Cancellations from 2000 to 2010 (by month)


(top 11 airlines from 2000 to 2002, top 20 airlines from 2003 to 2009)
Tarmac Delay Rule

- Fine of up to $27,000 per passenger delayed more than 3 hours
- Rule effective 29\textsuperscript{th} April 2010
- American, Continental, Delta, JetBlue and U.S. Airways all denied exemptions from the rule at JFK
  - Longest runway at JFK closed May-June 2010, putting strain on operations at that airport
- Not clear that airlines have the power to resolve the long-delay issue on their own
  - Reducing long delays will require the cooperation of all stakeholders in the air transportation industry
JFK Runway Closure

Source: H Balakrishnan
New York Airport Flight Delays*
from 1995 to 2009

* Note: 12 month moving average

Data source: FAA Operational Network (OPSNET)
Eyjafjallajökull Eruption

Allowable volcanic ash concentration raised from 0 to 0.002 g/m$^2$

Ongoing refinement to procedures for operating in ash

- May 17$^{th}$ UK CAA approves 0.004 g/m$^2$ limit

No ash impact
Long Term Plans for System Transformation

- Common recognition that existing US and European ATM systems will not scale to meet future demand

- Reflected in major long term initiatives
  - US  NextGen
  - Europe  SESAR
NextGen Implementation Plan

- Focus on first phase of NextGen Transition to 2018
NextGen-SESAR CNS Technologies

Integrated Mid-Term Capability

- Clearance delivery and frequency changes
- D-ATIS
- Digital delivery of flight specific Traffic Management Initiatives (e.g., re-routes) to the cockpit

- Uplink of RNAV/RNP procedures
- Negotiated optimized profile descents with required time of arrival (RTA)
- Further expanded capacity with Integrated Arrival Departure Management
- Tailored arrivals with FMS integration

- Expanded use of performance-based navigation
- Integrated arrival/departure management
- Curved segments for de-conflicted flows between nearby airports
- Optimized profile descents

Data Communications

RNAV/RNP

- RNP+ADS-B in with CDTI for CSPO
- RNP+RTA=ADS-B II in for spacing to optimized runway throughput

ADS-B

- Surveillance provided in areas without coverage today
- Enable improved separation management services
- Expanded STMS coverage
- ADS-B In surface safety with traffic and own ship on EFB moving map
- ADS-B In/CDTI assisted visual separation

Expect expanded synergy among technologies
Trends in Aircraft Size
U.S. Airlines

Data source: Form 41 Traffic data from Bureau of Transportation Statistics (US carriers)
RJ-NB Boundary Blurred

Source: based on manufactures’ a/c specifications. Full pax range of standard version
New Aircraft Types

- **Embrear EMB-190**
  - 671 delivered, 215 firm, 747 options

- **Boeing B-787**
  - 847 firm, 481 options

- **Airbus A-380**
  - 37 delivered, 234 firm, 57 options

- **Airbus A-350**
  - 573 firm, 200 options

Advanced Engines

- P&W Geared Turbofan
- GE Unducted Rotor
Next Generation Narrow Body Plans

Bombardier C-Series
- Seats: 100 - 145
- Est. Entry Into Service: 2013

Airbus: A320 NEO
- A320 Seats: 107 - 220
- Est. Entry Into Service: 2015

Boeing Y1:
- B737 Seats: 108 - 189
- Estimated Entry Into Service: ?

Re-engined B737?
New Aircraft Type?
Boeing 777 Replacement/Re-engine
NASA N+3
MIT D8 “Double Bubble” Configuration
50% - 70% Improvement in Fuel Burn
Green House Gas Emission Restrictions

- Cap and Trade Discussions
- CO2 Efficiency Standards
- Alternative Fuel Demonstrations
- Increase in Effective Price of Fuel

Greenhouse Gas Emissions

Each square represents 1% of total emissions inventory

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Source: US EPA data, 2005
Alternative Fuels for Commercial Aviation

- **Traditional jet fuel:**
  - Kerosene, from crude oil, tar sands or oil shale.

- **“Drop in” fuels:**
  - Fischer Tropsch (FT) synthetic fuel:
    - Coal to Liquid (CTL)
    - Natural Gas to Liquid (GTL)
    - Biomass to Liquid (BTL)
  - Biofuels:
    - 1st generation: biomass from food crops,
    - 2nd generation: Nature byproducts/waste,
    - 3rd generation: Algae, switch grass.

- **Hydrogen or Methane**

- **Challenges:**
  - Availability and production cost of alternative fuels,
  - Certification,
  - Airport infrastructure (i.e. dual distribution systems).