Valuation Implications of Aircraft Life Cycle

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AVITAS

June 8, 2015

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- AVITAS – Who Are We?
- Oil Prices
- Global Fleet Forecast
- Fleet Trends
- Parting Out Aircraft
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AVITAS 30 YEARS

AVITAS Facts and Figures

- **Founded in 1985**
- **Offices in Washington, D.C.; London**
- **Advised in over 500 Aircraft Restructurings**
- **Over 50,000 aircraft inspected / appraised**
- **Managed over 600 Aircraft for Financial Clients**
- **Senior Staff with Industry Experience from OEMs, Financiers / Lessors, Airlines, and MROs**

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AVITAS Practice Areas

Asset Management

Lease Negotiations

Restructuring

Portfolio Monitoring

Risk Management

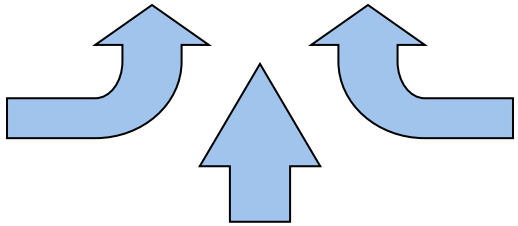
Valuation

Aircraft Appraisals

Market Analysis

Value Modeling

BlueBooks/Online Service



Technical

Aircraft Inspections

Delivery Assistance

Lease Language Drafting

Technical Consulting

Consulting

Strategic Planning

Industry Forecasting

Global Outlook Book

Airline Planning

Fleet Planning / Route Perf. Anal.

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Experience

AVITAS Appraisals

- 50,000 Aircraft Appraisals / Inspections
- 20 Million Parts Valued
- 100 Engine / Aircraft Teardowns

Paradigm Shift

- Last Few Years in Valuations - new industry trends
- Big Players / Big Money
- High Tech Companies with Financial Sophistication
- Number of Aircraft Teardowns Declining

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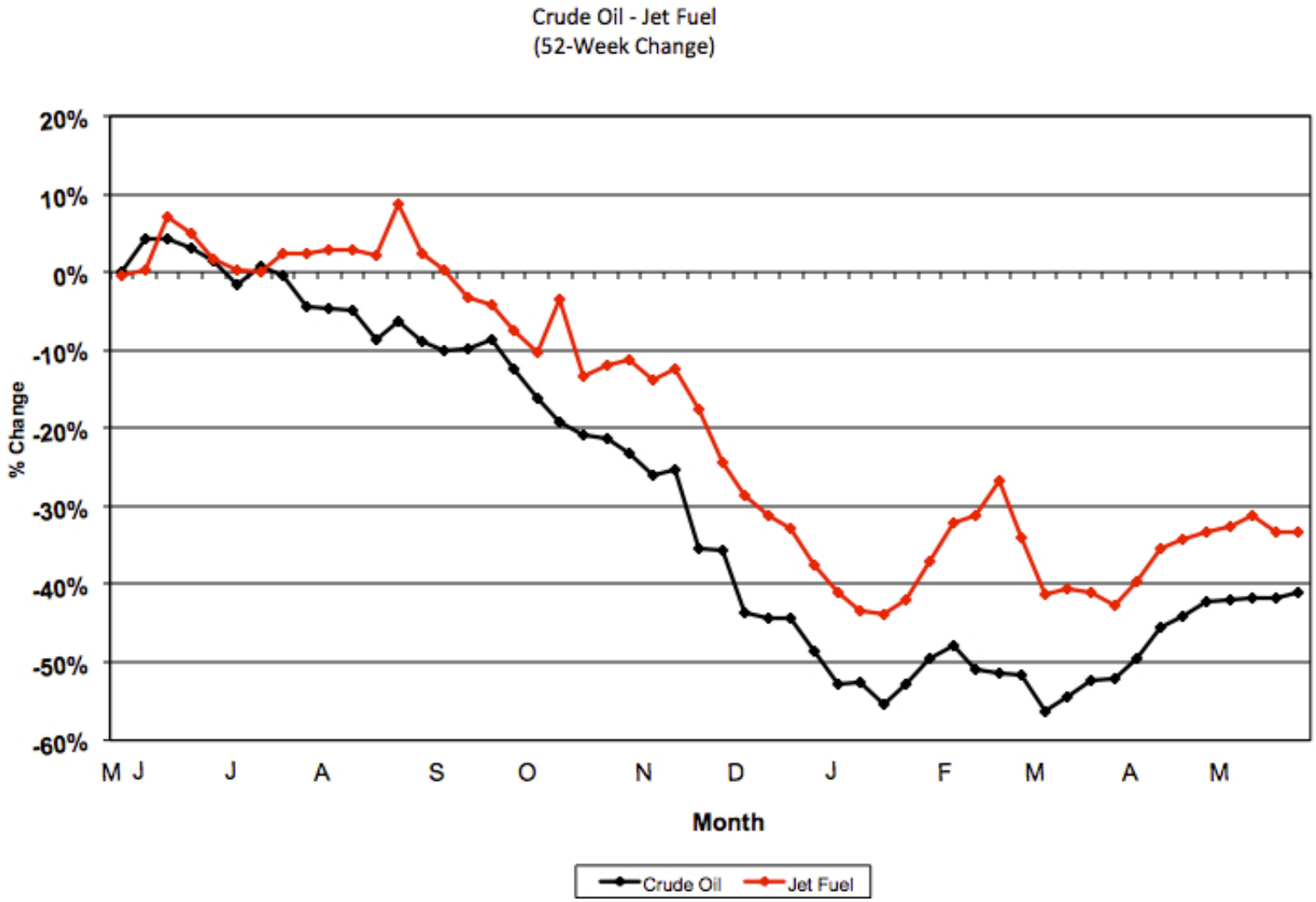
Crude Oil Prices



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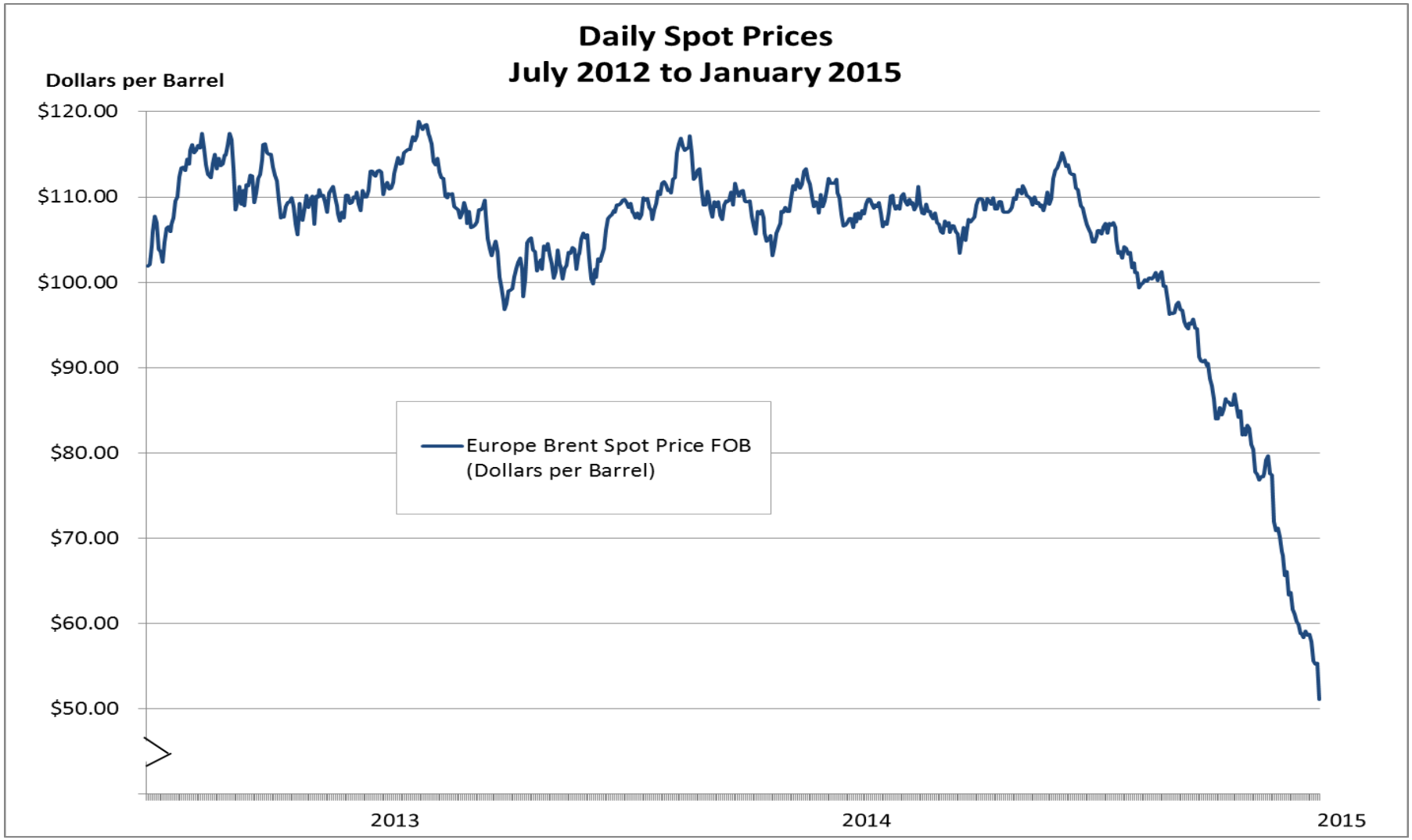
Oil Price



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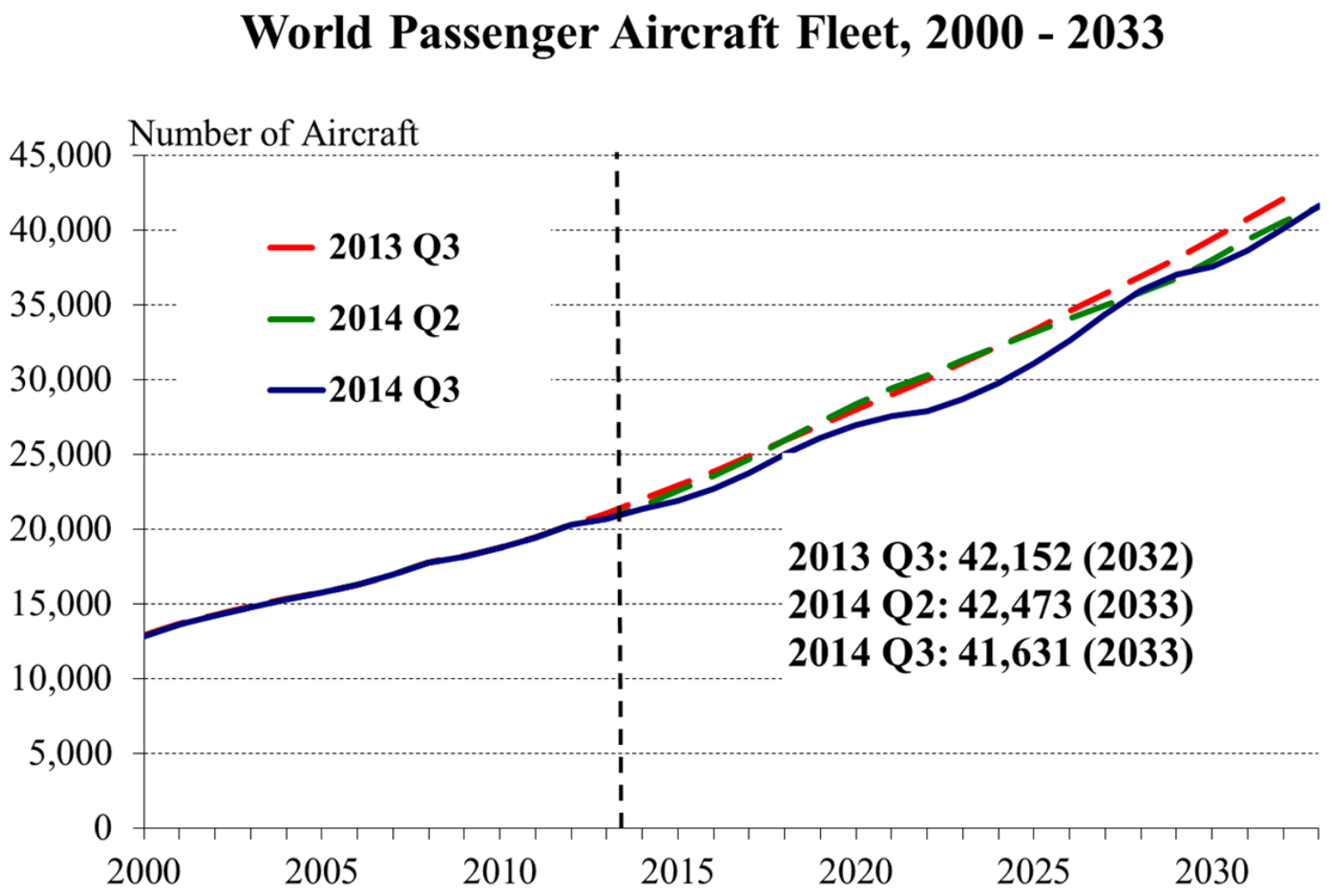
Global Fleet Forecast



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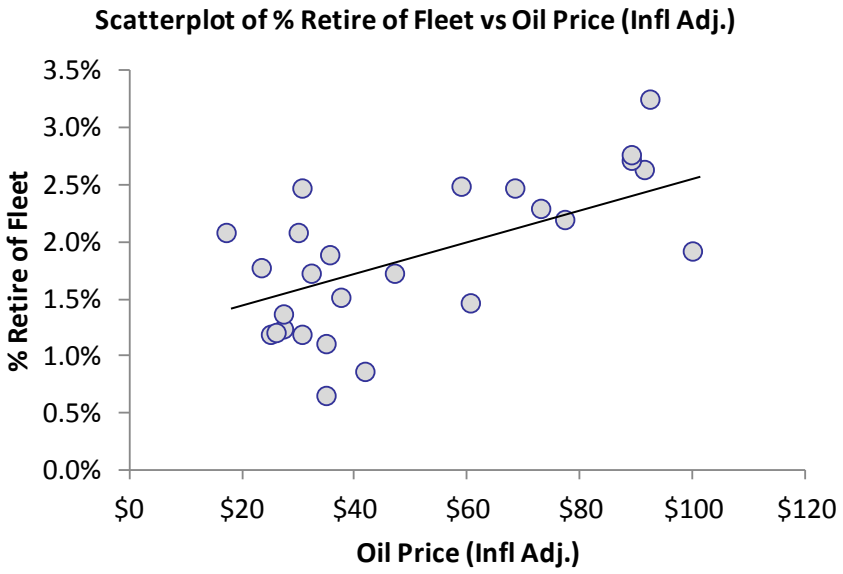
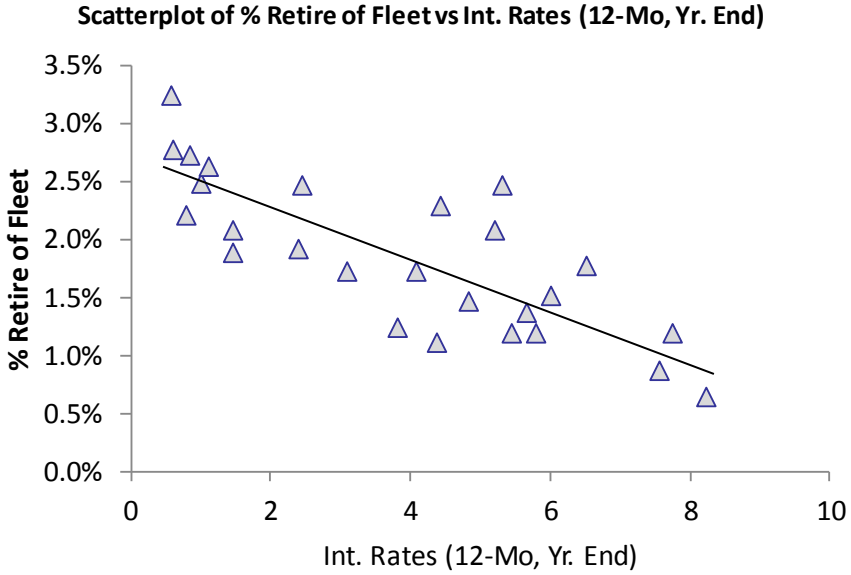
What Drives Retirements?

Many factors influence retirements,
but Oil Price and Interest Rates are primary ones

Oil Price and % of Fleet Retired



Interest Rates and % of Fleet Retired



Note: All data are year-end 1990 to 2014 for commercial jet aircraft; oil price is in constant 2014 US$, interest rates are year end 12-mo. LIBOR

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Annual Aircraft Retirements

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Fuel Price Effect

AVIATION WEEK INTELLIGENCE NETWORK

The Price of Cheap Oil

Drop In Oil Prices Means An Airline Profitability Boost Now, But...

Aviation Week & Space Technology Feb 20, 2015 , p. 62

Jens Flottau, Sean Broderick, Madhu Unnikrishnan, Adrian Schofield Frankfurt, Washington, San Francisco and Auckland

Airlines

Fuel Price Drop Does Not Deter Cathay's A340-Retirement Plan

Aviation Daily Feb 17, 2015 , p. 3

Bradley Perrett

Analysis

Low Fuel Price May Increase Pricing Pressure On Late 737NGs, A320ceos

Aviation Daily Feb 11, 2015 , p. 1

Jens Flottau

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Fuel Price Effect

AVIATION WEEK
INTELLIGENCE NETWORK

Low Fuel Prices Contribute To Fewer Aircraft Being Torn Down

Aviation Daily May 06, 2015 , p.
Lee Ann Shay BUDAPEST

Analysis

Avolon Analysis Of Storage Trends Concludes 800 Parked Aircraft Likely To Fly Again

Aviation Daily Apr 06, 2015 , p. 1
Sean Broderick

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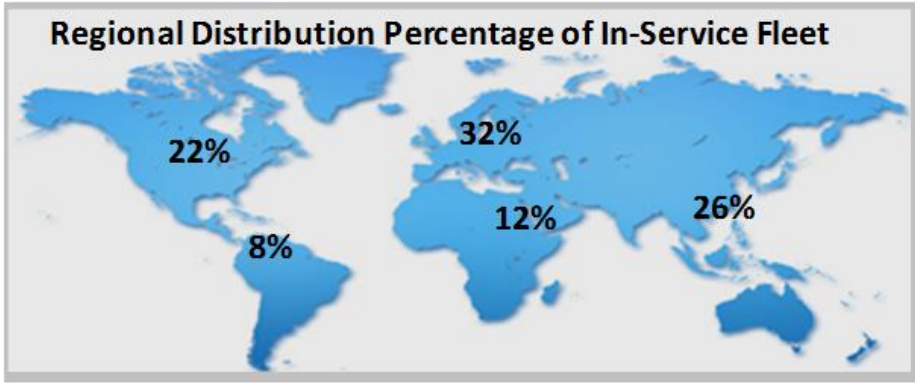
Avolon Study

- **Factors affecting probability of returning to service**
  - Time in storage
    - 66% of aircraft parked less than two years will fly again
    - 50% if parked 3 years
    - 20% if parked 5 years or more
  - Program Status
    - 90% of in-production aircraft re-emerge
    - 56% of out-of-production emerge
  - Age when parked
    - Young aircraft – almost always return to service
    - Mid-life (up to 15 years old) - will return to service
    - Older aircraft - unlikely

Fleet Trends – 737-300/400/500



World Region	In Service
Africa / Middle East	126
Asia / Pacific	284
Europe	349
Latin America / Caribbean	88
North America	242
World Total	**1,089**

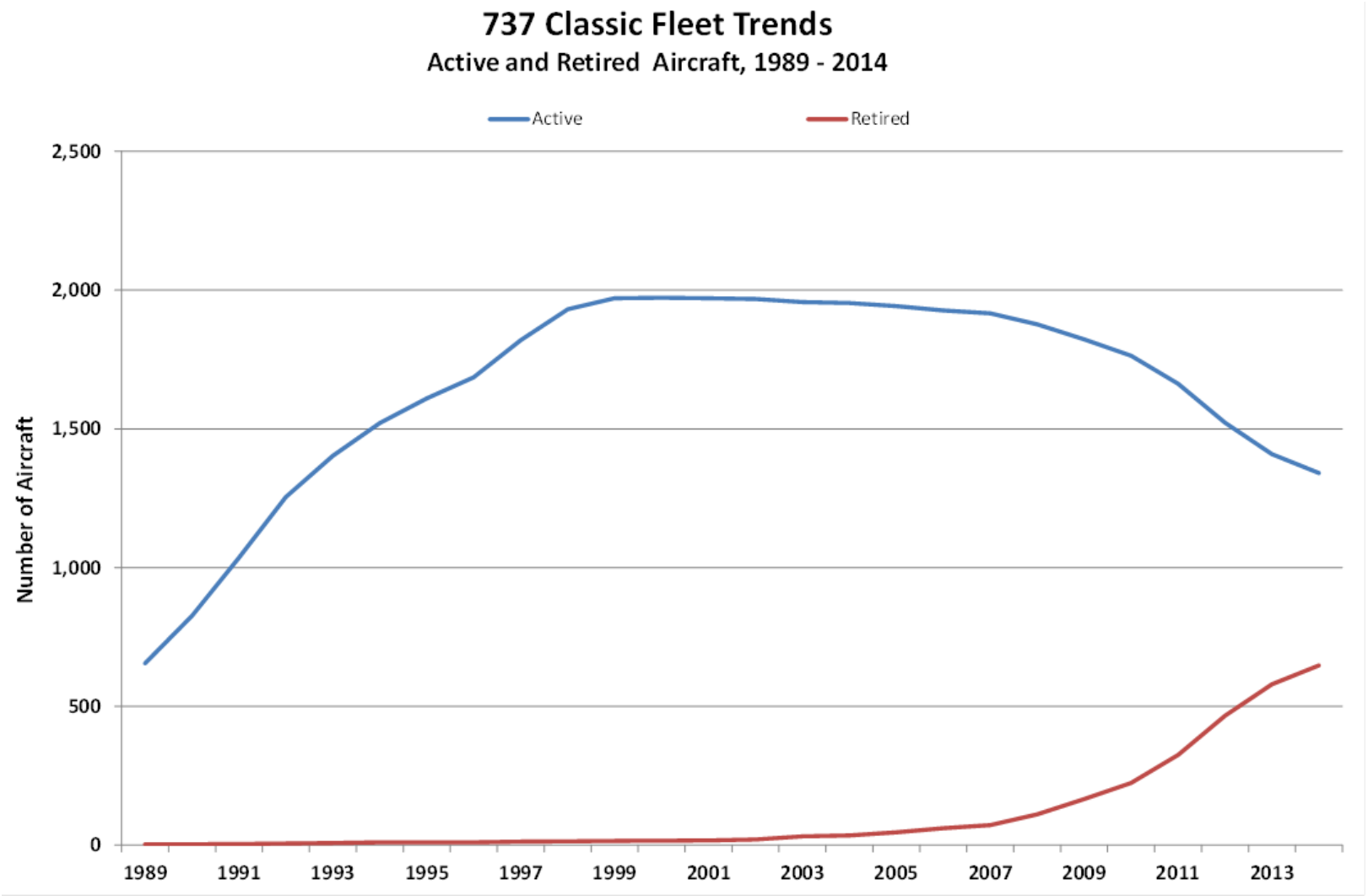
Source: Aviation Week Intelligence Network Fleets Database

737 Classic Aircraft Distribution By Aircraft Model as of April 2015

Model	In Service	Retired	In Storage	Grand Total
737-300	425	450	62	937
737-300QC	21			21
737-300SF	120	1	1	122
737-400	230	99	45	374
737-400SF	80	1	1	82
737-500	213	133	30	376
Grand Total	**1,089**	**684**	**139**	**1,912**

Source: Aviation Week Intelligence Network Fleets Database

Fleet Trends – 737-300/400/500



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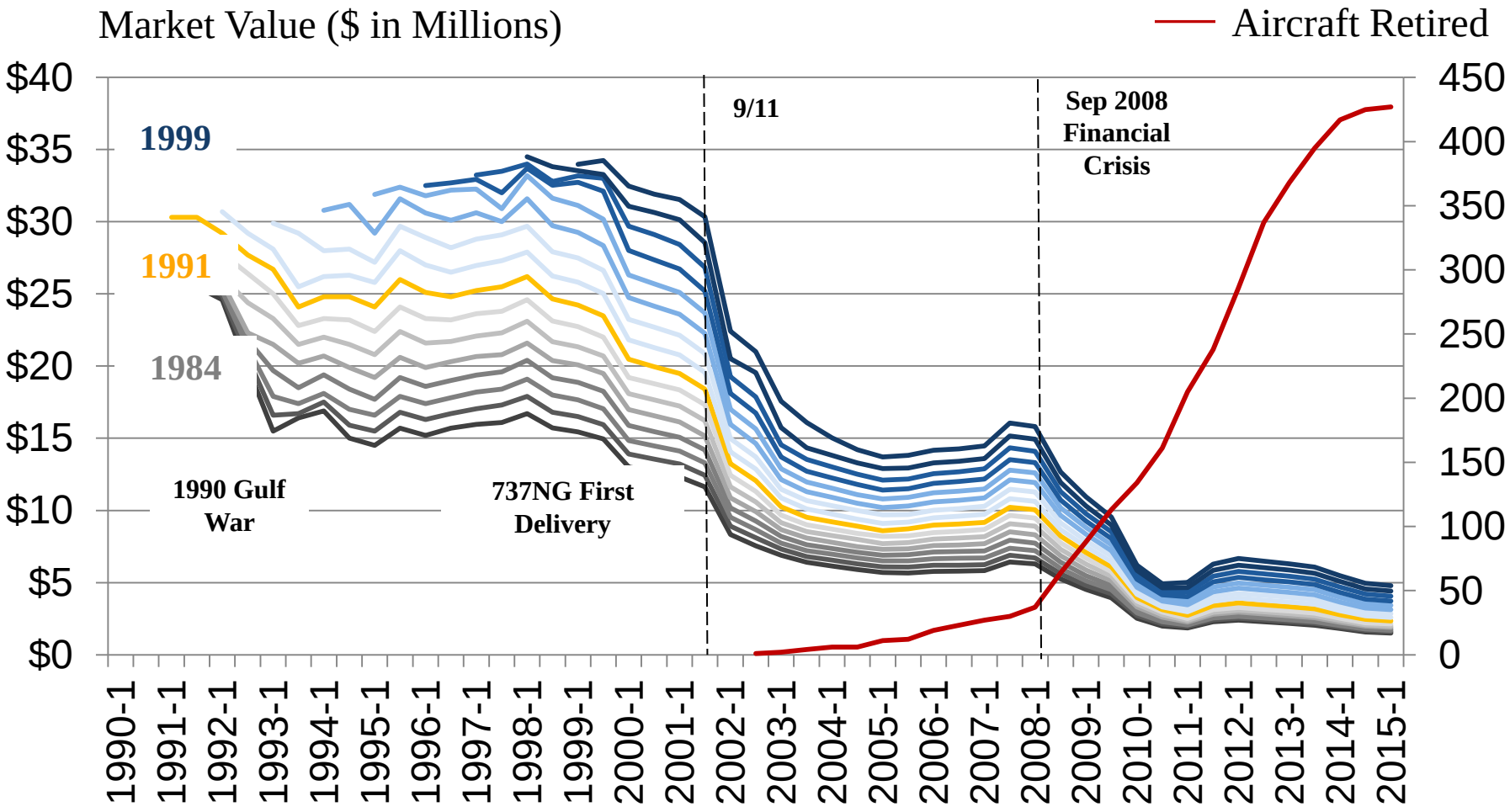
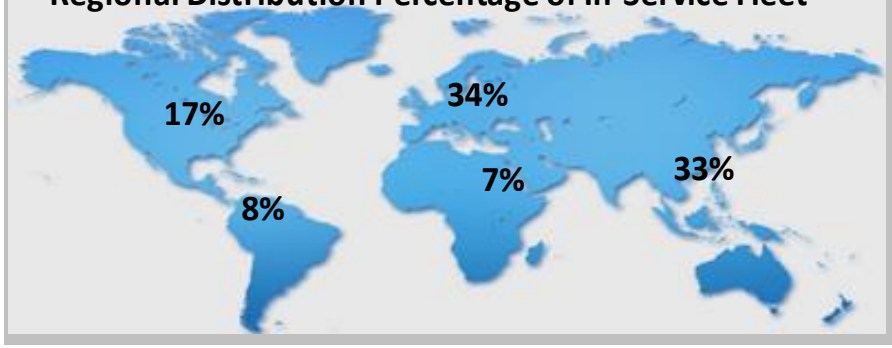
737-300 Historical *BlueBook* Market Values



BlueBook Edition

Fleet Trends – A320 Family

Regional Distribution Percentage of In-Service Fleet



World Region	In Service
Africa / Middle East	451
Asia / Pacific	2,046
Europe	2,100
Latin America / Caribbean	521
North America	1,041
World Total	**6,159**

Source: Aviation Week Intelligence Network Fleets Database

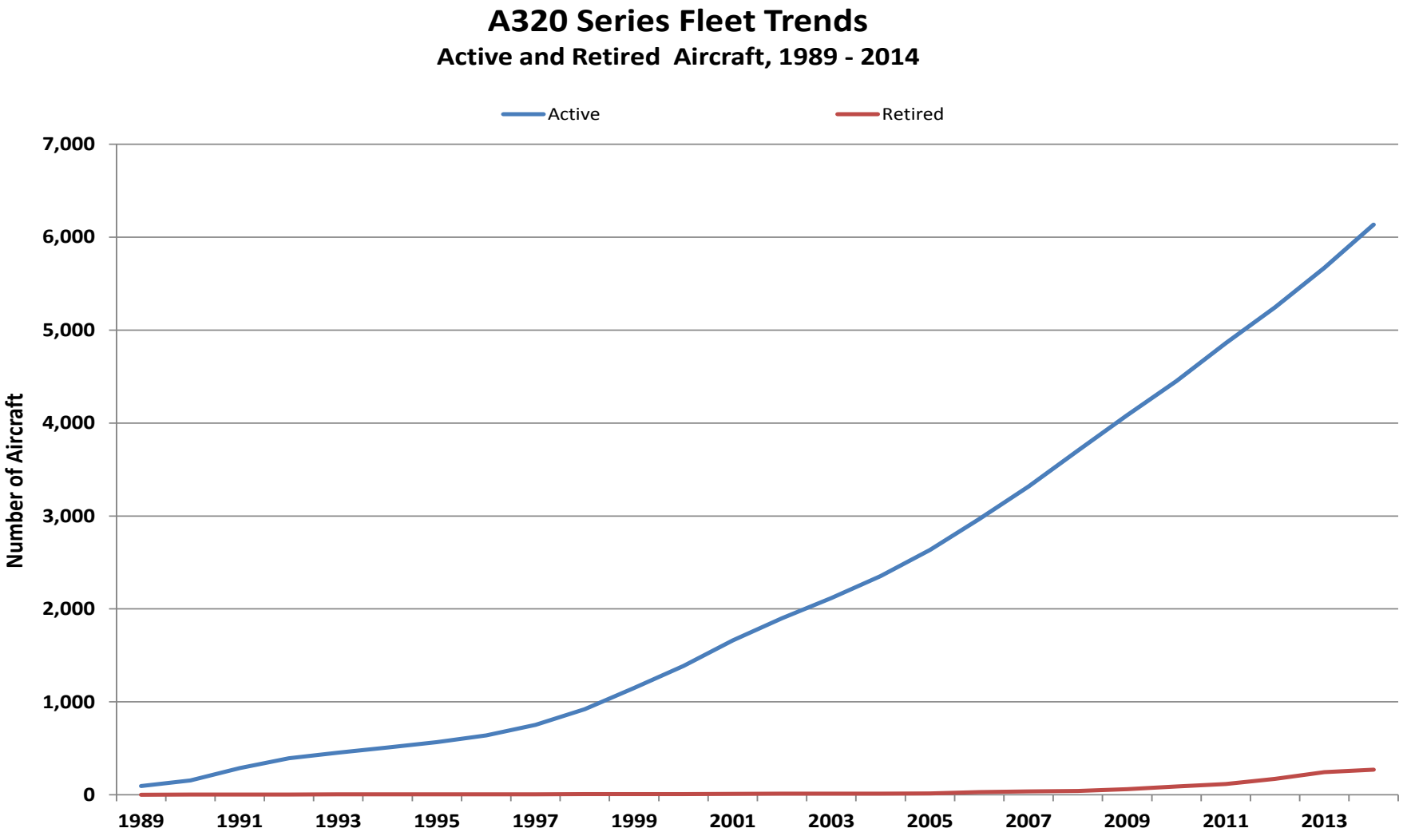
Airbus A320 Series Aircraft
Distribution By Aircraft Model
as of April 2015

Model	In Service	Firm Orders	Options	Retired	In Storage	Grand Total
A318-100	69			11		80
A319-100	1,395	31	32	18	7	1,483
A320-100				19		19
A320-200	3,637	823	105	223	37	4,825
A321-100	66			10	2	78
A321-200	991	503		4	10	1,508
Grand Total	**6,158**	**1,357**	**137**	**285**	**56**	**7,993**

Source: Aviation Week Intelligence Network Fleets Database

Note: Includes Airbus Corporate Jets, but does not include A320neo series aircraft

Fleet Trends – A320 Family



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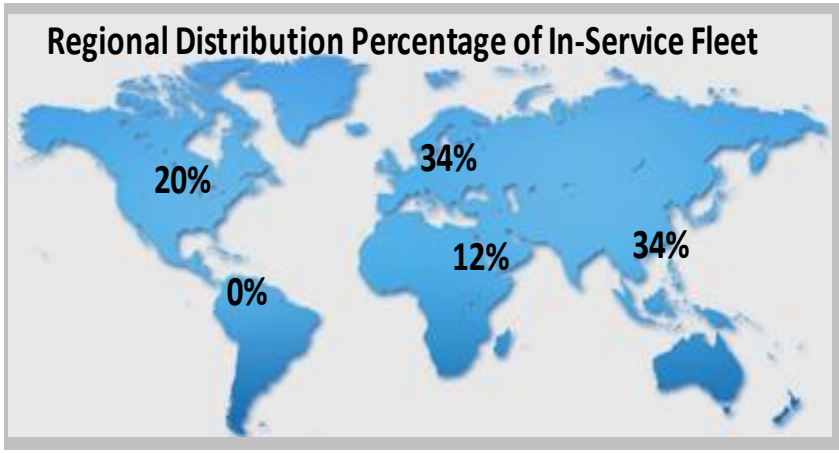
Fleet Trends – 747



World Region	In Service
Africa / Middle East	70
Asia / Pacific	207
Europe	202
Latin America / Caribbean	-
North America	123
World Total	**602**

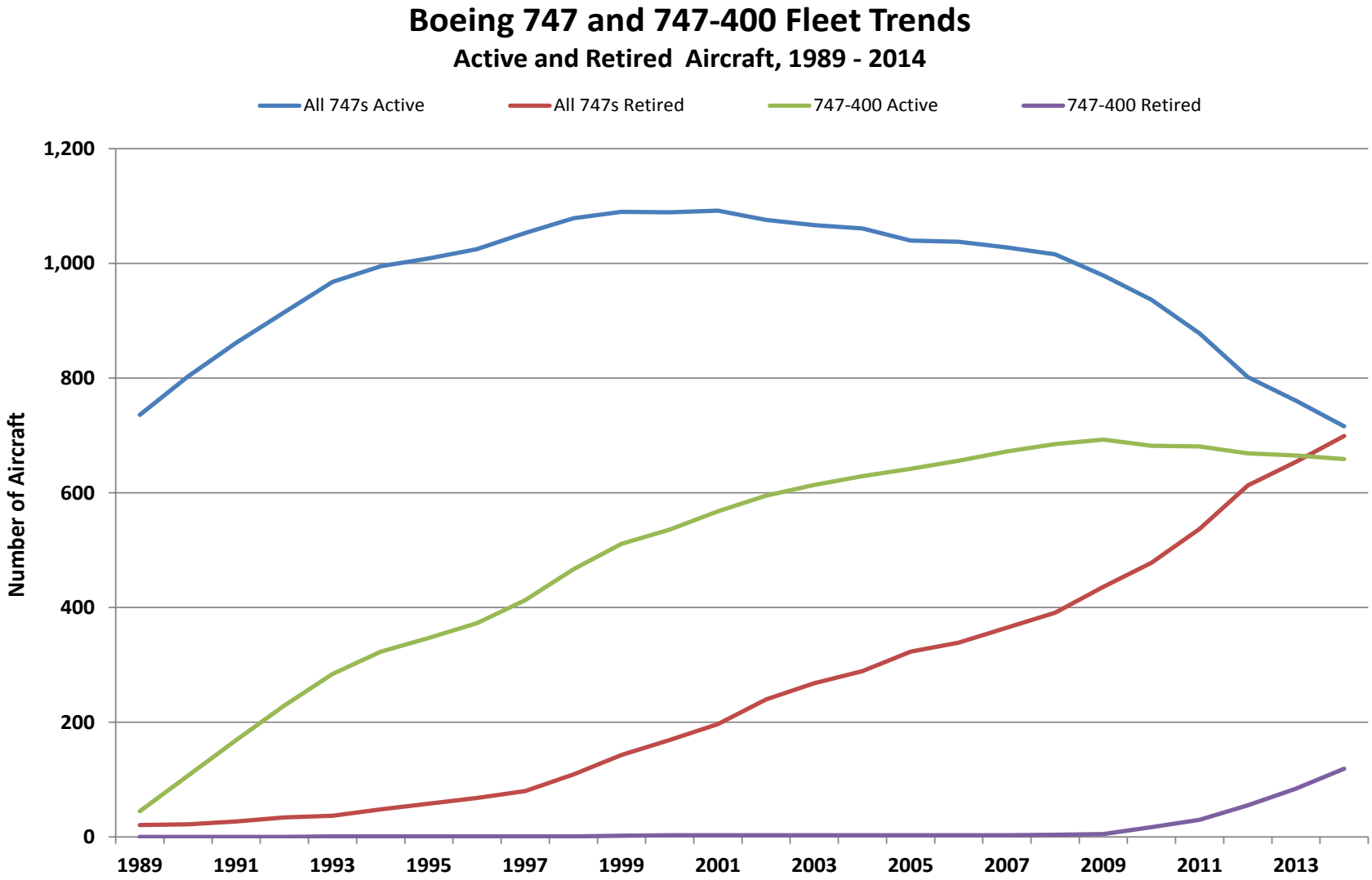
Source: Aviation Week Intelligence Network Fleets Database

Boeing 747 Series Aircraft Distribution By Aircraft Model as of April 2015

Model	In Service	Firm Orders	Retired	In Storage	Grand Total
747-100 & 747SP	14		205		219
747-200	33		321	1	355
747-300	8		65	1	74
747-400 Pax	258		142	19	419
747-400 Ftr	159		13	33	205
747-400ER	6				6
747-400ERF	37			3	40
747-8	28	18		2	48
747-8F	59	12		1	72
Grand Total	**602**	**30**	**746**	**60**	**1,438**

Source: Aviation Week Intelligence Network Fleets Database

Fleet Trends – 747



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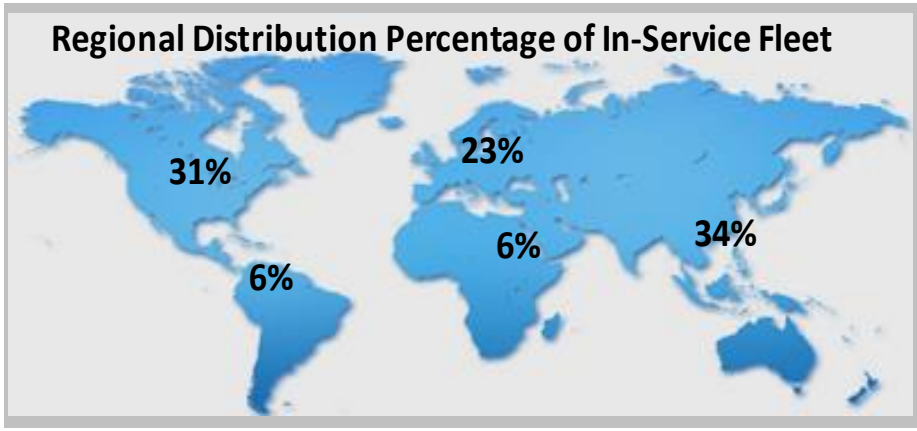
Fleet Trends – 737NG (-600/-700/-800/-900)



World Region	In Service
Africa / Middle East	312
Asia / Pacific	1,783
Europe	1,175
Latin America / Caribbean	318
North America	1,584
World Total	**5,172**

Source: Aviation Week Intelligence Network Fleets Database

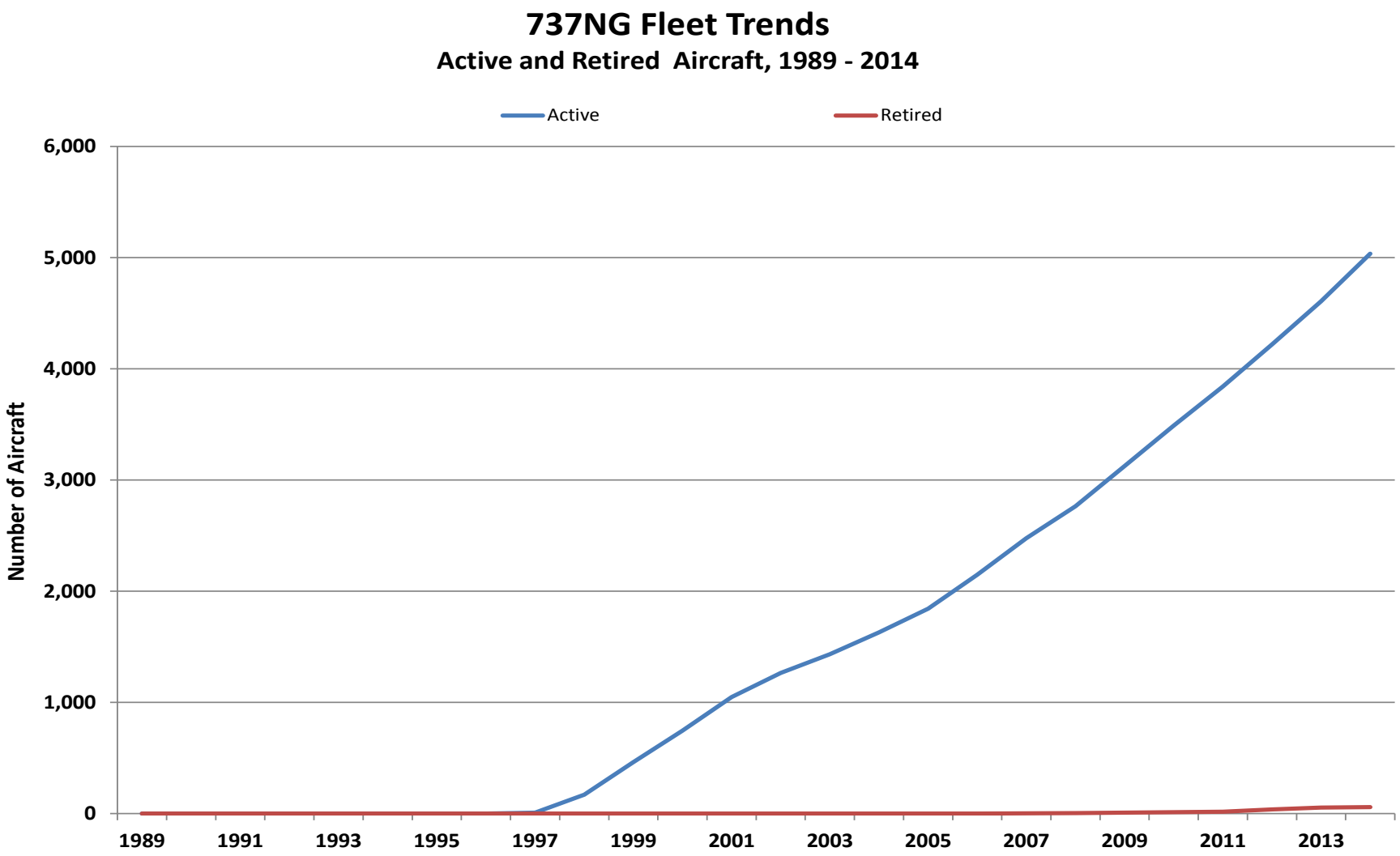
Boeing 737NG Aircraft
Distribution By Aircraft Model
as of April 2015

Model	In Service	Firm Orders	Options	Retired	In Storage	Grand Total
737-600	57			11	1	69
737-700	1,162	111	3	33	4	1,313
737-800	3,586	1,192	8	5	11	4,802
737-900	52					52
737-900ER	315	195			2	512
Grand Total	**5,172**	**1,498**	**11**	**49**	**18**	**6,748**

Source: Aviation Week Intelligence Network Fleets Database

Note: Includes BBJs but not the 737MAX

Fleet Trends – 737NG (-600/-700/-800/-900)



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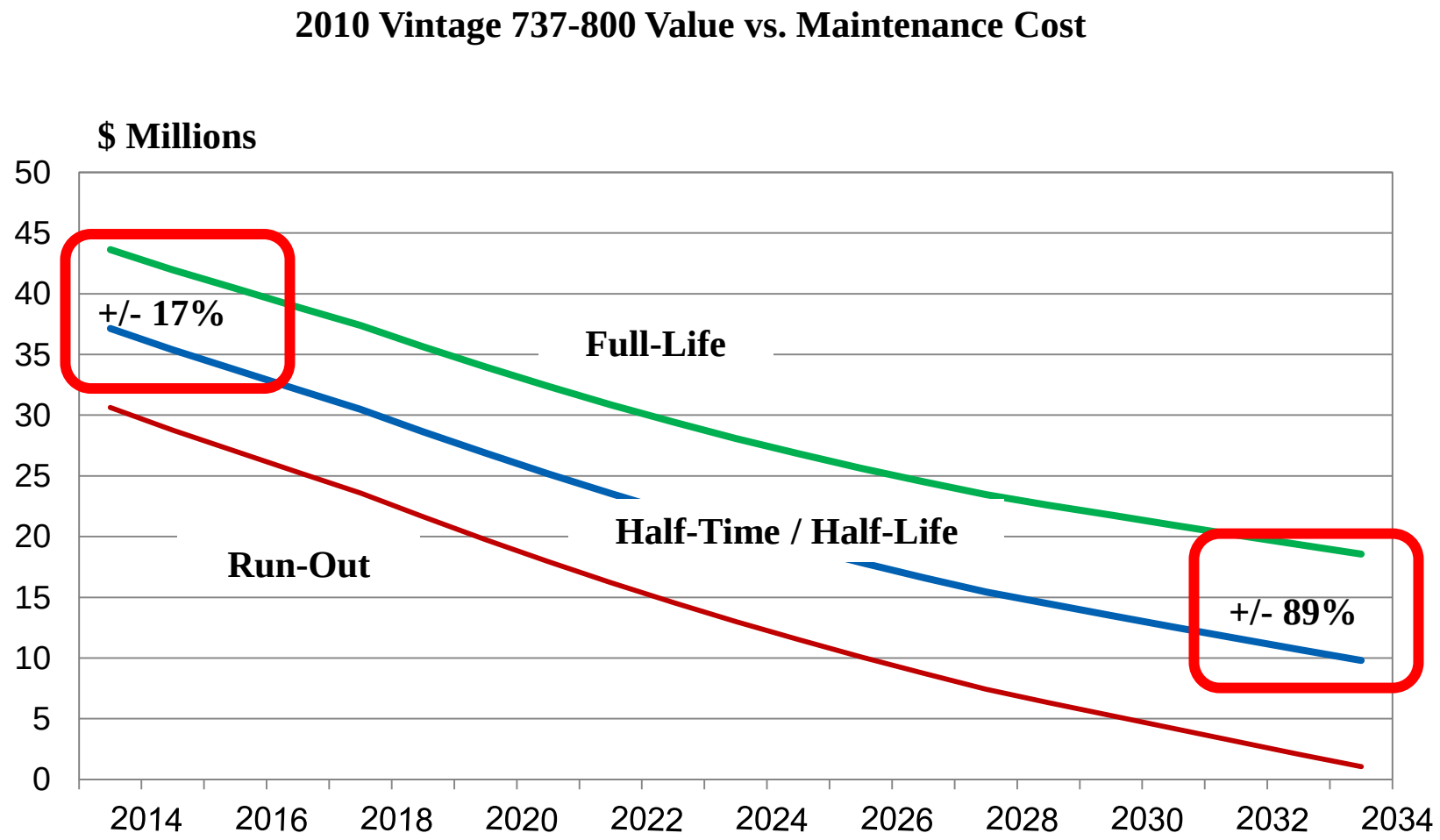
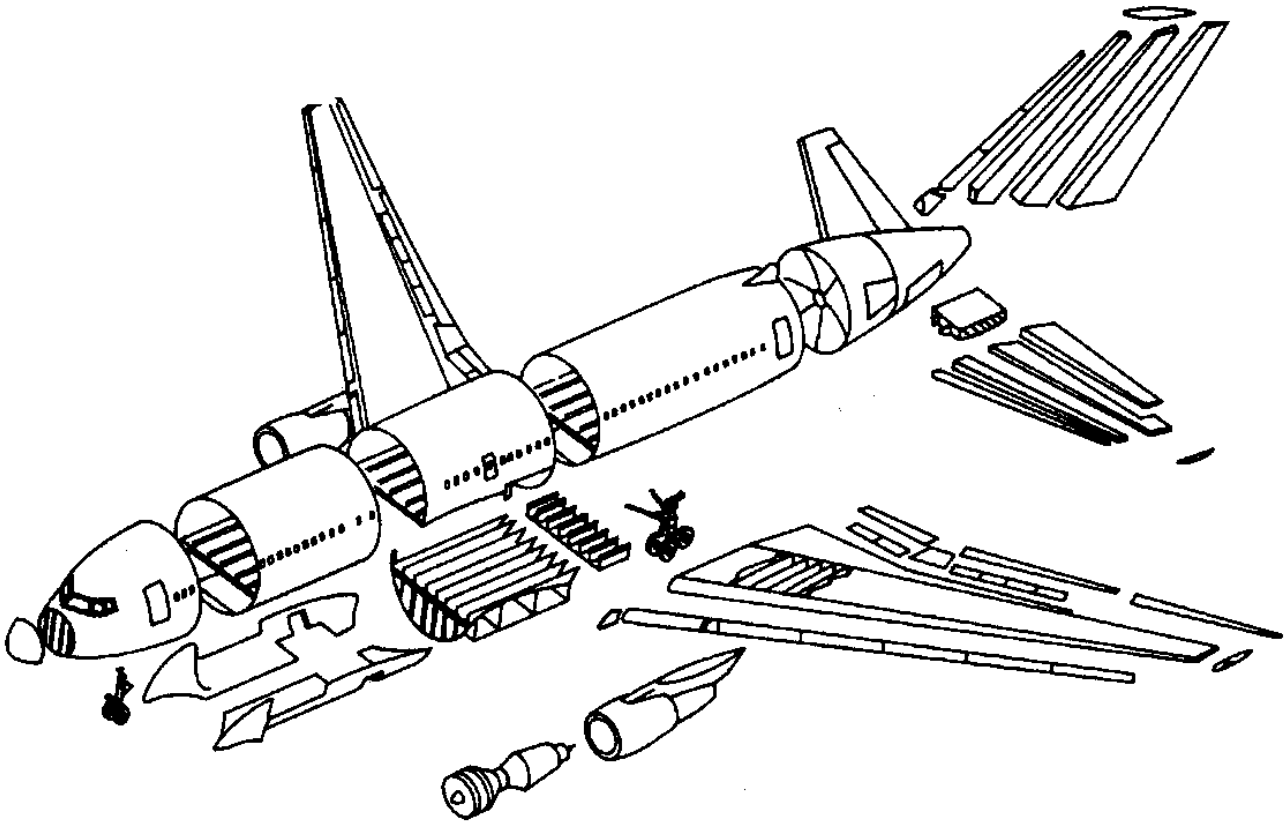
Maintenance Impact on Value Grows over Time

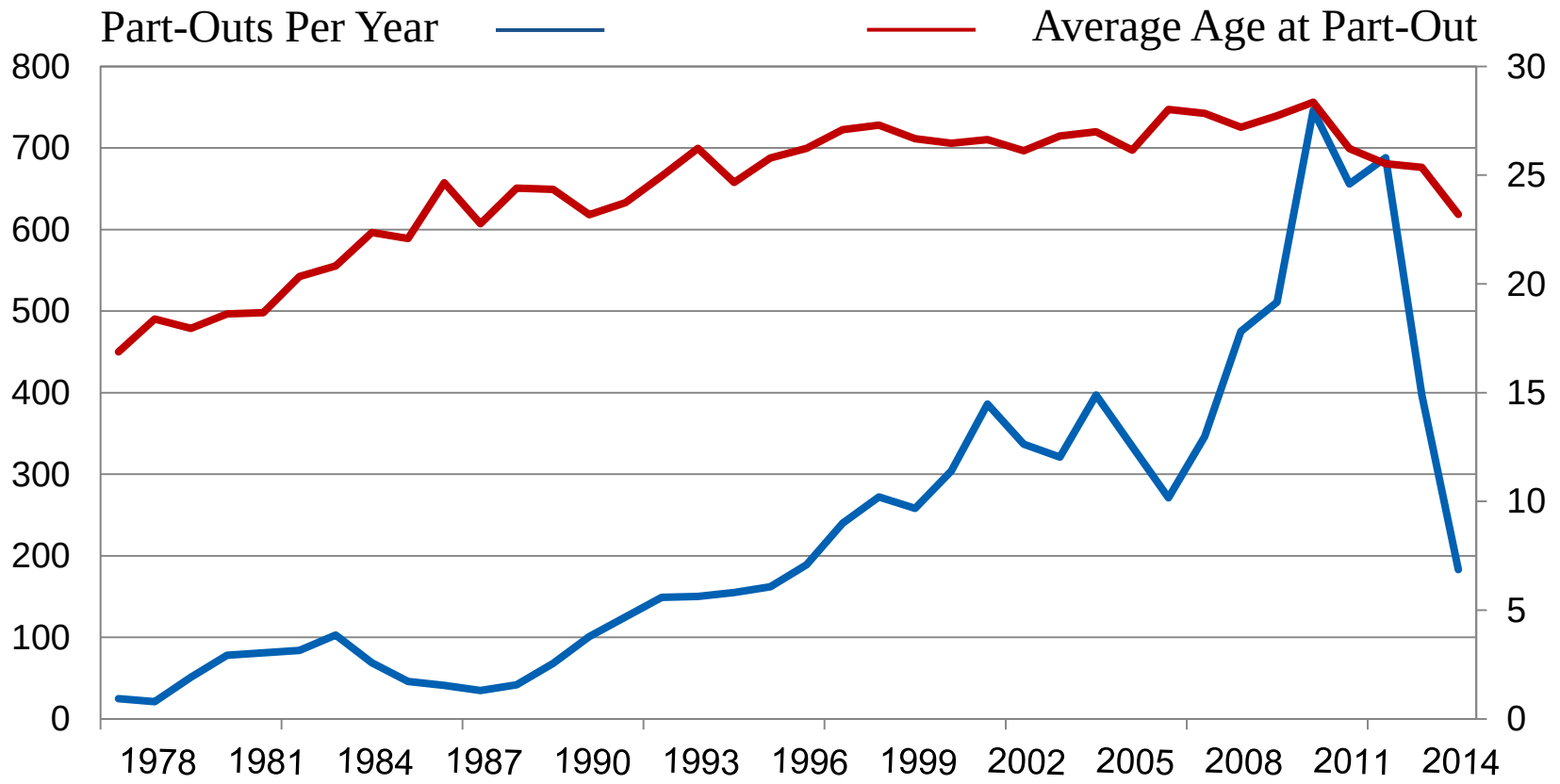


Parts Values

So what does this have to do with parts?



Jet Aircraft Part-Outs Per Year and Average Age



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Younger Aircraft Parted Out

- **A318**
  - First few did very well from airframe
  - Engines sales lagging due to on-wing life is to long
- **777-200**
  - First few did very well on airframe
  - PW4000 has a long service record
- **A340**
  - Commonality with A330
  - Engines unique to type and shrinking fleet
- **A330LW**
  - Slowing sales
- **787**
  - Rumors of Air India partout were untrue

A318 Story – Perfect Storm

- More lessors – 20% - 50%
- Decline in aircraft value due to financial crisis
- Frontier financial issues beginning in April 2008
- Large maintenance reserves – back to full life
- Commonality with A320 family
- Cost of parts from OEM
- First 6 year check determined to be worth more in parts
- Earliest part out was 6 years old aircraft
- Ten of 11 Frontier A318s were scrapped

Engines Teardowns

What are we seeing in the market in last 12-18 months?

- **Older technology engines** (CFM56-3, CF6-80C2, PW4000, etc.)
  - Pro-rated LLPs have fallen in value by more than 25% - some 50%
  - Fan blades values have followed similar trajectory
  - Engine overhauls are markedly slowing
  - What are engine carcasses values if demand for overhauls is limited?
  - Demand for serviceable engines is there – short term leases to burn off green time – but lease rates have fallen even in just the last 4-6 months

- **Newer technology engines** (CFM56-5B, CFM56-7B)
  - Time on wing is “too good” – at least from a spare parts perspective
    - Almost 40% of engines haven’t hit the first shop visit
    - Almost 75% of engines haven’t hit the second shop visit
    - Limited demand for USM so far
  - Bids on engines for part outs are still strong

Question – What Will be the Impact of OEM PBH Deals?

Rolls-Royce and GE control the majority of the aftermarket of the Trent and GE90 engines

- Repairs completed at either OEM or licensed MROs only
- Will there be any incentive for the use of USM vs. new?
- If engines typically account for 80% or more of an aircraft's value at end of life, how will PBH plans impact aircraft value as it ages?
- How will PBH plans impact aircraft liquidity?
  - 0.1% of A330s with Rolls-Royce Trent engines have been retired
    - Rolls reported controls nearly 90% of the market for Trent MRO
  - ~5% of Pratt & Whitney A330s have been retired.
    - P&W is not as involved in PBH plans
- Who benefits from PBH agreements?
  - OEMs – control entire life cycle of engine
  - Airlines – predictable maintenance costs
  - Asset owners/financiers – difficult to see benefit as asset ages

Future - Is There Hope?

- **Narrow Body Fleet**
  - Maybe
- **Older Wide Body Fleet**
  - No - due to maintenance and transition costs
  - A340 and 747 maintenance costs
  - Freighter market?
    - No – market is saturated with used aircraft
    - Last conversion completed in 2012
- **777MAX vs 777**
- **A320 and A330 neo vs ceo**
- **737MAX vs NG parts commonality**

Discussion

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