

INDUSTRY INSIGHTS

Quarterly Aviation Briefing

Prepared by ICF International for ALTA



FIRST QUARTER 2015





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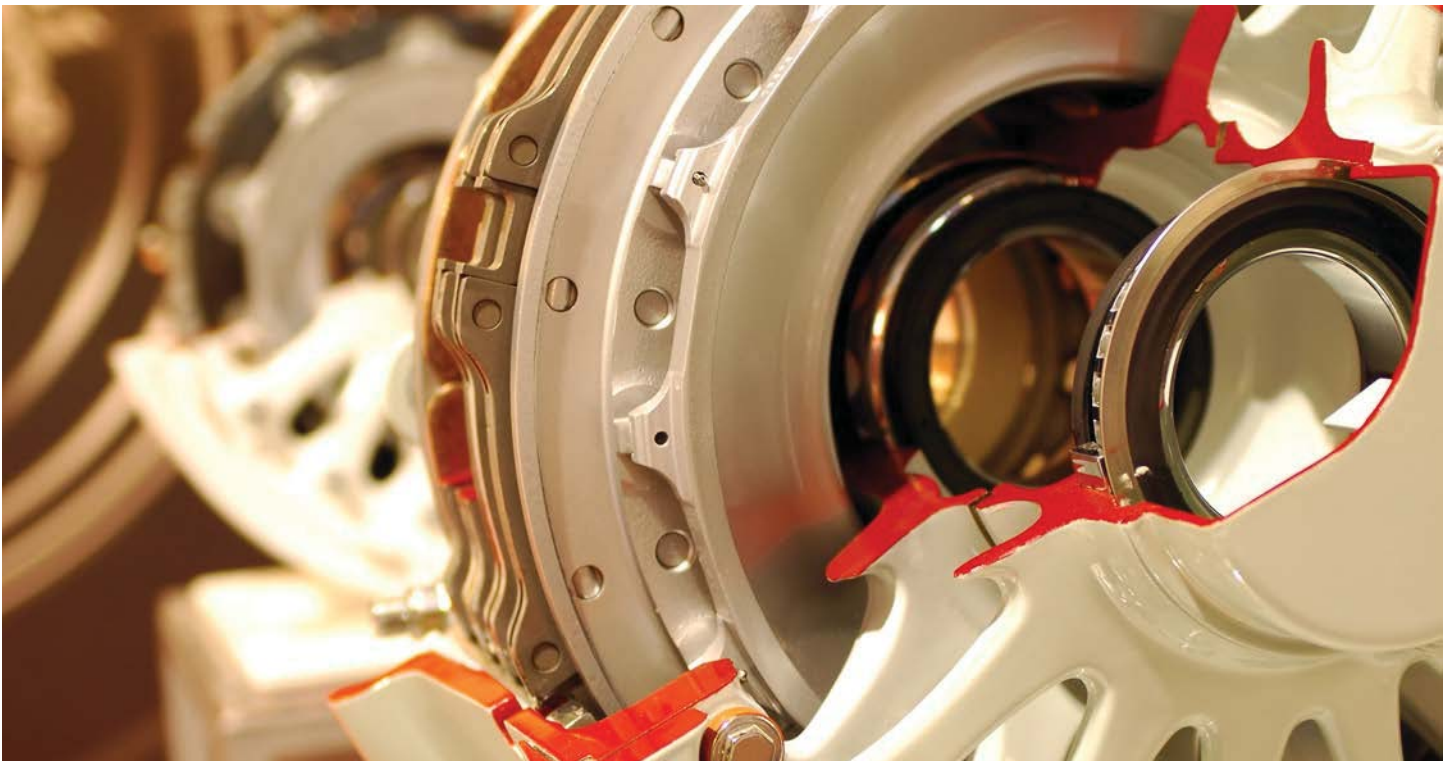
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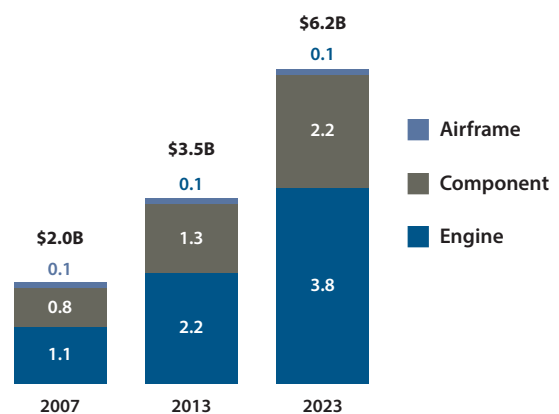
Alternative Reality: The Surplus Parts Market Comes Of Age



New service parts, or “spare” parts, are the lifeblood of commercial aerospace industry profits. Annual consumption is in excess of USD 20 Billion in the air transport sector alone, and most OEMs garner the lion’s share of their profits from this vital aftermarket revenue stream. Commercial aerospace is the ultimate “razor-razorblade” business model.

Alternatives to new OEM parts are therefore a big deal. PMA parts are the best known, yet have achieved a modest 2% market share after decades of effort. A less glamorous, but fast-growing alternative is surplus parts, which have emerged as the key threat to the OEM service parts revenue stream. ICF International has studied the surplus parts market extensively and estimates annual consumption is USD 3.5 billion – about six times as large as PMA parts and a 12% market share. Moreover, use of surplus parts is poised to grow significantly over the next decade. ICF’s nominal scenario is for surplus parts usage to reach USD 6.2 billion by 2023 (constant dollars) – a 5.6% annual growth rate.

Air Transport Surplus Parts Market Growth Forecast



Note: Forecast in constant 2013 US Dollars
Source: ICF International



Several factors will fuel the growth. With savings of 30% or more versus OEM new list prices, customer demand continues to increase – particularly with airlines that were loath to use surplus parts in the past and won't consider PMA. Surplus parts supply will also expand with an expected wave of aircraft retirements. ICF anticipates up to 1,000 retirements per year later this decade, up from just over 600 today. Also underpinning the growth is the changing nature of the surplus parts supplier business model itself, which has transformed from a cadre of small, agile and capital-constrained parts "traders" to large, integrated suppliers with ample access to capital.

Notably, engine OEMs and aircraft lessors have become major participants and comprise five of the six largest surplus dealers today: GE (including GECAS), Pratt & Whitney, CFM Materials, GA Telesis and AeroTurbine (owned by ILFC). System OEMs have been slower to participate, with exceptions being Rockwell Collins and Honeywell. As a result, these well-heeled suppliers can proactively pursue aircraft part-outs to ensure inventory availability on new generation aircraft. Today, over 80% of surplus parts come from aircraft part-outs, up from 55% a decade ago. For lessors, surplus parts are a useful extension of their business model. A 15-year old aircraft, for example, might be worth more parted-out than leased to another operator.

Not surprisingly, the lure of relatively quick returns from aircraft part-outs is also attracting outside capital. GA Telesis, for example, recently raised USD 500 million from institutional and private clients to establish a new aviation investment vehicle focused on part-outs. Private equity and hedge funds are also investing. Some industry veterans worry that too much capital is pursuing part-outs and inflating used aircraft acquisition prices to unsustainable levels as well as surplus supply.

What do these changes mean for OEMs, and their all-important service parts revenue streams? First, OEMs must pay greater attention to their service parts businesses – particularly for mature and sunset aircraft. In these phases of the aircraft life cycle, service parts list prices are out of whack with market realities after years of automatic price increases. Parts availability for some OEMs is poor, which increases customer demand for surplus parts (and PMA). OEMs also need to recognize the need for tailored maintenance work scopes integrating surplus parts should airlines demand this. Rolls-Royce, for example, recently introduced TotalCare Flex, a service offering that tailors the maintenance work scope for mature and sunset engines. Finally, many OEMs must decide whether or not to participate in the surplus market directly. While the largest engine and avionics OEMs have taken the plunge, dozens of other OEMs must determine their role in the surplus market: participate, partner or monitor?

For independent MROs, surplus parts are a mixed blessing. On one hand, they create an opportunity for price differentiation and low cost supply for rotatable banks. However in some instances surplus rotatables effectively compete with MRO services and may reduce maintenance demand for mature aircraft models.

Finally, for operators, surplus parts provide a rare chance to attack aircraft maintenance costs, which account for 15-18% of an airline's operating costs. Some large airlines are buying and parting out aircraft themselves (Delta MD90s are a good example) while others are demanding revised work scopes



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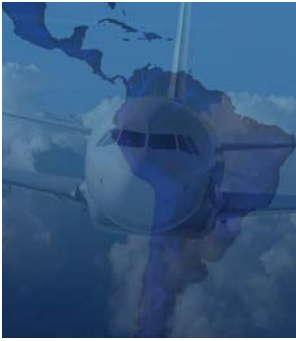


Learn More:

A panel discussion, moderated by Jonathan Berger, ICF Vice President Aerospace & MRO Advisory, will be held at the ALTA CCMA Annual Conference in Punta Cana, Dominican Republic May 17-20, 2015.

<http://www.alta.aero/ccma/2015/agenda.php>





Country Profile: Chile

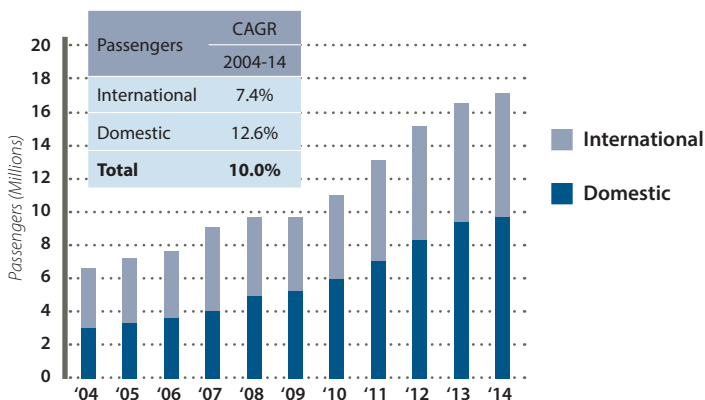
In February 2015, Chile's Ministry of Public Works awarded a 20-year concession to manage Santiago's Arturo Merino Benitez International Airport (SCL) to Grupo Nuevo Pudahuel, a consortium comprised of French airport operators Aeroports de Paris and Vinci airports, and Italian construction company Astaldi. Grupo Nuevo Pudahuel has committed to an investment of US\$ 700 million over the duration of the contract, the majority of which will fund the construction of a new terminal destined primarily to international service. Grupo Nuevo Pudahuel takes over administration of SCL in October of this year.

The award of the Santiago concession represents a major milestone in the development of Chile's aviation sector. The expansion of the country's largest airport and primary international gateway follows a decade of robust passenger growth; between 2004 and 2014, passenger traffic in Chile increased 10% per year to 17.2 million, spurring the need for additional airport capacity. After the initial expansion phase, the airport will have a capacity of 30 million passengers, with the possibility of a further expansion to 45 million.

Both supply and demand factors have contributed to Chile's strong performance. In particular, the country's vibrant economic expansion, relatively high personal income, and the growth of the country's two major airlines, LAN and Sky Airline, have driven record passenger volumes. As one of Latin America's more mature economies – Chile has the second highest GDP per capita in South America – , Chile's double-digit air passenger growth appears all the more impressive.

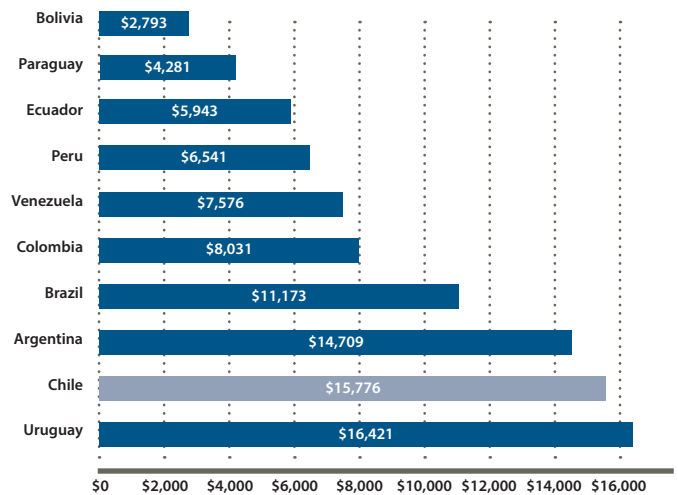
In the last decade, Chile's GDP grew by 4.7% per year on average, according to the International Monetary Fund. Chile's economy is highly dependent on mining, and its business cycle tracks closely with the price of copper, the country's largest export. Like its raw-material exporting neighbors across South America, Chile enjoyed a period of high commodity prices in the last decade, driven primarily by demand from China. Productivity in the mining sector is a critical driver of Chile's GDP growth, which in turn drives air traffic.

Annual Passenger Traffic in Chile
2004-2014



Source: JAC

GDP per Capita (Current Prices, USD)
2013



Source: IMF World Economic Outlook, October 2014

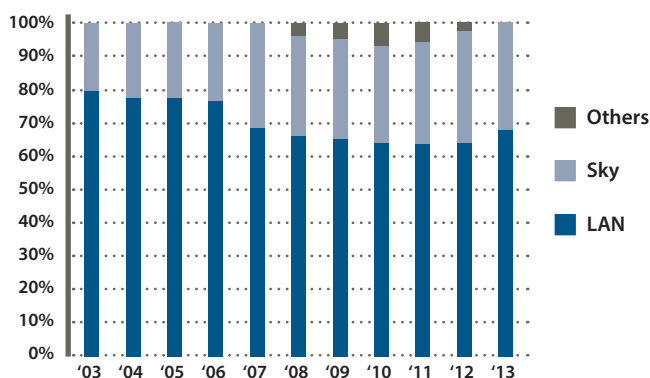


Domestic passenger growth over the last decade has also benefitted from supply side factors, including the entry of Sky Airline, launched in June 2002. In the last eight years, Sky has built up a strong network and emerges as a competitor to LAN in the domestic market. As of 2014, Sky had a 24% share of domestic traffic and serves 14 domestic markets compared

to 15 for LAN. In 2014, Sky became a member of ALTA and was also named the Best Regional Airline in South America by Skytrax. Although Sky Airline accounted for only 6% of Chile's international traffic in 2014, the carrier is expanding internationally, bringing additional competition to the market.

For its part, LAN adopted an LCC-inspired operating model on its domestic operations in 2007, driving efficiency that allowed the carrier to lower costs (and fares), which contributed to traffic stimulation. LAN, which maintains its primary hub at Santiago and carried two thirds of total Chile traffic in 2014, has expanded capacity at 4.2% annually over the last 10 years. After its aggressive expansion in the domestic market since 2007, LAN is expected to pursue more moderate capacity growth. Financial challenges stemming from the merger with TAM, coupled with economic slowdown and currency depreciation in Latin America, will contribute to its capacity moderation in the near term.

Share of Domestic Chile Seat Capacity by Carrier
2004-2014



Source: Innovata

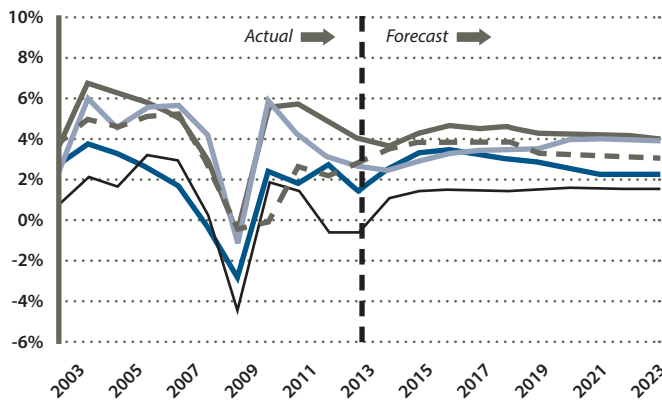
Looking ahead, the outlook for aviation in Chile remains bright, though the double-digit average growth achieved in the last decade is unlikely to be repeated. As the primary driver of air travel, slowing economic activity has already begun to impact Chile's aviation market. After two consecutive years of 17%+ traffic growth in 2011 and 2012, air traffic in Chile has slowed, registering 8.2% and 4.6% growth in 2013 and 2014, respectively. Major economic headwinds in 2015 and beyond, including falling commodity prices and slowing growth in China, have already begun to suppress the economic dynamism seen in the prior decade across the region. In addition, some analysts express concern that proposed fiscal and labor reforms, including an increase in the corporate tax rate, could further dampen investment and economic growth. Forward airline schedules reflect a reduction in capacity in response to this new demand environment, with 1H 2015 scheduled domestic seats down 7.8% compared to the same period in 2014. International capacity, however, is projected to increase 7.2% in the first half of 2015 compared to 2014.



Nevertheless, Chile's economy is projected to grow above the regional average in the coming years and the government's commitment to prudent macroeconomic management should remain intact. In addition, Chile's aviation sector will continue to benefit from the government's efforts to ensure that the country's air transport infrastructure keeps pace with demand. In December 2015, Chile's Public Works Minister Alberto Undurraga stated that "Chile requires more and better airports, both in small and large cities." The government will invest USD 1 billion in airport infrastructure in 2015 and beyond. Importantly, the government has taken a holistic approach to air transport infrastructure, considering both the major international gateway as well as regional airports (virtually all of Chile's international air service is concentrated in SCL).

Other factors supporting the continued growth of air travel in Chile include the recent expansion of air service rights between Chile and Australia, as well as Chile's membership in the U.S. Visa Waiver Program, allowing Chilean citizens visa-free travel to the U.S. Looking ahead, the next few years are likely to witness moderate growth in Chile's aviation sector. However, given the country's strong institutions, solid macroeconomic fundamentals, and healthy airline industry, the future of its aviation sector looks bright.

Real GDP Growth by Region



	CAGR	
	'03-'13	'13-'23
Chile	4.7%	4.3%
USA	1.7%	2.7%
Latin America	4.1%	4.0%
Europe	0.8%	1.5%
World	3.0%	3.3%

- Chile
- USA
- Latin America
- Europe
- World

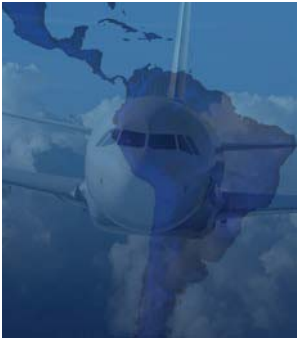
Sources: Economist Intelligence Unit; FAA Aerospace Forecast FY 2014-2034



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Best Practice in Aircraft Lease Returns

The First Part of a Four Part Series



Returning aircraft off lease to lessors is not a new process, yet many established operators find it difficult to complete scheduled lease returns on time, in compliance with the lease agreement and within budget. The aircraft lease return process is simply not a core business competency of an airline.

To help understand this process better, ICF International, a leading aviation and aerospace consulting firm, is producing a multi-part series of articles on best practices in managing aircraft lease returns for airlines.

In this article, ICF examines the demographic trends associated with aircraft leasing as a leading indicator for future lease return activity. In addition, ICF quantifies the impact on the airline industry associated with delayed lease returns.

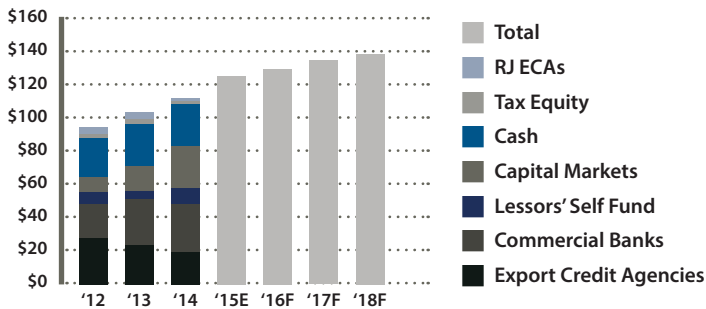
In three subsequent articles, ICF will outline the best practices that airlines should use to accomplish a successful eventual lease return, at three phases of a lease contract lifecycle:

1. At contract negotiation and signing
2. Throughout the lease term, and
3. At the end of the lease.

Global Aircraft Financing and Leasing Markets

As shown in Exhibit 1, the total value of new commercial jet aircraft deliveries was approximately USD 95 billion in 2012, USD 104 billion in 2013, and USD 115 billion in 2014 according to Boeing Capital Corporation. The total delivery value for new commercial jets is forecast to continue increasing, rising to nearly USD 160 billion by 2019.

Aircraft Financing History/Forecast
USD Billions



Source: Boeing Capital Corporation

Aircraft Operating Leasing

An alternative to airlines providing equity to finance aircraft is for aircraft leasing companies to provide such capital. In an aircraft operating lease, the lessor retains ownership of the aircraft and, at the end of the lease term, the lessee returns the aircraft to the lessor such that there is no residual value interest, or exposure, for the lessee.

Airlines typically lease aircraft from operating lessors through three primary channels:

- Airline takes placement of an aircraft from a lessor's direct order with a manufacturer
- Airline executes sale-leaseback transaction with a lessor to help finance its new deliveries (or less commonly, to help manage a fleet exit)
- Airline takes placement of a used aircraft on lease from a lessor's portfolio

Over the course of what is generally recognized as a 25-year economic lifecycle, an aircraft will be placed on lease multiple times, with the lessor retaining the residual value risk throughout time period or until the aircraft is retired or sold.

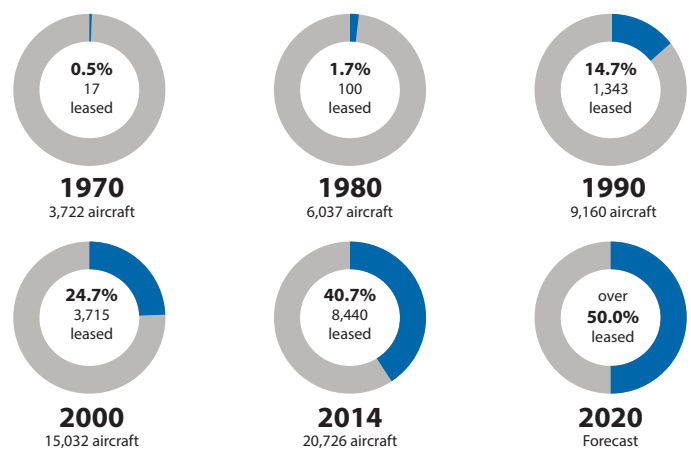
Operating leasing is an attractive instrument to airlines for a variety of reasons, including:

- Low capital outlay requirements
- Elimination of residual value risk
- Enhanced fleet planning flexibility
- Access to superior technology
- Advantageous delivery date availability

Global Operating Leasing Trends

Beginning over 40 years ago, the aircraft operating lease industry has evolved to become a highly sophisticated and major segment of the commercial aviation landscape. Since 1980, the percentage of the global active commercial aircraft fleet under operating lease has increased from less than 2% to nearly 41% in 2014. This represents an average annual growth rate for the leasing sector of approximately 14%, compared to overall fleet growth of 3.7% over the same period. Boeing Capital forecasts that operating leasing will account for 50% of the in-service fleet by the end of this decade, as shown in Exhibit 2.

Exhibit 2: Evolution of Operating Lease Penetration by Fleet Size
1970 – 2020F

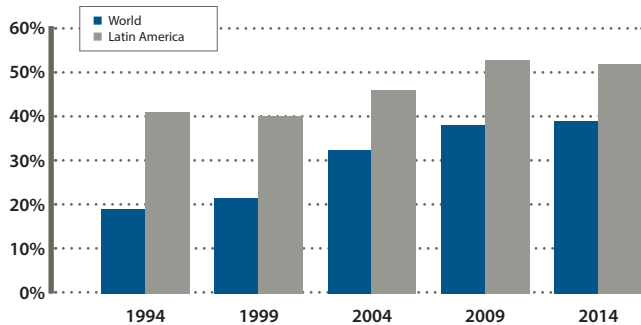


Source: Boeing Capital Corporation

Latin American Operating Leasing Trends

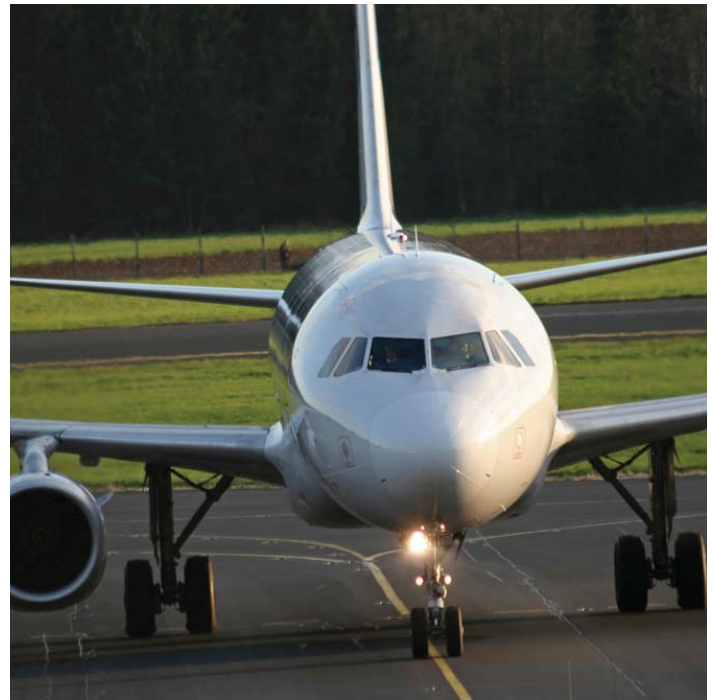
Latin America has long had the highest proportion of aircraft under operating lease, with over 50% of its fleet subject to this structure today. This high penetration has been driven by the historical financial challenges many carriers in the region have faced and by limited access to alternative sources of low-cost capital.

Exhibit 3: Latin America Operating Lessor Penetration
1994–2014



Source: Flightglobal ACAS, December 2014

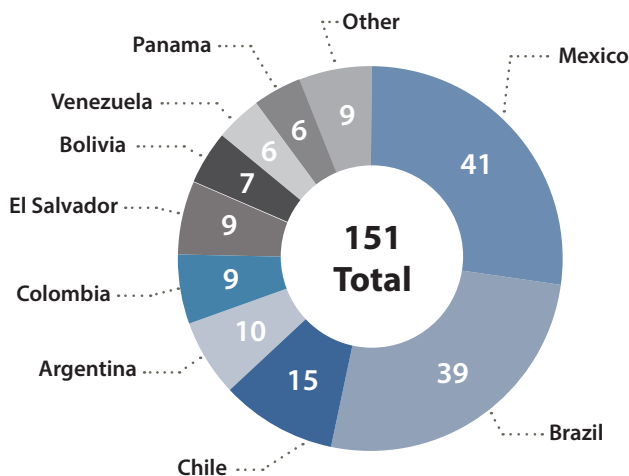
According to Flightglobal ACAS, in the last year more than 150 new and used aircraft placed in Latin America have been subject to operating lease agreements.



Outlook and Cost Avoidance Opportunity for Lease Returns in Latin America

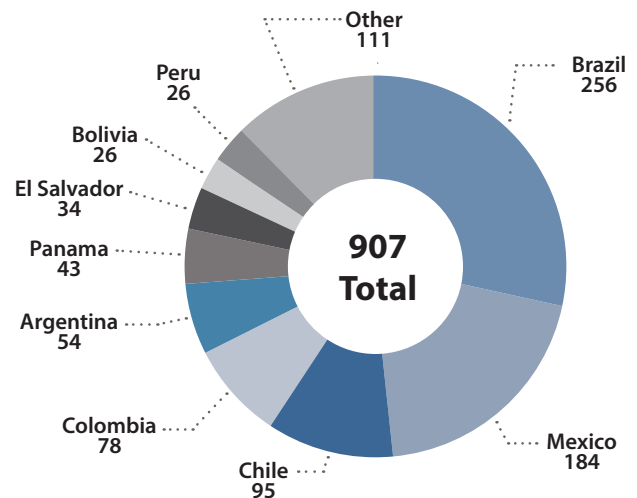
Unless otherwise extended, over the next five years it is anticipated that approximately 900 operating lease agreements will expire for those aircraft currently leased by Latin American carriers.

Exhibit 4: Aircraft Placed in Latin America Subject to Operating Leases
2014



Note: Fleet includes Western-manufactured narrowbody, widebody, and regional jets in commercial service.
Source: Flightglobal ACAS, December 2014, ICF Analysis

Estimated Lease Returns in Latin America
2015–2020



Note: Fleet includes Western-manufactured narrowbody, widebody, and regional jets in commercial service.
Source: Flightglobal ACAS, December 2014, ICF Analysis

The risk for airlines in the region of incurring undue delays upon lease return is significant. For example, if 50% of the aircraft under operating lease were to be returned to lessors on average just two weeks late each, the annual additional costs to Latin American airlines in penalty rent alone would be USD 23.6 million across the fleet (assuming an average monthly lease rental of USD 350,000 across narrowbody and widebody aircraft, leased new and used and 1.5X penalty rent),

To provide additional context, from 2010–2014, IATA reported that Latin American carriers generated an average of USD 380 million in net profits per annum. Thus, nearly USD 24 million in cost avoidance per annum could raise net profits by 6% across the industry.

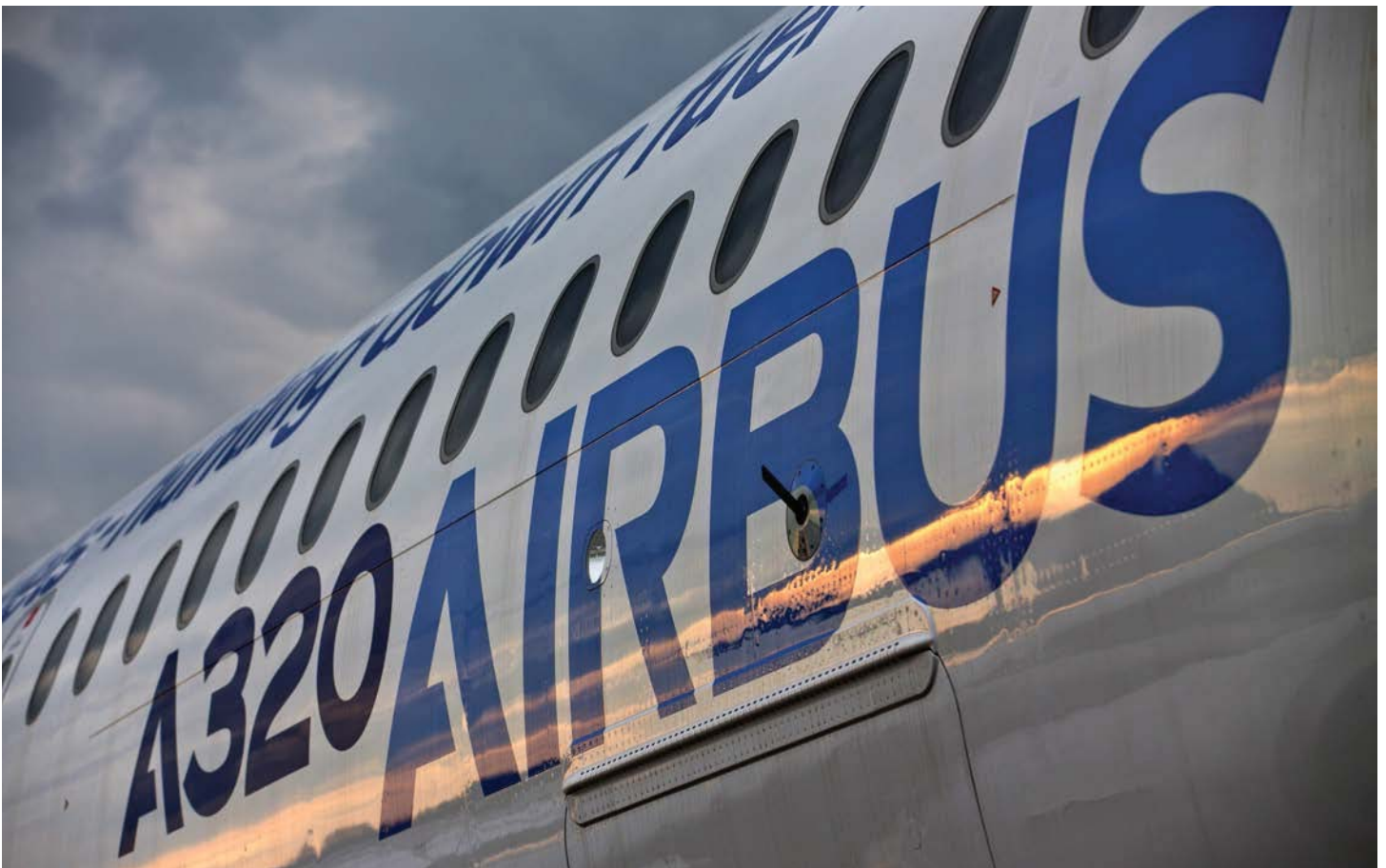
Given the strong operating lease landscape in Latin America and the significant potential cost reduction associated with minimizing delayed lease returns, it is essential for airlines in the region to follow best practices and avoid delayed or mismanaged returns.



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Airbus A320-200 Review



The opinion expressed here does not constitute a formal appraisal.

Airbus A320-200 Technical Description

The Airbus A320 family was the first of an entirely new generation of short- to medium-range, narrowbody, single-aisle commercial transport aircraft designed and produced by Airbus to replace older generation Boeing 727s and 737s and McDonnell Douglas DC-9s and MD-80s. The A320 family comprises four series of aircraft – the A318, A319, A320 and A321 – offering seating capacity from 100 to 220 seats. A high level of commonality within the family facilitates a common pilot type rating for all derivatives, allowing for cross-crew qualification and cost savings to operators which fly multiple family member aircraft. To date, about 6,360 A320 family aircraft have been delivered.

The A320-200 received JAA certification in November 1988, and was quickly established as the preferred version of the type, superseding the A320-100 as the standard version. Now known simply as the A320, this variant featured an increased MTOW, extra fuel capacity conferred by a wing center section fuel tank, and wingtip fences for improved aerodynamics.

Airbus recently developed a midlife “A320 Enhanced” variant involving a new interior, weight savings, aerodynamic improvements, and upgraded engines. The current A320-200, fitted with “Sharklet” winglets, has a range of approximately 3,300 nm with 150 passengers in a typical two-class configuration, baggage, and 200 nm reserves. A maximum of 180 passengers can be accommodated in a high-density layout

Two engine series are offered on new-build A320 aircraft – the IAE V2500-A5 and the CFM International CFM56-5B. These engine types exhibit nearly equal market share among current aircraft in operation and order backlogs, and therefore engine type for this aircraft is not a discerning factor for valuation purposes. Both CFMI and IAE currently offer retro-fittable upgrade packages (CFM Tech insertion PIP and IAE SelectOne/Two) for their respective engines to reduce fuel burn and CO2 emissions, and to improve time on-wing which, if installed on a given engine, would have a material positive impact on values.

Airbus A320-200 Values

Build year	2004	2007	2010	2014
Current Market Value (2015 USD \$millions)	17.9	23.1	29.5	41.0
Indicative Lease Rates (2015 USD \$ thousands/ month)	170 - 220	210 - 250	250 - 310	300 - 350

Assumptions:

Engine CFMI CFM56-5B4
MTOW(lbs) 169,756

Marketability of individual A320 aircraft is affected by the respective aircraft build standard, which is generally a proxy for aircraft vintage. Over time, Airbus has consistently improved construction techniques and incorporated service bulletins (“SBs”) into the production line, offering enhanced operating weights, major components, cockpit avionics, navigational performance, cabin interior, and the like. Early-build aircraft powered by IAE V2500-A1 and CFMI CFM56-5A series engines are proving more difficult to remarket with market preferences having moved to post-1995 vintage aircraft.

Airbus A320-200 Market Overview

As of December 2014, there were 3,585 A320-200 model aircraft in commercial operation with 276 operators across the globe, of which 143 aircraft are parked.

Downward value and lease rate pressure on used A320-200 aircraft has been observed over the last several years, particularly for older aircraft, following bankruptcies and increasing production rates by the manufacturer. Over

the course of the last six months there has been a modest improvement in values and lease rates for new and many used aircraft. According to Flightglobal ACAS, as of December 2014, there was a total of 27 A320-200 aircraft advertised as available for sale or lease, representing less than one percent of the existing fleet. This is indicative of healthy demand, although actual availability may be somewhat higher.

Demand for newer aircraft is significant, with Airbus expanding production capacity to deliver on the current backlog of 860 A320-200 aircraft (there are currently 4,805 orders for the entire A320 aircraft family of which 3,361 are neos).

ICF notes that any sustained reduction in fuel prices can be expected to provide support to used values, perhaps to the detriment of new aircraft.

Long term residual values can be expected to reduce with the introduction of the A320neo in 2015, and to a lesser extent by the current production aircraft when fitted with optional new-technology winglets, or “Sharklets” in Airbus nomenclature. Nevertheless, the more pronounced value decline potential represented by the introduction of the A320neo is not anticipated to take effect until late in the decade, once the new variant reaches a sizeable in-service fleet and is most likely to affect later-build examples of the existing A320ceo.



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ICF International Aviation Expertise

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