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November/December 2022

Beating inflation

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Lessors count cost of crisis

Higher interest rates and "hyperinflation" will mean a prolonged period of higher borrowing costs for lessors.

Operating lessors have entered a new phase of economic and political uncertainty with an evolving monetary policy and a shifting geopolitical landscape.

Inflation is not abating. As *Airfinance Journal* went to press, the US Federal Reserve increased its interest rate by 0.75 percentage points for the fourth time in a row.

Following the move, the central bank said data since its last meetings suggested the "ultimate level of interest rates will be higher than expected".

Though it is possible a less aggressive pace of "ongoing increases" will be needed to bring inflation back to the Federal Reserve's target rate of 2%.

In other words, the Federal Reserve knows it can ill-afford to mess this up and believes a more measured approach is a safer way to get to a higher peak rate.

On the day of the tightening, Elliott Management, one of the world's biggest hedge funds, warned clients that the global economy is heading for "hyperinflation" and possibly its worst financial crisis since the Second World War.

Weaker currencies outside the USA and looser fiscal policy have only added to existing price pressures.

But even with a slower pace of monetary tightening, the message is clear: lessors are in for a prolonged period of higher borrowing costs – perhaps longer than initially expected.

Airfinance Journal estimates lessor bond maturities will surge to $15 billion in 2023 from $3 billion this year. They will jump to $22 billion in 2024 before falling to $12 billion in 2025.

Are lessors prepared for these higher costs and the possible refinancing challenges ahead?

"For sure, the pain is going to come, but the leasing market is still holding on for now," a C-suite lessor tells *Airfinance Journal* on the back of the latest rate hike, adding: "I do think a lot of people have underestimated the ultimate level of rate increases that would be necessary to curb inflation."

The immediate impact of higher interest rates will be "felt by the lessors because the cost of debt could increase dramatically", warns an aviation banker. Airlines, on the other hand, can pass on the higher costs to their customers "for the time being", he says.

Andy Mansell, a partner at Split Rock Aviation, is slightly more sanguine when factoring in the weight of higher borrowing costs on upcoming bond maturities.

"Remember it's not necessarily a doubling of your cost of funds. It's incrementally moving your weighted average cost of capital. For example, if your weighted average cost of capital is 4% at the moment, and you do a 7% financing, your new weighted average cost of capital is going to be four and a quarter or 4.3 or 4.4. Not what you want to see, but it's not as horrific as people think."

And that picture will change again, he adds, with rates falling in 2024 according to the forward rate curve.

"So, if you want to look at where the risk lies for lessors, look at 2022 and 2023 expiries. That's the band that is going to be impacted if the forward rate is accurate. That's the band that will bear the brunt of things," he says.

Mansell adds: "Lessors also filled their boots in 2021 with incredibly cheap money that brought their weighted average cost of capital down. It is not as doom and gloom as some make out. But it depends if you have access to the 144A market."

Furthermore, economic uncertainty is rising with most major economies now not only expecting a slowdown but also a recession. Canada was the latest economy to release its "two economic outlooks" with a slowdown and a mild recession.

Meanwhile, China has delayed the release of its third-quarter GDP data but economists think annual growth will slow to 3.3%.

China's "big three" carriers fell further in the red in their third-quarter earnings because of the country's zero-infection strategy and higher fuel costs.

Against this backdrop, lessors could potentially experience the largest swap of aircraft assets since aircraft leasing began between western and Chinese lessors.

The move is expected following the National People's Congress in October as China lessors shift their strategy and look to decouple from the global leasing sector.

Aircraft swaps are already taking place, sources indicate, but are expected to increase in 2023 as China's domestic focus comes into full effect but also because western lessors were already reducing Chinese exposure following Russia's invasion of Ukraine.

Saudi Arabia-based Avilease is in talks to purchase 30 to 50 aircraft from China Aircraft Leasing (CALC) as the Hong Kong SAR-based lessor looks to scale back its global exposure, sources tell *Airfinance Journal* following the congress.

Avilease has hired Citi while CALC has appointed JP Morgan to advise on the sale discussions, say sources.

But whether this particular aircraft swap happens does not matter. Other lessor swaps will surely follow even with more expensive money on tap for longer.

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Moody joins Cranfield Aerospace Solutions

Cranfield Aerospace Solutions has appointed Richard Moody in the newly created role of chief investment officer.

Moody will drive forward the organisation's goal of developing the world's first zero emissions, regulatory-certified, commercially viable hydrogen aircraft.

Moody joins the firm with more than 25 years' global financial leadership experience in investment banking organisations with responsibility for providing leadership in investor relations, strategic investments and capital raising.

Most recently, he was the global head of transportation finance at Deutsche Bank, overseeing a team of professionals in London, New York, Singapore and Hamburg, and working with operators, lessors, developers and investors across private and public capital markets.

In his 15 years at Deutsche Bank, Moody raised and financed more than $75 billion across the transportation and infrastructure sectors globally.

He previously served as the co-head of transportation, infrastructure and energy financing for EMEA/Americas. Moody was a member of Deutsche Bank's global credit financing solutions management committee and chairman of the global transportation investment committee.


Richard Moody

He was also the global credit trading lead in helping to develop Deutsche Bank's transportation sustainable framework. He represented the bank on the Aviation Working Group (AWG), a non-governmental organisation focused on international aviation financing and leasing, including sustainability issues.

Before Deutsche Bank, Moody spent more than 10 years at RBC Capital Markets. His final two years at the bank were as director, head of transport infrastructure.

"Sustainability and decarbonisation are the major generational themes in the aviation industry today, and Cranfield has the engineering and aerospace expertise to play a significant part in this critical agenda. I am delighted to join the company at this exciting time as it seeks to develop the world's first commercially viable hydrogen aircraft," says Moody.

Paul Hutton, the chief executive officer of Cranfield, says: "Cranfield Aerospace is leading the introduction of zero-emissions hydrogen propulsion into commercial aircraft, and Richard's leadership, expertise and experience from the financial sector will be a key attribute as we look to scale the company and raise further capital and develop the commercial partnerships needed to deliver our vision."

BOC Aviation names new SVPs

BOC Aviation has appointed Mahamane Toure as a New York City-based senior vice-president (SVP) for airline leasing and sales.

Toure has spent the past five-and-a-half years at United Airlines in Chicago, including in senior manager roles in corporate finance and fleet transactions.

He previously held various roles at Boeing and the FAA.

Toure is a member of the technical standing committee of The Hague Court of Arbitration for Aviation, and an ISTAT Foundation committee member.

The Asian lessor also appointed Shairon Sexton as senior vice-president of airline leasing and sales, based in the Dublin office.

Before joining BOC Aviation, she was senior vice-president of Aercap between November 2021 and September 2022. Sexton worked at GECAS (now Aercap) for more than six years. Before that, she had experience at Standard Chartered Bank and Maples and Calder.

BOC Aviation has promoted Amy Zhao to vice-president aircraft sales, based in Singapore.

She will be responsible for the company's aircraft trading in North Asia. Zhao has been with BOC Aviation for almost 11 years, starting in corporate communications before becoming manager of the chief executive officer's office and eventually vice-president of treasury before joining the aircraft sales team.

Skyworks appoints new management team

Matthew Landess was named as chief executive officer (CEO) of Skyworks Holdings, effective from October 2022.

Landess joined Skyworks in 2008 with experience in structuring and arranging aircraft-backed lease and loan transactions.

Before joining Skyworks, Landess worked for more than 12 years at Babcock & Brown in its aerospace group where he managed several airline accounts.

Between 2005 and 2007, Landess led the Delta Air Lines bankruptcy restructuring process. Before that, he was involved with American Airlines' acquisition of TWA while in bankruptcy.

Skyworks Holdings also appointed Jeff Caine as its new chief financial officer.

Caine has been with the company for more than 20 years, having joined as a president. He was previously a partner and head of investment banking.

Caine started his aviation career at The Transportation Group as a principal in 1995. He moved to Natwest Markets in 1997 as an associate and the Seabury Group in 2000 as a vice-president.

Play names new CFO

Icelandic low-cost carrier Play has named Olafur Johannesson as its new chief financial officer (CFO), following the resignation of Thora Eggertsdóttir.

Johannesson will join the company in his new role from November.


Olafur Johannesson

He previously held the position of chief executive officer and CFO at Skeljung from 2019 to 2022. Before that, he held various management positions in the business world, served on the board of several companies and was an auditor at PwC.

Birgir Jonsson, chief executive officer of Play, says: "He has enormous experience from various fields and is a good addition to Play's strong management team. Now that he is taking over our strong finance team, we can take certain steps forward and continue to raise the bar."

ACS hires former Vmo Leasing deal originator

US lessor Aero Capital Solutions (ACS) has hired Viren Kumar as its new senior vice-president investments.

Kumar joins ACS after more than nine years at Vx Capital and Vmo Aircraft Leasing, where he most recently worked as head of deal origination and pricing.

Ares Management and Vx founders Bob Brown, Sean Sullivan and Will Hudson established Vmo Aircraft Leasing in early 2021.

ACS launched its Airbus A321 freighter-conversion programme alongside Smartlynx Airlines in October as a complement to its current 40-aircraft Boeing 737-800SF passenger-to-freighter (P2F) programme.

Four former Finnair A321s will be delivered in the first half of 2023.

JLPS Ireland names new SVP operations and funding

JP Lease Products & Services (JLPS) Ireland has appointed David Ronan as its new senior vice-president (SVP) operations and funding strategy. In his new role, Ronan will focus on day-to-day aircraft funding strategy for ongoing and future structured deals.

He joins from AMCK Aviation where he served as vice-president and head of capital markets for over six years.

Before AMCK, Ronan was VP finance at Amentum Capital and also worked as a commercial analyst and project manager at SMBC Aviation Capital.

Minsheng Leasing deputy chief joins AFG

Fei Chen has joined Aircraft Finance Germany (AFG) as a senior vice-president commercial, based in Dublin.

He joins from Minsheng Financial Leasing, where he was the deputy chief executive officer of the commercial aviation leasing division. Chen joined MSFL in 2009. Before that, he was an aircraft contracts manager at HNA.

AFG recently also appointed Kira Chong as vice-president of sales based in Singapore, as well as Tohru Saito as vice-president sales in Japan. AFG is led by its founder and chief executive officer, Christian Nuehlen.

The firm has transacted almost all commercial aircraft types, including Airbus A320neo, Boeing 737 Max and 747-8 freighter aircraft.

PIMCO-backed **High Ridge Aviation** launches

High Ridge Aviation launched operations with backing from fixed-income manager PIMCO in early November, confirming *Airfinance Journal*'s previous reports indicating PIMCO had reached an agreement with the former senior executives at GECAS and PK Airfinance to create the aviation asset manager.

Greg Conlon, the former head of GECAS, is the chief executive officer of High Ridge Aviation and is joined by several ex-GE/GECAS industry veterans with specialised experience in aviation finance.

John Bordeaux serves as executive vice-president and chief financial officer. Bordeaux was the chief investment officer for GECAS with responsibility for portfolio and investment decisions, aircraft trading, commercial operations and capital markets since 2020. He spent 14 years at GE and GE Capital in a variety of commercial finance and operational roles. Bordeaux started his career at Arthur Andersen as a senior consultant in 1997 and moved to Deloitte as a senior manager in 2002.

High Ridge Aviation's leadership team also includes John Ludden as general counsel and David Campbell as chief technical officer.

The company's executive vice-president and region managers include Jim Steckart (Americas), Michael O'Mahony (MAC, Turkey and India) and Antony Snelleman (Asia).

Mike Huang was named executive vice-president, portfolio management while Dave Vowles is senior vice-president powerplant.

O'Kane joins **ICBC Aviation**

ICBC Aviation has appointed Ross O'Kane as vice-president of sales and leasing.

He joins from Orix Aviation, where he spent the past six-and-a-half years in various roles, including most recently as a vice-president commercial.

O'Kane's appointment follows ICBC Aviation promoting Martin Ma to vice-president sales EMEA. Ma has been with ICBC's aircraft leasing division for more than seven years, most recently as a senior sales manager covering markets including the USA, Canada, Russia and Turkey.

This follows the departure of Chao Wu in September, who took up a new position with Avolon as a senior vice-president of origination, based in Dublin.

Wu served as the head of EMEA at the Chinese bank-backed lessor since May this year. He previously held the position of vice-president of sales and marketing for four years at the lessor.

ICBC Leasing Sanford moves to AEI

US-based private equity firm AE Industrial Partners (AEI) has appointed Stephanie Sanford as a senior vice-president (SVP).

She will have responsibility for the origination and management of aircraft leases, engine leases and related aerospace leasing investments for the AE Industrial Partners aerospace opportunities fund.

"Stephanie's significant aircraft leasing origination and management expertise will be an invaluable resource as we continue to invest from our Aerospace Opportunities Fund," says David Rowe, managing partner of AEI.

"We welcome Stephanie to the team and are confident her contributions will help us identify new opportunities while also adding expert guidance in lease management," he adds.

Stephanie Sanford

Sanford brings more than 25 years' aviation leasing experience at aircraft lessors, banks and financial institutions in the USA and Europe. Before joining AE Industrial, she was an SVP and head of aircraft trading at ICBC Aviation Leasing in Dublin, Ireland, where she was responsible for more than $2.5 billion in aircraft trading transactions.

Before ICBC Leasing, Sanford was SVP and head of trading at FPG Amentum, where she led the origination team. She has also held various aircraft leasing and aviation marketing roles at Bank of America Ireland Leasing, CIT Aerospace and aircraft lessor ILFC.

Sanford began her career at the Federal Aviation Administration (FAA).

Lessors optimistic on widebody demand

Leasing companies account for 114 widebody orders. **Hugh Davies** and **Olivier Bonnassies** report.

Aercap and Air Lease are confident demand for widebody aircraft will improve over the next few years.

"Today we are more optimistic about widebody demand than others," Aercap's chief executive officer Aengus Kelly said during the lessor's third quarter results conference call in late October.

Kelly believes the shortage experienced currently in the narrowbody market will be replicated in the widebody segment. "And like the narrowbody market, the tight supply will persist over the next few years."

In the third quarter alone, Aercap signed lease agreements with customers for 30 widebody aircraft, including 11 units from its orderbook and 19 units for used aircraft. Kelly says demand on those aircraft were from Asia, Europe and South America.

"This will be sustained by the low production rate of the new 787, Airbus A350 and A330neo, as well as significantly longer lead time for components, engines and shop visits which are impacting the supply of older kits," he says.

Kelly reveals that storage rates for 787s are lower than for the A320neo today.

"As result we believe that we will continue to see strong demand and upward pressure on lease rates for widebody aircraft," he adds.

He says Boeing had only delivered nine 787s through 30 September this year versus over 150 units in 2019.

"This is contributing to further tightening in supply. Given the events of the last few years, it is no surprise that the OEMs are facing higher scrutiny on deliveries and quality assurance. We are hopeful they will address these issues," he comments.

Kelly says demand for narrowbody aircraft perceived in the first leg of the recovery has proven to be reliable for forward looking indicators in the travel recovery.

"I expect the demand we currently see for widebody aircraft will continue to drive the recovery."

Kelly says the environment for aircraft leasing continues to strengthen and the best indication of this was in the execution of a record 255 transactions by Aercap in the third quarter of this year. This included lease agreements for 137 aircraft, 24 helicopters and 23 engines. Aercap also completed the purchase of 15 aircraft, 16 engines and three helicopters, and sold 21 aircraft, 13 engines and three helicopters.

"I expect the demand we currently see for widebody aircraft will continue to drive the recovery."

Aengus Kelly, chief executive officer, Aercap

"The amount of data emanating from this level of transaction activity is unparalleled and gives AerCap unique insight into the market allowing us to make meaningful decisions earlier and with more conviction. Today is the reason we are considerably more optimistic about global widebody demand than many others."

Air Lease chairman Steve Udvar-Hazy predicts a gradual but significant recovery in the widebody market as long-haul travel begins to recover from the effects of the Covid-19 pandemic.

"The international traffic recovery is starting to gain momentum as countries liberalise their border restrictions, particularly in Asia outside of China," Udvar-Hazy commented during the lessor's latest earnings call.

"Things are crawling back to normalcy. We expect by the middle of next year those regions will have caught up in their long-haul business."

The market is seeing strong demand for replacing older widebodies that are reaching the end of their lives.

"There are many current campaigns unfolding that have been reported… United for 100 widebody aircraft, Air India reportedly 40 to 60 widebodies, Saudi Arabia up to 50 twin aisles," said John Plueger, Air Lease's chief executive officer.

"These are very significant numbers. If it's true, then that really adds further momentum. We expect both Boeing and Airbus to seek production rate increases for the 787 and A350," he adds.

Udvar-Hazy added that the pending campaigns for Boeing and Airbus could stretch to two years of production.

"If you accumulate them in terms of quantity of new aircraft, it's almost three years of production of 787, 777X, A330neos and A350s. Even if you take a 60-70% success ratio, we're looking at almost two years of production going towards these bulk orders," he noted.

Airfinance Journal Fleet Tracker shows that Aercap has 293 widebody aircraft in its fleet with orders for 26 787-9s.

Air Lease has orders for 43 widebodies, including five A350-900s, two A350-1000s, 13 A330-900s, six 787-9s and 17 787-10s. The Los Angeles-based lessor has 119 widebodies in its fleet.

According to Fleet Tracker, there are 1,450 orders for widebody aircraft. Lessors orders in the account for 114 units, of which 69 (or 60% of the lessors orders) are committed by Aercap and Air Lease.

Challenging road to 75 a month

Airbus faces serious roadblocks on its path to achieving a monthly production rate of 75 aircraft by 2025 with supply chain issues and severe labour shortages disrupting production of new aircraft. **Hugh Davies**, **Laura Mueller** and **Olivier Bonnassies** report.

Guillaume Faury, the Airbus chief executive officer, insists that, despite the challenges of the supply chain, both Pratt & Whitney and CFM International agree on the staging-post volumes to reach output of 75 Airbus A320-family aircraft a month in 2025.

Earlier this year, the European manufacturer confirmed its intention to produce 75 aircraft a month by 2025. The proposal came despite the company facing criticism from some suppliers over a previous plan to boost A320 production to 65 a month by summer 2023.

The Raytheon Technologies chief executive officer, Greg Hayes, said in September that, despite growth returning and a solid backlog, it would "take us a little while" as the original equipment manufacturers ramp production back up.

"If you take a look at the projections for Airbus, we think that Airbus by 2025 will be at rate 65. And Guillaume might say rate 75, but we think rate 65 is doable," he told a Morgan Stanley conference.

"The comments from Greg were not helpful," Faury said at the Airbus capital markets day 2022 on 23 September. "I can only share the other side because this is not really satisfying. It is not consistent with what we have discussed recently."

He adds: "They are not challenging the need for 75. That is not clear in the way it was expressed. They fully agree with us. They don't push back on the willingness to get there but what they are telling us is that it is going to be hard. And we know it is going to be hard, this year and next year."

Faury says that Airbus has agreed on volumes with both engine manufacturers for single-aisle aircraft for 2023 and 2024. "We are starting to discuss the volume for 2025," he says.

"Ramping up quickly to 75 a month from where we are today for engine manufacturers is difficult. They have a very heavy supply chain… They need lead time visibility investment and we know it is a supply chain that is difficult to move."

The impact of the supply chain in terms of materials and labour was highlighted in the summer by Hayes, who does not believe there will be a return to a normal labour environment this year.

"I think it is end of 2023 and going into 2024. It takes time to develop skills, hire and train people. It does not happen overnight," says Hayes.

"Ramping up quickly to 75 a month from where we are today for engine manufacturers is difficult. They have a very heavy supply chain."

Guillaume Faury, chief executive officer, Airbus

At *Airfinance Journal*'s North America 2022 conference in October, Aviation Capital Group's chief procurement officer, Steven Hazy, said the supply chain is in a very challenging situation across the board, from the aircraft manufacturers to engine makers to essentially all other underlying suppliers supporting the industry.

"We also see the disruption on the transition side of the business, where we're seeing our MRO [maintenance, repair and overhaul] providers sourcing equipment and spare parts to transition aircraft to onward lessees," he told delegates.

"We're seeing this really affect the time frames in which we need to order equipment for our airplanes, both for new airplanes and modifications for aircraft off-lease," he adds.

Lead-time disruptions are increasingly long and require the lessor to plan much further in advance than it had to before the pandemic.

"There's a tremendous amount of disruption in production delays affecting the planning for our airline customers. Ultimately, as a lessor, our success is based on the success of our customers, but it also has a disruption to our financial planning, because we're planning for cash flow and revenue that haven't occurred on schedule."

He also noted that the lessor has an increase in extension activity from lessees for aircraft such as Boeing 737NGs or A320s because of disruptions.

Marie-Aude Gagnon Rousseau, senior director, fleet transactions at Air Canada, said that over the past few years the Canadian carrier has come to "effectively stop assuming" that aircraft will be delivered on time.

"We have to have a plan A, B, C and D to address all those different delays and it depends on what is happening with the fleet. Are we ordering aircraft to replace an existing fleet or to achieve growth?" she asked.

"If it is for growth, it is a slightly different situation and the only way to mitigate it is to take in some short-term lift from the market and from lessors," adds Gagnon Rousseau.

Both panellists agree that a best-case scenario for these supply chain issues to be resolved is in 2025.

"It takes a lot of planning and corrective actions across the supply chain, so this is not an overnight fix," says Hazy.

One of the biggest challenges in Airbus's path to achieving rate 75 is industry-wide labour shortages.

"It takes time to train and get new hires up to speed and develop a new workforce that can manage very sophisticated technology. We, as an industry, need to do a better job of getting more people into the business, especially on the production side," says Hazy.

Gagnon Rousseau notes that one reason for the labour shortage is the aviation industry's lack of success in increasing workforce diversity.

"During Covid, we were so busy fighting fires that we set aside focusing on diversity to some extent. We have a labour shortage and not enough women in the industry which means we're effectively not tapping into 50% of the labour pool that is available globally," says Gagnon Rousseau.

In September, Airbus confirmed its 700-aircraft revised guidance for 2022 deliveries.

Its chief financial officer, Dominic Asam, said 382 aircraft had been delivered through the end of August and about 320 units are remaining over the four-month period.

"Based on the visibility from the supply chain, we think it is manageable but it will not be easy. Each Airbus delivery at the year-end is challenging but we are on the trajectory to get there," commented Airbus's Faury at the time.

He also stressed the need to look beyond a year-end deadline and for Airbus to manage deliveries for 2023.

"It is going to be a difficult year again," warned Faury. "We don't know exactly when the supply chain will normalise. Some say mid-2023, while more conservative views are over the year 2023. We have indications that things are starting to be better. But we are in the ramp-up phase and it is not only fulfilling the needs of today."

Airbus must have been detached from reality when it reiterated its A320neo production ramp-up goals of 65 aircraft per month in 2024 and 75 in 2025, Air Lease's executive chairman of the board told *Airfinance Journal*.

"Either it was oxygen deprived when it made these predictions, or there must have been something in the drink or food that had some kind of psychedelic effect because when talking to the supply chain, particularly the engine manufacturers, there's just no way that they can build a sufficient number of engines in the next 36 months to be put on existing ordered aircraft and spare engines," says Steven Udvar-Hazy in a fireside chat at *Airfinance Journal*'s North America event.

"For every 10 installed engines, you need at least one spare engine. And based on very detailed discussions we have had with the engine guys, there is no way they can make these Airbus projections."

Aviation Capital Group's Steven Hazy echoed that prediction. "It's all well and good for Airbus to say they're going to get to 75 but it's not just for them to determine that.

"They have to get the buy-in and support and capabilities of the entire supply chain and all the underlying suppliers to support those rates. We're quite concerned because a lot of those suppliers don't have the resources, facilities and capabilities to meet those targets.

"We get nervous when we look at very dramatic rate increase plans – if you're not building off of a stable production system now, it makes it that much more difficult to ramp up. Rate ramps are already very challenging in a stable production system,

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>
> **Guillaume Faury**, chief executive officer, Airbus

but it's even more difficult when the system is not stable," says Hazy.

Airbus' Asam provided the production update during a capital markets briefing on 23 September. Airbus is expecting to reach an A320neo monthly production rate of around 50 aircraft by the end of this year, as it moves towards higher levels of output for the family.

"And that is just the view from the engine manufacturers. Then you look at avionics, APU, interiors, a lot of the forgings for titanium and even interior panels, and the industry today is not equipped to have 125 widebodies between Airbus and Boeing. And then you also have the A220, and then you have massive defence contractor requirements that take precedence," ALC's Udvar-Hazy said.

He reckons that airline analysts fail to understand the importance of defence companies in the pecking order.

"The airline analysts totally have ignored the fact that the defence industry gets first priority, so the likes of Lockheed Martin, Northrop Grumman. They're all talking about production rates as well for the Pentagon and for foreign export.

"And when you look at that, in totality, the supply chain and the various subcontractors at the second and third levels are unable to keep up with these overall projections."

On 4 October, Airbus and Pratt & Whitney started development flight testing of a more efficient PW1100G geared turbofan – known as the GTF advantage engine – on an A320neo aircraft.

When asked about the number of Pratt & Whitney GTF engine removals at various airlines, Udvar-Hazy stressed that "none" of the reliability issues are due to the geared turbofan's design concept.

"It's all been in the combustor, in bearings and in the low-pressure compressor, so these are things that they are able to fix…and we think that by 2025, it is probably fixed," he says. "But there are issues. And it is another sign that you need more spare engines to support the AOG aircraft and that is where Pratt & Whitney is having so many challenges."

The CFM Leap "has a lot of issues too", he adds. "Let's not crucify Pratt. The CFM is not any better. There is no shop availability. Also, we recently had one customer that had two engines that failed prematurely with less than 2,000 hours and they were told they would have to wait six months to be able to put the engine into a shop.

"These are totally unacceptable industry support situations."

CFM is the engine supplier for the COMAC C919, which received its type certification from the Civil Aviation Administration of China at Beijing Capital Airport on 29 September.

However, Udvar-Hazy does not believe certification will occur outside of China for the narrowbody from the US Federal Aviation Administration and the European Aviation Safety Agency.

"No. And there is no grey in that answer. It is black and white. It won't happen," he asserts.

According to him, politics will decide whether CFM continues to support the Chinese manufacturer with LEAP engines.

"We will find out in the second week of November when we have elections in the USA, and we'll see which direction the government is leaning toward in our economic relationships with China."

In September, *Airfinance Journal* asked Kevin Harris, GE Aviation's general manager of Latin America and the Caribbean, for an update after the Chinese government imposed sanctions on the chief executives of Boeing Defense and Raytheon following the 2 September sale of nearly $1.1 billion in military equipment to Taiwan.

Harris said: "There's not a perfect answer that I can give here. For sure, we are continuing to work with the team at COMAC regarding the status of that programme and certification delivery, but there is not a whole lot I can share on that."

Commenting on GE's response, Udvar-Hazy adds: "It is not their (GE's) decision. It will be done at a different level."

China's aviation regulator reportedly met with Boeing in September about the return of the 737 Max to China.

However, he does not expect Chinese airlines to be able to start flying the aircraft "before sometime next year" even though they would prefer to start sooner.

"Chinese airlines are stomping to get the aeroplane revalidated. There are a lot of aeroplanes that are not operational, I think is close to 100 of them that they paid for and they're not able to fly," he says. "So it's not something that the airlines want. This is strictly a political poker game between Beijing and Washington."

The purpose of the meeting between the parties was to review improved aircraft training plans for the model, the regulator said on social media.

The aircraft has not flown commercially in China since March 2019, when it was grounded after two fatal crashes.

The case for **ATR72-600 freighter conversions**

Acia Aero Leasing and appraisers discuss values and lease rates for ATR72-600 freighter conversions with **Olivier Bonnassies**.

Acia Aero Leasing (Acia) has opted for the ATR72-600 freighter conversion to continue building its future freighter fleet as it expands its portfolio and product offering.

The lessor has teamed up with group affiliate IPR Conversions (Switzerland), which owns the supplemental type certificate (STC) for the ATR42 and ATR72 types, and Empire Aerospace to convert the first of three ATR72-600s: two ATR72-600 large cargo door (LCD) and one ATR72-600 bulk freighter cargo (BFC) conversions.

Talking to *Airfinance Journal*, Acia's senior vice-president commercial, Sameer Adam, says the launch of the ATR72-600 freighter conversion project results from the low availability of good ATR72-500 freighter candidates, as well as the -600 fleet's younger average age.

"The uptick in the regional cargo market over the past few years has been very significant. We are seeing limited ATR72-500s available in the market that are worth buying and investing in, most of what is tracked as being in storage will likely never be returned to service," he says.

"Consequently, current demand is sucking up available used aircraft. In addition, the regional OEMs [original equipment manufacturers] as a group have reduced production of new aircraft. From our perspective, to meet cargo demand and open up an additional customer base, it is a natural transition to convert ATR72-600s."

As of 1 October, Acia's fleet included 23 ATR72s in addition to five ATR42s. These include ATR72-600s in passenger configuration, ATR72-500s in passenger configuration, LCD and BFC freighters, and ATR72-212s in LCD and BFC freighter configurations.

"With the addition of ATR72-600 conversions to our freighter portfolio, we are building a larger freighter fleet with an ability to target an expanded customer base," says Adam.

The regional lessor released a request for proposals (RFP) in November 2021 seeking up to 30 aircraft.

Adam says Acia was "getting ahead of the market" and has acquired aircraft along with additional letters of intent (LOI) progressing on more assets.

Conversions will complement new build ATR72-600Fs

"We are at LOI negotiation or heads of agreement stage for up to a further 10 ATR72-500s and -600s, which we intend to add to our fleet by the first quarter of 2023. We are still looking for more assets. It is a function of finding good calibre assets at the right price to invest in and extend the life for other applications like cargo," he explains.

Adam also discusses the options for converting more -500s from its portfolio.

"Most of our -500s are already converted or being converted right now. Some will remain in passenger configuration for a few more years, but we're also looking at the longer-term asset angle. Once the market gets past the next three to five years, the older -500s will be getting too old to operate and age-restriction rules potentially limit the ability to import into certain jurisdictions.

"The youngest -500 will be 15-16 years old and have less market appeal for long-term investment. By opting for the -600 freighter conversions now, we can respond to operators that need younger assets for fleet commonality and also respond to the needs of pilots who are more and more becoming accustomed to glass cockpits."

Adam says the lessor's strategy is to leverage the availability of upcoming -600s that are coming off first leases and be ready to convert those aircraft to -BFC or -LCD using the IPR Conversions STC.

"This will support additional market growth and offer replacement options where required for older ATR72-212s and, in some cases, even ATR72-500 converted freighters," he comments.

Adam adds: "The ATR platform has proven to be very reliable and broadly adopted in all regions. The demand for ATR cargo aircraft has always been strong. The fact that the OEM developed a dedicated factory freighter solution in addition to our group's STC tells a story in itself.

"We expect that there will be continuing strong demand for the product. It is partly because of the strong ATR platform, investment by various stakeholders such as IPR Conversions, and the market appetite for it but also the investment Acia has put into space over the last few years to become a leader in the regional cargo leasing."

Cost

The cost for an ATR72LCD kit is in the $1.75 million to $1.85 million range, according to Adam. This does not include the cost of labour, which will depend on where the aircraft is converted and if the owner also needs to consider other non-conversion costs that an operator may require such as base maintenance.

When comparing the cost of an LCD kit, this solution offers the lowest market cost for any regional aircraft in its size or even when compared with other larger regional aircraft freighter options, says Adam.

"The appraisers have also recently begun to recognise the value proposition of the LCD, and this is reflected in a difference between passenger aircraft values and LCD values that wasn't there two years ago," he adds.

Acia has been evaluating the Embraer freighter-conversion market, but Adam questions if the incremental cost of a conversion and significant increase in operating cost (versus the ATR conversion) is justified by a proportional increase in payload.

"The E190/195F present a good value proposition and it is a seemingly good replacement for 737-300/-400 models, you need to keep costs down. We're still evaluating the overall economics against the 737NG models or when fuel prices are at current levels," he says.

Lease rates are always a function of base value and cost of financing.

Monthly ATR72-600LCD freighter rates are believed to be in the $120,000 to $140,000 range depending on the age of the aircraft, lease term and operator credit, whereas an ATR72-500LCD converted freighter ranges between $95,000 to $115,000 for equivalent lease terms.

Adam says there are some ATR72-500BFCs leased at lower rates but the operator needs to consider maintenance reserve rates or post-delivery maintenance costs that have not been factored into the overall lease proposal.

"Even with that snapshot, interest rates going up and the investment cost required, we have had to revisit some of our lease discussions. The market is expecting $55,000-$65,000 per month lease rates for a -BFC but this is not feasible today. It is not sustainable to place an aircraft at that rate otherwise the investor will lose money at that transaction rate. It just doesn't work when Fed rates are set to hit 4% this year and aircraft values have been increasing since the pandemic."

Airfinance Journal's Fleet Tracker shows that Acia has six ATR72-600s on lease to African operators Green Africa Airways and Bestfly. All units are 2012/13-vintage aircraft with a $7.5 million to $8.1 million market value, according to Avitas.

"In the regional aircraft market, the life cycle appears to be shorter than mainline narrowbody aircraft and this can be demonstrated by the age at which ATR72-500s started to be converted to freighters at around 10-12 years old in extreme circumstances. It will be a similar scenario with the ATR72-600. The market value curve in recent years has seen short, steep drops on young aircraft, which appears to stabilise and increase again when you re-invest in the asset to extend its life. That said, in the last 12 months, we have seen a marked increase in value across all ATR72-500 and -600 types."

He explains that the residual value curve of brand new freighters is relatively consistent throughout its life cycle because there is no additional major investment to change to a cargo configuration that would further extend the life of the asset for another 10 years.

"Whereas for passenger aircraft at mid-life (say 15 years of age) the conversion to freighter will extend the useful life of that asset by another 10 to 15 years. The residual value will have a spike due to that freighter investment. Most of the time, we see an immediate market value return from our investment into the ATR aircraft," says Adam.

"There are advantages and disadvantages for new versus pre-owned conversions. A new off-the-line freighter is good for the right customer but from an investment standpoint, there is an argument that favours pre-owned assets because you have that first life as a passenger aircraft that is heavily written down in book value, and you have also paid most of the debt. Then the new investment extends the useful life of the asset. That new investment is amortised over a very long time," he adds.

Time frame

Adam says the first maintenance slot is booked with Empire Aerospace for January 2023 for a June completion.

"It is not a massive shift from the ATR72-500-conversion programme. The aircraft are virtually the same except the flight deck. It is a matter of integrating some of the ATR72-600 changes into the -500's STC. Our affiliate, IPR Conversions, are well into this process already," he explains.

PMV Engineering is the European Union Aviation Safety Agency (EASA)-approved design organisation for the extension of these EASA STCs to the ATR72-600 variants. The company has developed comprehensive and detailed instructions through detailed task cards and associated installation drawings to help the working parties (Part 145 approved maintenance, repair and overhaul providers) complete these freighter conversions in the shortest possible time, which is six to eight weeks for the bulk freighter conversion and four to five months for the large cargo door).

Adam says age is not an issue because the ATR72-600 is an 11-year-old programme.

"We don't foresee a limit on cycles at this point especially since the number of cycles are lower in a cargo application," he says. "The vast majority of the ATR72-500s and -600s in our fleet are still below 25,000 cycles, so there's more than 40,000 cycles to go before this becomes an issue."

ATR announced the -600 programme in October 2007. The prototype ATR72-600 first flew on 24 July 2009. Launch customer Royal Air Maroc received the first of four ATR72-600s at the end of 2011.

The European turboprop manufacturer has delivered 577 ATR72-600s, according to Fleet Tracker. It has a 124-unit backlog for the type.

Appraisers' views

Oliver Stuart-Menteth, managing director, Fintech Aviation Services, says the launch of the ATR72-600P2F programme was not unexpected given that the average age of the passenger ATR72-500 fleet is now 20 years old and residual values of the ATR72-600 passenger variant have fallen to a level that now makes conversion financially viable.

"The ATR72-600 and the -500 have the same physical dimensions which, after conversion, results in both freighter variants offering the same volumetric payload. The weight payloads for the -600F and -500F variants, typically 7.5-8.5 tonnes (depending upon the line number), are also very similar," he tells *Airfinance Journal*.

However, Stuart-Menteth adds that given that freighter aircraft operate at an average of 60% of their maximum weight payloads (depending on the kg/m3 density of the cargo), this parameter is not typically viewed as critical as most operators will reach the volumetric limit of their unit load devices before the threshold is approached.

"With only three ATR72-500Fs publicly available, the market is relatively tight and demand is reported as healthy. Lease rates for ATR72-500 freighters equipped with a large cargo door are around $90,000 to $100,000 per month, or some $20,000 to $25,000 per month more than the equivalent passenger variant," he says.

The introduction of the new avionic suite flight deck to the ATR72-600 has, however, led many aviation regulators to restrict common-rated crews to one variant a day.

"Freight operators may therefore intentionally decide to remain with a single variant to limit crewing inefficiencies," he says. The current wider availability of -600s at pricing levels that reflect their heritage from the -500 with levels of technology that are now viewed as industry standard has permitted investors to enter the market, although Fintech Aviation Services is of the opinion that lease premiums between the two variants will be minimal, at least initially, as both exhibit similar operational costs and levels of productivity.

But he reckons that as the -500 freighters fleet ages and aircraft begin to incur heavy maintenance checks, coupled with the costs of potential new avionic mandates, some operators will phase them out in favour of both the converted and production variants of the -600F.

Avitas senior vice-president, asset valuation, Doug Kelly, says the move into ATR72-600 conversions can be explained by a lack of supply of good ATR72-500s.

"I don't think this will cannibalise the ATR72-500 market. The -500 will still be the preferred solution, when good candidates are available, for most operators because of its lower acquisition cost," he comments.

"With low utilisation, acquisition cost is more important than the small operating cost benefit of the -600. Fedex is different because they are buying in large quantities so they get attractive pricing, a large cargo door to carry containers and a predictable, steady supply of lift," he adds.

Avitas says a 2011-vintage ATR72-500 bulk freighter has a current market value of $6.7 million while a same-age ATR72-500 LCD freighter is more in the $8.6 million range.

In comparison, a 2012-vintage ATR72-600 large cargo door freighter is valued at $10.8 million. A two-year-old factory-built ATR72-600F is in the $18 million range.

C919 faces uncertain future

China's C919 received its type certificate in September, but the programme's long-term success remains the subject of much controversy. **Elsie Guan** reports.

Chinese lessors are expected to increase their commitments for the locally manufactured COMAC C919 after the type gained certification from the Civil Aviation Administration of China (CAAC) in September. A Shanghai-based firm tells *Airfinance Journal* that it is already working on formalising a new C919 order.

Many uncertainties, unknowns and potential challenges, however, remain. The C919 and the ARJ21 use western-manufactured engines: a CFM International LEAP variant in the case of the C919 and General Electric's CF34 on the ARJ21. A Chinese-manufactured high-bypass turbofan engine for the C919 – the ACAE CJ-1000A – is under development.

Responding to concerns about the supply of CFM engines for the C919 given sanctions on Russia for such equipment and tensions between the USA and China, a COMAC source says: "There are political uncertainties, but there is no obvious impact on engine supply for the C919 at present."

A source from the mainland says: "Possible sanctions definitely could have a very negative impact on the stability of the C919 engine pipeline. They could kill the entire programme."

Kevin Harris, general manager of Latin America and the Caribbean, GE Aviation and CFM, said at *Airfinance Journal*'s LATAM conference in October that COMAC would continue to receive the CFM LEAP-1C propulsion system to power the C919 despite recent sanctions and geopolitical uncertainty.

"There's not a perfect answer that I can give here. For sure, we are continuing to work with the team at COMAC regarding the status of that programme and certification delivery, but there is not a whole lot I can share on that," commented Harris.

Another issue is overseas airworthiness certificate approval for the C919.

"Certainly, there are difficulties for the C919 to receive overseas certificates. This year, the ARJ21 received type certificate in Indonesia, and the C919 type certification will be very similar. I believe the lessors' exposure to the C919 will eventually be the same as that of the ARJ21," a source tells *Airfinance Journal*.

Indonesian carrier Transnusa is waiting for its first ARJ21-700, which completed a test flight in December 2021. The ARJ21 is on operating lease between China Aircraft Leasing (CALC) and Transnusa. The carrier is expected to receive the first ARJ21 before the end of the year.

COMAC claimed 815 commitments for the C919 and 740 order commitments for the ARJ21, including 670 passenger aircraft and 70 freighters.

"As far as I know, the cost of the C919 is relatively high. However, airlines which will operate this aircraft type will get lots of government subsidies. But, if these supporting factors were completely removed, I doubt that operating the C919 would be profitable for airlines," says a lessor source.

With the C919 expected to operate largely for Chinese carriers only, financing is likely to come exclusively from Chinese financial institutions, too.

A source, who wishes to remain anonymous, tells *Airfinance Journal* that "there are no second-hand markets for the C919", adding there will be almost no residual value.

"Doing operating lease for the C919 is very risky. The aircraft cannot be remarketed and redelivered to overseas operators, and most Chinese carriers don't like used passenger aircraft, especially state-owned carriers," says the source.

Another source indicates that lessor orders will follow airline orders when COMAC begins to deliver the C919.

China Eastern Airlines will be the launch operator of the C919. It is expected to take delivery of its first aircraft before the end of this year.

In China, several lessors have placed C919 commitments with firm orders and purchase options, including ICBC Leasing (100), Bocomm Leasing (30), CCB Leasing (50), CMB Leasing (30), Everbright Leasing (30), ABC Leasing (75), AVIC Leasing (30) and Huaxia Financial Leasing (20).

The C919 will have a capacity of 156 to 168 passengers – the Airbus A320neo-family and Boeing 737 Max programme can accommodate between 140 to 230 passengers. The list prices for the ARJ21-700, C919, A320neo and 737 Max is $38 million, $50 million, $110.6 million and $99.7 million, respectively.

In addition to the C919 and the ARJ21, COMAC is also developing the widebody CR929 in a joint venture with Russian state manufacturers. That programme had entered into its preliminary design phase in September.

The Made in China aircraft controversy lingers as China continues to restrict its airlines from operating the 737 Max. In an earnings call in late October, the Boeing chief executive officer, David Calhoun, said there were currently no signs that China would be open to resume 737 Max deliveries anytime soon.

"I have not gotten a single signal – and I'm surprised by it – that they're going to take deliveries in the near term. [...] It is really hard for me to find signals that things are going to change in China and move in our direction," admitted Calhoun.

Boeing opened a 737 Max cabin and delivery centre in Zhoushan near Shanghai in 2018, its first overseas delivery facility.

In October, Fitch analysts said they believed an agreement with China to recertify the 737 Max is possible over the next three to six months. However, it does "not expect an agreement will have a meaningful effect on the company's financial performance and delivery numbers until Zero Covid policies are loosened, which Fitch does not anticipate until mid-2023 or later".

In a possible first sign of a reversal of fortunes for the Max in China, the CAAC permitted MIAT Mongolian Airlines to operate a Max 8 flight between Ulaanbaatar and Guangzhou in October – the first time a Max was allowed to carry passengers across Chinese airspace since the 2019 grounding.

To date, Chinese carriers have received 97 737 Max aircraft, including China Southern Airlines (24 units), Air China (16), Hainan Airlines (11), Shanghai Airlines (11) and Xiamen Airlines (10).

DAE not interested in old freighters

Excess inventory is pushing lessors into cargo conversions. Dubai Aerospace Enterprise has no interest in that segment and prefers "factory fresh" freighter aircraft, its chief executive officer, Firoz Tarapore, tells **Dominic Lalk**.

UAE-based Dubai Aerospace Enterprise (DAE) prefers to invest in new-technology cargo aircraft rather than joining the fray converting older models for freighter usage, chief executive officer Firoz Tarapore tells *Airfinance Journal*.

"Converted freighters will allow large logistics solutions providers to create solutions using these converted freighters to displace slower solutions currently provided by other means. The introduction of converted freighters will expand the air cargo market meaningfully as air cargo solutions that were hereto uneconomic become economic. This, in turn, will expand global e-commerce activity," says Tarapore.

"DAE prefers to invest in new-technology, factory fresh freighter aircraft rather than spend incremental money converting 18-year-old aircraft.

"We do not have any excess inventory of older widebody aircraft for which we need to find solutions to recover our initial investment – this excess, thus far, seems to be the driving force behind the widebody freighter-conversion activity we have seen in the last few years," he adds.

DAE has 11 Boeing 777F aircraft in its portfolio – all were delivered new as speciality freighters from the Boeing production halls. Most of them operate for Emirates Airline except single aircraft placements with Kalitta Air and Lufthansa Cargo. It placed the 777F with Lufthansa, on operating lease, in 2021. The unit was a former Emirates aircraft and came off its initial 10-year lease term.

The cargo segment continues to demonstrate resilience. Cargo volumes, while tracking below the exceptional performance of 2021, have been relatively stable in the face of economic uncertainties and geopolitical conflicts, although market signals remain mixed, the International Air Transport Association (IATA) said in a recent communication.

The IATA director-general, Willie Walsh, cautions that "the decrease in new export orders in all markets except the US tells us that developments in the months ahead will need to be watched carefully".

At DAE, the push into new-technology aircraft does not start or end with freighters.

"DAE prefers to invest in new-technology, factory fresh freighter aircraft rather than spend incremental money converting 18-year-old aircraft."

Firoz Tarapore, chief executive officer, DAE

The firm has been making continuous investments into newer, more sustainable aircraft and this was observed again in October when the Dubai lessor agreed to acquire 100% of Sky Fund I Irish and its subsidiaries.

The Sky Leasing managed fund acquisition will add 36 additional latest-generation aircraft to the DAE portfolio, on lease with or committed for future lease with 14 airline customers from 11 countries.

"This transaction will allow us to continue our growth trajectory and materially increase the proportion of new-technology assets in our portfolio. DAE has a successful track record of integrating acquisitions into our business, and we look forward to welcoming additional relationships with our current customers as well as new airline customer relationships," says Tarapore.

The transaction will be funded by internal resources and is expected to be completed in the fourth quarter of 2022, subject to the receipt of required regulatory approvals. Freshfields Bruckhaus Deringer and KPMG advised DAE in the transaction; Milbank and PwC advised Sky Leasing.

Tarapore has confirmed to *Airfinance Journal* that DAE's long-term objective for owned and managed assets remains at about 800 aircraft. Before the Sky Leasing deal, at this year's half-year point, it had 297 owned aircraft in its fleet, 85 managed and eight committed units.

The Dubai-based firm signed 85 lease agreements, extensions and amendments during the first half, with 98.7% of its owned portfolio contracted at the time and a cash collection rate of 103%. During the period, DAE agreed new capital commitments for aircraft purchases of about $750 million.

Profit for the six months ended 30 June was $140.1 million compared with a profit of $49 million for the six months ended 30 June 2021. Loss after exceptional items was $397.8 million compared with a profit of $49 million a year earlier. During the six months, there was an asset write-off of $576.5 million relating to aircraft in Russia not in the group's control.

Going forward, Tarapore points to the incredible resilience the aircraft leasing sector has been able to demonstrate during the Covid-19 crisis of the past two-and-a-half years.

"We see more investors looking at the aviation space with the view that well-run companies like DAE have done incredibly well in managing through an unprecedented crisis no one would have expected could have been managed as well as it was.

"These investors are expressing keen interest in taking some of the exposures DAE acquired during the crisis. We also expect to continue growing our Aircraft Investor Services managed aircraft business on the back of this investor interest," he says.

Tarapore adds: "Overall, our business was incredibly nimble in reacting to the ever-changing landscape of challenges during the Covid crisis and I think we are even better positioned now to work in new ways toward being more efficient and more timely in meeting customer needs."

CAL aims for complete fleet renewal

China Airlines (CAL) says overhauling its entire fleet with new-technology aircraft will ensure its continued profitability. The Taiwanese flag carrier never requested Covid support from its lessor base, its chairman Hsieh Su-Chien, tells **Dominic Lalk**.

Taiwan's China Airlines (CAL) is weathering the ongoing Covid pandemic better than most of its Asia-Pacific peers, returning solid profits when many other carriers in the region remain in restructuring mode.

The reasons for its continued success are manifold but largely boil down to CAL's significant cargo operations and state-of-the-art passenger fleet that translates into lower operating costs, its chairman, Hsieh Su-Chien, tells *Airfinance Journal*.

CAL took delivery of its maiden Airbus A321neo at the height of the pandemic. The aircraft is on operating lease from USA-based Air Lease (ALC) and part of a six-unit deal. It has agreed a deal for eight more A321neos with Hong Kong SAR-based China Aircraft Leasing (CALC), although the first few aircraft from that batch were sold on to Standard Chartered Aviation following their deliveries over the summer, as exclusively revealed by *Airfinance Journal* in late October.

Separately, CAL also has 11 A321neos on direct order with Airbus, to be delivered after the leased units, from 2024. They are replacing Boeing 737-800s in the fleet and could potentially be opened up to sale and leaseback financing, although no final decision has been made, says Hsieh.

In the widebody department, CAL in August confirmed the purchase of 16 787-9 aircraft fitted with General Electric GEnx engines. Deliveries are expected to commence in 2025 to meet a "post-pandemic boom".

CAL says the 787 "will become the mainstay of the medium-capacity widebody fleet", replacing more than 20 A330-300s currently deployed in that market segment. The 787 order includes options for eight more aircraft, as well as conversion rights to the higher-capacity 787-10 model.

"We are optimistic about the surge in demand for tourism and travel once the border restrictions are relaxed. We are therefore actively preparing to meet the recovery in travel demand in the post-Covid travel market. Our current goal is a return to pre-Covid levels in passenger operations and profitability by 2025," says Hsieh.

Easing of restrictions

In late September, Taiwan's Central Epidemic Command Center announced a phased relaxation of border restrictions and CAL responded by increasing the number of flights by about 40% (compared with the second quarter), and from there it added another 50% in current fourth quater. "This means we will eventually be operating about 300 passenger-carrying roundtrips each week," says Hsieh.

"When the relaxation was announced, we were immediately deluged with customer inquiries. The number of reservations during the winter holidays and Lunar New Year in January next year shot up by 500%, with most of the growth coming from Japan and Korea in north-east Asia, as well as Vietnam, Malaysia and Hong Kong in south-east Asia," says the Taoyuan-based flag carrier.

Current International Air Transport Association estimates indicate that a return to pre-Covid passenger numbers in the Asia-Pacific is not expected until 2025.

To counter this, CAL tells *Airfinance Journal* that it will continue to "consolidate [its] passenger and cargo fleets, routes and network resources, and adjust [its] passenger and cargo mix in response to potential quarantine policies and market demand".

Hsieh says: "Post-Covid travellers may place greater emphasis on safety and hygiene during their trip but still want to fly as economically as possible. Carriers are, however, faced with fluctuating fuel prices, inflation, labour shortages and epidemic prevention costs. The increase in operating costs has an impact on fares so travellers can expect higher costs as well."

Cost management

Amid the industry turmoil caused by Covid and Russia's war against Ukraine, CAL has become a leaner organisation. Yet, the airline managed to get by without tapping its aircraft lessors for concessions as its lenders proved steadfast.

"We implemented many measures to cut back operating expenses and improve cash flow during Covid-19. We reduced our flying activity, put crews on furlough and extended stopovers.

"We also worked to reduce our contractual expenditures, postponed non-urgent capital expenditures and adopted a more conservative financial strategy. In addition to securing relief loans and related subsidies from the government, we also took advantage of low interest rates to raise more funds, expand our lines of credit and increase our liquidity to reduce financial risks.

"In terms of business operations, we mitigated losses in the passenger division by reducing or merging services as well as flexible dispatching of carrying capacity. On the cargo side, we made flexible use of cargo hold spaces and supplemented it with the belly cargo holds of passenger aircraft. We also competed for high-yield cargo and custom charter opportunities to generate more revenue and increase our cash flow," says Hsieh.

"As our operating income remained steady and our company finances stayed sound, most local banks as well as domestic foreign-owned banks all expressed their continued support and willingness to expand their business dealings with CAL.

We continued meeting the leasing costs for all our leased aircraft and there were no delays in payment," he adds.

The Taiwanese flag carrier did, however, raise funds from the sale and leaseback of five A330-300s with CALC. This exercise also presented an efficient solution for CAL to dispose of some of its oldest owned aircraft assets.

Airfinance Journal previously reported that since Russia's war against Ukraine, the air finance community is taking a hard look at its exposure to Taiwan. Many are concerned Taiwan could be next in line for aggression and invasion from China. This has caused some insurers to turn away from new underwritings with operators from the island and others charging considerable premiums for doing so. CAL says it continues monitoring "the situation with premiums closely".

In the first half of 2022, CAL recorded a net operating income of NT$4.59 billion ($153 million) and a net profit of NT$3.5 billion. Assets were NT$285 billion versus liabilities of NT$210 billion. The half-year 2022 results compare with a net operating income of NT$737 million posted in the year-ago period, and a net loss of NT$1.36 billion.

Fleet

As *Airfinance Journal* went to press, CAL operated 86 passenger and cargo aircraft including the A350-900, 777-300ER, A330-300, 737-800 and A321neo. These included 65 passenger aircraft as well as 21 747-400F/777F cargo aircraft.

Going forward, CAL's passenger fleet will be streamlined to its 14 A350s, 10 777-300ERs, the 16 newly ordered 787-9s and 25 A321neos. On the cargo front, CAL continues taking delivery of 10 777Fs on order and confirms it is mulling either the A350F or 777-8F as possible replacements for its 747-400 freighters.

"CAL is continuing to proceed with our fleet-renewal programme as part of our sustainable development strategy to ensure that overall fleet operations are aligned with market trends and the operational requirements of our passenger and cargo businesses," says Hsieh.

"The A321neo offers a significant advantage in terms of fuel consumption, unit cost, range, payload and reduced noise. Eight A321neos have already been delivered and are now deployed on the Tokyo-Haneda, Hong Kong, Manila, Palau and Phnom Penh routes," says Hsieh, adding that, from November, the efficient Neo will also commence flying routes from Taiwan to Okinawa, Cebu, Da Nang and Chiang Mai.

"The number of reservations during the winter holidays and Lunar New Year in January next year shot up by 500%."

Hsieh Su-Chien, chairman, China Airlines

"The A321neo will be CAL's mainstay on regional routes. Currently, we have no plans to convert the A321neo to the A320neo or A220," he adds.

A350F or 777-8X for CAL?

"We adopted a cargo supplemented by passenger business model during the pandemic. Our 18 high-capacity 747F freighters and the all-new high-performance and fuel-efficient 777F freighters introduced at the end of 2020, along with the belly cargo hold on passenger aircraft, were used to expand our cargo capacity. Priority was given to niche routes with higher yields to maximise returns during the peak in global air cargo demand," says Hsieh.

CAL has ordered 10 777Fs directly from Boeing and four of them had been delivered through October. Hsieh confirms that a fifth is due in the ongoing fourth quarter, with all 10 to be delivered by 2024.

"The 747F freighter will be gradually retired due to higher maintenance costs, difficulty of sourcing parts and fuel consumption. During this period, we will adopt a mixed-use strategy based on aircraft loading characteristics and individual market requirements to compete for the cargo market."

As for their replacement, CAL confirms that both the A350F and 777-8F are "in the running to become CAL's next freighter". Both models, however, are only expected to hit the market from 2025.

Staying at home

Chinese lessors are cutting back on their global aspirations, with their focus switching to domestic airlines. **Laura Mueller** looks at the implications for the aviation market. (Additional reporting by **Mike Duff**.)

Leaders of the Communist Party of China gathered on 16 October for the most important event in the country's political calendar, and only the 20th such meeting since the Communist Party was founded in 1921.

This year's congress, which is now held every five years, was significant because China's president, Xi Jinping, secured his mandate for a third-consecutive time after term limits were removed from the Chinese constitution in 2018. The third term is unprecedented and some speculate could pave the way for Xi to remain in power for life.

The congress also potentially has implications for aircraft lessors and airlines. It is understood that the meeting finally gave direction for the sell-off of non-domestic exposure by Chinese lessors – a policy change *Airfinance Journal* first flagged in autumn 2021 when it broke the story of CK Asset Holdings disposing of its AMCK Aviation leasing portfolio to Carlyle Aviation.

Air Lease's (ALC) executive chairman of the board, Steven Udvar-Hazy, said in a fireside with *Airfinance Journal* on 4 October that he expected the shift in strategy that was due to be set in motion at the Communist Party congress.

Udvar-Hazy believes it will result in a smaller market share for Chinese lessors on the global stage.

"Whereas before there was a push to get dollar base revenues from Chinese lessors, now it's sort of reorienting toward domestic leasing," he says.

"It was just a matter of time. The Chinese lessors will still have selective Dublin offices in their international footprint, but I think their market share outside of China will diminish."

ALC has felt the shift on its leasing team. Its executive vice-president in Hong Kong, Jie Chen, is believed to have left the US lessor to replace Patrick Hannigan as the chief executive officer (CEO) of CDB Aviation, which is owned by China Development Bank Financial Leasing, the dedicated leasing arm of China Development Bank.

His appointment "symbolises" this expected shift in China's perennial position in leasing, observes a C-suite lessor.

"Chen is a domestic marketing expert. He has not led a global lessor, so his appointment as CEO potentially says a lot about the direction of Chinese lessors such as CDB Aviation to focus on China, not the global market," says the lessor, adding: "The next question becomes: what happens at other lessors, such as BOC Aviation, that has a chief that will be looking to retire soon. Who will be selected to take over?

"Is Singapore-based BOC Aviation considered to be sheltered from what might be happening at other Chinese lessors?"

If Chinese regulators do encourage their leasing companies to focus on business with domestic airlines and to scale back their global aspirations, what would be the impact on the aviation market?

Western lessor exposure to Chinese operators

Rank	Lessor	No. of Aircraft	MV $m
1	AERCAP	261	9,216
2	BOC AVIATION	86	3,313
3	AIR LEASE CORPORATION	64	2,429
4	AVOLON	49	1,868
5	AVIATION CAPITAL GROUP	41	1,378
6	SMBC AVIATION CAPITAL	38	1,226
7	GOSHAWK	12	283
8	CASTLELAKE	11	279
9	MAVERICK AVIATION PARTNERSHIP	10	219
10	ALAFCO	7	325
11	MERX AVIATION	6	142
12	ABS E NOTE INVESTOR	6	104
13	STANDARD CHARTERED AVIATION FINANCE	6	146
14	MACQUARIE AIRFINANCE	6	142
15	JACKSON SQUARE AVIATION	6	168
16	CARLYLE AVIATION PARTNERS	5	103
17	ORIX JOL INVESTOR	5	109
18	CASTLELAKE AVIATION LIMITED	5	133

Source: *Airfinance Journal* Fleet Tracker.

Lessor swaps

One consequence is likely to be a reorientation of Chinese lessors' portfolios. "It is already happening by trading for additional Chinese domestic exposure," an industry source familiar with the situation tells *Airfinance Journal*.

"Western lessors are selling Chinese airlines to Chinese lessors and that has been happening very quietly. The focus, so far, has been on the large airlines or the big three," adds the source.

According to the source, as long as there are no lease novation requirements, lessors typically will not involve airline customers in discussions because this could complicate matters.

However, in these situations, the source says lessors are being "extremely careful" with the airlines involved and ensuring they are aware of all movements.

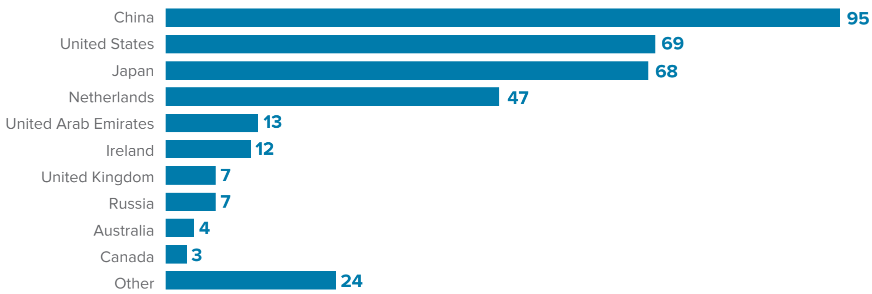
Any large-scale exposure repositioning is expected to take place through aircraft swaps between Chinese and western lessor portfolios, albeit in "concept" only.

"The talk will be about swaps, but these are not outright swaps, the mechanics will be down to wire transfers. And that is because of the debt attached to the aircraft," indicates a source familiar with the process. "There will be cases where debt is not the constraining factor, but, by and large, expect these swaps to be handled by many, many wire transfers."

Portfolio sales are another option. *Airfinance Journal* is aware of two non-domestic lease portfolios at Chinese lessors that are subject to sales discussions with western lessors.

On one of the portfolios, investment banks already have been appointed by the lessors to advise on the potential sale.

Ultimate beneficial ownership of leased aircraft by country ($bn)



Source: *Airfinance Journal* Fleet Tracker.

Such transactions would appeal to new entrants in aircraft leasing such as Saudi Arabia's Avilease, which is eager to purchase assets in a market plagued by delivery delays because of supply chain woes.

Backed by Saudi Arabia's $620 billion public investment fund, the lessor was launched at the Farnborough air show in step with the region's Vision 2030 economic transformation plan to diversify its economy away from oil, in part, by becoming a global transport hub.

Another potential buyer of Chinese exposure could be the new lessor, High Ridge Aviation, founded by the former GECAS CEO, Greg Conlon.

The lessor, which will offer debt and operating leasing, was due to launch with about 15 members of GECAS's former management team and investment from Pacific Investment Management Company.

In July, when Domhnal Slattery stepped down as CEO of Avolon, a role he had held since he launched the lessor, he denied that his departure had anything to do with the congress meeting and the expected impact on the leasing sector.

Avolon is 70% owned by Bohai, which is an independent leasing entity based in China.

"Whatever political dynamic exists in China will have its own cadence and its own rhythm. I mean, the reality is, we've been dealing with a very dynamic situation with HNA going all the way back to 2016," he told *Airfinance Journal* at the time.

Avolon's new CEO, Andy Cronin, also dismissed the suggestion at the time.

"Our ownership is stable. If you look at Bohai, it is trading multiples, it is actually on par with the US public lessors, so we continue to run our business as an internationally owned, standalone, independently funded business."

When Avolon introduced Orix Aviation as a 30% shareholder in a $2.2 billion deal in 2018, the primary reason was to insulate Avolon's balance sheet and its governance from the day-to-day events in China.

Following months of deliberations, in 2019, Orix declined the opportunity to purchase the remaining 70% from HNA, Bohai's embattled parent, citing concerns that such a significant acquisition could negatively affect its credit ratings.

But now, faced with a change in strategy, perhaps the purchase of Avolon, or its non-Chinese exposure, could be of interest to the Japanese lessor once again.

Three's company

Sources indicate that 2023 will see an increase in China's domestic focus as the policy comes into full effect but also because western lessors were already reducing Chinese exposure following Russia's invasion of Ukraine.

"Lessors, especially the public ones, have been under pressure to scale back Chinese exposure following Russia. That pressure will step up," says a lessor.

He adds that China will be assertive in its plan to be "inward looking and have full control" over its transportation system.

"And not only the debt book controlling assets with China airlines but a Chinese entity controlling leasing to those carriers," he says. "This is a measure that protects you, unlike Russia where you had two to three lessors handling the market. I think that situation has influenced China's decision to make sure Chinese lessors are back focusing on Chinese airlines."

A C-suite source says the idea of swaps "makes sense" because the market will likely view Chinese risk differently and lessors will need to manage this exposure shift in a timely manner.

"I don't see another way around this because this transfer will be very costly for western lessors, especially if Chinese aircraft are viewed as national assets as we saw with Russia," says the lessor.

"This transition will require large-scale cooperation, on both sides, and that is not guaranteed. But if China starts to impose such swaps, you could kind of play the book value game and probably transition the book value over by swapping western-leased aircraft for Chinese-leased aircraft, and all of the sudden, the Chinese control a whole bunch of Chinese leases and the Chinese leasing companies are out of the international space."

Airfinance Journal's Fleet Tracker indicates the Chinese leasing portfolio was worth about $95 billion as of 30 September, of which $63 billion – or about 18% of the global leased fleet – was leased to non-Chinese airlines.

In addition, Chinese-owned and controlled leasing companies have more than 1,000 aircraft on order, mostly from Airbus, Boeing and COMAC at a total estimated cost of $57 billion.

Airfinance Journal has reviewed the ultimate beneficial ownership of every leased aircraft to look beyond the country of incorporation to where most of the controlling shareholders are located.

Based on this methodology, China has by far the largest exposure to aircraft leasing at $95 billion followed by the USA at $69 billion and Japan at $68 billion.

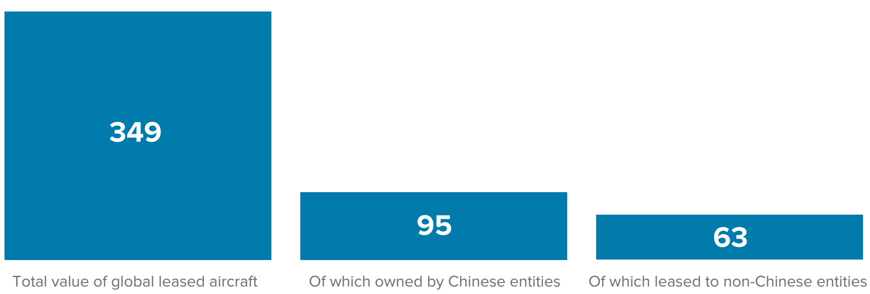
The data for Japan includes Japanese operating lease and Japanese operating lease with call option investors, the latter of which do not involve asset risk, except in lessee default situations.

As shown in the chart, a total of $63 billion of China's aircraft leasing assets are leased to non-Chinese airlines.

Are these all of these assets likely to be hitting the market and, if so, when, who will the buyers be, and at what prices?

To put the figure in context, *Airfinance Journal* estimates there were about 2,000 secondary market trades valued at $30 billion in the 12 months ending 30 June 2022.

Value of aircraft leased by Chinese entities ($bn)



Source: *Airfinance Journal* Fleet Tracker.

Lease rates rise on supply chain delays

Lease rate factors are returning to sensible levels on persistent supply chain problems and manufacturer delays, BOC Aviation managing director and chief executive officer, Robert Martin, tells **Dominic Lalk**.

Robert Martin, BOC Aviation managing director and chief executive officer, cautions that not all lease providers will benefit from rising lease rates. Those who funded long-term leases using short-term money especially could be in for a rude awakening. They may even be facing "zombie portfolios" in an environment of rising interest rates and inflation, he tells *Airfinance Journal* in an exclusive interview.

OEM, supply chain delays

"On the Airbus narrowbody side, we are still seeing one- to three-month delays this year; on the Boeing side, not so bad. Next year, however, we are expecting to see more significant delays and we think manufacturers will have to reschedule orderbooks because they got so many problems further down the supply chain, not just the engines but much deeper down the supply chain to where they forge the parts," says Martin.

He notes good news on the Boeing front now that the Boeing 787 is finally delivering again. The Singapore-based, Hong Kong-SAR listed lessor accepted four 787s before August and is hoping to take still another five in 2022. They all are scheduled to enter service with American Airlines. As to their quality, Martin notes no further deficiencies.

"The OEMs still don't have enough people or inventory of raw materials. As well, we have got prices going up. Embraer's cost of production has increased 13% over the last year, I think. In our view, it is the manufacturer's job to manage its supply chain. For us, however, there is an upside – high lease rates.

"You must remember, when they cannot deliver new planes in a rising market there is an increase in used aircraft prices. And that is exactly what we are seeing. There has been a good pick-up in -800 rates, good pick-up in [Airbus] A320 rates, both Ceos and Neos. We are seeing lease rate factors of .75 now," says Martin.

Deal pricing

Not all industry players are reaching such sustainable levels, however. Some continue to discount because they are lacking experience and awareness.

"Frankly, I do not understand why these other leasing companies are doing deals below that. I think what is happening is the more nascent players in our industry basically sometimes cannot tell the difference between what is an LRF [lease rate factor] for a Jolco [Japanese operating lease with call option] versus what is an LRF for a standard sale and leaseback. I think a lot of the rates around .5 are actually Jolco rates or Jol [Japanese operating lease] rates that involve a tax benefit or an extra boost.

"I think people are confusing deals that are done with tax equity involved when they go down to those levels," he says.

"Another thing might be that they use euro or Japanese yen as the debt currency in the lease because obviously that would also bring down the LRF," adds Martin.

"If you calculate long-term returns, based upon today's interest rates, people have got to be up between .7 and .8 to make money long-term in this industry. If they do not, I would expect big impairments coming their way. There will probably be a loss on sale when they try to sell the lease-attached aircraft. People who just take today's interest rates and put them into the deals they did back in 2021 will realise they are loss-making.

"People fund long-term leases using short-term money and while that worked very well in 2021 when Libor was down at 0.25%, today the same Libor is at 4.6%. If they funded it short term, then whoops suddenly there is a big loss. What they will start doing next is they will start borrowing in other currencies that have lower interest rates. They will spot the money into US dollars and they will not hedge against the currency risk. We saw this before in the late 1980s and we will see it again. They will become zombie portfolios," says Martin.

Funding cost

"Forget about the ABS [asset-backed securities] market basically. This market is dead for the time being. It will only be a funding market for the time being because equity is not prepared to play yet. So, let us go back to the traditional funding markets," says Martin.

"If you look at the secondary prices in debt capital markets, there was probably a band of about 50bps [basis points] between lessors at the start of this year before Russia. Today, that band is up to about 200bps, so we clearly see a widening in the debt capital markets between secondary prices," he adds.

Martin says that BOC Aviation recently signed a syndication "that's done well" with the pricing they wanted. On 31 October, the lessor confirmed a $500 million unsecured term loan facility with a tenor of five years.

Lenders in the facility included: Bank of Communications' Hong Kong and Singapore branches; China Everbright Bank's Hong Kong branch; the Hongkong and Shanghai Banking Corporation; KfW IPEX-Bank; National Bank of Kuwait's Singapore branch; Oversea-Chinese Banking Corporation; and Westpac Banking Corporation's Singapore branch.

First-half loss

BOC Aviation reported a net loss after tax of $313 million in the first half of 2022 because of Russia's war against Ukraine. Excluding the impact of this one-off event, its core net profit after tax was $206 million.

Lease rental income dropped by 5% compared with the first half of 2021, reflecting a 3% decline in the net book value of its fleet related to the write-down of aircraft that remain in Russia and the absence of $31 million in revenue from the second quarter related to these aircraft. Lease income was also affected by the number of aircraft that were in transition during the period.

Revenue generated elsewhere included $74 million of interest and fee income, which was down about $20 million on the previous year, primarily because of lower fees from funding airline customers' pre-delivery payments.

Other sources of income rose "as we recognised the cash collateral held as security against the aircraft remaining in Russia, which alone accounted for $223 million", he says.

BOC Aviation's two largest expenses in the first half were depreciation and interest and together they accounted for 90% of the first-half total when the effects of the one-time write-down are excluded.

Depreciation – the lessor's largest expense item – increased by 4% year-on-year, in line with fleet growth. However, finance expenses – the second-largest item – declined 3% to $229 million, reflecting lower debt balances and stable cost of funds at an average of 2.9%, the same as in 2021.

The lessor maintained a liquidity of $454 million in cash and short-term deposit in addition to $5.5 billion in undrawn committed credit facilities as of 30 June.

Airbus "inflation order"

In April, BOC Aviation announced a top-up order with Airbus for 80 more A320neo-family aircraft scheduled for delivery between 2027 and 2029, its largest single order placed.

BOC Aviation placed this order with escalation and inflation on the horizon, says Martin.

"Everyone was asking why. They thought I had gone mad. But it is simply that we had done our homework and saw escalation in the market and inflation coming. And we wanted to fix things on our terms before we got to the point of escalation. That is the real reason why we did that," recalls Martin.

"People fund long-term leases using short-term money and while that worked very well in 2021 when Libor was down at 0.25%, today the same Libor is at 4.6%. If they funded it short term, then whoops suddenly there is a big loss."

Robert Martin, managing director and chief executive officer, BOC Aviation

In the third quarter to 30 September, BOC Aviation executed a total of 44 transactions, and it committed to purchase nine new aircraft

"This was a long-dated order – the aircraft are not arriving before 2027 – but we wanted to get in ahead of our competitors, before they realised the escalation that was happening. Our research team picked up on signs inflation was coming in March last year and so we decided now was the time to go negotiating with the manufacturers," he adds.

On signing, Airbus chief commercial officer and head of Airbus International, Christian Scherer, "saluted" BOC Aviation's "vision and foresight in securing future delivery positions of these most desirable assets in the single-aisle segment now and in the longer run".

Current market

Rising levels of passenger traffic and a strong fare-setting environment are allowing airlines particularly in North America, the Middle East and parts of Europe to offset the impact of higher jet fuel prices, wages and interest rates to report better earnings. The Asia-Pacific, and particularly China, however, continue to produce largely sobering results.

"As we look forward to the next six months, the market that is going to have the most impact on the global market will be Asia-Pacific. When North Asia rises, the whole of Asia-Pacific will rise with it. I believe the Chinese opening will come, rather sooner than what most would expect," he says.

"During the fourth quarter we will see the first signs of that opening. When that happens, and now we need to look back at that 2019, that will bring more than 72 million passengers to south-east Asia. In 2021, the last time we spoke, that brought 1.5 million passengers to south-east Asia. This gives us an idea what a significant event it would be. It will be huge in terms of impact," adds Martin.

He notes that most other markets are already at 80% or above their pre-Covid levels, so the incremental upside is more limited in those markets.

"The one market where I have some concern going into the winter is Europe. Inflation is at nearly 10% in most EU countries. Interest rates are at around 2%. This situation cannot persist. And then we have got the energy problem as well. I think Europe's in for a tough winter and the strong carriers will get stronger, because they always do in Europe in these kinds of situations, and the weak carriers, I'm afraid, are going to have a very tough winter," says Martin.

He adds that, in addition to a strong US dollar, high interest rates and inflation attention must be paid to global trade. "We need to watch global trade carefully. People have built up huge inventories of goods and so they slow down the incremental shipments that they need and that is becoming very visible in the shipping industry now in the fourth quarter, usually the strongest quarter in the cargo and shipping market. Compared to the strong market of the past two-three years, it is beginning to dampen, especially the package freight market.

"Another trend we have identified is that with the reopening of Asia-Pacific and the current situation with Russia, airlines, except those from China, now often require widebodies with longer range than they would have before to reach Europe. In some cases, they have to add three to four hours of flying time. Chinese carriers will have a huge advantage compared to their European competitors and that is on top of their already much lower cost base," adds Martin.

Lessor benevolence

Despite forecasts of an unprecedented winter for Europe, Martin says he does not believe this will necessarily translate into new airline bankruptcies and market exits. Aircraft leasing companies emerged as the knight in shining armour when some airlines were on the brink of financial collapse during Covid and they will continue to provide options when things go awry, he says.

"From 2020-22, very few carriers exited the market. There are two main reasons for this. The first one is that the lessors became the working capital providers to the industry. Lessors now hold 50% of the global fleet, so when an airline hits a problem, they no longer just call their banks like they would have done in the old days, they call the aircraft owners.

"During Covid, lessors were more tolerant because they were not able to place the aircraft elsewhere anyways but now, they have a choice. There are many parts of the world that are growing faster and need the aircraft. If you add to this the problems with the manufacturers and the manufacturer delays, then you see a market that is tightening," says Martin.

He adds that lessors might be easier convinced these days to curtail leases and move the aircraft to operators or regions that require them.

"People have less problems to deal with now than they did two years ago. If you're facing problems all over the world you're less likely moving planes out. But if you've got just one particular region that's the problem, then you might as well shift those planes out quickly to where they are needed," he says.

Stable third quarter

In the most recent quarter to 30 September, BOC Aviation executed a total of 44 transactions, and it committed to purchase nine new aircraft. The total fleet operated by more than 80 customers through the end of the third quarter stood at 612 aircraft: 395 owned, 36 managed and 181 on order.

The 181 aircraft in its orderbook comprise 117 A320neo-family aircraft, 50 737 Max and 14 787 widebodies.

At the end of the third quarter, the owned aircraft utilisation remained stable at 96%, with eight single-aisle, five twin-aisle and one freighter aircraft off lease but committed for new lease.

Still going **global**

China's CMB Financial Leasing is still cutting aircraft deals with high-quality airline credits from across the globe, bucking an increasingly domestic focus observed at other Chinese leasing peers, its aviation leasing department's managing director, Jenny Ma, tells **Elsie Guan**.

"CMB Leasing's aircraft fleet has actually grown since the start of the Covid-19 pandemic, and we don't have plans to cut our fleet size," Jenny Ma, managing director at Shanghai-based CMB Financial Leasing's aircraft division, tells *Airfinance Journal* in an exclusive interview.

From the beginning of the pandemic, CMB Leasing's aircraft portfolio has grown by about 70 aircraft to 164 units through 20 October 2022. These comprise 68 finance leases and 96 aircraft on operating lease.

Its portfolio covers almost all commercial types, including Airbus A220, A320-family, A320neo-family, A330, A350, Boeing 737, 747, 777, 787, Embraer 190 and COMAC ARJ21.

The number of Chinese domestic lessees account for 56% of its current lessee ledger; the remainder comprises global carriers.

Its most significant lessees by asset value exposure are China Southern Airlines and Flynas, followed by Air China and Turkish Airlines, indicates *Airfinance Journal*'s Fleet Tracker.

"We are not particularly reliant on one market. We seek balanced development both domestically and internationally and reach out to lessees which we want to cooperate with, no matter where they are from," says Ma.

CMB Leasing is among the China-based financial leasing companies which received official approvals from the China Banking and Insurance Regulatory Commission to establish overseas qualified subsidiaries, joining the ranks of ICBC Financial Leasing and Bocomm Financial Leasing.

"We will check a lessee's own credit, its continuous operating capability in the industry and whether it can provide passengers with a safe, comfortable and fast travel service. If an operator can provide such services to passengers, I think it has the ability to continue to operate, and we will continue to look for such customers and provide them with our services," says Ma.

"The pandemic actually provided a lot of opportunities for us, especially with strong credits in Europe and North America, the two markets that were quickest to recover from the pandemic downturn," notes Ma.

In terms of new aircraft exposure, CMB Leasing placed aircraft from its orderbook and on sale and leaseback with carriers including American Airlines, Frontier, Wizz Air, Volaris and Flynas. On the used aircraft side, the lessor repossessed A320s from South African Airways and remarketed them to European ACMI provider Smartlynx Airlines.

I think the capital strength of CMB Leasing is stronger than that of most international leasing companies on average.

Jenny Ma, managing director, CMB Financial Leasing

Two additional A321neos on sale and leaseback between CMB Leasing and Wizz Air are due in the current fourth quarter.

CMB Leasing has placed six aircraft in the USA: four A320neos on sale and leasebacks with Frontier Airlines and two A321neos on sale and leasebacks with American Airlines.

On 29 September, CMB Leasing delivered its 200th aircraft – a new A321neo – on operating lease to Wizz Air.

"CMB Leasing has robust corporate governance and shareholder support that will see us and our customers through challenging periods. During the pandemic, we have also shared some of the burdens of our customers – for example, when interest rates rose to unbearable levels," says Ma, noting that its customer relationships and mutual trust only grew stronger as a result, which, in turn, helped build the brand in the market and "obtain some high-quality customers".

Ma adds: "The company's aviation leasing business mainly depends on our team during the pandemic, and the trust we have built up with customers over a long period of time."

CMB Leasing does not rule out the possibility of merger and acquisition with suitable partners at the right time, provided these complement its current business and forge greater synergies.

CMB Leasing cooperates with 176 banks and financial institutions worldwide, and its credit line exceeds Rmb800 billion ($109 billion).

"I think the capital strength of CMB Leasing is stronger than that of most international leasing companies on average. Our financing supports our leasing businesses very well," says Ma.

"CMB Leasing does not have financing problems. Financing is a part where CMB Leasing is very good at," adds Ma.

Established in 2008 by its parent company, China Merchants Bank, CMB Leasing was one of the first tranche of bank-backed financial leasing companies in China.

In September 2021, its registered capital increased to Rmb12 billion from Rmb6 billion. China Merchants Bank still owns 100% shareholding in CMB Leasing. China Merchants Bank is ranked 11th in world banks by tier one capital in the latest *The Banker* magazine, says the lessor.

The lessor is warming to adding locally produced Made in China aircraft to its portfolio, including COMAC's ARJ21 and C919. It recently purchased two ARJ21-700s which attached lease agreements with Chengdu Airlines, from China Aerospace Leasing. The deal made CMB Leasing's ARJ21 fleet grow to three units, with the remaining one ARJ21 on finance lease with Genghis Khan Airlines.

Market demand on the aircraft type and delivery volume by COMAC will determine how CMB Leasing markets locally produced aircraft, says Ma.

The C919 has received its type certificate during a ceremony held in Beijing in September.

"The cooperation with COMAC and the orders we will place depend on the market demand," says Ma. "In addition, it depends on the delivery volume by COMAC. The C919 has received its type certificate, and there will be a continuous delivery process for the C919 in the future."

Buoyant ELFC targets new technology

ELFC'S president and chief executive officer, Tom Barrett, tells **Olivier Bonnassies** that the recovery trend that started early this year will continue into late 2022 despite some dark clouds on the horizon.

Tom Barrett, ELFC president and chief executive officer, is confident that the green shoots of recovery in the first three quarters will continue.

"The return of traffic service, in particular in Asia-Pacific, will uncharacteristically sustain some demand through the later part of this year in a way that we may not have been expected in the northern hemisphere," he tells *Airfinance Journal* in an interview.

Barrett says the recovery was really taking off at the beginning of the year for ELFC.

"The green shoots were characterised by strong demand early this year as airlines were ramping up activity and preparing for their summer schedule," he says. "However, Asia-Pacific then opened up slower than anticipated, China shut down and the capacity constraints we saw in the summer around Europe took a bit of edge off that recovery. That's disappointing.

"The second quarter is normally a strong quarter for us in terms of demand for inventory because airlines are planning for the busy summer season," adds Barrett.

The transportation and aviation market is expected to continue its recovery trend despite some darker clouds increasingly gathering on the horizon. Fuel prices remain high, inflation is rampant in some economies and the dollar has gone up to its highest levels for decades versus some currencies, while the supply chain is still disrupting the aviation sector.

"We might see some unseasonal demand for the rest of the year. There is little doubt that when an engine goes to the shop they are taking too long to come out. They are now in the queue to go in whereas in 2020 and 2021, you were given immediate slots from MROs [maintenance, repair and overhaul companies]," he says.

Most of the activity this year has been on CFM-5B/7B and IAE V2500-A5 markets where ELFC has inventory to place.

"As a mature portfolio, we expect to be competitive on the placement activity especially in the -5B/7B and V2500-A5 markets. The -5B currently lags behind the other two engine models in terms of demand," he says.

We are very active in the current market and intend to continue this growth strategy into the future.

Tom Barrett, president and chief executive officer, Engine Lease Finance

New-technology strategy

Barrett says that the lessor's strategy is "heading for 50%" of its portfolio being new engine technology. The lessor will not only focus on the narrowbody market with the GTF and LEAP engines but also the widebody space with GEnx and XWB engines.

ELFC invested heavily in those engine groups during the pandemic. Last year was its record year in terms of investments in the 32 years' history of the company.

"But ELFC also considers investment in mature engine equipment. We have continued to invest in some of this equipment but it is a very modest amount versus new engine technology," he says.

"The objective for ELFC with the portfolio scale we have built up over a number of years is being able to part out at the right value. ELFC aims not to be exposed to high book values on equipment in part-out scenarios."

Barrett explains that over its 32-year history ELFC has always transitioned to newer technology engines.

"We started off with the JT8Ds, then the CFM56-3C, which was the bulk of our portfolio for 15 years. It has been the CFM56-5B/7B and V2500-A5 engines up to a few years ago. It will be the LEAP and GTF for the next 10-15 years."

Key for him is to maintain a disciplined approach in terms of pricing. "We tend not to play games with the residual value. We are quite aggressive in our accounting of the residual values and this gives a flexibility to ride the storm and go through cyclical downturns," he says.

In the past, ELFC has placed speculative orders for new engine equipment but has no current orders.

"We are a medium- to long-term leasing platform but have not bet the house on speculative commitments."

Last year, it purchased 25 GTF engines from Pratt & Whitney, which were part of a sale and leaseback transaction. Previously, it had an order for 10 CFM engines.

"Our traditional growth is from the purchase and leaseback market. We either acquire an engine on the delivery of the engine or we move and purchase and leaseback the engine after delivery from the airline or from a competitor as part of a novated purchase," explains Barrett.

The lessor has benefitted from almost 30 years' ownership by strong institutions, which provides it with access to funding that allows it to follow this strategy.

"We are very active in the current market and intend to continue this growth strategy into the future. ELFC are extremely competitive, thanks to our funding regime, at the front end for sale and leaseback transactions," he says.

The engine lessor has stayed away from the airframe market over the years but has added an in-house engine parts company, INAV, based in Lake Crystal, Illinois, USA.

"We have parted airframes as part of a short sale and leaseback transaction but we are not an aircraft lessor and have no intention to get into this market. Jackson Square Aviation is part of our group and they are in the aircraft space," he says.

End-of-life business

ELFC joined forces with INAV, the US-based parts company known as Inventory Navigators in 2017.

This strategic move allowed the engine lessor to enter the end-of-life business space and effectively control its engines from new through to disassembly.

INAV's end-of-life business is growing but from a modest scale and is really important for ELFC to manage its exits.

"INAV allowed us to get access to the repair business through the cycle. They have tremendous expertise on repair and equipment, and feedstock for most engines. The team there has done extremely well and have managed the crisis expertly by controlling costs and managing acquisitions and repairs carefully as the pandemic unfolded," says Barrett.

However, INAV also sources its own materials from the market and is performing module swaps, albeit not to the extent of some of the competition, he adds.

Barrett sees INAV having an advantage with its fully repaired and serviceable inventory versus its competition, which may also have the inventory, because the current limited capacity in the engine repair business means the customer has to experience delays and pay premium prices.

"The plans for INAV are to continue to recover from the pandemic using targeted programmes with its main customers," he adds.

As ELFC gradually moves to a majority of new-technology assets, it is the perfect timing for INAV to be picking up more business from its -5B/7B and -A5 engines.

Barrett says airlines are also swapping engines to avoid engine shop visits.

"I am not sure it is going to be the future, long term, but it certainly has a place now, particularly with airlines that have constrained cash flows. Airlines have to manage their cash and if they can see the benefit of engine swaps, they will certainly look at it," he says.

"It also coincided with power-by-the-hour deals," but Barrett observes: "There are fewer power-by-the-hour arrangements now. There was a debate at the beginning of the pandemic on whether power-by-the-hour arrangements were the norm going forward to support customers but this has not materialised."

For Barrett, any responsible airline management should preserve cash in times like this and minimise outlay.

"Like us, if we can do a surgical strike on an engine rather than commit to a full overhaul, that is the way to go to survive the crisis."

He adds: "No one has gone through a crisis like this, but some of the principles we are seeing here are the ones you would anticipate in any downturn. Maybe the module swaps are a new piece, or the power-by-the-hour was pushed harder this time. But some of those trends were pre-crisis, as parties were already seeking to find ways of performing modest repairs rather than committing for larger overhauls, because of the cost uncertainty and cash constraints."

More sale and leaseback opportunities

From an investment point of view during this crisis, Barrett would have anticipated a bumper time for sale and leasebacks.

"This time around, the sale and leaseback market did not transpire to the degree we expected. There were many factors that came to play for the lack of sale and leaseback transactions, one of them being government support in some jurisdictions. It gave breathing space for airlines, which was a blessing," he says.

Barrett believes airlines are now dealing with the reality of no government intervention and consequently are open more to the sale and leaseback market.

"I do anticipate the shortage of deals passing with more opportunities coming to the market now and this will be good for well-capitalised lessors," he says.

Barrett recalls that while the engine lessor space is "much smaller" in size compared with the aircraft leasing market, the reduced number of players still makes the space extremely competitive.

"About 10-20 years ago, there was a view that the engine lease came with a premium lease rate factor versus the aircraft lease market. That flipped over the past four years, due to fierce competition," he says.

But Barrett sees more "common sense" now especially with the current interest rates environment.

"The benign interest rates environment, for as long as it lasted, made many believe that you could bet your house on the asset residual value and not be worried about the lease."

Barrett says ELFC had the scale to compete in that market, but it was not going to do so naively because the engine lessor focuses on both commercial returns through the lease period and managing the residual values successfully.

"Some players, as they were looking to build their presence in the LEAP and GTF markets, did purse some non-sensical deal pricing. The short-term funded competitors may feel the pain now. In a scenario of a $1 billion loan, a 1% interest rate increase translates into $10 million and it takes a long time to find that money in yields/lease/gain revenues."

He says there could be more possibilities for companies such as ELFC to find more opportunistic deals in that space.

"We have over a $2.5 billion portfolio and we can be larger – some of that is the natural inflationary impact of moving to newer and more expensive assets on our books.

"However, there is not a big enough market for the scale of a $10 billion portfolio in engine leasing. If you add up all the engine leasing platforms, the engine leasing market is around $15 billion. Therefore, the annual potential is very modest. We believe we have the size to take opportunities, including consolidation, but you have to set your goals with that market size in mind."

Barrett believes the engine leasing market is still awash with liquidity but not to the levels of the aircraft leasing industry.

He compares a $5 million engine investment versus a $100 million aircraft deal.

"We will put as much effort with the same quality of engineers, risk, finance, lawyers and other professionals into a $5 million purchase of a used CFM56-7 as one of the participants in the aircraft leasing space would commit to a $100 million aircraft asset. The numbers and scale are very different. In addition, the lack of transactions compared with the aircraft leasing market does not allow you to scale organically in the engine leasing market."

He acknowledges the "newer investors" in the space, especially on an opportunistic basis, but recalls that to achieve success it is difficult to get the returns required with the complexity and the relatively modest number of dollars involved.

"Engine leasing is not a short-term business and our parent company understands that it is about patient capital," he says.

GEEL/SES ownership change effect

Barrett believes there is not too much "concrete change'" yet between the GECAS and Aercap offering in the engine leasing space, nine months after the merger between the two entities and the resulting partial change in ownership of SES.

"Last year, there were some rumours about how the engine leasing will have to stay with GE, but it did not. That's an opportunity for us: when GE owned GE Engine Leasing [GEEL] it was very difficult to crack the GE product," he says.

Barrett adds that relationships do not stop overnight because of the change of ownership but it does level the playing field for the likes of ELFC.

"We have the same concern at Rolls-Royce with Rolls-Royce Partners Finance. If an OEM [original equipment manufacturer] has ownership of an engine leasing company, it is difficult to penetrate those markets as an independent player."

He adds: "Over time, it is inevitable that if OEMs no longer have to be concerned about the engine leasing part of their business, then that is positive for the independent firms like ELFC."

Widebody sales remain a concern

Neither major aircraft manufacturer is enjoying great success with their large widebody models. **Geoff Hearn** looks at the issues facing the Airbus A350 and Boeing 777X families.

The market for widebody aircraft continues in the doldrums, presenting both Boeing and Airbus with difficult, but different, problems. The long-haul market is taking longer to recover from the effects of the Covid-19 pandemic than is the case for the short-haul and regional sectors. The paucity of widebody aircraft sales reflects the depressed passenger growth.

Sales of widebody aircraft have been hit by external factors, but orders have not been helped by the programme delays and difficulties experienced by both Boeing and Airbus in developing their latest-generation models. The European manufacturer had to rethink its initial plans for the A350 family, while its US counterpart seems to be faced with ever-greater problems as it seeks to replace the iconic 747 and the current 777 models.

The recent drop in Airbus sales may be providing some respite to Boeing in terms of market share, but the 777X is also struggling to obtain orders, not least because of development and certification issues.

Entry into service of the 777-9 has been further delayed

Damaging delays

The 777 programme had already suffered delays, making comparisons with the troubled 787 development programme difficult to avoid. The problems were compounded when, in April, the manufacturer announced another delay to the planned first delivery of its 777-9 by up to a further two years. This pushes the entry into service back to 2025.

The company also announced a temporary halt to production of the new widebody. The announcement stated: "Delivery of the first 777-9 airplane is now expected in 2025, which reflects an updated assessment of the time required to meet certification requirements." The Federal Aviation Administration had previously stated that it would need to commit more resources to certifying the aircraft, and that Boeing might need to conduct additional test flights.

Airbus setbacks

In August, Airbus cancelled all 19 outstanding A350-1000s for Qatar Airways after deleting four additional -1000s from the backlog in previous months.

The cancellation came after a protracted row between the Middle East carrier and the manufacturer. In unusually frank public comments, Qatar Airways' chief executive officer said in June that the ongoing dispute over the protective skin of its A350s is not unique to the carrier and sets a "dangerous precedent" in the industry.

The European Union Aviation Safety Agency (EASA) has acknowledged quality flaws with the Airbus widebody at several airlines. However, Airbus, backed by EASA, said that there is no evidence that paint or surface erosion on A350 models posed a safety concern.

777X and A350-1000 recent orders

Aircraft models	Up to 2019	2019	2020	2021	2022 (to 1 October)
777-8	17	1	0	11	21
777-9	273	18	0	0	0
A350-1000	161	8	0	0	12
A350-900	623	105	21	5	6

Source: Airfinance Journal Fleet Tracker, includes subsequently cancelled orders.

Longer term potential

A more positive view of the prospects for large widebodies is held by some in the industry, who believe environmental pressures may favour larger aircraft, because limits are placed on aircraft movements at airports that are under pressure to reduce their carbon emissions. Fewer movements would push operators to opt for increased capacity models. Larger aircraft are intrinsically less damaging in terms of their impact per passenger, which could mean that demand for aircraft such as the 777-9 and A350-1000 might increase.

There are, however, caveats. The demise of the A380, for which the business case was founded on the potential lack of airport slots, does not augur well for this line of argument. Regulators and the public will have to be convinced that larger aircraft offer genuine environmental benefits, which is likely to require the ability to use sustainable fuels.

Cost comparison

Both manufacturers claim their largest models offer superior economics to the respective competitor aircraft. In order to steer through these apparent contradictions, *Airfinance Journal* has estimated the relative costs based on its own calculations.

As the largest members of the respective families, the analysis focuses on the A350-1000 versus the 777-9. However, the 777-8 has been included in the comparison, because it is arguably a more direct competitor to the A350-1000 than the larger Boeing model.

The closeness of the 777 models and A350-1000 in terms of operating cost was borne out by *Airfinance Journal*'s previous analysis at a fuel price of $1.75 per US gallon. With the current fuel price at nearly double this level, *Airfinance Journal* has revisited the comparison. The differences in the cost of operating the 777-8 and the A350-1000 still appear to be small but are increased by the higher fuel price.

Differences are more marked in the case of the 777-9 comparison. A caveat to these findings is that 777X performance figures are estimates based on Boeing's early briefings and will only be verified once the aircraft has entered service, which is moving further into the future. Relative seat counts are also a source of claim and counter-claim.

Based on their respective cash costs, *Airfinance Journal*'s analysis suggests that the 777-9 will provide efficiencies for airlines that can use its full capacity, while the A350-1000 is a less expensive lower risk option, particularly at lower fuel prices.

Comparing pricing, and therefore capital costs, of the aircraft is difficult. Airbus no longer publishes list prices and where Boeing's pricing will be by the time the 777X enters service is a matter of conjecture. Previous *Airfinance Journal* analysis suggested that the 777-9 would sustain a total cost per seat advantage with a price increase of about 15% compared with the A350-1000.

In a high fuel cost environment, similar to today's, the price differential increases slightly. In any case, Airbus will be hoping to bolster sales of the A350-100 before the new-generation 777 enters service.

Relative cash cost at fuel price of $1.75 per US gallon

	A350-1000	777-8	777-9
Cash cost per trip	Base (100%)	102%	105%
Cash cost per seat	Base (100%)	101%	93%

Relative cash cost at fuel price of $3.5 per US gallon

	A350-1000	777-8	777-9
Cash cost per trip	Base (100%)	97%	101%
Cash cost per seat	Base (100%)	96%	91%

Assumptions: 4,000 nautical-mile sector, *Airfinance Journal* cost model/interpretation of manufacturer data.

Largest models go head-to-head

Boeing 777-8/9 characteristics

The 777X family was launched in late 2013. The X designation was originally applied to the individual models, but is now used only as a programme designation.

The manufacturer offers two variants of the new family. The 777-9 provides seating for more than 400 passengers in a two-class configuration and has a range of close to 7,300 nautical miles (13,500 kilometres).

The second member of the family, the 777-8, seats more than 350 passengers and offers a range capability of about 8,700 nautical miles – matching the A350-1000.

Although Boeing says it remains committed to the long-range model, development of the -8 variant appears to be on hold. It is, however, the basis for the freighter version (see Cargo contest).

Airbus A350-1000 characteristics

The A350-1000 is the largest variant of the A350 family and Airbus's largest offering in the absence of the A380. The aircraft seats 350 to 410 passengers in a typical three-class layout with a range of 8,700 nautical miles. The aircraft was originally conceived with a nine-abreast economy configuration and was designed to replace the A340-600 and compete with the 777-300ER.

Economy layouts with 10-abreast seating have subsequently been developed, which go some way to reducing the seating gap to the new 777-9. This competitiveness is aided by an increase of the maximum certificated capacity by 40 seats.

The European authorities awarded type certification in November 2017. It entered commercial service with Qatar Airways in February 2018.

Leading characteristics of competing large widebodies

Model	A350-1000	777-8	777-9
Typical seating	350-410	384	426
Max seating	440	Not specified	Not specified
Typical range (nm/km)	8,700/16,100	8,730/16,170	7,290/13,500
Engine	Trent XWB	GE9X	GE9X
Entry into service	2018	Unconfirmed	2025 (planned)

Source: Manufacturers.

Cargo contest

Freighters are another front in the competition between Boeing and Airbus for widebody market share.

Boeing has traditionally dominated the freighter market and, in particular, the success and longevity of the Boeing 747 programme owes much to the suitability to the cargo role of both factory-built and converted models. The US manufacturer sees the freighter version of the 777-8, which is designated as the 777-8F, as the natural successor to its historically successful model.

This view was supported in mid-October when Boeing was able to confirm that Cargolux Airlines had finalised an order of 10 777-8F models with options for six additional aircraft. Cargolux's interest in Boeing's newest freighter was announced at this year's Farnborough air show.

Boeing, which launched the 777-8F in January, says it has booked more than 50 orders for the model. The manufacturer says its latest freighter has nearly identical payload and range capabilities to that of the 747-400 model, but has 30% better fuel efficiency and 25% better operating costs per tonne compared with the older type.

However, unlike 747 freighters, the 777-8F faces direct competition from an Airbus model – the Airbus A350F. The manufacturer says that its all-new model, based on the A350-1000, burns 40% less fuel than the 747-400F and that it offers greater payload and range than its competitor. *Airfinance Journal*'s Fleet Tracker indicates that Airbus has 31 orders for the A350F model.

ATR – available in two sizes

Industry interest in turboprop aircraft has centered on 70-seaters and larger, but ATR continues to produce a smaller model. **Geoff Hearn** assesses the prospects for ATR's offering.

Turboprops have not been immune to the recent trials and tribulations of the commercial aircraft market, but the ATR72 and ATR42 families have suffered less than most types.

As the market picks up, the European manufacturer is seeing an upturn in orders. The revival is largely driven by sales of the larger member of the family, but the sub-50-seat ATR42 has also chalked up some recent successes and, as of mid-October, has outsold its larger stablemate this year. The Toulouse-based manufacturer is looking to sustain the improvement with the announcement of plans for the next generation of its turboprop – dubbed the ATR Evo. The company is also pushing freighter variants of its models.

Recent market activity

Evidence of a recovery in the market is provided by the reducing quantity of aircraft in storage, although significant numbers have yet to re-enter service. Sales have recovered from the low levels of 2020, but are a long way from the 2017 peak.

At the July 2022 Farnborough air show, ATR announced that Japan's ORC and Gabon's Afrijet had selected the ATR42-600 and the ATR72-600, respectively.

In a press release, the manufacturer said it continues to enlarge its footprint in Japan as Feel Air looked to operate a fleet of up to 36 aircraft. Positive developments from the leasing community were also in evidence, as newly formed Abelo agreed to acquire 20 aircraft, including 10 of the short take-off and landing (Stol) version of the smaller member of the family – the ATR42-600S.

Trading activity has continued, albeit at a modest level. For example, Braathens Regional Airlines has added a new ATR72-600 aircraft to its fleet. The aircraft is leased from Nordic Aviation Capital, according to *Airfinance Journal*'s Fleet Tracker.

Sales of the ATR42-600 continue at modest levels

Longer-term trends

ATR's latest 20-year global market forecast predicts a total market of close to 2,500 aircraft over the next 20 years. The manufacturer believes this will consist of 620 ATR42 deliveries plus 1,830 of the larger ATR72 model.

As well as the longer-term plan to develop the Evo, the manufacturer continues with its strategy of incremental development. The latest example is the introduction of Pratt & Whitney Canada's PW127XT-M engine, which will power new-build aircraft. The updated powerplant has recently been type certified by Transport Canada. The new engine is retrofittable to -500 and -600 series aircraft. Air Corsica is the launch customer for the engine variant and is due to take the first aircraft in the final quarter of 2022.

ATR sees an increasing demand for cargo versions of its products, but believes the requirement will be largely for models with a size corresponding to 70-seat passenger aircraft. Its market forecast estimates that of the 550 regional freighters predicted to be in service by 2041, all but 40 will be in the 70-seat category. There are currently 22 factory-built ATR72-600 freighters on order, according to *Airfinance Journal*'s Fleet tracker.

There is also an active freighter-conversion market for both ATR models. As recently reported by *Airfinance Journal*, Acia Aero Leasing has opted for the ATR72-600 freighter conversion to continue building its future freighter fleet as it expands its portfolio and product offering. The lessor has teamed up with group affiliate IPR Conversions (Switzerland), which owns the supplemental type certificate for the ATR42 and ATR72 types, and Empire Aerospace to convert the first of three ATR72-600s: two ATR72-600 large cargo door and one ATR72-600 bulk freighter cargo conversions.

Talking to *Airfinance Journal*, Acia's senior vice-president commercial, Sameer Adam, says the launch of the ATR72-600 freighter-conversion project results from the low availability of good ATR72-500 freighter candidates, as well as the -600 fleet's younger average age.

ATR is confident the regional and turboprop market will continue to grow as the general recovery in the air transport market continues and the Covid-19 pandemic recedes. Whether the recovery results in De Havilland of Canada restarting the Dash 8-400 programme – the ATR72's most direct competitor – is unclear.

Plans by Brazilian manufacturer Embraer to launch a passenger turboprop in either or both the 70-seat and 90-seat category could provide ATR with renewed competition.

According to previous analysis by *Airfinance Journal*, the ATR models have enjoyed significant operating cost advantages over their turboprop and jet rivals, particularly when fuel prices are high. The arrival of a new-technology competitor would likely counter this and the threat has perhaps pushed ATR to launch the Evo. However, entry into service of the Embraer aircraft is not planned before 2027, even if the go-ahead is given in the coming months.

ATR family

The ATR42 is a twin-turboprop, short-haul regional airliner developed and manufactured by Avions de Transport Regional (ATR), a joint venture owned by Airbus and the Italian aviation conglomerate, Leonardo. The original ATR42-300 entered service at the end of 1985.

The -500 series was a major upgrade with new more powerful engines, new propellers, increased design weights and an improved passenger cabin.

ATR recent order history

	2017	**2018**	**2019**	**2020**	**2021**	**2022** (to 31 Oct)
ATR72	112	33	47	2	23	14
ATR42	0	26	1	3	1	14

Source: Airfinance Journal Fleet Tracker. Includes subsequently cancelled orders.

Aircraft characteristics

	ATR42-600	ATR72-600
Seating/range		
Max seating	50	78
Typical seating	48	70
Maximum range (nautical miles)	800	825
Technical characteristics		
MTOW (tonnes)	18.6	22.8
OEW (tonnes)	11.5	14
MZFW (tonnes)	16.7	20.8
Fuel capacity (litres)	5,700	6,370
Engines	PW127M	PW127M
Thrust (shp)	2,160	2,475
Fuels and times		
Block fuel 200nm	560kg	610kg
Block fuel 500nm	1,210kg	1,310kg
Block time 200nm	55 minutes	58 minutes
Block time 500nm	122 minutes	125 minutes
Fleet data (-600 models only)		
Entry into service	**2012**	**2011**
In service	57	487
Current plus planned operators	20 plus 5	86 plus 11
In storage	6	86
On order	13	124

Source: *Air Investor 2022, Airfinance Journal Fleet Tracker*, 15 October 2022.

The -600 is the latest version, which in common with its larger and more widely sold stablemate, the ATR72-600, incorporates further significant improvements in performance and available payload. A new cabin design and updated avionics are also part of the latest upgrade.

The ATR72 is a stretched version ATR42, with capacity for 68-plus passengers. As well as a lengthened fuselage, the wingspan is increased and more powerful engines are fitted. The original ATR72-100 variant entered service in October 1989, but was soon superseded by the -200 model. The aircraft was developed with a series of upgrades to maximum take-off weight and engine power, culminating in the ATR72-212.

The ATR72-500 (certificated as the ATR72-212A) is a major development of the aircraft, which incorporates six-bladed propellers in place of the original four-bladed configuration.

The ATR72-600 model replaces the -500 and is the current production standard. It offers further performance improvements and includes a redesigned cabin.

ATR says the -600 variants have reduced maintenance costs compared with their predecessors.

An Appraiser's view

Oliver Stuart-Menteth, managing director, Fintech Aviation Services, assesses ATR values and lease rates.

The launch of the ATR72-600 in October 2007 as a replacement of the -500 model provided a much-needed boost to ATR's product offering, primarily through the implementation of a new avionics suite.

However, aside from this significant upgrade, the delineation between the two products is less clear, because they offer very similar operating costs and performance. The subsequent coupling of these two variants by the market dictates that sentiment affecting the -500 similarly also impacts the -600, with aircraft of similar vintages being affected by the general variation in market dynamics.

With a significant proportion of the ATR72-600 fleet still in storage, pricing compared with pre-pandemic remains depressed with remarketing agents reporting that relatively high book values are causing trading stagnation and high return to service costs are forcing some owners to part out much earlier than originally anticipated.

Thanks to the small in-service fleet and very limited availability, the market for the ATR42-600 has historically been viewed as more robust than that of its larger stablemate. Orders for the smaller model of the family remain sporadic, resulting in an average of just six aircraft being delivered each year.

Modifications required for the newly launched short take-off and landing (Stol) variant are not retrofittable into the present fleet. However, given that a relatively small number of Stol models are expected to be ordered, general market sentiment affecting the standard ATR42-600 will also impact the specialist variant. Value premiums for Stol aircraft will only be realised by owners/operators selling or leasing at highest and best use.

The majority of transactions in the ATR market consists of operating leases delivered new from the original equipment manufacturer (OEM) to operators with sales typically occurring towards the end of second or third leases.

Market values and lease rates for both the ATR72-600 and ATR42-600 have recovered since the lows recorded in 2020, but they still remain some 25% below those achieved in 2019.

Achievable operating lease rates are highly correlated to the technical status rather than year of build. Even if De Havilland elects to restart the Dash 8-400 production line, this is unlikely to occur before 2025 at the earliest leaving the field wide open for ATR.

Fintech's view of ATR42-600 values and lease rates **(PW127M engine, MTOW 40,920lbs)**

Build year	2018	2019	2020	2021	2022 (new)
Current market value ($m)	7.41	8.63	9.95	11.37	13.25
Operating lease rate ($'000s/month)	50-80	50-80	50-80	50-80	110-130

Fintech's view of ATR72-600 values and lease rates **(PW127M engine, MTOW 50,600lbs)**

Build year	2018	2019	2020	2021	2022 (new)
Current market value ($m)	9.18	10.72	12.37	14.15	16.48
Operating lease rate ($'000s/month)	75-95	75-95	75-95	75-95	145-165

Source: Fintech Aviation Services.
Fintech does not generally differentiate lease rates in the secondary market by build year. Maintenance status assumes half-life, except for new aircraft, which assume full-life.

Rating agency unsecured ratings

Airlines

	Fitch	Moody's	S&P
Aeroflot	WD	-	-
Air Canada	B+(neg)	Ba3(stable)	B+(stable)
Air New Zealand	-	Baa2(stable)	-
Alaska Air Group	BB+(neg)	WD	BB(stable)
Allegiant Travel Company	BB-(stable)	Ba3(stable)	B+(stable)
American Airlines Group	B-(stable)	B2(stable)	B-(Stable)
Avianca Holdings	WD	B3(stable)	B-(stable)
British Airways	BB(neg)	Ba2(neg)	BB(stable)
Delta Air Lines	BB+(neg)	Baa3(stable)	BB(Stable)
Easyjet	-	Baa3(stable)	BBB-(stable)
Etihad Airways	A(stable)	-	-
Grupo Aeromexico	-	B3(stable)	B-(developing)
GOL	B-(neg)	B3(stable)	CCC+(stable)
Hawaiian Holdings	B-(stable)	B1(stable)	B-(stable)
International Consolidated Airlines Group	-	Ba2(neg)	BB(stable)
Jetblue	BB-(neg)	Ba2(stable)	B+(neg)
LATAM Airlines Group	WD	-	-
Lufthansa Group	-	Ba2(neg)	BB-(stable)
Pegasus Airlines (Pegasus Hava Tasımacılıgı Anonim Sirketi)	B+(neg)	-	B (stable)
Qantas Airways	-	Baa2(stable)	-
Ryanair	BBB(Stable)	-	BBB(stable)
SAS	-	-	BBB(stable)
Southwest Airlines	BBB+(neg)	Baa1(stable)	BBB(pos)
Spirit Airlines	BB-(neg)	B1(stable)	B(stable)
TAP Portugal (Transportes Aereos Portugueses, S.A.)	-	B3(stable)	B+(stable)
Turkish Airlines	B(neg)	B3(stable)	B(stable)
United Airlines Holdings	B+(neg)	Ba2(neg)	B+(stable)
Virgin Australia	WD	-	-
Westjet	B(neg)	B3(stable)	B-(stable)
Wizz Air	BBB-(neg)	Baa3(neg)	-

Source: Ratings Agencies - 31/10/2022.

Lessors

	Fitch	Moody's	S&P	Kroll Bond Ratings
Aercap	BBB-(pos)	Baa3(pos)	BBB(stable)	-
Air Lease Corp	BBB(Stable)	-	BBB(stable)	A-(stable)
Aircastle	BBB(stable)	Baa3(Stable)	BBB-(stable)	-
Avation PLC	WD	-	B-(stable)	-
Aviation Capital Group	-	Baa2(stable)	BBB-(stable)	A-(stable)
Avolon Holdings Limited	BBB-(Stable)	Baa3(stable)	BBB-(stable)	BBB+(stable)
AWAS Aviation Capital Limited	-	Baa3(Stable)	-	-
BOC Aviation	A-(stable)	-	A-(stable)	-
CCB Leasing (International) Corporation	-	-	A (stable)	-
CDB Aviation Lease & Finance	A+(stable)	A2(stable)	A (stable)	-
Clover Aviation Capital	-	Baa3(stable)	-	-
Dubai Aerospace Enterprise	BBB-(Stable)	Baa3(stable)	-	BBB+(stable)
Fly Leasing	-	B3(neg)	CCC(developing)	BB-(neg)
Global Aircraft Leasing	-	B2(neg)	-	-
ICBC Financial Leasing	A(stable)	A1(stable)	A(stable)	-
ILFC (Part of Aercap)	BBB-(pos)	Ba2(hyb)(pos)	-	-
Macquarie Group Limited	A(Stable)	A3	BBB+(stable)	-
Marubeni Corporation	-	Baa2(stable)	BBB+(stable)	-
Mitsubishi UFJ Lease	-	A3(stable)	A-(stable)	-
Park Aerospace Holdings	BBB-(Stable)	Baa3(Stable)	-	BBB+(stable)
SMBC Aviation Capital	A-(neg)	-	A-(stable)	-
Voyager Aviation	WD	WD	-	WR

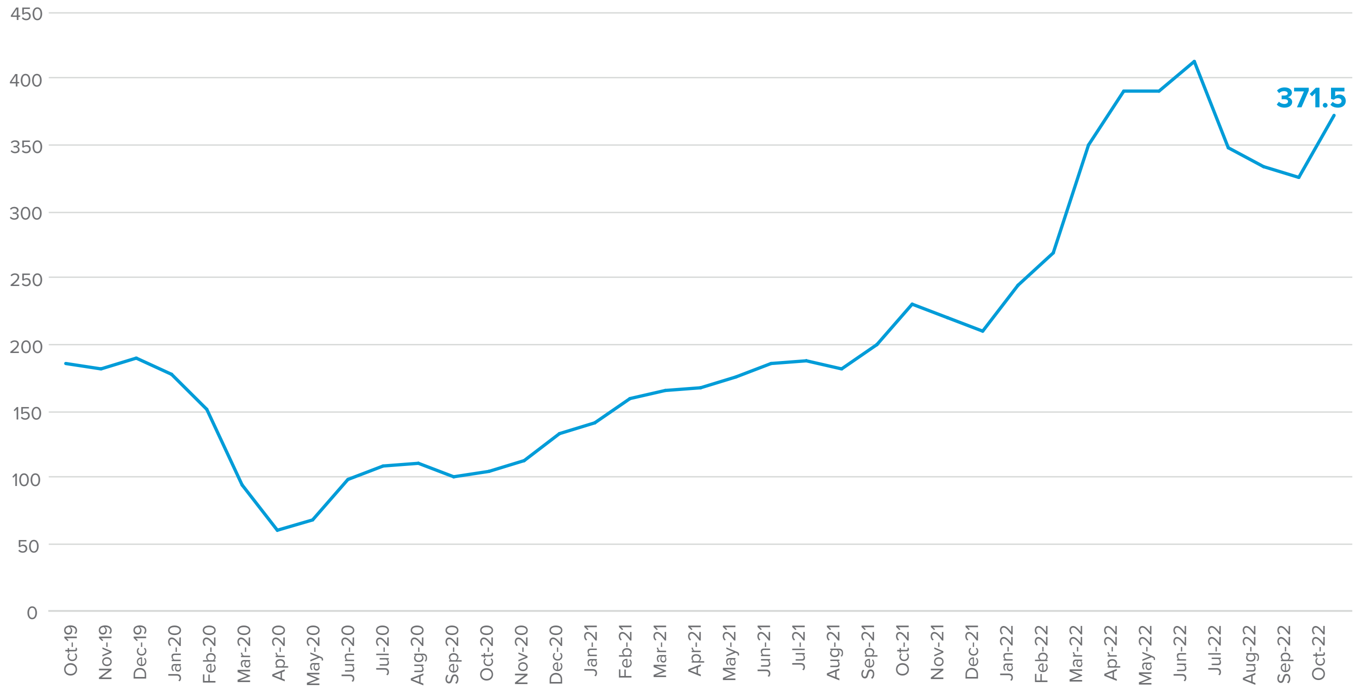
Source: Ratings Agencies - 31/10/2022.

Manufacturers

	Fitch	Moody's	S&P
Airbus Group	BBB+(stable)	A2(stable)	A(stable)
Boeing	BBB-(stable)	Baa2(neg)	BBB-(neg)
Bombardier	WD	B3(stable)	B-(stable)
Embraer	BB+(stable)	Ba2(stable)	BB(pos)
Rolls-Royce plc	BB-(stable)	Ba3(stable)	BB-(stable)
Raytheon Technologies Corp	-	Baa1(stable)	A-(neg)

Source: Ratings Agencies - 31/10/2022.

US Gulf Coast kerosene-type jet fuel (cents per US gallon)



Source: *US Energy Information Administration.*

Commercial aircraft orders by manufacturer

	Gross orders 2022	Cancellations 2022	Net orders 2022	Net orders 2021
Airbus (30 September)	856	209	647	507
Boeing (30 September)	542	110	432	535
Embraer	57	0	57	81
ATR	28	0	28	35

Based on *Airfinance Journal* research and manufacturer announcements until 31/10/2022.

Recent commercial aircraft orders (September-October 2022)

Customer	Country	Quantity/Type
Air Canada	Canada	15 A220-300
Air Tahiti	France	Two ATR42-600S, one ATR72-600
Air Cote d'Ivoire	Ivory Coast	Two A330-900
Alaska Airlines	USA	52 Max aircraft
Cargolux Airlines	Luxemburg	10 777-8 Freighter
China Airlines	Territory of Taiwan	16 787-9
IAG	United Kingdom	31 A320neo, 28 A321neo
IAG	United Kingdom	25 737-8200, 25 737-10
Jet2	United Kingdom	35 A320neo
Salam Air	Oman	Six E195-E2
Sichuan Airlines	China	Three A320neo, three A321neo
Undisclosed		Four A321neo
Undisclosed		Two A330-900
Undisclosed		Seven 737 Max
Undisclosed		Two 777F
Undisclosed		12 777X
UPS	USA	Eight 767F
Westjet	Canada	42 737-10
Xiamen Airlines	China	25 A320neo, 15 A321neo

Based on *Airfinance Journal* research September-October 2022.

New aircraft values ($ million)

Model	Values of new production aircraft*
Airbus	
A220-100	32.6
A220-300	37.4
A319neo	37.4
A320*	40.6
A320neo	50.4
A321*	47.7
A321neo	58.6
A330-800	87.5
A330 900	102.4
A350-900	146.3
A350-1000	159.0
A380	140.7
ATR	
ATR42-600	15.3
ATR72-600	19.0
Boeing	
737-800*	33.8
737 Max 8	47.8
737 Max 9	49.4
767F	80.0
777-300ER	132.4
777F	161.4
787-8	107.5
787-9	138.0
787-10	148.1
De Haviland	
DHC 8-400*	19.6
Embraer	
E175	26.4
E190-E2	31.1
E195-E2	33.9
Sukhoi	
SSJ100	20.0

Based on ISTAT appraiser inputs for Air Investor 2022. *Values for last year of build.

New aircraft lease rates ($'000 per month)

Model	Low	High	Average
Airbus			
A220-100	210	245	227.5
A220-300	230	270	250
A319neo	227	290	258.5
A320*	210	310	260
A320neo	285	380	332.5
A321*	269	360	314.5
A321neo	325	430	377.5
A330-800	562	700	631
A330 900	655	750	702.5
A350-900	850	1,100	975
A350-1000	900	1,250	1,075
A380	640	1,234	937
ATR			
ATR42-600	105	135	120
ATR72-600	115	165	140
Boeing			
737-800*	125	325	225
737 Max 8	265	340	302.5
737 Max 9	265	340	302.5
767F	400	700	550
777-300ER	850	1,015	932.5
777F	950	1,260	1,105
787-8	630	875	752.5
787-9	805	1,100	952.5
787-10	835	1,150	992.5
De Haviland			
DHC 8-400*	125	180	152.5
Embraer			
E175	170	241	205.5
E190-E2	190	225	207.5
E195-E2	216	260	238
Sukhoi			
SSJ100	140	198	169

Reasons for high inflation are here to stay

Adam Pilarski, senior vice-president at Avitas, looks at the "profound changes" that have led to high inflation and why they are here to stay, for a while at least.

Big changes have been occurring in the world economy and consequently in aviation. The Covid-19 pandemic was the most dramatic example of such changes but many other factors contribute to a significantly different reality.

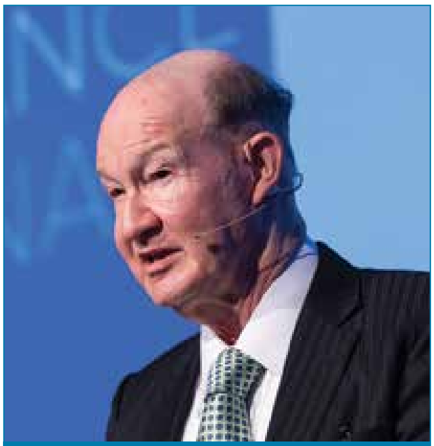
Currently, we are experiencing substantially higher rates of inflation compared with what the world has been accustomed to for the past few decades. I want to argue here that the higher rates of inflation are not a temporary aberration but rather the result of profound changes in the environment we live in.

Outsourcing has been the mantra of business for some time and has been a major reason why inflation rates remained so low for so long. China's explosive economic growth has been the result of this phenomenon. Outsourcing basically means ceding control of your production in return for very low costs achieved by economies of scale and very low local wages. Sometimes such policies led to disaster.

Boeing outsourced too much in the early stages of the production of the Boeing 787 and ran into significant delays and loss of control. Eventually, it brought parts of the production process back in house. This change was motivated by internal Boeing consideration where the company decided to forgo savings for tighter control over the production process.

A number of external events convinced many companies to move in the same direction. The Tohoku earthquake and tsunami of 2011 exposed the high dependency of many companies to events totally outside their control in the supply chain that could have a catastrophic impact on their business. The slogan of JIT (just in time) is being replaced with JIC (just in case), which leads to a build-up in inventories, incurring higher costs but more predictability. More control means higher costs.

In times of Covid-19, where a sudden outbreak of the disease led to regional lockdowns and abrupt disruptions in the supply chain, relying on a multitude of more expensive suppliers seems logical. We are clearly trading cost for stability. The somewhat unexpected war in Ukraine is another example of such circumstances. Many companies consciously decided to rely on multiple (higher cost!) suppliers and purchase parts from suppliers closer to home. The most popular term used now for business strategies is "de-risking", which basically means paying more to endure less risk.



Our author at the *Airfinance Journal* Dublin 2022 conference

> *"Boeing outsourced too much in the early stages of the production of the Boeing 787 and ran into significant delays and loss of control."*

While the consistent trend towards deglobalisation over the past few years contributed to the current higher worldwide inflation, there are, of course, many other contributing factors. Governments have been printing more money for quite some time. The reader can create a chart from public data that includes a combination of balance sheets of the US Fed, the European Central Bank (ECB) and the Bank of Japan.

A quick look at the graph, which aviation finance executive Bertrand Grabowski calls the Mother of all Charts, is quiet illuminating and scary. The world is simply awash with money. That trend accelerated further after the start of Covid-19. Governments printed money and bailed out some industries to ensure minimum suffering for their populations. Savings increased substantially and there was less need to work in order to survive. With these bailouts, unemployment remained low but more money and less work led to strong inflationary pressures.

The movement towards less outsourcing had the effect of increasing union power, which translates into higher inflation, at least in Europe and the USA.

Additionally, the brutal attack by Russia on Ukraine caused significant increases in the costs of food products. The sanctions on Russia by the West had a similar effect on energy prices. Taken together, this resulted in price increases not experienced for decades.

In the USA, price increases were about four times what the Fed is willing to tolerate. As a consequence, the US Fed started consistently to raise rates, leading to higher interest rates. The Europeans followed. The ECB raised its rates twice after a period of 12 years of stable rates. Higher rates in the USA are one of the contributing factors in the high value of the US dollar, which has caused many problems for the world's airlines.

The policy of the Fed is very clear. The objective is to slow down the economy ("cool down the overheated economy"). With low unemployment rates, the Fed does not have to be shy about the raises and will continue doing so until inflation comes under control. The stated goal of a return to inflation below 2% will not happen soon in my view, in part because of the geo-political factors I already mentioned (war and reduction of globalisation).

The soft landing goal is a nice dream that very seldom materialises. A moderate recession in the US and in parts of Europe are a more likely scenario for the next year. A recession will produce some winners along with losers. Smart planning is needed to end up in the former category.

AIRFINANCE JOURNAL

An *Airfinance Journal*

special supplement

Leasing Top 50 2022

Leasing Top 50 2022

After the Covid years, the Russia year. The 12 months since last year's Leasing Top 50 have continued to be tumultuous for the aircraft leasing industry.

The confiscation of non-Russian-owned aircraft leased to Russian airlines was the biggest event of the period. Some were located outside Russia at the time and were fortuitously repossessed. Most were in Russia*, Airfinance Journal's Fleet Tracker* data shows.

Airfinance Journal published the first assessment of the impact of 100% write-off of these aircraft on lessors' balance sheets. One leading analyst told *Airfinance Journal* that he couldn't believe that these aircraft would just disappear. Well, they did.

Airfinance Journal has recently launched a new product covering the leasing industry, *The Lessor Analyst*, sister to the established and highly regarded *The Airline Analyst.*

The Lessor Analyst covers more than 100 leasing entities and the asset-backed securitisation (ABS) and unsecured bond markets. It permits lessors to instantly benchmark their portfolios and financial performance with their peers, investors to compare risk and return on the multiple instruments available for investment in the aviation asset class and lenders to assess absolute and relative credit risk. Some selected data from **The Lessor Analyst** is presented in this report.

For example, disclosed Russia-related write-offs total $6.6 billion and range up to 10% of leased assets for individual lessors. Leverage has taken a significant hit in some cases, as disclosed in this report. Seeking recompense, Aercap has led the industry with a reported claim for $3.5 billions of losses covering 116 aircraft and 23 engines under its "all-risk" insurance policies. Others plan to follow.

Previous editions of this report have shown, even pre-Covid, a steady decline in yields, compensated in some cases by a significant reduction in the average cost of debt. Over the last two years, the overriding factor has been the Covid effect of airline defaults, aircraft off lease, reduced rentals and higher transition costs. The only positive from Covid for the leasing industry is that it took the leasing percentage above 50% for the first time. Because of the lagged reporting, the latest financials for many lessors are for the full-year 2021 and incorporate only the residual Covid effect and not the Russia effect. Only the 10 lessors which publish quarterly or semi-annual numbers (Aercap, Aircastle, Air Lease, ALAFCO, Avation, Aviation Capital Group, Avolon, BOC Aviation, CALC and DAE) give an indication of current underlying market conditions.

The bottom lines are dominated by the provisions, with all making substantial losses. However, average yield held up quite well at 10.9% and average debt cost was an impressive 3.3%. We need to note that Aercap represents a major component of these numbers.

Financial market turmoil has also created challenges for the industry. Yields on unsecured bonds for investment grade lessors have approximately doubled to double the current coupons, creating uncertainty over the likely cost of the $37 billion of bond refinancings looming for 2023 and 2024. After 14 issues in 2021, there have been only two aircraft ABS issues in YTD 2022, which has impacted some lessors' aircraft sale plans and "warehouse to ABS" strategies. Unsecured bond issues have also been thin on the ground.

Against this background, we have seen some notable exits (with gains) from the industry (CK Holdings, NWS and Chow Tai Fook) with their businesses acquired by Carlyle and SMBC Aviation Capital. Also, GE made a partial exit by swapping a 100% interest in GECAS for a 45% interest in Aercap - plus plenty of cash!

The GE diaspora is meanwhile establishing new careers for themselves in the industry. Despite these consolidations, our analysis shows that the concentration of ownership (by the number of aircraft and market value) has not increased in the last five years. If anything, it has slightly reduced, as shown in the report.

A major new development is a review by Chinese regulators of Chinese lessors' increasing presence in the industry. The analysis presented in this report from our *Fleet Tracker* data shows that lessors ultimately owned and controlled by Chinese entities are now by far the largest national group of aircraft beneficial owners by aircraft market value, with $95 billion of exposure.

The regulators' review is reported to be focusing on Chinese lessors' participation in the non-domestic aircraft leasing market. Our same analysis shows that $63 billion of the $95 billion is leased to non-Chinese airlines. Simultaneously, some Western lessors are reported to be reviewing the scale of their exposure to Chinese airlines which, per Fleet Tracker, totals $25 billion.

"The only positive from Covid for the leasing industry is that it took the leasing percentage above 50% for the first time."

Michael Duff, Product Director
Airfinance Journal

Perhaps 2023 will bring some "swaps" of Chinese lessors' non-Chinese airline exposures for Western lessors' Chinese exposures? No doubt investment banks, advisers and brokers are lining up to play a profitable role in this realignment.

A complicating factor is that the Chinese-owned and controlled "ultimate" beneficial owners still have $57 billion of firm orders for more than 1,000 aircraft, mostly from Airbus, Boeing and COMAC. These will need to be deployed into long-term leases with decent credits in order to be easily sold.

And what lies ahead? Hopefully not a pandemic or a mass seizure of aircraft. But there are plenty of challenges ahead for the lessors. A sluggish global economy, increasing interest rates, massive refinancing challenges, higher insurance costs, environmental issues, capital expenditure to be funded, the impact of a strong dollar and high fuel prices (for now) on their airline customers' cash flow and profitability. Inflation has bailed out aircraft financiers in the past. Will history repeat itself?

Top 50 **managers by number of aircraft**

Rank	Manager	2021	2022	% change since last year	Turboprop	Regional Jet	Narrowbody	Widebody
1	Aercap	2,008	**1,809**	↓ -9.9%	19	78	1,382	330
2	Avolon	570	**587**	↑ 3.0%	-	-	461	126
3	Air Lease Corporation	444	**507**	↑ 14.2%	-	2	388	117
4	SMBC Aviation Capital	505	**506**	↑ 0.2%	-	-	452	54
5	BBAM	519	**456**	↓ -12.1%	-	-	341	115
6	ICBC Financial Leasing	393	**428**	↑ 8.9%	-	18	367	43
7	BOC Aviation	396	**426**	↑ 7.6%	-	-	346	80
8	Carlyle Aviation Partners	228	**406**	↑ 78.1%	-	-	370	36
9	DAE Capital	337	**362**	↑ 7.4%	65	-	244	53
10	Nordic Aviation Capital	485	**350**	↓ -27.8%	208	142	-	-
11	Aviation Capital Group	342	**347**	↑ 1.5%	-	-	332	15
12	Castlelake	265	**272**	↑ 2.6%	15	24	173	60
13	Bocomm Leasing	258	**270**	↑ 4.7%	-	11	229	30
14	CDB Aviation	239	**269**	↑ 12.6%	-	20	206	43
15	Falco	224	**257**	↑ 14.7%	134	117	6	-
16	Aircastle	257	**255**	↓ -0.8%	-	11	219	25
17	Jackson Square Aviation	189	**195**	↑ 3.2%	-	-	171	24
18	Macquarie Airfinance	189	**189**	↑ 0.0%	-	3	175	11
19	Orix Aviation	220	**183**	↓ -16.8%	-	-	150	33
20	China Aircraft Leasing Company	138	**175**	↑ 26.8%	-	-	159	16
21	Goshawk	182	**174**	↓ -4.4%	-	-	158	16
22	CCB Financial Leasing	158	**168**	↑ 6.3%	-	-	141	27
23	CMB Financial Leasing	129	**151**	↑ 17.1%	-	7	121	23
24	Deucalion Aviation Limited	149	**137**	↓ -8.1%	-	-	108	29
25	Avmax	142	**136**	↓ -4.2%	57	68	9	2
26	Cargo Aircraft Management	111	**130**	↑ 17.1%	-	-	9	121
27	Fortress Transportation And Infrastructure Investors	108	**127**	↑ 17.6%	-	-	121	6
28	Standard Chartered Aviation Finance	129	**121**	↓ -6.2%	-	-	119	2
29	Aergo Capital	48	**110**	↑ 129.2%	47	-	48	15
29=	Aero Capital Solutions	53	**110**	↑ 107.5%	-	-	110	-
31	Altavair Airfinance	108	**109**	↑ 0.9%	-	4	44	61
32	JP Lease Products & Services	87	**89**	↑ 2.3%	-	-	72	17
33	Aviator Capital Management	72	**88**	↑ 22.2%	-	2	70	16
34	Aircraft Leasing & Management	87	**84**	↓ -3.4%	-	12	57	15
35	Merx Aviation	85	**83**	↓ -2.4%	-	-	78	5
35=	FPG Amentum	75	**83**	↑ 10.7%	-	-	67	16
37	World Star Aviation	51	**78**	↑ 52.9%	-	-	72	6
38	State Transport Leasing Company	78	**77**	↓ -1.3%	-	41	29	7
38=	Alafco	78	**77**	↓ -1.3%	-	-	66	11
38=	ABC Financial Leasing	68	**77**	↑ 13.2%	-	7	61	9
41	Regional One	42	**72**	↑ 71.4%	15	57	-	-
42	Avia Capital Leasing Cyprus	70	**70**	↑ 0.0%	-	-	60	10
43	Azorra Aviation	18	**69**	↑ 283.3%	8	57	4	-
44	SPDB Financial Leasing	43	**66**	↑ 53.5%	-	9	53	4
44=	GTLK Europe	60	**66**	↑ 10.0%	-	1	50	15
46	Minsheng Financial Leasing	53	**65**	↑ 22.6%	-	-	58	7
47	Tokyo Century Leasing	62	**63**	↑ 1.6%	-	3	43	17
48	Abelo Capital Aviation Limited	63	**61**	↓ -3.2%	61	-	-	-
49	Itochu Group	33	**60**	↑ 81.8%	-	-	55	5
50	VEB Leasing	61	**59**	↓ -3.3%	1	36	8	14
	Grand Total	10,709	**11,109**	↑ 3.7%	630	730	8,062	1,687

Source: Lessors and AFJ Fleet Tracker as of 30 June 2022.

Top 50 **managers by $MV of fleet** ($m)

Rank	Manager	2021	2022	% change since last year	Turboprop	Regional Jet	Narrowbody	Widebody
1	Aercap	$47,121	**$47,939**	1.7%	$178	$887	$31,064	$15,810
2	Air Lease Corporation	$18,176	**$21,709**	19.4%	-	$22	$12,590	$9,096
3	Avolon	$18,291	**$19,810**	8.3%	-	-	$11,880	$7,929
4	SMBC Aviation Capital	$18,954	**$19,552**	3.1%	-	-	$15,149	$4,403
5	BOC Aviation	$15,966	**$17,647**	10.5%	-	-	$11,578	$6,069
6	BBAM	$18,528	**$16,451**	-11.2%	-	-	$9,103	$7,348
7	ICBC Financial Leasing	$13,738	**$15,052**	9.6%	-	$394	$11,635	$3,024
8	Aviation Capital Group	$9,519	**$10,051**	5.6%	-	-	$8,995	$1,055
9	CDB Aviation	$7,877	**$9,676**	22.8%	-	$236	$7,427	$2,013
10	Bocomm Leasing	$8,829	**$9,554**	8.2%	-	$142	$7,618	$1,793
11	DAE Capital	$8,622	**$9,550**	10.8%	$697	-	$5,936	$2,917
12	Carlyle Aviation Partners	$2,717	**$8,175**	200.9%	-	-	$7,271	$904
13	Jackson Square Aviation	$6,923	**$7,389**	6.7%	-	-	$5,608	$1,781
14	CCB Financial Leasing	$5,625	**$6,173**	9.7%	-	-	$4,444	$1,729
15	CMB Financial Leasing	$4,682	**$5,643**	20.5%	-	$100	$4,153	$1,390
16	Goshawk	$5,947	**$5,639**	-5.2%	-	-	$4,309	$1,330
17	Orix Aviation	$6,240	**$5,401**	-13.5%	-	-	$3,576	$1,825
18	China Aircraft Leasing Company	$4,148	**$5,020**	21.0%	-	-	$4,476	$545
19	Aircastle	$4,844	**$5,018**	3.6%	-	$262	$4,042	$714
20	Castlelake	$4,235	**$4,893**	15.5%	$25	$291	$2,984	$1,594
21	Standard Chartered Aviation Finance	$3,712	**$3,729**	0.5%	-	-	$3,683	$47
22	Altavair Airfinance	$3,313	**$3,555**	7.3%	-	$29	$1,026	$2,500
23	Macquarie Airfinance	$3,263	**$3,298**	1.1%	-	$28	$3,022	$249
24	FPG Amentum	$2,368	**$3,287**	38.8%	-	-	$1,926	$1,361
25	Nordic Aviation Capital	$4,438	**$3,143**	-29.2%	$1,541	$1,602	-	-
26	Aircraft Leasing & Management	$3,250	**$3,116**	-4.1%	-	$199	$1,595	$1,323
27	Alafco	$3,025	**$3,033**	0.2%	-	-	$2,067	$965
28	Deucalion Aviation Limited	$2,836	**$2,876**	1.4%	-	-	$1,591	$1,285
29	JP Lease Products & Services	$2,221	**$2,765**	24.5%	-	-	$1,777	$988
30	ABC Financial Leasing	$2,532	**$2,692**	6.3%	-	$94	$1,922	$676
31	Tokyo Century Leasing	$2,598	**$2,624**	1.0%	-	$34	$1,222	$1,369
32	Falco	$2,351	**$2,490**	5.9%	$1,070	$1,258	$161	-
33	Aergo Capital	$941	**$2,371**	152.1%	$289	-	$1,024	$1,059
34	SPDB Financial Leasing	$1,336	**$2,032**	52.1%	-	$131	$1,655	$246
35	Itochu Group	$1,453	**$2,028**	39.6%	-	-	$1,733	$295
36	Minsheng Financial Leasing	$1,479	**$2,002**	35.3%	-	-	$1,741	$260
37	Merx Aviation	$2,131	**$1,959**	-8.1%	-	-	$1,710	$249
38	IAFC	$2,066	**$1,955**	-5.4%	-	-	$910	$1,045
39	GTLK Europe	$1,624	**$1,867**	15.0%	-	-	$929	$937
40	Stratos	$481	**$1,849**	284.3%	-	-	$1,065	$785
41	Sky Leasing	$1,087	**$1,809**	66.5%	$62	-	$1,666	$81
42	Airborne Capital	$590	**$1,657**	180.8%	$23	-	$1,283	$352
43	Avia Capital Leasing Cyprus	$1,637	**$1,635**	-0.2%	-	-	$1,546	$89
44	Novus Aviation	$1,815	**$1,617**	-10.9%	-	-	$585	$1,033
45	ABL Aviation	$1,266	**$1,509**	19.2%	-	-	$521	$989
46	EMP Structured Assets	$1,136	**$1,508**	32.8%	-	-	-	$1,508
47	Banc Of America Leasing	$1,181	**$1,494**	26.5%	-	-	$658	$835
48	Seraph Aviation Management	$1,686	**$1,450**	-14.0%	$54	-	$474	$923
49	Everbright Financial Leasing	$1,344	**$1,444**	7.4%	-	$16	$1,296	$131
50	CIB Leasing	$1,226	**$1,409**	15.0%	$25	-	$915	$470
	Grand Total	$291,368	**$318,543**	9.3%	$3,962	$5,723	$213,541	$95,317

Source: Lessors and AFJ Fleet Tracker as of 30 June 2022.
AVITAS Blue Book Market Values as of 26 September 2022.

Top 50 beneficial owners by number of aircraft

Rank	Beneficial Owner	Total	Turboprop	Regional jet	Narrowbody	Widebody
1	Aercap	**1,743**	19	78	1,324	322
2	Avolon	**539**	-	-	424	115
3	ICBC Financial Leasing	**421**	-	18	360	43
4	Air Lease Corporation	**415**	-	1	308	106
5	BOC Aviation	**395**	-	-	318	77
6	Nordic Aviation Capital	**350**	208	142	-	-
7	SMBC Aviation Capital	**336**	-	-	317	19
8	DAE Capital	**316**	63	-	206	47
9	Aviation Capital Group	**283**	-	-	274	9
10	CDB Aviation	**271**	-	20	208	43
11	Carlyle Aviation Partners	**248**	-	-	222	26
11=	Aircastle	**248**	-	11	212	25
13	Chorus Aviation	**242**	135	101	6	-
14	Bocomm Leasing	**229**	-	7	199	23
15	NBB Leasing Clients	**218**	-	-	134	84
16	Castlelake	**203**	9	10	139	45
17	Jackson Square Aviation	**190**	-	-	168	22
18	Macquarie Airfinance	**189**	-	3	175	11
19	Goshawk	**155**	-	-	142	13
20	Orix Aviation Clients	**154**	-	-	123	31
21	China Aircraft Leasing Company	**150**	-	-	136	14
22	JP Lease Products & Services Clients	**136**	-	-	103	33
22=	Avmax	**136**	57	68	9	2
24	Cargo Aircraft Management	**130**	-	-	9	121
25	Maverick Aviation Partnership	**129**	-	-	123	6
26	Fortress Transportation And Infrastructure Investors	**122**	-	-	116	6
27	Regional One	**106**	17	89	-	-
28	Aero Capital Solutions	**105**	-	-	105	-
29	Standard Chartered Aviation Finance	**98**	-	-	96	2
30	Aergo Capital	**97**	41	-	47	9
31	Avenue Capital Management	**96**	-	1	69	26
31=	CCB Financial Leasing	**96**	-	-	84	12
33	SMBC Aviation Capital & Investors	**94**	-	-	82	12
34	Altitude Aircraft Leasing	**93**	-	4	31	58
35	CMB Financial Leasing	**91**	-	2	83	6
36	Incline Aviation	**90**	-	-	85	5
37	Aviator Capital Management	**88**	-	2	70	16
38	Deucalion Aviation Funds	**87**	-	-	63	24
39	State Transport Leasing Company	**77**	-	41	29	7
39=	Alafco	**77**	-	-	66	11
41	Oaktree Capital Management	**76**	-	-	71	5
42	VTB Leasing	**70**	-	-	60	10
43	Azorra Aviation	**69**	8	57	4	-
44	Tokyo Century Clients	**66**	-	3	48	15
45	FPG Amentum Clients	**64**	-	-	53	11
46	Minsheng Financial Leasing	**63**	-	-	58	5
47	GTLK Europe	**62**	-	-	48	14
48	Fuyo General Lease Clients	**61**	-	11	35	15
48=	Abelo Capital Aviation Limited	**61**	61	-	-	-
50	VEB Leasing	**59**	1	36	8	14
	Grand Total	**9,894**	619	705	7,050	1,520

Source: Lessors and AFJ Fleet Tracker as of 30 June 2022.

Top 50 **beneficial owners by $MV of fleet** ($m)

Rank	Beneficial Owner	Total	Turboprop	Regional jet	Narrowbody	Widebody
1	Aercap	**$46,431**	$178	$887	$29,626	$15,740
2	Air Lease Corporation	**$19,528**	-	$12	$11,002	$8,514
3	Avolon	**$18,948**	-	-	$11,323	$7,625
4	BOC Aviation	**$17,242**	-	-	$11,000	$6,243
5	ICBC Financial Leasing	**$14,783**	-	$394	$11,366	$3,024
6	SMBC Aviation Capital	**$12,595**	-	-	$10,851	$1,744
7	NBB Leasing Clients	**$9,829**	-	-	$4,368	$5,461
8	CDB Aviation	**$9,746**	-	$236	$7,497	$2,013
9	DAE Capital	**$8,867**	$678	-	$5,393	$2,795
10	Aviation Capital Group	**$8,573**	-	-	$7,744	$829
11	Bocomm Leasing	**$8,232**	-	$100	$6,823	$1,310
12	Jackson Square Aviation	**$7,211**	-	-	$5,504	$1,707
13	Goshawk	**$5,045**	-	-	$3,960	$1,084
14	Aircastle	**$4,853**	-	$262	$3,877	$714
15	Orix Aviation Clients	**$4,623**	-	-	$3,003	$1,620
16	China Aircraft Leasing Company	**$4,174**	-	-	$3,782	$392
17	Carlyle Aviation Partners	**$4,127**	-	-	$3,588	$539
18	JP Lease Products & Services Clients	**$3,770**	-	-	$2,288	$1,482
19	SMBC Aviation Capital & Investors	**$3,665**	-	-	$2,699	$966
20	CCB Financial Leasing	**$3,496**	-	-	$2,675	$820
21	Maverick Aviation Partnership	**$3,443**	-	-	$3,256	$187
22	CMB Financial Leasing	**$3,338**	-	$20	$2,927	$390
23	Macquarie Airfinance	**$3,298**	-	$28	$3,022	$249
24	Altitude Aircraft Leasing	**$3,256**	-	$29	$869	$2,358
25	Castlelake	**$3,241**	$18	$115	$2,198	$910
26	Nordic Aviation Capital	**$3,143**	$1,541	$1,602	-	-
27	Standard Chartered Aviation Finance	**$3,037**	-	-	$2,990	$47
28	Alafco	**$3,033**	-	-	$2,067	$965
29	Tokyo Century Clients	**$2,791**	-	$34	$1,448	$1,309
30	Fuyo General Lease Clients	**$2,573**	-	$187	$962	$1,424
31	FPG Amentum Clients	**$2,459**	-	-	$1,491	$969
32	Falco	**$2,394**	$1,069	$1,164	$161	-
33	Incline Aviation	**$2,314**	-	-	$2,123	$191
34	Deucalion Aviation Funds	**$2,031**	-	-	$881	$1,151
35	IAFC	**$1,955**	-	-	$910	$1,045
36	Minsheng Financial Leasing	**$1,915**	-	-	$1,741	$173
37	GTLK Europe	**$1,844**	-	-	$916	$928
38	Itochu Clients	**$1,840**	-	-	$1,623	$217
39	Sky Leasing	**$1,809**	$62	-	$1,666	$81
40	Aergo Capital	**$1,685**	$220	-	$983	$483
41	VTB Leasing	**$1,635**	-	-	$1,546	$89
42	Castlelake Aviation Limited	**$1,611**	-	$148	$779	$684
43	Avic Leasing	**$1,598**	-	$26	$1,267	$306
44	ABC Financial Leasing	**$1,561**	-	$28	$1,341	$192
45	Banc Of America Leasing	**$1,494**	-	-	$658	$835
46	Avenue Capital Management	**$1,458**	-	$12	$887	$558
47	ABL Aviation Clients	**$1,413**	-	-	$425	$989
48	Cargo Aircraft Management	**$1,390**	-	-	$60	$1,330
49	Goal	**$1,351**	$98	-	$1,094	$160
50	Bain Capital Credit	**$1,331**	-	-	$958	$373
	Grand Total	**$281,979**	$3,864	$5,283	$189,619	$83,214

Source: Lessors and AFJ Fleet Tracker as of 30 June 2022.
AVITAS Blue Book Market Values as of 26 September 2022.

Top 50 lessors (with 10 or more aircraft) **by % of current generation fleet**

Rank	Lessor	Current generation fleet	Total fleet	% of current generation fleet
1	ABL Aviation Clients	**21**	24	88%
2	Sky Leasing	**34**	47	72%
3	ICBC Financial Leasing	**7**	10	70%
4	Bain Capital Credit	**20**	29	69%
5	China Southern Air Leasing	**8**	12	67%
6	Clover Aviation Capital	**8**	14	57%
7	Air Lease Corporation	**231**	415	56%
8	Itochu Clients	**29**	54	54%
9	SMBC Aviation Capital	**172**	336	51%
10	Alafco	**39**	77	51%
11	Jackson Square Aviation	**96**	190	51%
12	Einn Volant Aircraft Leasing	**9**	19	47%
13	Mitsui & Co	**7**	15	47%
14	CDB Aviation	**124**	271	46%
15	Avic Leasing	**19**	42	45%
16	CMB Financial Leasing	**41**	91	45%
17	BOC Aviation	**176**	395	45%
18	Blackbird Capital Ii	**6**	14	43%
18	SMBC Aviation Capital	**40**	94	43%
20	NBB Leasing Clients	**82**	218	38%
21	Tokyo Century Clients	**24**	66	36%
22	Vietnam Aircraft Leasing	**6**	17	35%
23	Aviation Capital Group	**99**	283	35%
24	Goal	**16**	47	34%
25	Avolon	**178**	539	33%
26	FPG Amentum Clients	**21**	64	33%
27	Bocomm Leasing	**73**	229	32%
28	SDH Wings International Leasing	**7**	22	32%
29	ICBC Financial Leasing	**132**	421	31%
30	Apollo Global Management	**9**	29	31%
31	Marathon Asset Management	**4**	13	31%
32	Banc Of America Leasing	**11**	36	31%
33	Minsheng Financial Leasing	**19**	63	30%
34	Novus Aviation	**6**	20	30%
35	Waterfall Asset Management	**3**	10	30%
36	Haitong Unitrust Leasing	**3**	10	30%
37	Aercap	**499**	1743	29%
38	Amedeo Air Four Plus Limited	**4**	14	29%
39	CCB Financial Leasing	**27**	96	28%
40	Airborne Capital	**9**	34	26%
41	ABC Financial Leasing	**12**	46	26%
42	Standard Chartered Aviation Finance	**25**	98	26%
43	Orix Aviation Clients	**38**	154	25%
44	Goshawk	**37**	155	24%
45	Aerdragon Aviation Leasing	**8**	34	24%
46	Fuyo General Lease	**6**	26	23%
47	Castlelake Aviation Limited	**12**	56	21%
48	Fuyo General Lease Clients	**13**	61	21%
49	VMO Aircraft Leasing	**6**	29	21%
50	China Aircraft Global	**5**	25	20%

Source: Lessors and AFJ Fleet Tracker as of 30 June 2022.
"Current generation fleet" includes A220s, A320neos, A330-800/900s, A350s, 737 MAX, 787 and Embraer E2 models.

Top 50 **lessors' orderbooks**

Rank	Beneficial Owner	Total	Turboprop	Regional Jet	Narrowbody	Widebody
1	Aercap	**455**	-	-	420	35
2	Air Lease Corporation	**426**	-	-	372	54
3	China Aircraft Leasing Company	**256**	-	30	226	-
4	Avolon	**225**	-	-	208	17
5	SMBC Aviation Capital	**190**	-	-	190	-
6	BOC Aviation	**176**	-	-	173	3
7	Aviation Capital Group	**130**	-	-	128	2
8	ICBC Financial Leasing	**109**	-	45	64	-
9	Ilyushin Finance Corporation*	**95**	-	27	67	1
10	CDB Aviation	**78**	-	-	78	-
11	Alafco	**68**	-	-	68	-
12	Macquarie Airfinance	**49**	-	-	49	-
13	ABC Financial Leasing	**45**	-	-	45	-
14	Azorra Aviation	**42**	-	-	42	-
15	Goshawk	**40**	-	-	40	-
16	Nordic Aviation Capital	**37**	17	-	20	-
17	Timaero Ireland	**35**	-	-	35	-
17=	Bocomm Leasing	**35**	-	-	35	-
17=	Avia Capital Services	**35**	-	-	35	-
20	Everbright Financial Leasing	**30**	-	-	30	-
21	VEB Leasing*	**27**	-	2	25	-
22	Jackson Square Aviation	**21**	-	-	21	-
23	Aircastle	**20**	-	12	8	-
23=	Accipiter (Maverick/ Carlyle)	**20**	-	-	20	-
23=	Lease Corporation International	**20**	-	-	20	-
26	State Transport Leasing Company*	**17**	3	14	-	-
26=	Minsheng Financial Leasing	**17**	-	3	14	-
28	Comsys Aviation Leasing	**16**	-	16	-	-
29	SPDB Financial Leasing	**15**	-	15	-	-
30	Sberbank Leasing*	**14**	-	-	14	-
31	Hong Kong Int. Av. Leasing	**6**	-	-	-	6
31=	Bain Capital Credit	**6**	-	-	6	-
33	CIB Leasing	**5**	-	5	-	-
34	Middle East Leasing	**4**	-	-	4	-
35	CIAF Leasing	**3**	-	3	-	-
35=	Acia Aero	**3**	3	-	-	-
37	CES International Financial Leasing	**2**	-	-	-	2
37=	DAE Capital	**2**	-	-	2	-
37=	Aerostar Leasing	**2**	2	-	-	-
37=	Avation	**2**	2	-	-	-
41	MG Aviation	**1**	-	-	-	1
	Grand Total	**2,779**	27	172	2,459	121

Source: Lessors and AFJ Fleet Tracker as of 30 June 2022.
Source: as per OEMs` input and press releases.
**currently impacted by international sanctions.*

Lessor firm orders

Figure 1: Firm orders by body type

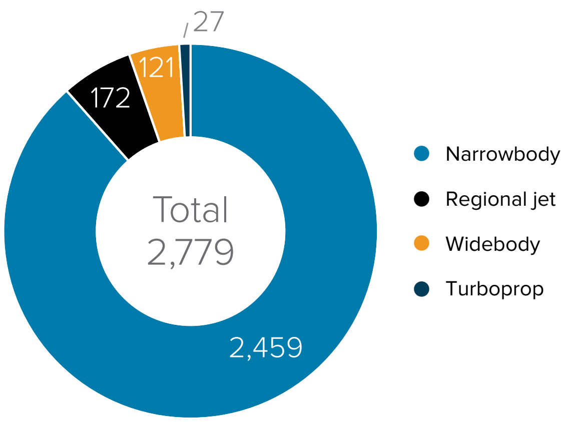


Figure 2: Firm orders by value by body type ($m)

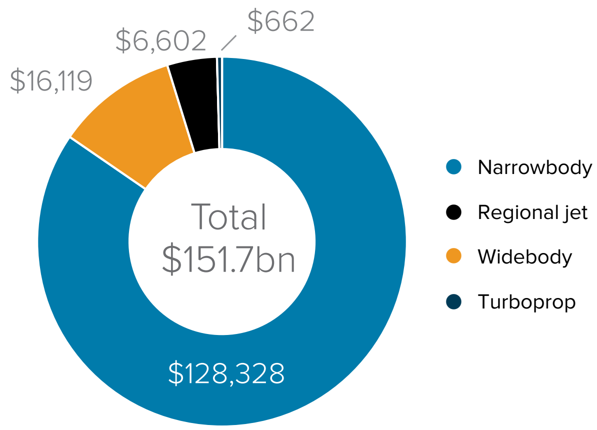


Figure 3: Firm orders by manufacturer

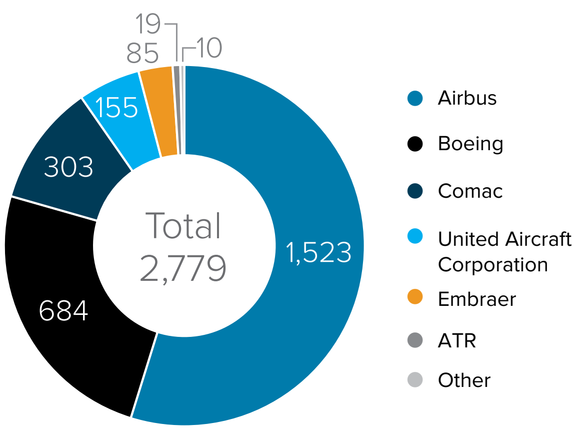


Figure 4: Firm orders by value by manufacturer ($m)

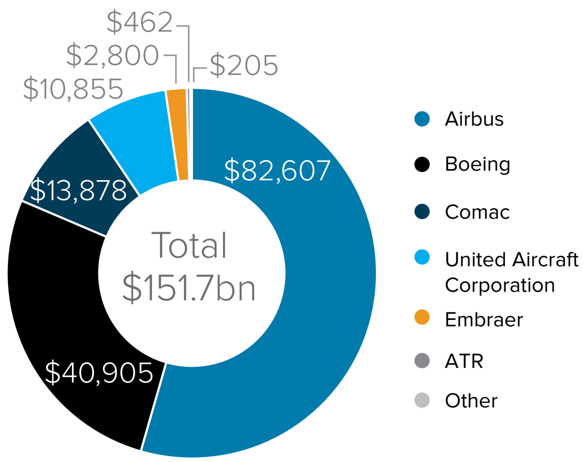


Figure 5: Firm orders by country of lessor

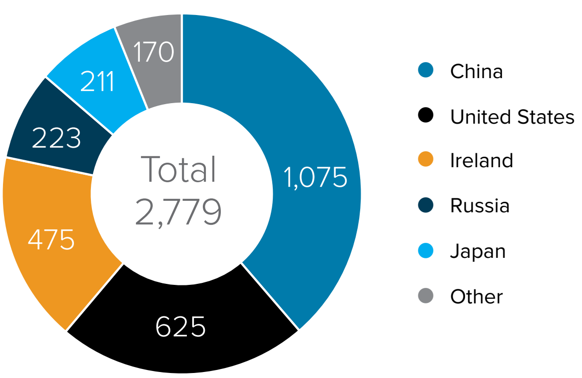
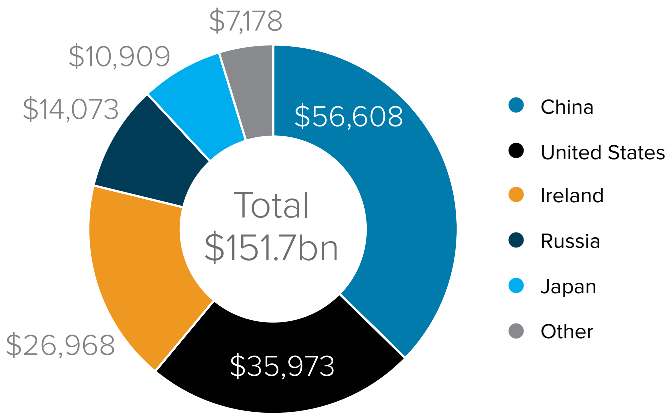


Figure 6: Firm orders by value by country of lessor ($m)



Source: Manufacturers and Avitas as of 30 June, 2022.
** Calculated as of 2022 market list prices and Avitas Base Values.*

Trend analysis – Changes in the global leased fleet 2018-2022

Airfinance Journal follows global airline fleets in its *Fleet Tracker* product. Designed for aviation finance, a single click generates a report showing the entire global leased fleet. This year we focus particularly on lessors' exposure to Russia as of the end of February, 2022, the current national share of "ultimate" control and ownership of leased aircraft and the evolving changes in the type of entities owning aircraft and seeking attractive risk-adjusted returns.

Aercap has the largest exposure to Russia with $2.4 billion

Russia
The table shows non-Western exposure to Russian airlines as of the end of February, 2022 both in absolute $ and as a percentage of total leased fleet. The two largest exposures were Aercap with $2.4 billion, but only 5% of total leased asset market value and SMBC Aviation Capital with $1.3 billion but almost 10% of total leased assets. At the far right of the chart are those lessors (some of them with Russian connections, admittedly) with almost "off-the-chart" levels of exposure.

The data behind this chart includes the aircraft that were fortuitously outside of Russia at the time and aircraft leased to some airlines that co-operated in their repossession.

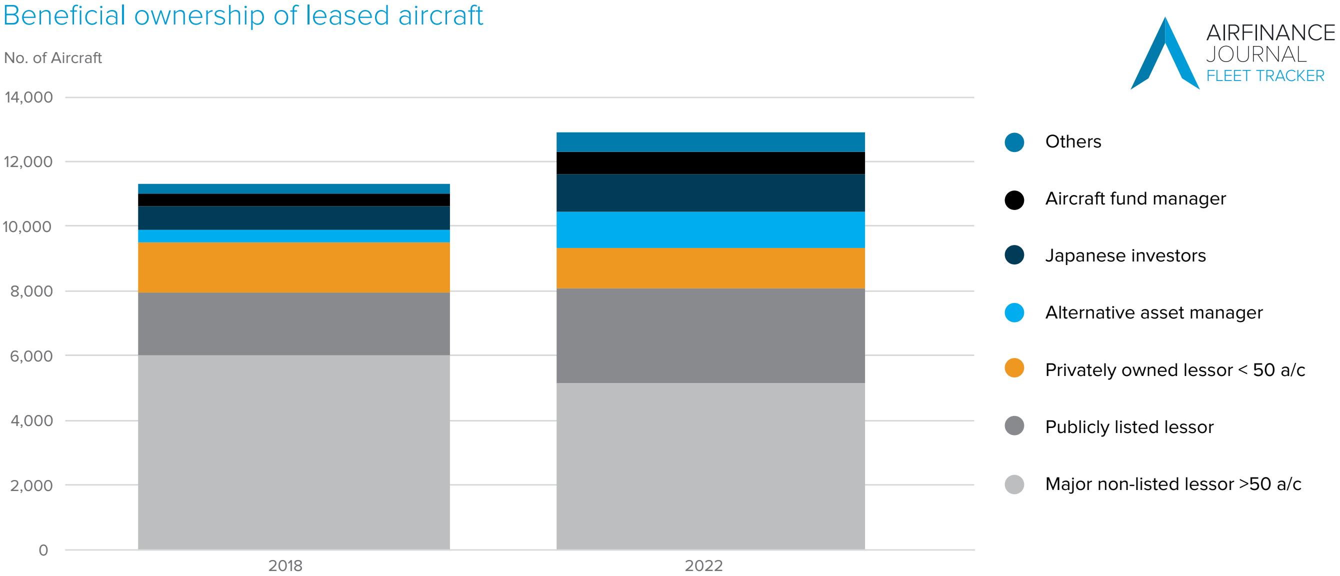
Beneficial ownership of leased aircraft
Airfinance Journal tracks the nature of the beneficial owners of leased aircraft.

This table shows a few key developments of the nature of the beneficial owners between 2018 and 2022. The transition between the two largest blocks is primarily related to the assets of non-listed GECAS being transferred to listed Aercap. Beyond that, we see a "squeeze" in the "privately owned lessor < 50 aircraft category", offset by a significant rise in the "Alternative asset manager" ownership. Translated, this means private equity firms, investment funds, fund managers and pension funds.

"Japanese investors" includes a wide range of entities including JOL and JOLCO investors and grew significantly over the five years as did "Aircraft fund manager" and "Others".

"Ultimate" beneficial ownership and control
We also follow the jurisdictions of "ultimate" ownership and control of leased aircraft. Our analysis shows that Chinese entities are by far the largest beneficial owners of leased aircraft, with an estimated market

Beneficial ownership of leased aircraft



value from Fleet Tracker of $95 billion. This is well ahead of the United States at $69 billion and Japanese entities at $68 billion.

The chart, which shows number of aircraft rather than market values, shows the very large increase in both the Chinese and Japanese investment in leased aircraft. The Netherlands is higher due to Aercap's acquisition of GECAS and Canada due to the significant increase from Chorus and their acquisition of Falko.

Concentration of ownership

We also monitor the degree of concentration amongst owners. There is a perception that the industry is "consolidating", but our data shows that this is not the case. We have assessed the % ownership of the global leased fleet by number and market value of aircraft for the Top 10 and Top 50 Lessors.

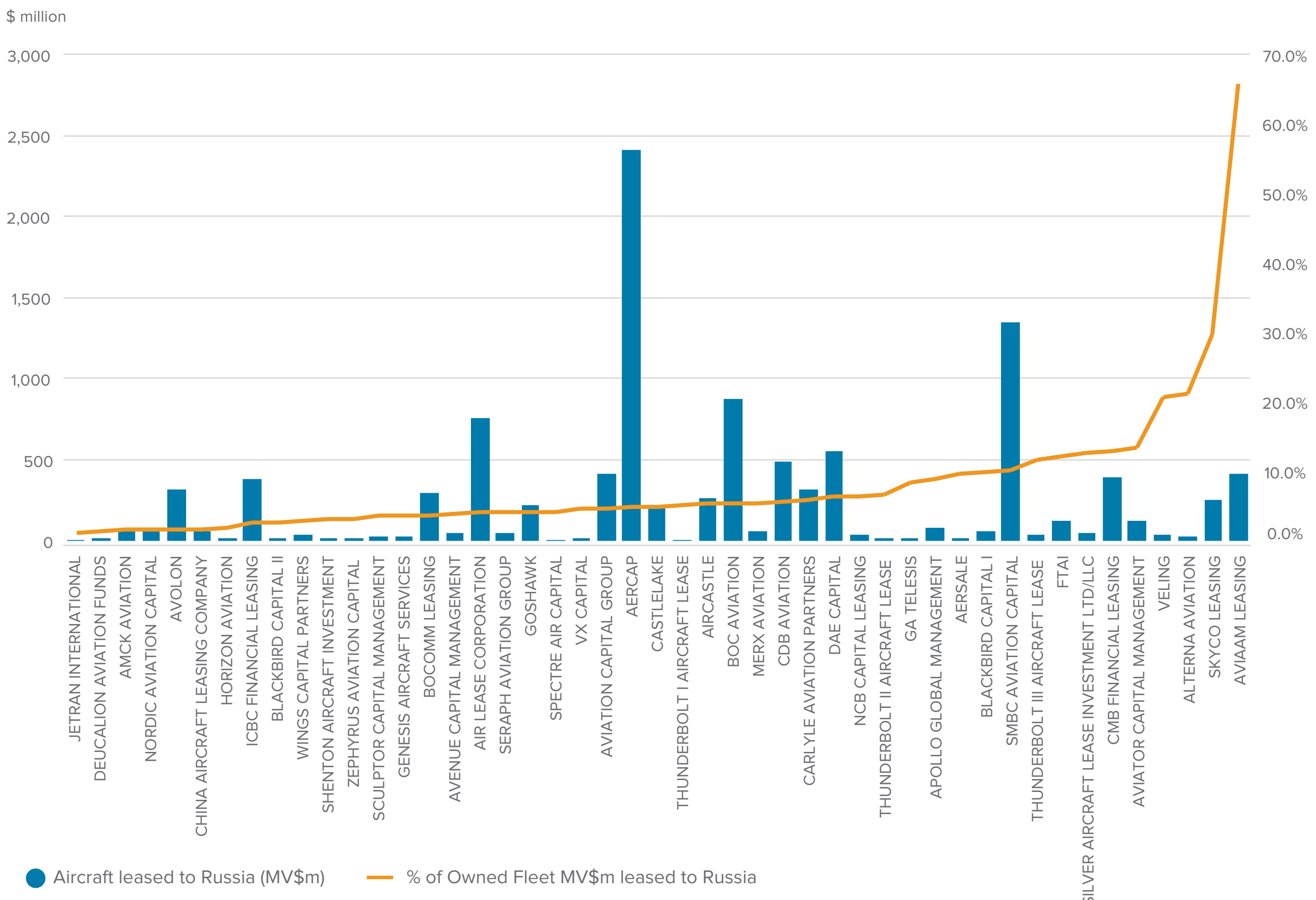
By number of aircraft, the Top 10 percentage has actually fallen over the last five years, while the Top 50 figure is essentially the same. By market value the percentages are higher because the larger lessors tend to invest more in newer and larger aircraft, but the trend is towards reduced concentration.

Western lessor exposure as beneficial owner to Chinese operators

Rank	Lessor	No. of Aircraft	Ave Age	MV $m
1	AERCAP	261	7.6	9,216
2	BOC AVIATION	86	5.5	3,313
3	AIR LEASE CORPORATION	64	7.3	2,429
4	AVOLON	49	8.0	1,868
5	AVIATION CAPITAL GROUP	41	6.8	1,378
6	SMBC AVIATION CAPITAL	38	6.4	1,226
7	GOSHAWK	12	9.9	283
8	CASTLELAKE	11	6.5	279
9	MAVERICK AVIATION PARTNERSHIP	10	10.6	219
10	ALAFCO	7	7.4	325
11	MERX AVIATION	6	9.7	142
12	ABS E NOTE INVESTOR	6	13.7	104
13	STANDARD CHARTERED AVIATION FINANCE	6	9.8	146
14	MACQUARIE AIRFINANCE	6	9.3	142
15	JACKSON SQUARE AVIATION	6	8.3	168
16	CARLYLE AVIATION PARTNERS	5	11.4	103
17	ORIX JOL INVESTOR	5	10.4	109
18	CASTLELAKE AVIATION LIMITED	5	9.1	133

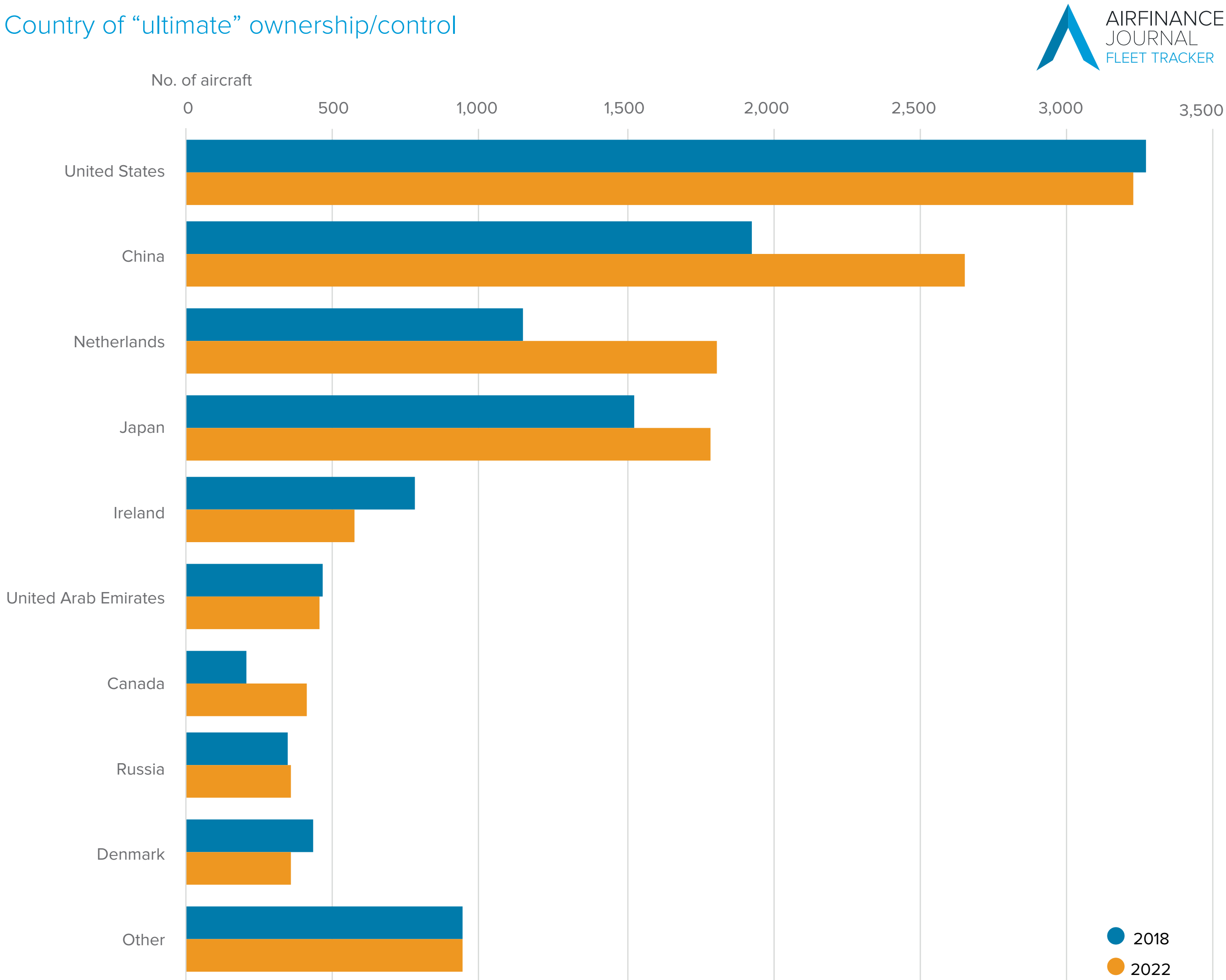
Source: AFJ's Fleet Tracker.

Non-Russsian lessor exposure to Russia as beneficial owner as of 28 February, 2022

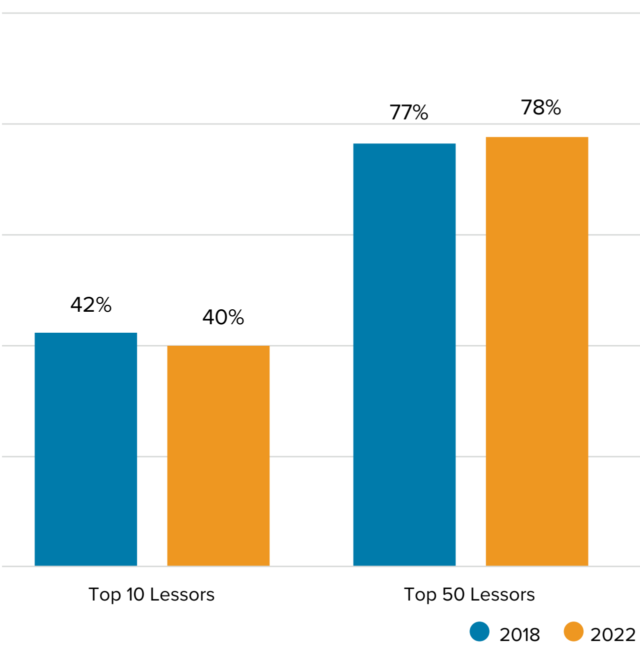


Source: AFJ Deal Tracker.

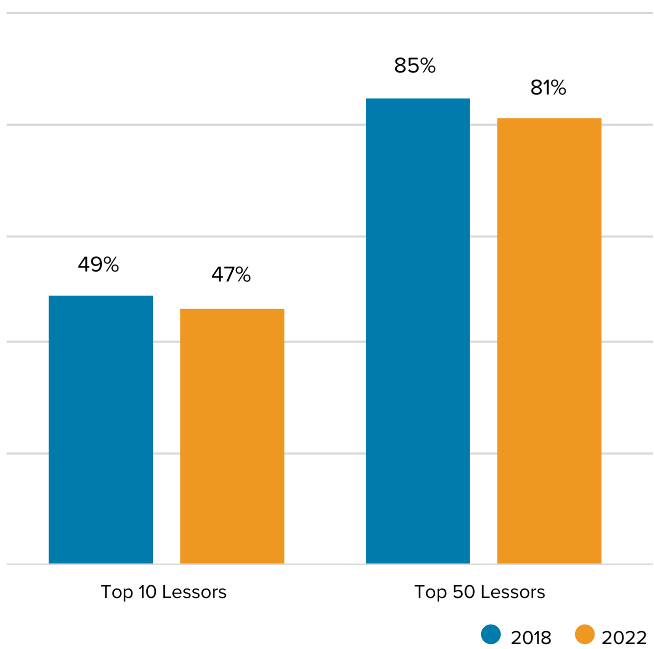
Country of "ultimate" ownership/control



Concentration of beneficial ownership by number of aircraft



Concentration of beneficial ownership by market value of aircraft



Trend analysis – Global aircraft leasing companies' financial performance

Financial performance – last three years
We have expanded our coverage of lessors' financial performance very substantially, in relation to the launch of *The Lessor Analyst. The Lessor Analyst* covers more than 100 lessors and leasing entities.

In this section we analyse the three most recent years' financials for the top lessors whose most recent financial year-end falls between 30 September 2021 and 30 June 2022. As noted elsewhere, the majority of these financials do not incorporate the Russia effect and are therefore not comparable with each other on most measures. The lessors included in the study are listed in the table. The minimum asset size for inclusion is $1 billion. As can be seen, pre-Russia, most of the lessors had clawed their way back to at least modest profitability, unless one is referring to Aercap with their $1 billion net income (and that was with a contribution from GECAS for only two months). We can, however, see the Russia impact creeping in to the Aircastle numbers, which are for the 12 months ending 28 February 2022. Enough time for the accountants and auditors to step in and make sure asset values are properly assessed.

Note that the analysis we present here is aggregate data for the lessors involved. Individual lessors' values, KPIs, financial ratios, KPIs and portfolio ratings are available in *The Lessor Analyst*.

AerCap leads the lessors' financial performance

The annual numbers show the Covid and market induced downward pressure on yields and revenue. GECAS contributed a blow-out gain on disposal of aircraft in 2021/22 which is a significant help to the industry's numbers.

Even before Russia, we see significant impairments in 2020/21 which were continued in 2021/22, largely by lessors such as Aircastle, Merx Aviation and Macquarie Airfinance whose results straddled the calendar year-end.

Lessors' most recent 12 months' results (wiith assets >$1 billion)

	12 Month Period Ending	Total Revenue ($m)	Net income ($m)	Total Assets ($m)
AerCap Holdings N.V.	31-Dec-21	4,589	1,001	74,570
Bohai Leasing Co., Ltd.	31-Dec-21	4,156	(191)	38,947
Avolon Holdings Limited	31-Dec-21	2,248	47	30,984
Air Lease Corporation	31-Dec-21	2,088	408	26,969
BOC Aviation	31-Dec-21	2,183	561	23,879
SMBC Aviation Capital	31-Mar-21	1,262	14	15,966
Dubai Aerospace Enterprise	31-Dec-21	1,319	150	12,610
Aviation Capital Group	31-Dec-21	1,041	140	12,135
CDB Aviation Lease Finance	31-Dec-21	946	6	9,712
Aircastle	28-Feb-22	770	(294)	7,093
China Aircraft Leasing Group	31-Dec-21	422	68	6,415
Macquarie AirFinance	31-Mar-22	562	(57)	4,572
BOCOMM Aviation Leasing Ireland	31-Dec-21	212	6	4,495
ORIX Aviation Systems	31-Mar-21	175	1	4,443
ALAFCO	30-Sep-21	333	(79)	4,390
Jackson Square Aviation Ireland	31-Dec-21	346	(15)	3,550
Pembroke Aircraft Leasing Holdings	31-Dec-21	396	50	3,231
Rolls-Royce & Partners Finance	31-Dec-21	337	(29)	3,031
Castlelake Aviation Limited	31-Dec-21	45	29	2,802
Banc of America Leasing Ireland	31-Dec-21	250	58	2,393
CCB Aviation Corporation	31-Dec-21	175	(34)	2,068
Amedeo Air Four Plus Limited	31-Mar-22	261	34	1,829
Minsheng Commercial Aviation (Ireland)	31-Dec-21	49	2	1,811
Aviator Ireland	31-Dec-21	170	(97)	1,440
Merx Aviation Finance Assets Ireland	31-Mar-21	265	(40)	1,354
Chorus Aviation Capital (Ireland)	31-Dec-21	104	(25)	1,222
Avation	30-Jun-21	117	17	1,217
China Aircraft Global	31-Dec-21	106	0	1,197
Sky Fund 1 Irish Limited	31-Dec-21	71	15	1,061
Einn Volant Aircraft Leasing	31-Dec-21	97	19	1,016

Global aircraft leasing industry aggregate balance sheet

Balance sheet - $ million	2018/19	2019/20	2020/21
Number of lessors included	43	43	37
Aircraft & engines available for lease	213,061	220,175	205,057
Maintenance rights	3,974	3,263	5,004
Lease incentive assets	1,207	1,274	1,637
PDPs	19,928	17,876	15,441
Finance lease assets	5,487	5,272	4,512
Assets held-for-sale	4,542	945	999
Unrestricted cash	7,532	11,373	8,813
Restricted cash	2,351	1,939	1,193
Notes & loans receivable	1,347	2,736	2,453
Other assets	19,969	22,626	20,895
Total assets	**279,398**	**287,480**	**266,005**
Loans & notes	160,202	171,631	181,592
Deferred tax liabilities	7,240	7,558	6,603
Deferred income	1,893	1,800	1,560
Maintenance reserves	443	220	281
Security deposits	2,351	1,939	1,193
Other liabilities	20,503	18,643	16,496
Total liabilities	**192,633**	**201,791**	**207,725**
Total equity	**86,765**	**85,689**	**58,279**
Total liabilities & equity	**279,398**	**287,480**	**266,005**

Source: Company financial statements and The Lessor Analyst.
Includes GECAS until 31 October 2021.
Includes many lessors with year-ends of 31 December 2021 so does not include the Russia impact on them. Lessors that have not reported their 2021/22 results are excluded from all years (e.g. NAC, GTLK, STLC, AerDragon). Number of lessors has gone down due to acquisition (e.g. FLY, AMCK, Accipiter). Excludes Bohai Leasing to avoid duplication of Avolon.

Lease yield shows evidence of the challenging market, declining from 11.8% in 2019/20 to 9.3% in 2021/22. Fortuitously, interest costs declined as average debt costs fell from 4.4% to 3.6% but still the net spread was well below historic levels.

The balance sheet has a multiplicity of influences on it. Assets available for lease decline as a result of continued depreciation, impairments and slower acquisition of new aircraft for various reasons. Notably, unrestricted cash fell from the previous year's peak and so did credit extension to customers.

Debt, nevertheless, increased largely represented by AerCap's funding of its acquisition of Gecas, whose balance sheet was historically under-levered.

By virtue of the impairment charges and the GECAS equity substitution by Aercap debt, the industry leverage increased from 1.9 times to 3.0 times.

Global aircraft leasing industry aggregate annual cash flow statement

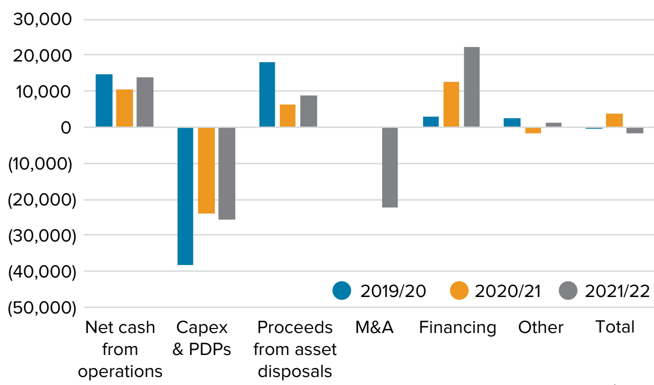
Balance sheet - $ million	2018/19	2019/20	2020/21
Number of lessors included	43	43	37
Net cash from operations	**14,786**	**10,559**	**13,813**
Investing Activities			
Capital expenditure	(33,054)	(20,861)	(23,015)
PDPs	(5,298)	(2,898)	(2,548)
PDP refunds	106	639	824
Proceeds from asset disposals	17,881	5,693	7,890
M&A			(22,466)
Other	2,388	(1,808)	1,435
Total of Investing Activities	**(17,977)**	**(19,234)**	**(37,880)**
Financing Activities			
Loans received	37,933	47,266	55,162
Loans repaid	(31,542)	(36,167)	(33,190)
Other financing	(3,412)	1,542	194
Total of Financing Activities	**2,980**	**12,641**	**22,165**
Net increase (decrease) in unrestricted cash	**(212)**	**3,965**	**(1,791)**
Effect of exchange rate changes	(3)	8	2
Unrestricted cash at beginning of period	7,665	7,470	10,277
Unrestricted cash at end of period	**7,449**	**11,443**	**8,377**
Restricted cash at end of period	**2,351**	**1,939**	**1,193**
Total cash at end of period	**9,801**	**13,383**	**9,571**

Global aircraft leasing industry aggregate annual income statement

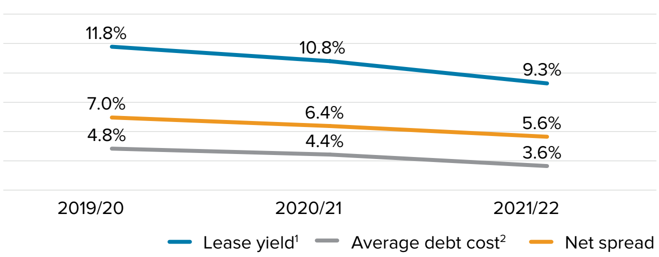
Income statement - $ million	2019/20	2020/21	2021/22
Number of lessors included	43	43	37
Revenue			
Basic lease revenue	23,976	22,602	19,784
Maintenance rent	1,150	1,163	1,487
Total operating lease revenue	**25,127**	**23,765**	**19,034**
Finance lease revenue	483	424	315
Net gain (loss) on disposal of aircraft	1,716	693	3,526
Interest income	615	515	498
Other income (incl management fees)	645	778	832
Total Revenue	**28,585**	**26,175**	**21,098**
Operating expenses			
Maintenance, transition costs etc.	(765)	(686)	(729)
Tangible asset impairment	(355)	(3,516)	(3,081)
Intangible asset impairment	(5)	(270)	(38)
Provisions for credit losses	(82)	(592)	(304)
Selling, general, admin and staff expenses	(1,917)	(1,658)	(1,612)
Other operating expenses	(441)	(606)	(790)
Total operating expenses excl. dep'n	(3,563)	(7,329)	(6,554)
EBITDA	**25,022**	**18,846**	**17,407**
Depreciation & amortisation	(10,395)	(11,088)	(10,132)
Non-recurring gains and losses	159	(256)	712
Total finance costs	**(7,735)**	**(7,589)**	**(6,610)**
Profit before tax	**6,919**	**(87)**	**1,377**
Income tax expense	(851)	(199)	(240)
Equity in net earnings of investments	374	68	78
Profit from continuing operations	**6,442**	**(218)**	**1,216**
Net income	**6,551**	**(186)**	**1,153**

Source: Company financial statements and The Lessor Analyst.
Includes GECAS until 31 October 2021.
Includes many lessors with year-ends of 31 December 2021 so does not include the Russia impact on them. Lessors that have not reported their 2021/22 results are excluded from all years (e.g. NAC, GTLK, STLC, Aerdragon). Number of lessors has gone down due to acquisition (e.g. FLY, AMCK, Accipiter). Excludes Bohai Leasing to avoid duplication of Avolon.

Overview of cash flows 2019-2022

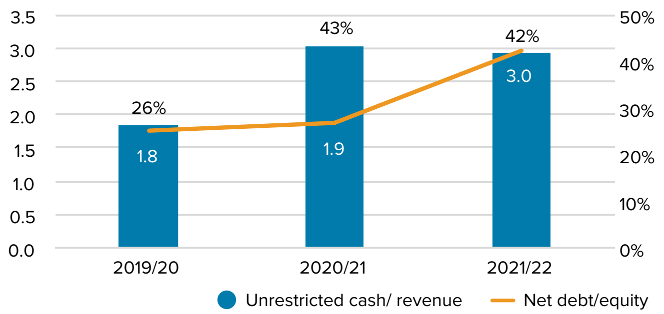


Average yield, debt cost & net spread 2019-2022



[1]Operating lease revenue/aircraft & engines available for lease. [2] Finance costs divided by total loans & notes. [3] Lease yield minus average debt cost.

Key balance sheet ratios 2019-2022



Financial performance in the first half of 2020-2022

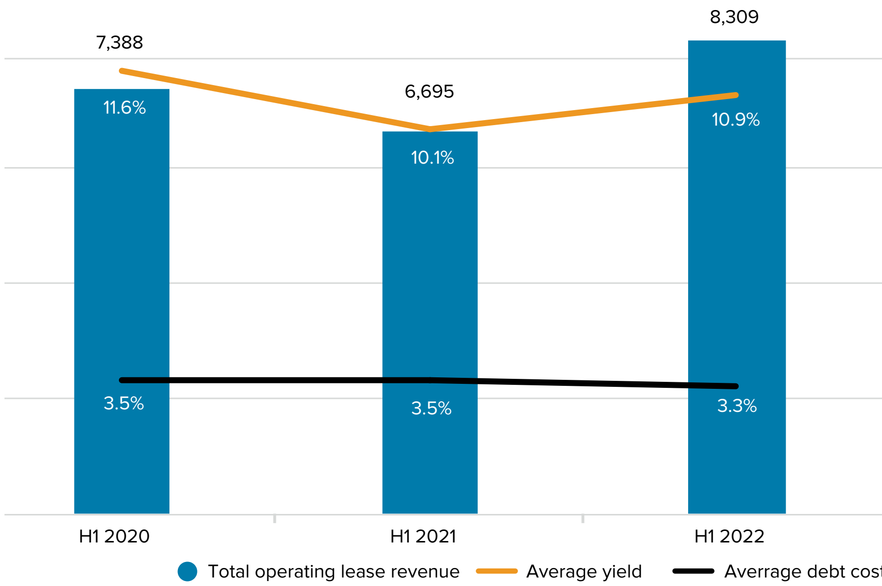
We analyse the first half calendar 2022 financials for the 10 lessors who publish quarterly or semi-annual results, compared with the same period in the two previous years. These are more comparable and representative of the development of underlying market conditions and all reflect large impairment charges for aircraft confiscated by Russia.

The table shows the 10 lessors enjoyed strong revenue recovery but incurred $5.1 billion of impairments (mostly Russia related) and a resulting net loss of $33.4 billion. Yield recovered to 10.9% from the prior year and average debt cost declined still further to a low of 3.3%.

Assets available for lease showed strong growth to $152 billion as did loans and notes, both mainly relating to Aercap's GECAS purchase. Most other line items were similar to the prior year but unrestricted cash was down to 27% of revenues, compared to 61% at the peak of Covid.

Cash from operations showed a strong recovery and capital expenditure was modest.

Key profitability indicators - H1 2020-2022



Aggregate Income Statement for quarterly and semi-annual reporting lessors

$m	H1 2020	H1 2021	H1 2022
Total operating lease revenue	**7,388**	**6,695**	**8,309**
Finance lease revenue	87	94	135
Net gain (loss) on disposal of aircraft	219	134	230
Interest income	44	40	75
Other income (incl management fees)	247	316	280
Total Revenue	**7,985**	**7,281**	**9,030**
Operating expenses	(910)	(924)	(1,236)
Tangible asset impairment	(493)	(309)	(5,110)
Depreciation & amortisation	(3,006)	(2,971)	(3,481)
Non-recurring gains and losses	(4)	243	(870)
Total finance costs	(2,088)	(2,105)	(2,170)
Profit before tax (PBT)	**1,485**	**1,216**	**(3,838)**
Income tax expense	(313)	(169)	407
Other	(5)	(20)	(3)
Net income	**1,167**	**1,026**	**(3,434)**

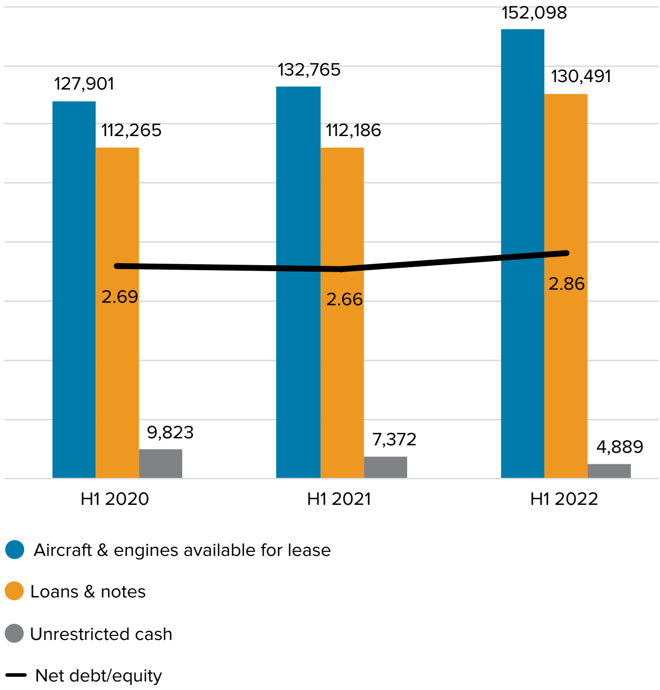
Source: Company financial statements and The Lessor Analyst.

Aggregate cash flow statement for quarterly and semi-annual reporting lessors

$m	H1 2020	H1 2021	H1 2022
Net cash from operations	**2,374**	**3,120**	**5,759**
Investing Activities			
Capital expenditure	(4,732)	(4,997)	(4,808)
PDPs	(1,345)	(1,662)	(1,897)
PDP refunds	170	248	217
Proceeds from asset disposals	1,332	1,175	2,004
Other investing	(197)	(102)	(151)
Total of Investing Activities	**(4,772)**	**(5,339)**	**(4,635)**
Financing Activities			
Loans received	16,092	11,504	6,526
Loans repaid	(11,123)	(10,440)	(8,015)
Other financing	(236)	(34)	(508)
Total of Financing Activities	**4,733.6**	**1,030.4**	**(1,997.0)**
Net increase (decrease) in unrestricted cash	**2,335.4**	**(1,188.4)**	**(873.1)**
Effect of exchange rate changes	3.1	(0.3)	(4.1)
Unrestricted cash at beginning of period	**7,839.8**	**8,539.2**	**5,852.7**
Unrestricted cash at end of period	**10,178.3**	**7,350.6**	**4,975.6**
Restricted cash at end of period	**757.0**	**660.3**	**522.7**
Total cash at end of period	**10,935.4**	**8,010.9**	**5,498.3**

Source: Company financial statements and The Lessor Analyst.

Key assets, debt, cash & leverage - H1 2020-2022



Lessors that have reported quarterly or semi-annual results during 2022

	Half-year Period Ending	Total Revenue ($m)	Net income ($m)	Total Assets ($m)
AerCap	30-Jun-22	2,135	(1,661)	69,748
Air Lease Corporation	30-Jun-22	967	(374)	27,646
Aircastle	31-Aug-22	382	(12)	7,162
ALAFCO	31-Mar-22	170	(15)	4,148
Avation PLC	30-Jun-22	50	32	11,765
Aviation Capital Group	30-Jun-22	502	(436)	30,593
Avolon Holdings Limited	30-Jun-22	1,123	(173)	11,503
BOC Aviation	30-Jun-22	1,107	(313)	22,813
China Aircraft Leasing Group	30-Jun-22	204	(17)	6,878
Dubai Aerospace Enterprise	30-Jun-22	644	(398)	1,217
TOTAL		7,284.2	(3,365.0)	193,473.6

Aggregate balance sheet for quarterly and semi-annual reporting lessors

$m	H1 2020	H1 2021	H1 2022
Aircraft & engines available for lease	127,901	132,765	152,098
Maintenance rights	1,966	1,555	3,443
Lease incentive assets	291	760	1,130
PDPs	15,136	12,305	13,872
Finance lease assets	3,318	3,013	4,142
Assets held-for-sale	570	1,097	1,973
Unrestricted cash	9,823	7,372	4,889
Restricted cash	863	660	523
Notes & loans receivable	459	1,023	1,414
Other assets	6,956	7,799	9,989
Total assets	**167,284**	**168,350**	**193,474**
Loans & notes	112,265	112,186	130,491
Deferred tax liabilities	3,044	4,441	5,425
Deferred income	1,057	901	1,185
Maintenance reserves	6,698	6,161	6,733
Security deposits	2,724	2,524	2,770
Other liabilities	3,407	2,735	2,916
Total liabilities	**129,195**	**128,949**	**149,518**
Total equity	**38,089**	**39,401**	**43,955**
Total liabilities & equity	**167,284**	**168,350**	**193,474**
Net debt/equity	**2.69**	**2.66**	**2.86**
Unrestricted cash/annualised revenue	**62%**	**51%**	**27%**

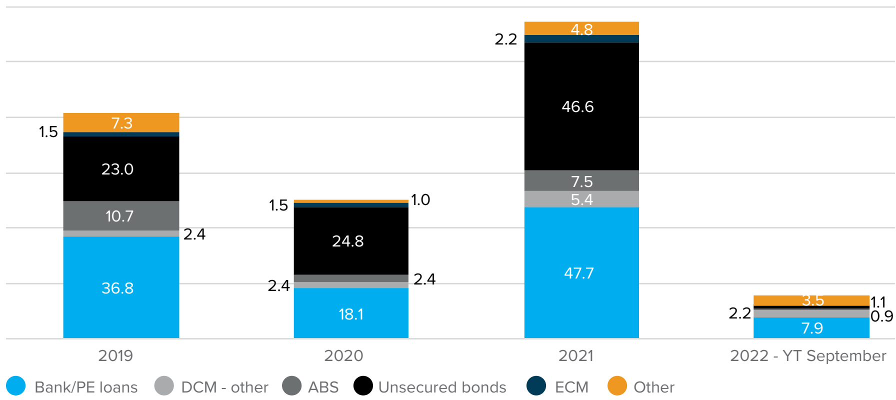
Lessor funding sources

The following chart shows funding sources accessed by the lessors in the 12 months ending 30 September 2022, using data from *Airfinance Journal*'s Deal Tracker.

This chart shows lessors' use of different funding sources in the full years 2019-2022 and nine months to September 30, 2022 as recorded in AFJ's Deal Tracker. As can be seen, 2021 was a blow-out year, with total fundraisings reaching a record $114 billion, driven significantly by the Aercap funding for its acquisition of GECAS. The unsecured bond market and bank market played approximately equal roles in that year, supplemented by $7.5 billion of ABS, $2.2 billion of equity capital markets and $4.8 billion of "Other".

By contrast, 2022 has been very quiet in the capital markets and fundraising by lessors, generally. Bankers are no doubt hoping for some spark to ignite the markets rather than face the prospect of having to turn down their thermostat at Christmas.

Lessor Fundraising 2019 - September 2022



Source: AFJ Deal Tracker

Year of Issue of Current Outstanding $ Bonds (Amounts in $ millions)

Lessor	2013	2014	2016	2017	2018	2019	2020	2021	2022	Grand Total
Aercap				1,800	2,350	2,900	4,000	22,000		33,050
Air Lease		500	750	1,600	1,700	2,550	4,450	4,250	1,500	17,300
Avolon				1,653	535	2,467	3,400	3,500		11,555
BOC Aviation	550		750	700	1,240	1,900	2,900	1,500	300	9,840
ICBC Financial Leasing		300	300	950	1,100	1,400	900	2,600	1,200	8,750
Aircastle			500	500	650	650	650	1,150		4,100
DAE							750	2,550		3,300
CCB Leasing						1,000	800	1,000		2,800
SMBC Aviation Capital					500	500		1,000		2,000
CDB Aviation		400		400	500	130	500			1,930
ORIX Corporation						500			1,000	1,500
Aviation Capital Group								750		750
Voyager								413		413
FLY				10				390		400
Avation					343					343
Willis Group	249									249
CALC								100		100
CMB Financial Leasing									75	75
Grand Total	**799**	**1,200**	**2,300**	**7,612**	**8,917**	**13,997**	**18,350**	**41,203**	**4,075**	**98,454**

Source: AFJ Deal Tracker.

We see in the next chart, that lessors are not immune from market reality. For the first time in five years, coupons on the (limited sample of) new investment grade issues turned up, and quite materially.

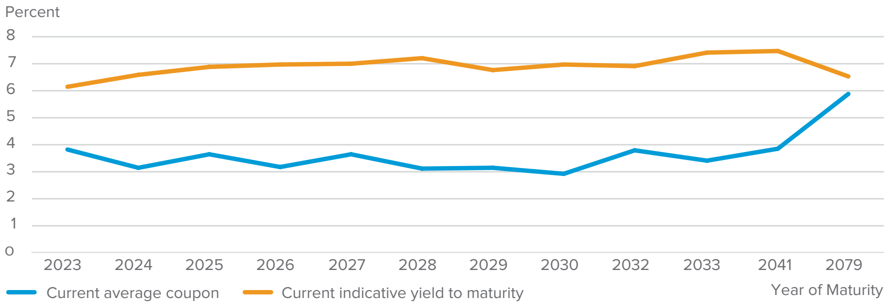
The table shows the cumulative build up to the current aggregate amount outstanding of $98.5 billion for the lessors shown, with Aercap being top of the pile at $33 billion.

Shifting then into the current yields-to-maturity on outstanding lessor bonds compared to current coupons, the chart shows that the yields are as much as double the current coupons. A large part will be driven by increases in market rates as well as some credit concerns.

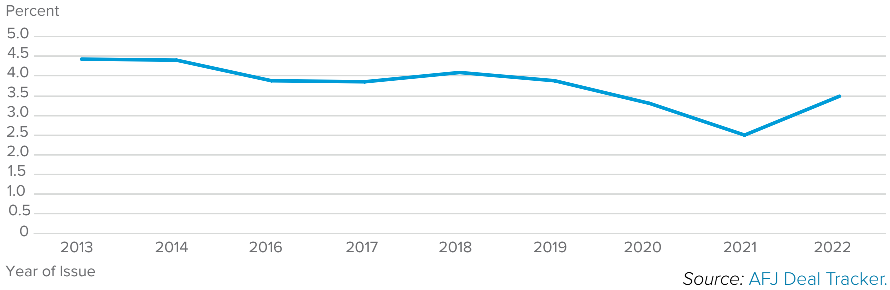
Most of 2022's refinancing is now done, as shown in the chart. But $15 billion and $22 billion lies ahead in 2023 and 2024, mostly attributable to the "big 5" – Aercap, Air Lease, Aircastle, Avolon and BOC Aviation.

Subscribers to The Lessor Analyst will be able to see updated maturities and daily prices, yields and spreads on all of these bonds on a comparative basis.

Investment Grade Lessor US$ Bond IssuersAverage Coupons vs Average Yields to Maturity

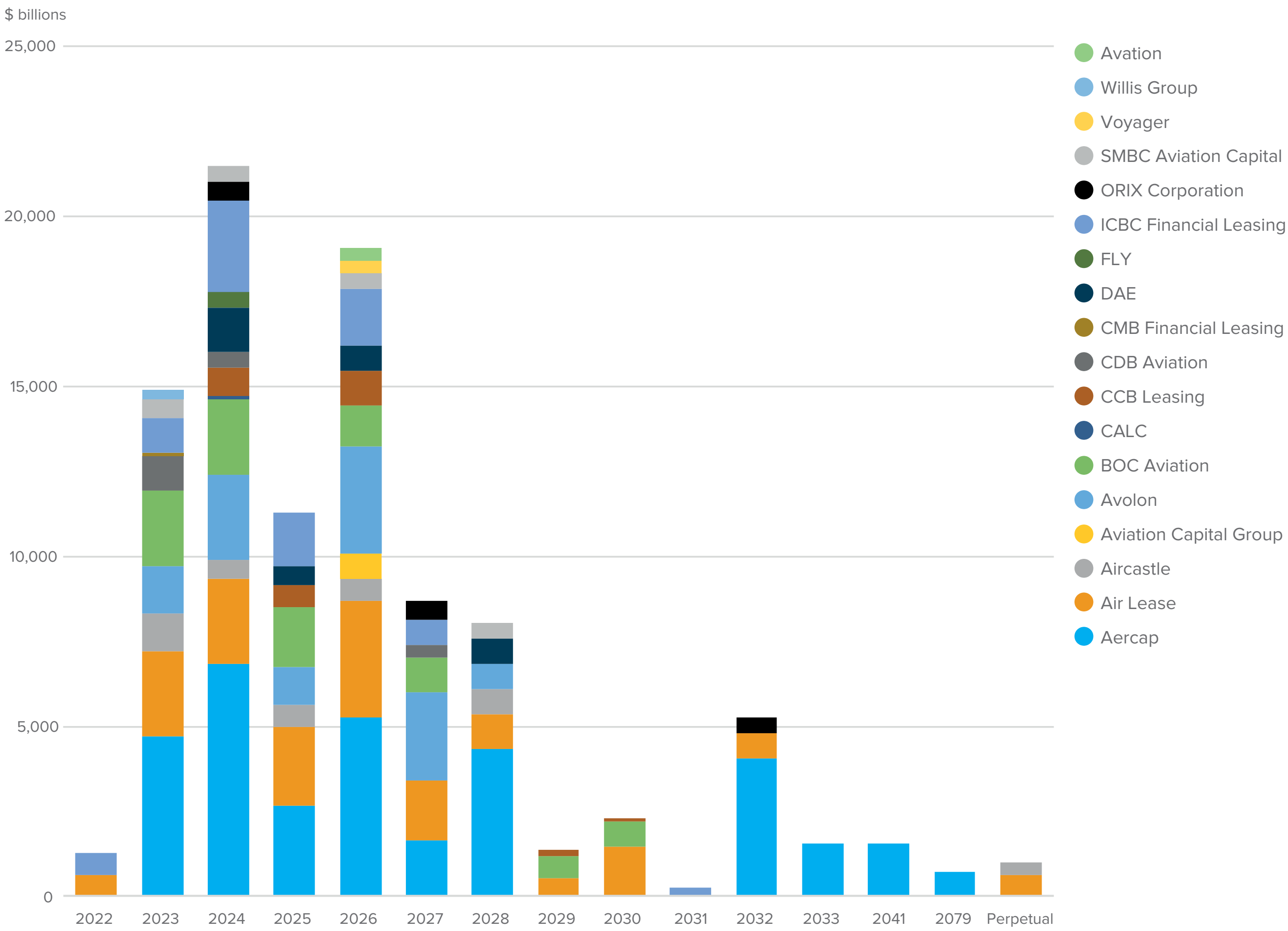


Average Coupons by Year of Issue by Investment Grade Lessors



Source: AFJ Deal Tracker.

Maturity Years of Lessor $ Bonds



Source: AFJ Deal Tracker.

Analysis of the **global leased fleet**

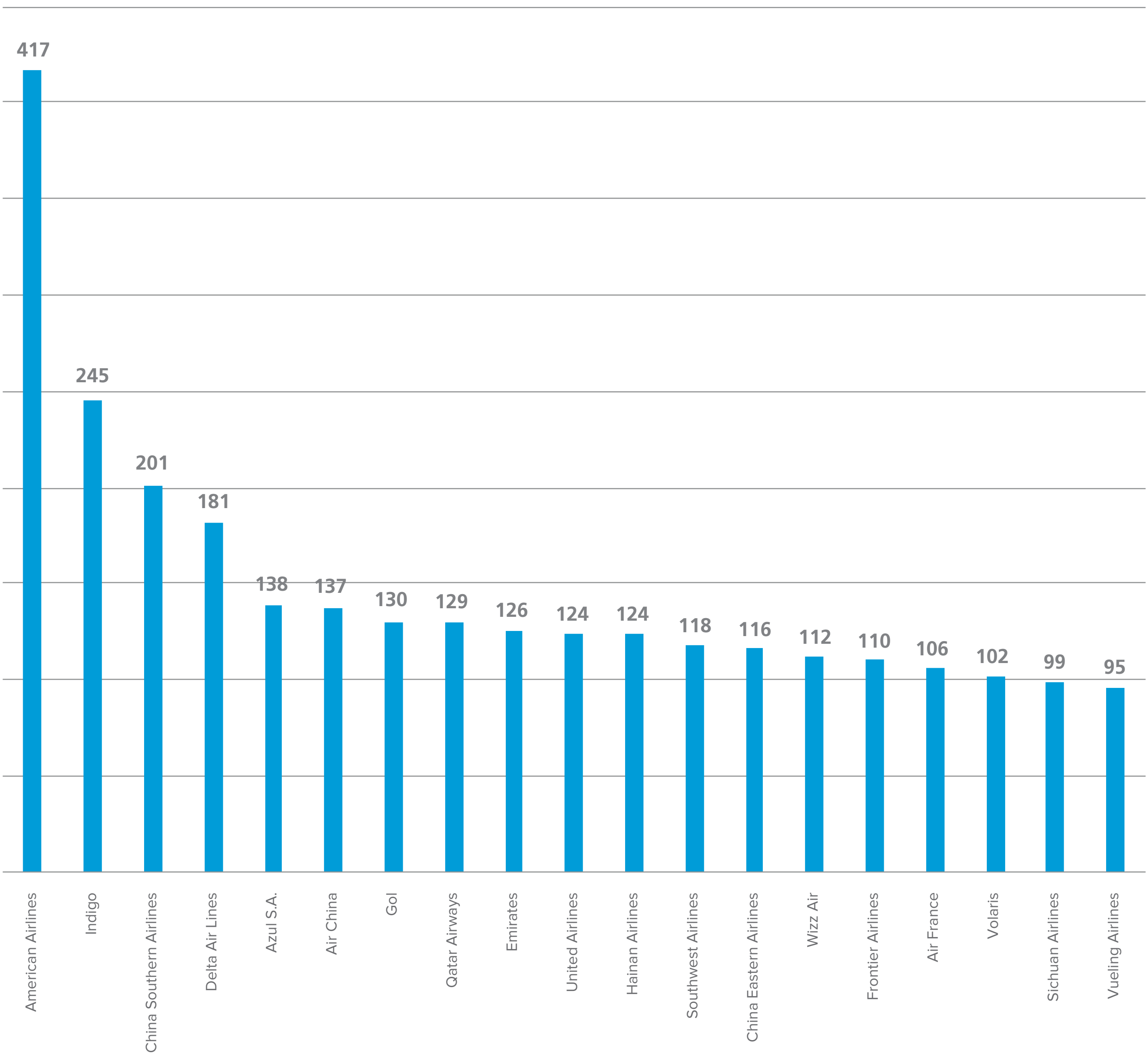
American Airlines has held the position of "Number 1 lessee" ever since its acquisition of US Airways. Shooting up the ranks has been Indigo, due to its rapid expansion and focus on operating leases as the best financing solution for them. The rest of the table is a mix between legacy carriers such as China Southern, Delta Air Lines and China Southern and relatively young airlines which have grown, and continue to grow, rapidly, examples being Azul, Gol, Wizz, Volaris and Vueling. Such a variety of counterparties, jurisdictions, growth plans and operating environments must be a challenge for lessor portfolio and risk managers.

The global distribution of lessees is similar to previous years. While Europe appears the largest, the sum of all the sub-regions of Asia clearly exceeds it by a big margin.

The Top Lessors of regional jets have changed significantly in the last year. Despite shrinking from a portfolio of 160 to less than 120 aircraft, Nordic Aviation Capital retains number one spot with the combination of Chorus and Falko sliding into second spot.

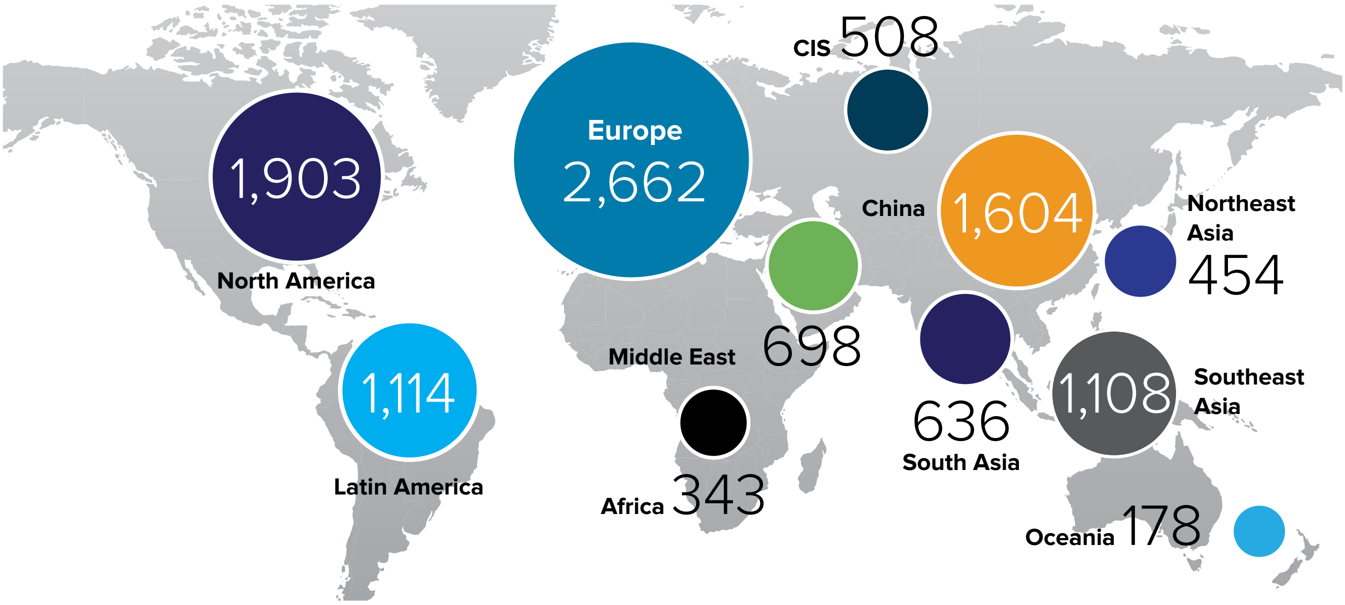
A similar pattern applies in turboprops, with DAE Capital in third place.

Biggest lessees by number of aircraft



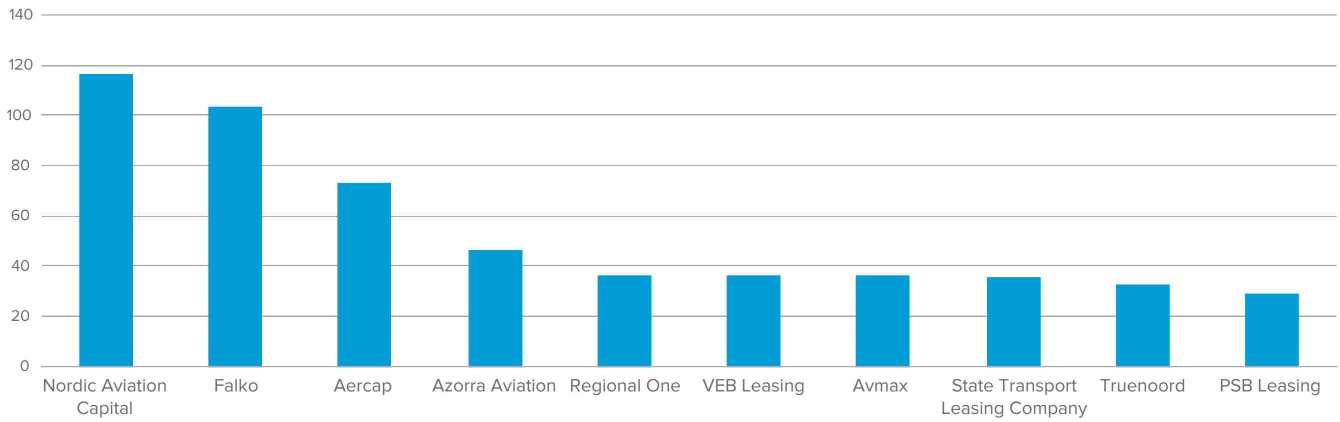
Source: *Airfinance Journal*'s Fleet Tracker.

Geographic distribution of leased aircraft



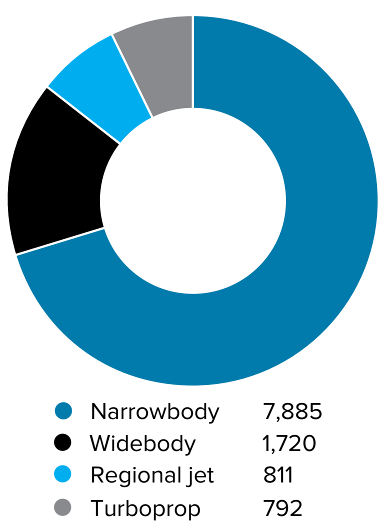
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

Top 10 lessors of regional jets

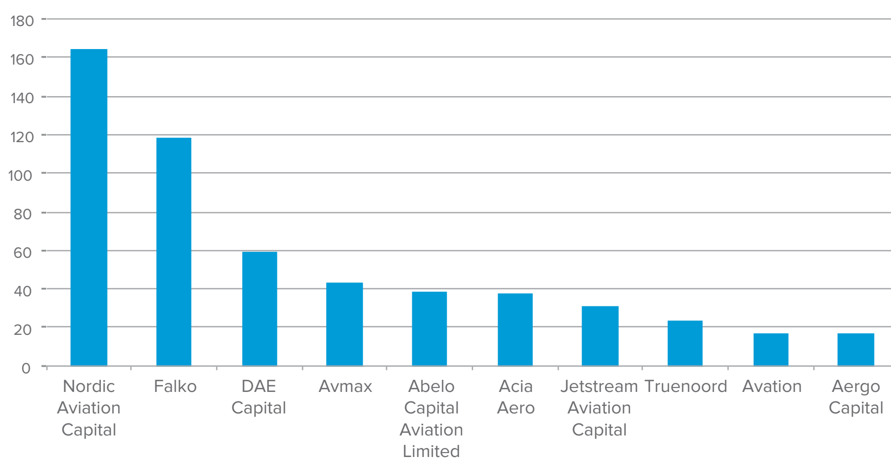


Source: Lessors and *Airfinance Journal*'s Fleet Tracker.

Leased aircraft body type



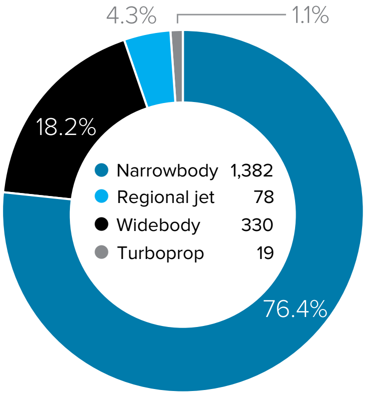
Top turboprop lessors



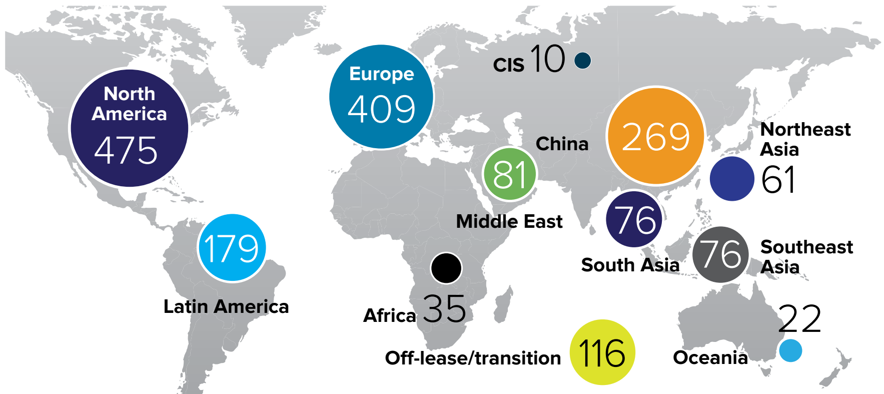
Source: Lessors and *Airfinance Journal*'s Fleet Tracker.

1 Aercap

Aercap fleet by aircraft type

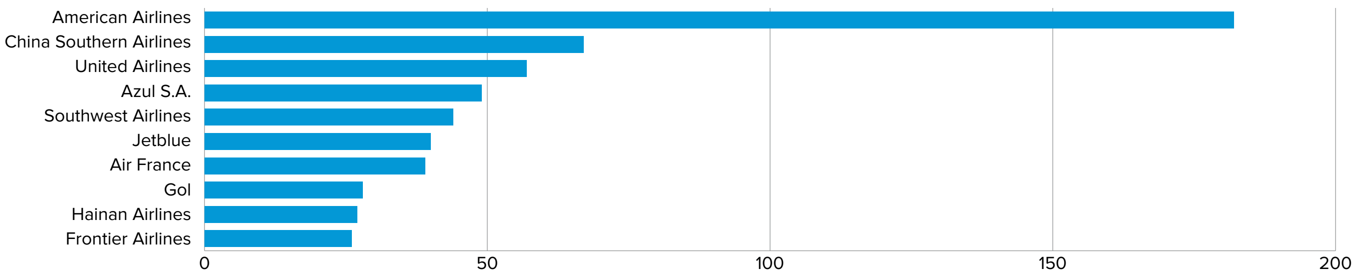


Aercap fleet by region of lessee



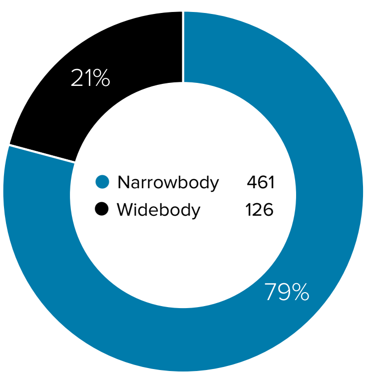
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

Aercap top lessees

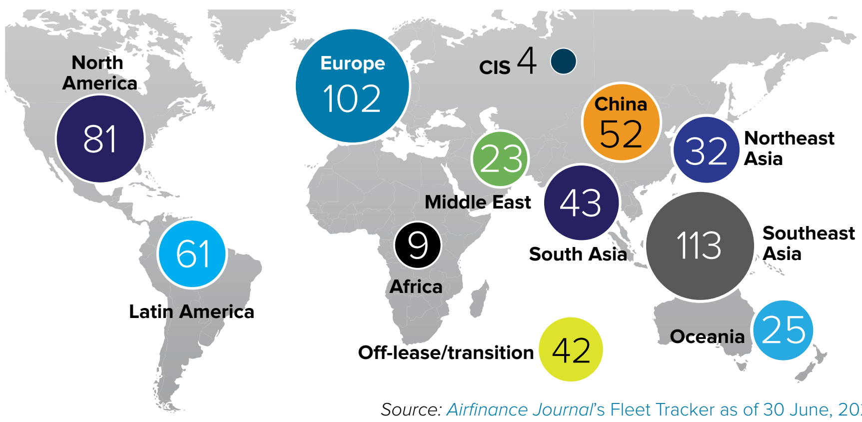


2 Avolon

Avolon fleet by aircraft type

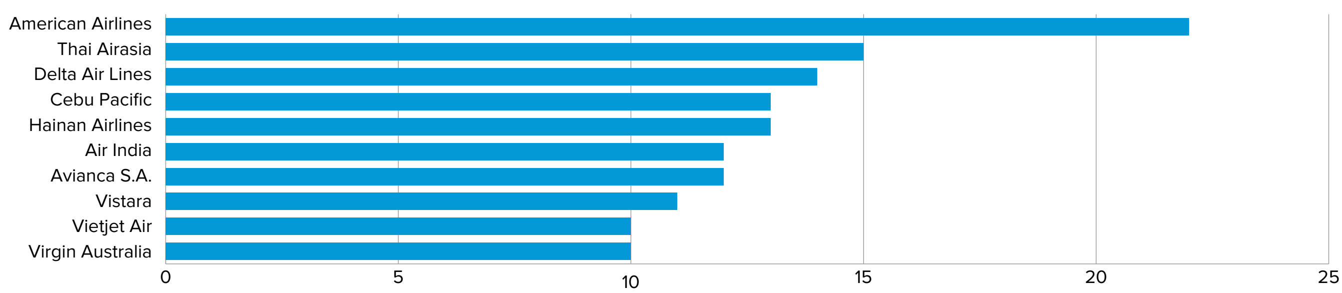


Avolon fleet by region of lessee



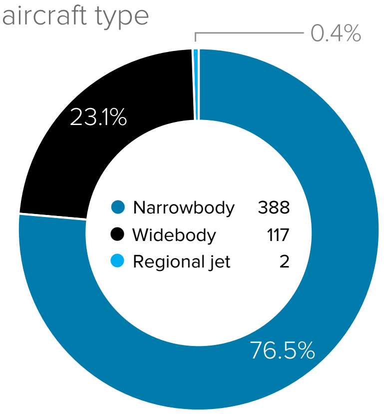
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

Avolon top lessees

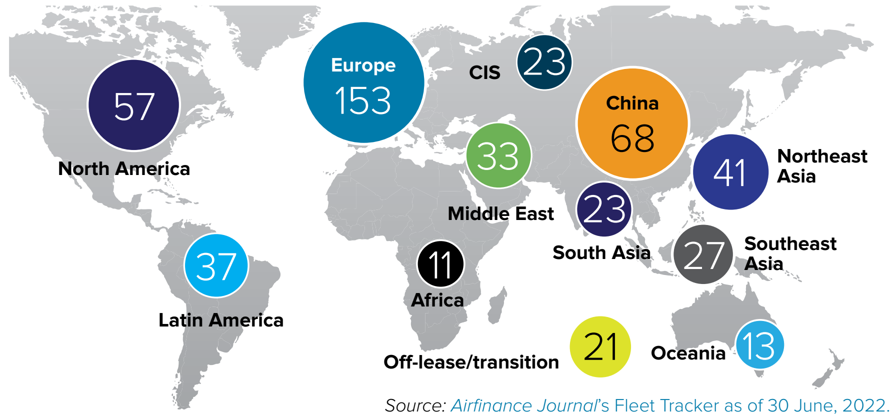


3 Air Lease Corporation

Air Lease Corporation fleet by aircraft type

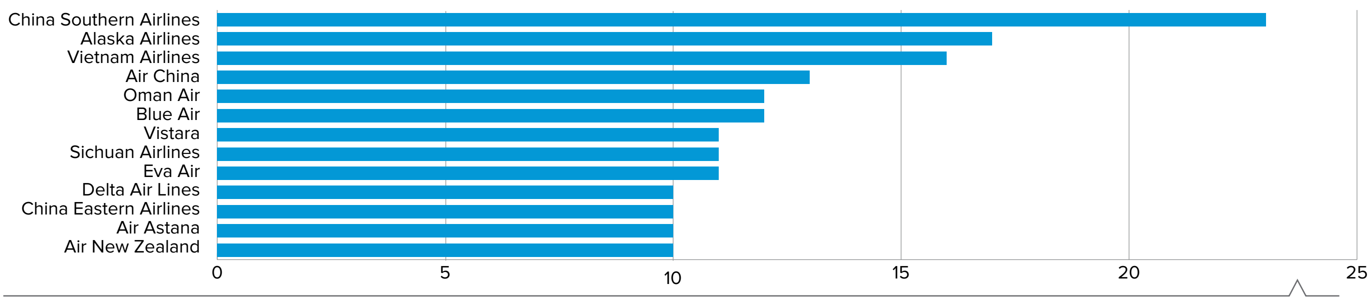


Air Lease Corporation fleet by region of lessee



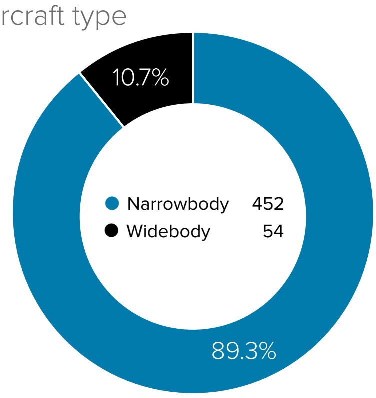
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

Air Lease Corporation top lessees

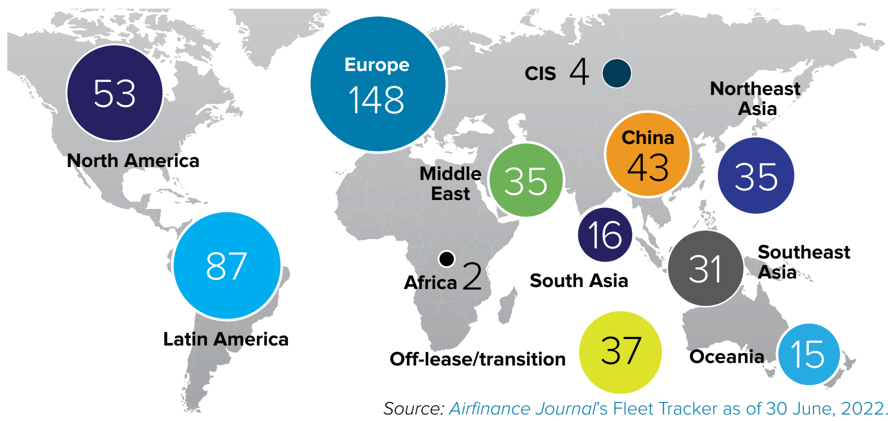


4 SMBC Aviation Capital

SMBC Aviation Capital fleet by aircraft type

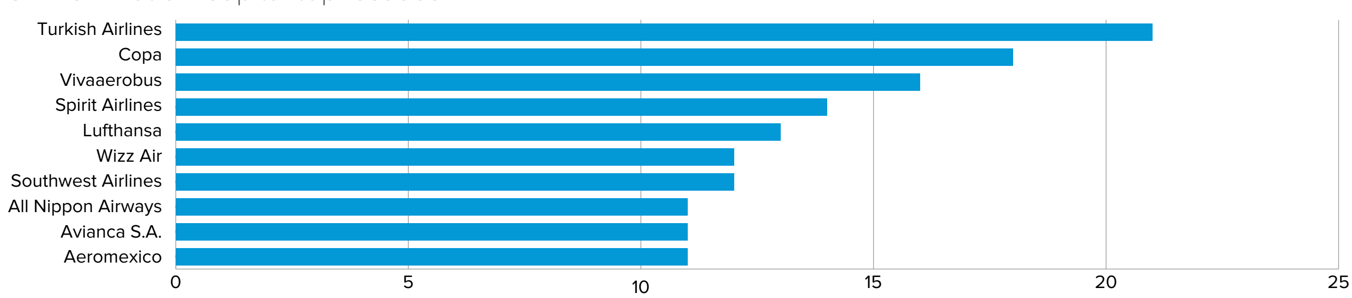


SMBC Aviation Capital fleet by region of lessee



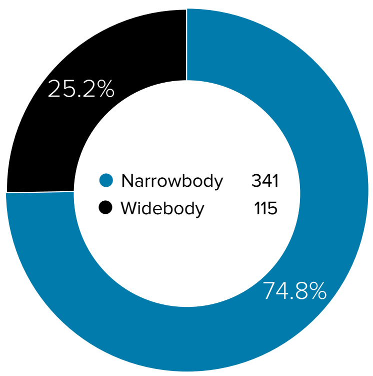
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

SMBC Aviation Capital top lessees

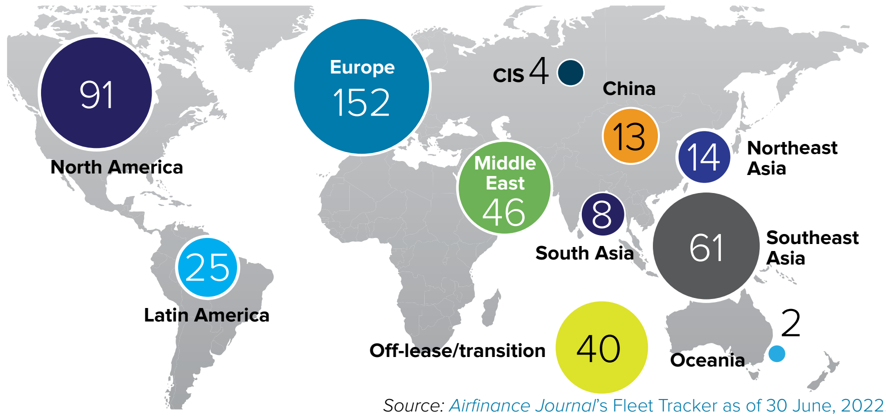


5 BBAM

BBAM fleet by aircraft type

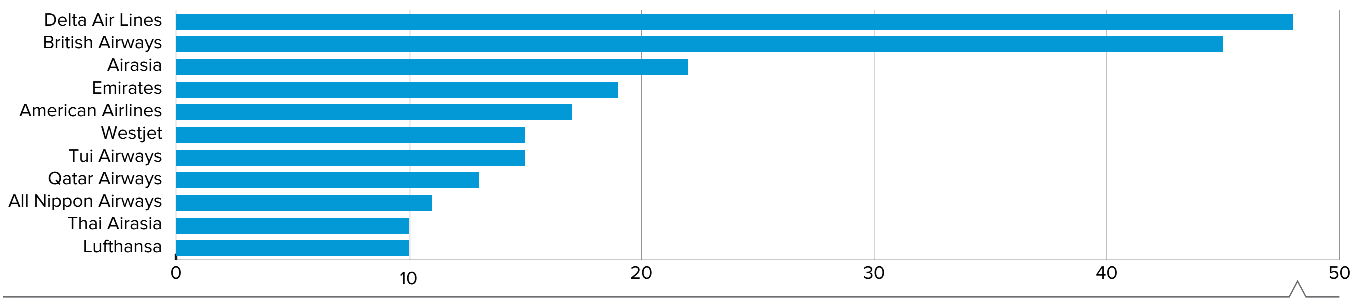


BBAM fleet by region of lessee



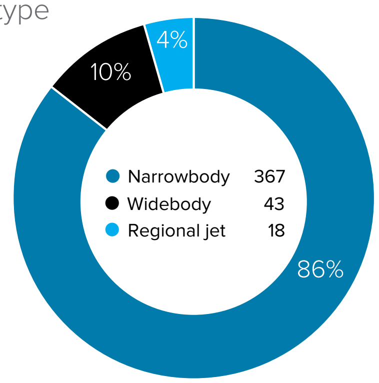
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

BBAM top lessees

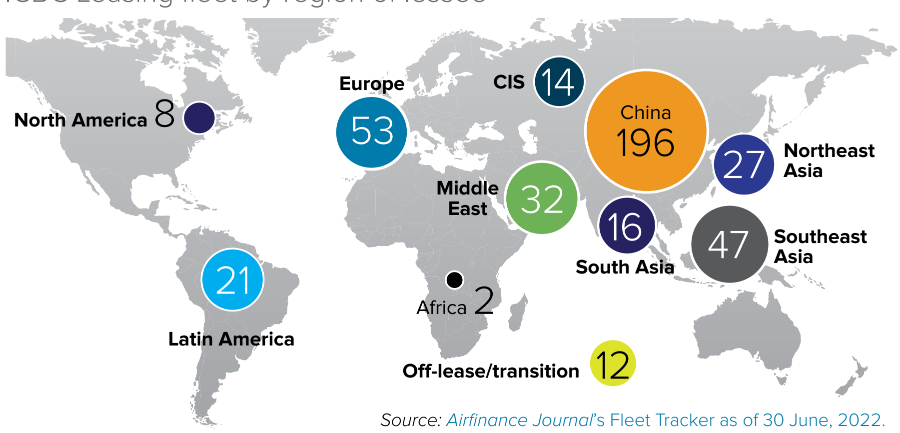


6 ICBC Leasing

ICBC Leasing fleet by aircraft type

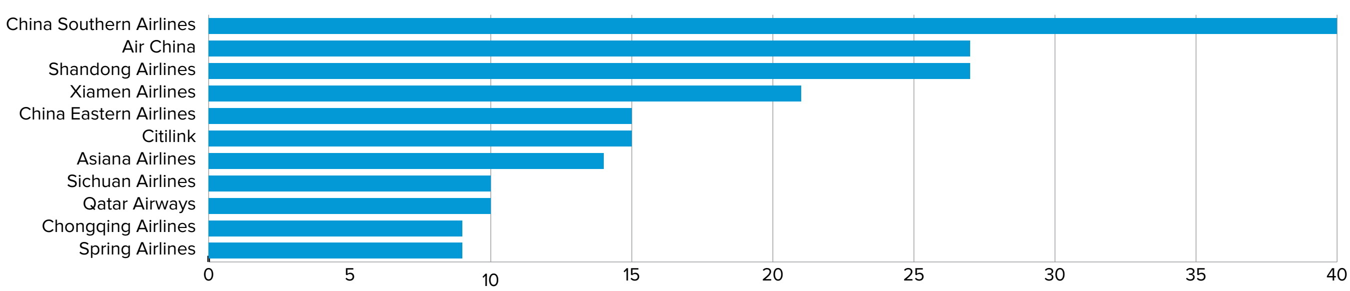


ICBC Leasing fleet by region of lessee



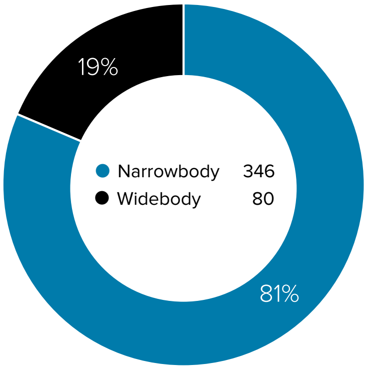
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

ICBC Leasing top lessees

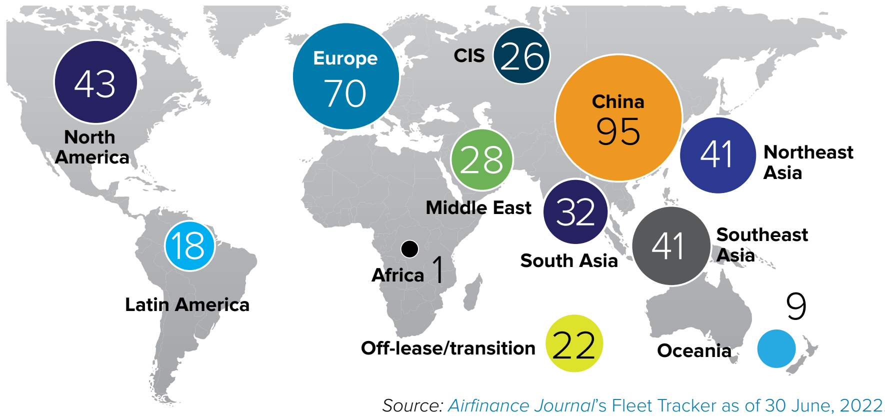


7 BOC Aviation

BOC Aviation fleet by aircraft type

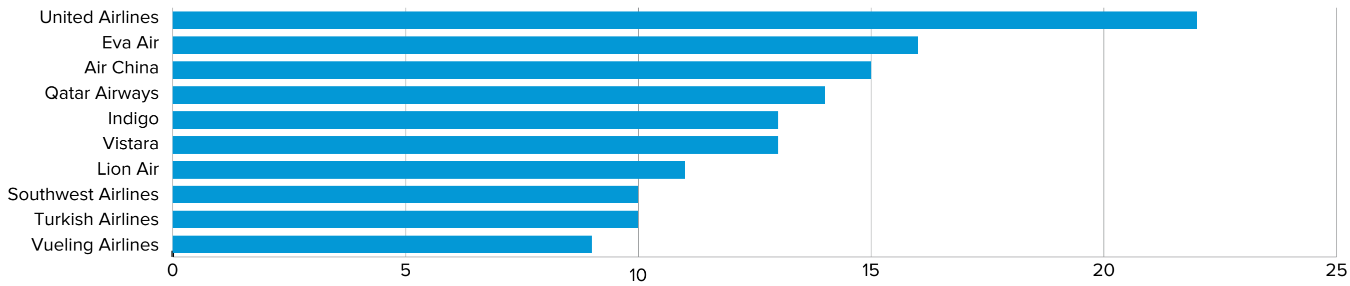


BOC Aviation fleet by region of lessee



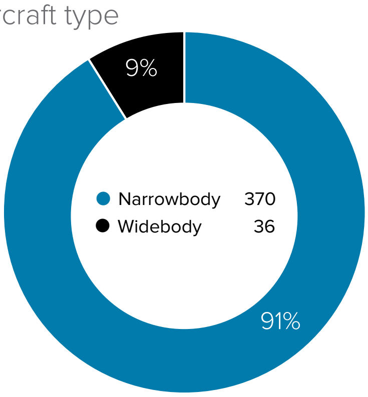
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

BOC Aviation top lessees

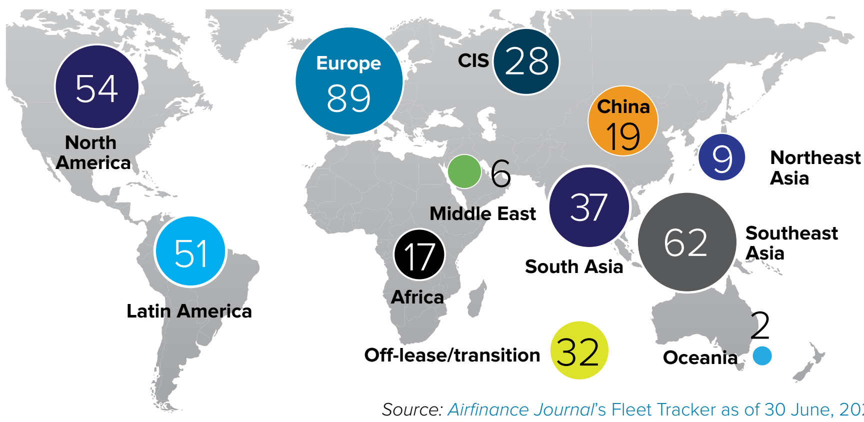


8 Carlyle Aviation Partners

Carlyle Aviation Partners fleet by aircraft type

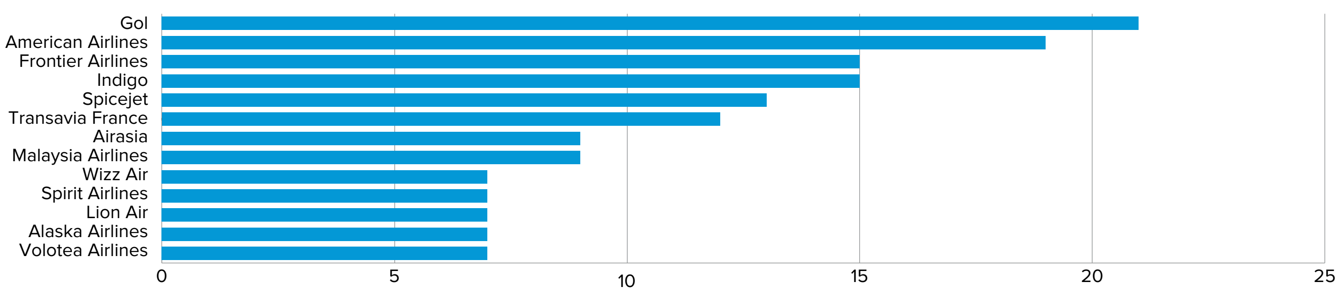


Carlyle Aviation Partners fleet by region of lessee



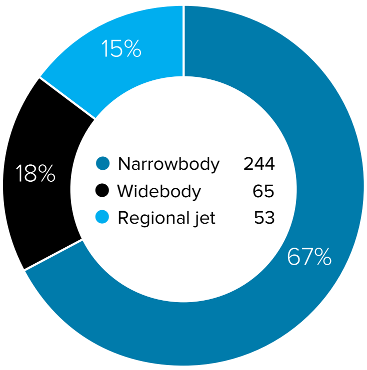
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

Carlyle Aviation Partners top lessees

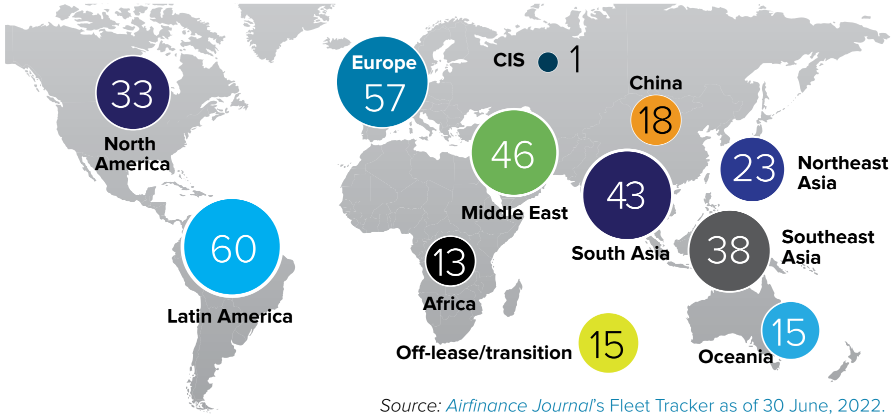


9 DAE Capital

DAE Capital fleet by aircraft type

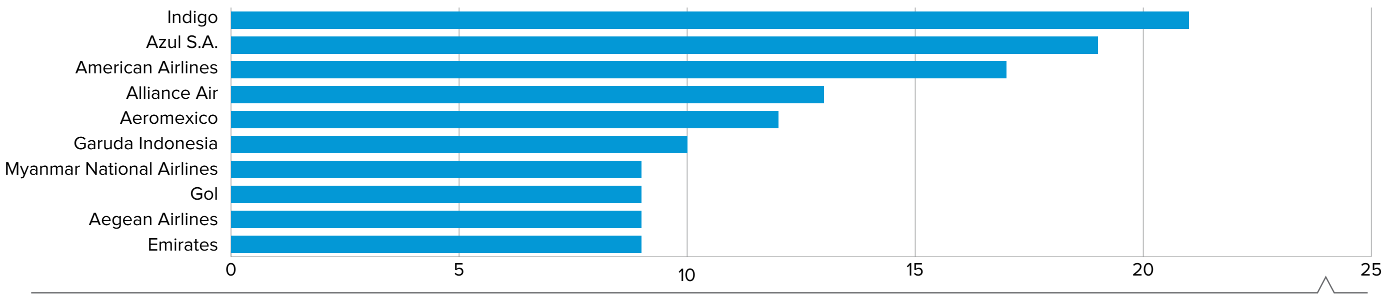


DAE Capital fleet by region of lessee



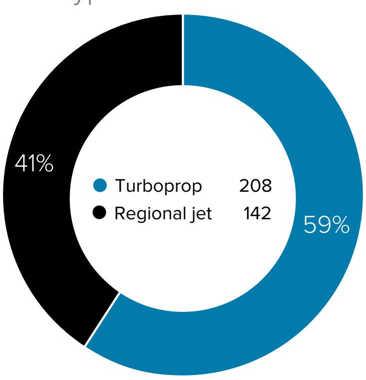
Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

DAE Capital top lessees

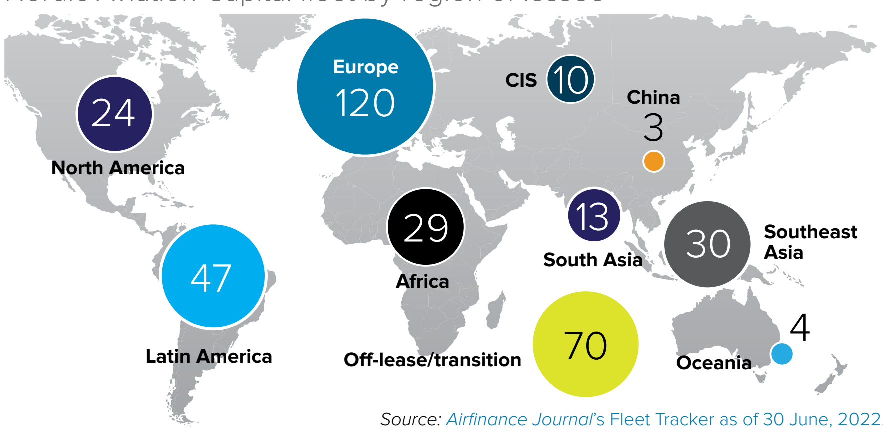


10 Nordic Aviation Capital

Nordic Aviation Capital fleet by aircraft type

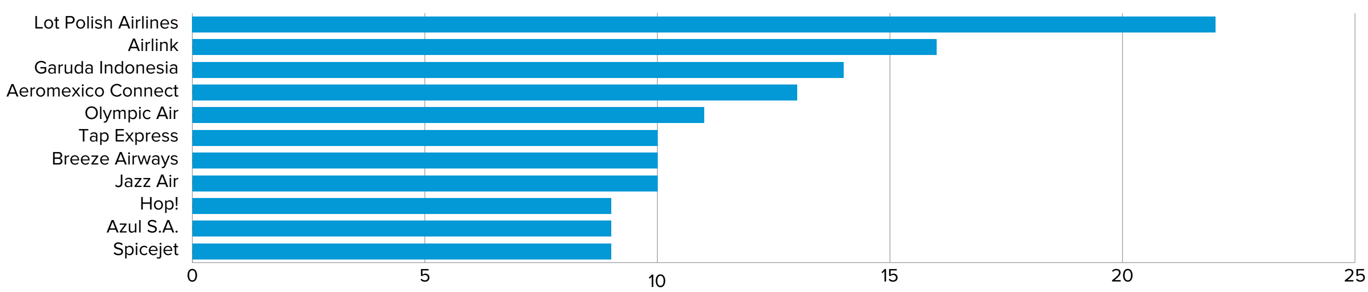


Nordic Aviation Capital fleet by region of lessee



Source: *Airfinance Journal*'s Fleet Tracker as of 30 June, 2022.

Nordic Aviation Capital top lessees

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