

Musings of an Aviation Investor

GROWTH momentum has continued since the start of the year with airline equity prices tracking strong traffic demand ahead of what is predicted to be a boom summer in Europe and the US. So-called “Revenge” travel remains unsated even as consumer pockets come under increasing pressure from high energy costs, rising food price inflation and increasing interest rates.

As mentioned in my last piece (see *Aviation Strategy*, December 2022), leisure travel in the West is relatively price inelastic with flights to the sun an inviolable item in the annual family shopping list. Various commentary from airline management teams have recently stated that the consumer will give up Netflix and eating out before sacrificing the yearly beach holiday. Along with such sentiment in Europe, most carriers are predicting continuing double-digit percentage growth in fares after the already impressive rises seen last year assisted by moderating capacity growth.

Growth caps

Capacity growth is being hampered by OEM delivery delays, which have pushed some of the previously expected 2023 fleet growth into next year, while problems with new generation engines have increased aircraft unserviceability rates further constraining capacity.

Spirit and Frontier Airlines, the two dominant ULCCs in the US, both announced capacity growth cuts for 2023 on the back of such challenges.

Spirit had originally guided 27% higher capacity for 2023 vs 2022, but is now looking at 18%-20% after two successive reductions blaming this on

NEO GTF engine problems as well as Airbus delivery delays. In terms of the Pratt & Whitney GTF engine issues, time-on-wing has been less than expected and it has been hit by a barrage of removals at a time when shop visit times are three times longer than that it would expect for the older generation CEO engines. It said in February that between two and seven of its Airbus A320 family NEOs were parked at any one time due to unavailability of serviceable engines. On OEM delays, it said around seven Airbus single aisle units had been pushed from delivery in 2023 into 2024.

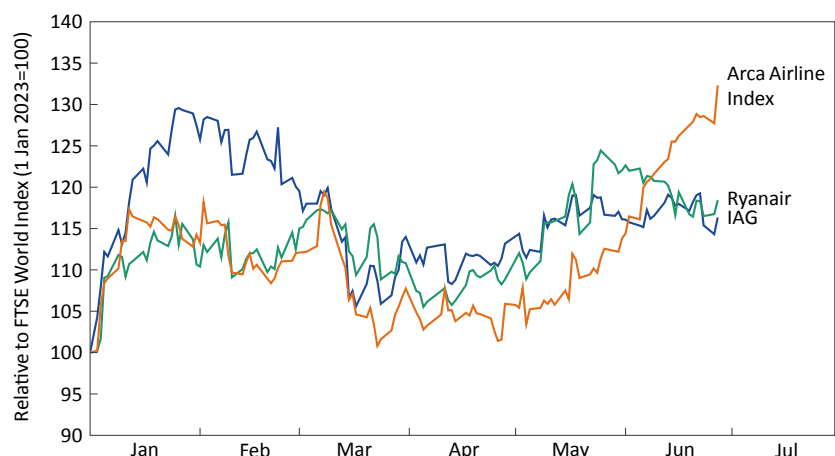
Frontier likewise has confronted

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delivery postponements. In February it stated that delivery of nine new A321NEOs had been shifted into 2024 from this year and in May this had increased by a further two units moving forward into next year.

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Frontier has twice revised downwards its FY2023 capacity growth versus 2022, most recently to between 19% and 22% after originally targeting 23-28% growth. It is not blaming engine reliability as it has operated the GE LEAP engine on its older Airbus NEO fleet only introducing the GTF engine type on deliveries starting in the fourth quarter 2022.

Frontier also laying points to the new pandemic-induced phenomenon of shifting day-of-the-week travel profiles, with peak travel days extending into Thursdays and Mondays. It has reshaped its schedules to increase peak day flying from Thursday to Monday, while reducing off peak days. Overall this will lead to a reduction in total flying for Frontier this year, while also de-risking its total schedule to better accommodate disruptions.

Management has said that this schedule revamp will be accretive to earnings by a couple of margin points by cutting some unprofitable flying on Tuesday and Wednesdays. The markets, however, were unconvinced by the announcement, with the share price tanking on the news of the capacity cuts, which will inevitably increase unit costs, a metric which investors follow closely. In my view, Frontier probably knows what it is doing and was originally pushing too much added capacity into its markets, eroding its pricing power. If fuel prices continue to moderate, we are likely to see the airline gradually reintroduce some withdrawn services as margins allow.

It should be noted that several other carriers have shared Frontier's observation regarding the changed travel behaviour. EasyJet mentioned an extension of the weekend, with travel across the week becoming more equalised.

Problems facing the P&W GTF engine cannot be as easily ignored as a short-term issue and investors will wisely be looking at the universe of airlines with significant existing or future commitments to GTF powered fleets.

This should now be considered as a serious industry challenge as it is now impacting a growing share of global single-aisle capacity, not only the A320NEO family but also the Embraer E2 variants. GO First India has blamed serviceability of the engine as a reason for its insolvency and we now hear that Wizz Air is having to replace its entire GTF powered NEO fleet in its Middle East operation with older CEOs from Europe due to concerns of poor reliability in the hot conditions of the Arabian Gulf. It is likely that the GTF problems will continue into the medium term at a minimum and will probably start to impact lease rates and residual values of aircraft fitted with the powerplant.

Corporate demand

While leisure travel is flourishing most admit that corporate demand remains subdued compared to pre-pandemic times in both the short-haul and long-haul travel. EasyJet thinks that corporate travel is around 90% of pre-Covid, while IAG which has historically relied on the Business class cabin for the largest chunk of its profitability, particularly out of London Heathrow across the Atlantic, says that demand remains somewhat off pre-pandemic levels, with BA extracting only about 75% of pre-Covid revenues from the business passenger.

As it is not certain that the ZOOM meeting will become the new normal, there remains significant upside for the full-service long-haul airlines to boost revenues and materially im-

Aviation Strategy

prove profitability should the front cabins begin to fill again. This writer is optimistic that this will be evident, likely starting this autumn..

Before looking too far ahead, one point of caution in relation to the bullish sentiments communicated by most of the incumbents regarding the upcoming summer peak, particularly in Europe — there remains low visibility of how revenues will finally pan out.

While it is true that yields for booked summer flights are high, plenty of seats remain to be filled. This is not a new thing as the leisure sector has historically relied upon what is called the “lates” market to boost margins and add the cream to the summer revenue tally. It is my view that this will be as true this year as any other supported by anecdotal as well as data released by some of the carriers. On-the-Beach, the OTA, said in mid-May that, while airlines were bullish, it saw plenty of late

booking availability for the summer.

This was supported by easyJet which also in May said that only 36% of seats for the peak summer quarter (Jul-Sept) had been booked, which was at a similar level to pre-Covid times in 2019. I only caution readers, as most indications are that demand will continue to remain robust, but simply that until the outturn, associated risk lingers.

If economic pressures finally flow through to the consumer or good Northern European weather keeps holidaymakers in home countries, airlines could start to break ranks by selling cheaper inventory. This would start to erode unit pricing and the robust margins currently expected. In this case those that have pre-sold higher volumes will be rewarded. The likes of Jet2, which sells higher capacity from its in-house tour operator via holiday packages, as well as Ryanair, which has also sold more seats ahead (42% in late May) but

at lower year-on-year average fare increases (10% to modest), will be the primary beneficiaries by being able to avoid aggressive seat dumping.

By The Irrational Investor

Above not intended to be investment advice and should not be taken as such and readers should ensure that they take independent advice prior to investing and to be aware of all the risks of equity investing, including the possibility of losing all invested capital. The writer takes no responsibility for the accuracy of the information contained.

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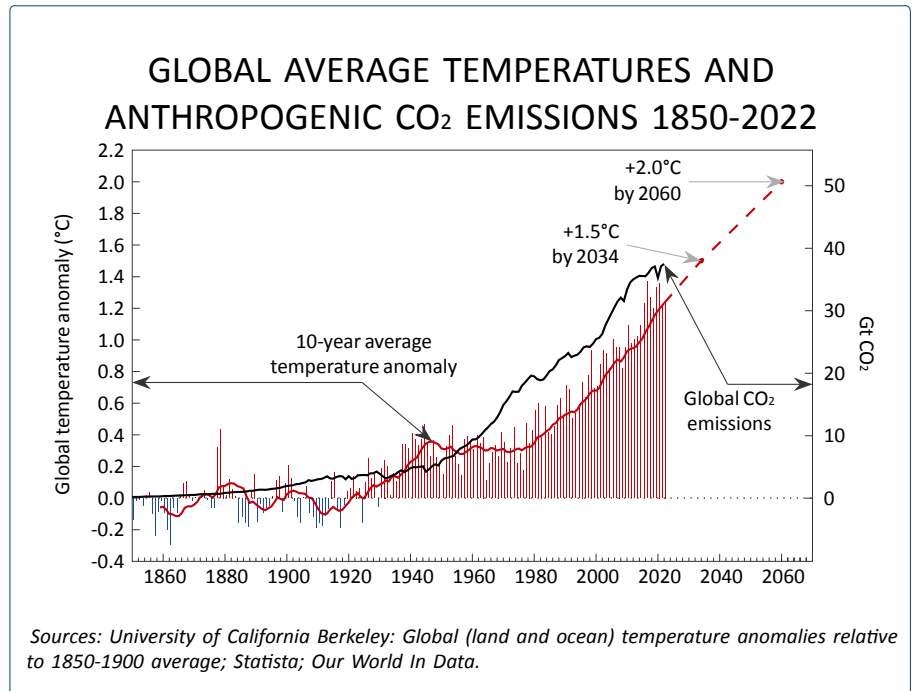
The Path to Net Zero: Paved with Good Intentions

MAY SAW the publication from the UN's World Meteorological Organization (WMO) of its annual *Global Annual to Decadal Climate Update*. For the first time, it said, it is more likely than not that global temperatures in the next few years will exceed 1.5°C above pre-industrial levels.

The main reason for the prognostication is that the Pacific El Niño Southern Oscillation is once again approaching a warming phase, the El Niño, having been in its cooling phase (La Niña) since 2020. The recent peak in global temperature anomalies, according to data from Berkeley Earth (see chart right), was in 2016 when temperatures were 1.37°C above the average for 1850-1900. That was towards the end of an extended El Niño episode that lasted from 2014-2016.

El Niño can have a strong impact on world climate. Intriguingly, the largest temperature anomaly on the chart in the late 19th century reflects a record-breaking El Niño in 1877-88 combined with a strong positive Indian Ocean Dipole effect (a similar phenomenon on the other side of the world): these, it is said, led to widespread droughts in Asia, Brazil and Africa and an estimated 50 million human fatalities.

The WMO points out that this event does not necessarily mean that the world would cross the long-term warming threshold of 1.5°C above preindustrial levels set out in the 2015 Paris Agreement. But the threshold could be passed in any case. Figures from Berkeley Earth show that the ten-year moving



average of global temperature rise has been accelerating by 0.02°C a year since 1980: if that trend continues, the world will hit the threshold by 2034, and touch 2.0°C global warming by 2060.

The 1.5°C threshold is critical. Warming above that level could trigger a cascade of tipping points generating positive feedback loops which would irreversibly alter the global climate system and further exacerbate global warming.

Global anthropogenic carbon emissions, having dipped by 5% during the Covid-19 pandemic in 2020, reached record levels in 2022 with an estimated 37.4 gigatonnes of CO₂ — 1% higher than 2019 and 65% higher than the level in 1990 at the time of the first report of the Intergovernmental Panel on Climate Change (IPCC).

Decarbonisation essential

Time seems to be running out on the global need to remove dependency on fossil fuels, and the world needs to decarbonise. To do so is going to be expensive. The UN estimates that the investment needed to achieve net-zero carbon emissions by 2025 will reach \$125tr. A recent report from McKinsey suggests that capital spending on physical assets for energy and land-use systems would top \$275tr between 2022 and 2050, or over \$9tr a year, a 66% increase in annual investment costs from today's levels.

Aviation is one of the most difficult sectors to decarbonise. As IATA succinctly puts it, the industry is constrained by three main factors which limit its options:

✈ **Aircraft have long useful lives.**

They can remain in service for 30 years, and the renewal process can take decades.

✈ **Aircraft have lengthy development times.** Because of necessary strict certification requirements and safety standards the development of new aircraft incorporating the latest technology can take over 10 years. (Airbus is developing a hydrogen-powered zero-carbon fuel cell engine for a 100-seat aircraft that might be launched later this decade but not enter service until at least 2035).

✈ **Aircraft use a lot of energy.** Very few energy storage solutions can currently provide the power-to-weight ratio provided by fossil fuels to enable a tin can to carry hundreds of passengers with their luggage at 1,000km/h more than 10km above the ground.

In 2021, IATA adopted a resolution at its annual meeting committing its member airlines to achieving net-zero carbon emissions from their operations by 2050 (see *Aviation Strategy*, December 2021). The following year ICAO adopted a similar long term aspirational goal. At this year's annual IATA meeting the organisation reiterated its commitment to the resolution and produced a series of documents highlighting the pathways required to meet the Fly Net-Zero ambition.

IATA also restates how expensive the process will be, suggesting that the investment needed to bring about aviation's transition to net-zero by 2050 could touch \$5tr, over \$180bn a year (equivalent to a quarter of current airline annual revenues).

Aviation accounts for a modest 2-2.5% of global CO₂ emissions, but is expected to continue growing: without taking additional efforts annual CO₂ emissions from the industry could double to 2 gigatonnes by the

middle of the century.

Sustainable Aviation Fuels

By far the largest contribution to the path to net-zero is expected to come from the use of Sustainable Aviation Fuels (SAF) — accounting for 62% of the planned mitigation of carbon emissions in 2050 and 80-90% of aviation fuel use.

A huge ramp-up of production of this contentious source of energy is required. SAF output in 2022 trebled to 300m litres — roughly equivalent to 0% of the industry's total 350bn litre fuel consumption.

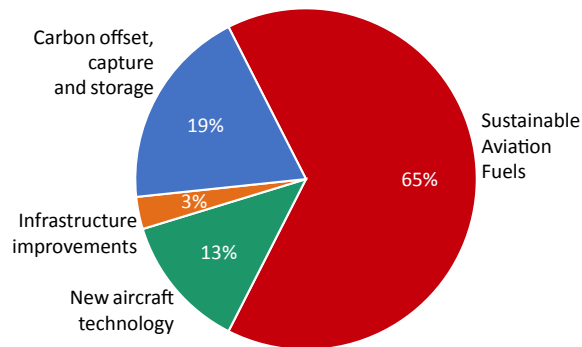
IATA estimates that there will be a need for 5,000-7,000 biorefineries to supply the industry's needs, at an investment cost of \$1.08-1.45trn (roughly equal to \$12/gallon capacity) which it estimates equates to 6% of historical annual fossil fuel investments. At the moment SAF production costs a multiple of the jet fuel price: the premium to fossil fuels may come down over time, but the blended price will be passed on to the passenger through ticket prices.

SAF is a contentious issue because it is neither well understood nor well explained. At the moment a key method for its production is from

hydrotreated vegetable oils (HVO) and hydroprocessed esters and fatty acids (HEFA): transforming "waste" fats into a kerosene equivalent. Other methods include alcohol-to-jet (ATJ) from waste fermentation, and pyrolytic conversion of CO₂ and hydrogen (syngas) through the Fischer-Tropsch process into liquid hydrocarbons. The key idea is that it is using carbon from a renewable source to burn and release into the atmosphere which can then be reabsorbed through photosynthesis into the food chain: a perfect circle and carbon neutrality.

Unfortunately, current SAF technology cannot produce the aromatics present in fossil fuel production that provide lubricating, sealant and anti-corrosive properties in pipes. The regulations require a particular proportion of these aromatics for a fuel source to qualify as jet kerosene, and SAF needs to be blended with conventional aviation fuel to achieve these levels. Although some aircraft have successfully tested 100% SAF flights, the safe proportion is deemed a 50% blend. Depending on the source of power used to create the biofuel, blended SAF flights could achieve no more than a 42% reduction in net life-

IATA's PATH TO NET ZERO:
CO₂ SAVING BY SOURCE



cycle carbon emissions.

Technology in the aircraft will no doubt improve, and by the 2030s IATA in its road maps suggest that all new aircraft will be able to operate safely on tanks entirely consisting of bio-fuels. But, the ground infrastructure may cause problems: delivery from refinery to airport and, within airports, from fuel farm to wing may require significant investment for pure SAF deployment.

Pigs Can Fly

And then there are the feedstocks: the source of non fossil fuel carbon to transform into juice. Aviation here is competing with ground transport, a sector of the economy equally needing to decarbonise with a fuel requirement ten times that of air transport (albeit that ground transport is in the process of transitioning to battery powered propulsion). And bio-diesel to power trucks doesn't have quite the same level of structural safety requirements to which airlines are subject, and its production may appear more profitable.

A recent report from Brussels-based Transport & Environment (T&E, a non-governmental organisa-

tion that lobbies and campaigns for zero-emission mobility) highlighted the dubious sustainability credentials of using used cooking oil and "waste" fats from animal carcasses to generate biofuels in general, and SAF in particular. In Europe the use of animal fats (some of which according to a bizarre European rule can be double-counted for carbon reduction accreditation) to generate biodiesel has grown from 30,000 tonnes a year in 2006 to 1.4m tonnes in 2021. It is forecast almost to triple to 3.9m tonnes by 2030. There are only so many pigs you can slaughter to power the trucks to take the carcasses to the refinery.

Regarding SAF, the group suggests that the HEFA process will only be able to provide a sustainable source of animal fats for 1.4% of the aviation industry's requirement by 2050 — without taking into account that there is a need to reduce livestock farming to fit in with greenhouse gas emission reduction commitments.

The report highlights the group's analysis that a 100% SAF flight between London and New York would require the equivalent of 8,800 pig

carcasses each way.

Then the publication of the report raised concerns in other industrial sectors.

Fats from animal carcasses are not necessarily unwanted waste, and the anticipated high demand for their use in biofuel production may have unintended consequences. Some categories of fats are burnt by other industries to provide heat and power: their alternative might be fossil fuels.

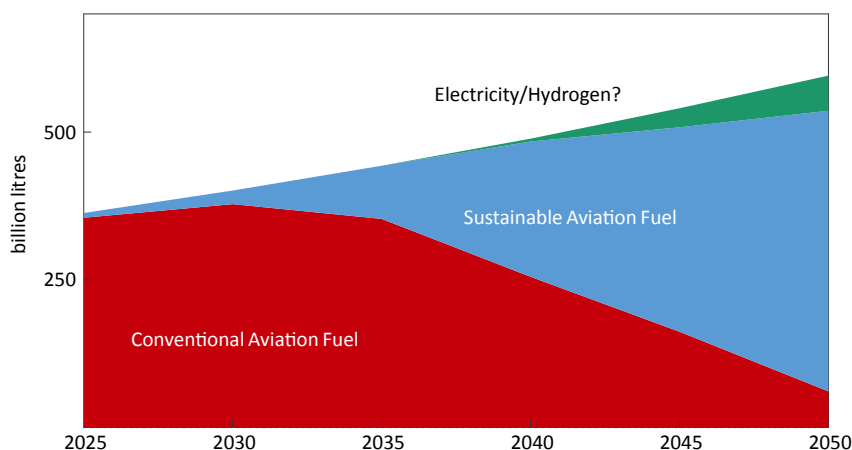
Others, those deemed fit for human consumption, are used in the oleochemical industry for the production of soaps, cosmetics and candles; or by the pet food industry to make their products "more palatable".

The cosmetics industry might be under pressure to source fats from less sustainable sources (such as palm oil — the cultivation of which generally requires land-use change and is seen to contribute to deforestation). Pet food suppliers, with fewer alternative replacements, will see significant price pressure.

Quoted by the BBC, Nicole Paley, deputy chief executive of UK Pet Food, the manufacturers' trade association said: "These are really valuable ingredients for us and they are hard to replace, and they're put to good use already in a very sustainable way. So actually diverting these ingredients to biofuels... put us in competition with the aviation industry. And when it comes to the purse strings of the aviation sector, the pet food industry would find it really difficult to compete."

Demand for used cooking oils for biofuel production is causing additional problems. *The Times* of London reported that French police as saying that theft of used cooking oil from outside restaurants has reached industrial levels. This followed the arrest of a gang suspected of stealing

AIRLINE FUEL CONSUMPTION: A SCENARIO



385 tonnes of the stuff over a three month period, worth nearly €0.5m, shipping it abroad for conversion to biodiesel. The price of used cooking oil, it said, has risen ten-fold from €150/tonne in 2008.

Meanwhile, the Vegan Society of Canada has warned that many flights would no longer be “vegan certifiable”, encouraging airlines to specify that their sources of SAF do not contain animal products.

Other sources of feedstock are needed, and plant-based sources such as *Jatropha* oil and *Camelina Sativa*, grown on marginal land, and even algae have been used. But the cause has not been particularly helped by a recent briefing document published by the UK’s Royal Society, suggesting that demand for crop-based aviation biofuels would require up to 68% of the available agricultural land in the UK.

Willie Walsh, IATA’s Director General, was scathing of the report in his address to the airline association’s AGM this year. In particular he noted that the authors had based their analysis on the fuel burn performance data for flights between London and New York on a 737-300 (an aircraft that went out of production in 1999). “Now, I’ve flown the 737-300”, he said, “so I know a bit about it and what I know for certain is you cannot get the minimum of 21 tonnes of fuel that they estimated you would require into the fuel tanks that can only take a maximum of 16 tonnes. So, if we know that that section of the report is rubbish what confidence can we have in the rest of the document?”

Another contentious element of SAF is that currently there are so few production facilities that physical delivery is impossible: transporting SAF to a specific airport or flight could lead to higher greenhouse gas emissions.

To counter this IATA is calling for a policy decision to establish global standards for a SAF book-and-claim system, and especially one that avoids double-counting.

On the principle that a gallon of fuel burnt in the USA is the same as 3.78 litres burnt in the EU or China it does not matter where SAF is bought or consumed. The sustainable fuel would go into the fuel system at an airport near the refinery, the body covering the fuel premium (“buying” the SAF) would be credited with the CO₂ mitigation no matter where they were. This is the accepted practice in renewable electricity generation. It even gives corporate entities the option to “purchase” any volume of SAF, including 100% of fuel needs, to satisfy their requirements for ESG credentials.

But it is also a beautifully confusing concept for the man in the street: he may be willing to pay a premium for a ticket on an airline that advertised its use of sustainable fuel, but he would not even know if such fuel were used on the flight he takes. The Canadian vegan would never be able to find out if the kerosene on their flight were porcine in origin.

The real problem though is that SAFs are hydrocarbons and, when burnt, release the same amount of CO₂ as do conventional fuels.

Green Hydrogen

Further down the path to fly net-zero, the use of hydrogen will play a part. IATA estimates that by 2050 maybe 10% of aviation’s fuel requirement will be satisfied by the use of green hydrogen. But this presents another series of problems.

Generating hydrogen by electrolysis takes a lot of energy — it may take 50kWh to generate 1kg of hydrogen which could produce 33kWh (an en-

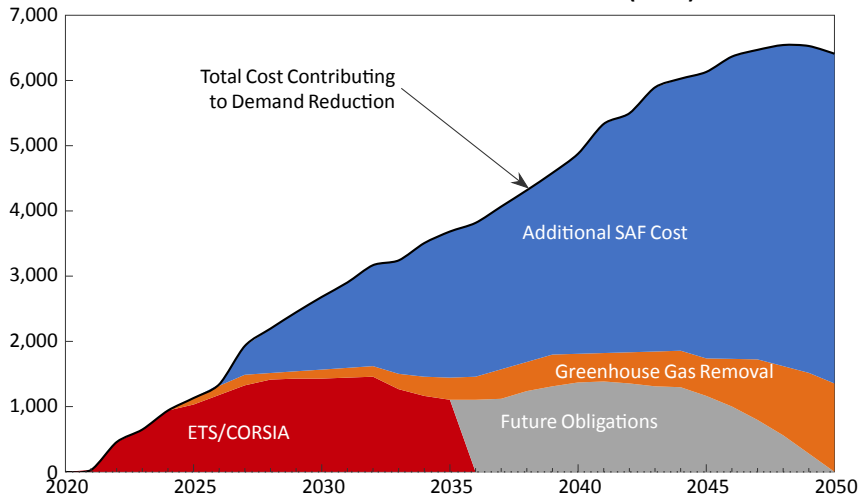
ergy efficiency of 67%). But it takes up a lot of space: 1kg of H₂ needs a container with a volume of 11m³. To cool it to 20°K and compress to manageable liquid quantities requires the use of another third of that output energy, reducing the energy efficiency to 50%. To qualify as “green” hydrogen and a zero-carbon fuel, the power used to generate it has to come from renewable sources.

IATA suggests that by 2050 the industry will have a need for 100m tonnes of hydrogen — equivalent to the total hydrogen production worldwide in 2023. The majority of that need will be used to create liquid hydrocarbon fuel: only around 10% is expected to be used to power zero-carbon aircraft.

According to the organisation’s aircraft technology road map, it anticipates that regional turbo-props and commuter aircraft retrofitted with hydrogen fuel cell power plants may first enter service in the late 2020s, but that it will be at least 2035 before we see the entry into service of a clean sheet short- to medium-haul H₂ powered “jet”. Widebody H₂ combustion aircraft may be possible in the 2040s.

As well as the technical difficulties of storing and delivering hydrogen on board an aircraft, airports will need to find the space and build the facilities for in-plane delivery, and there is a strong need for the development of the supply chain to get the hydrogen to the airports. T&E estimates the total cost of the transition in Europe to H₂ aircraft will amount to €300bn by 2050 — allocating, somewhat speciously, three quarters of this cost to hydrogen generation and liquefaction. By then it argues that hydrogen aircraft could be cheaper to operate — but, unhelpfully, only if demand (particularly business travel) is restricted and jet kerosene is taxed.

UK: ESTIMATED ANNUAL COST OF DE-CARBONISATION MEASURES (£m)



Source: Sustainable Aviation, Net Zero Carbon Road-Map, Apr 2023

Sticks... ?

One thing seems certain: the cost of flying will rise as the industry transitions towards net-zero; this cost will be passed on to ticket prices; and, the passenger will pay. Less certain is how much this may dampen demand growth.

Europe has introduced a structural change to its controversial cap-and-trade emissions trading scheme (ETS). Since 2012, airlines had been granted free grandfathered carbon rights (based on their production of RTKs in 2010). In 2019 these free allocations accounted for about 50% of the sector's CO₂ exposure under the scheme. Under the new "Fit for 55" package (aiming to reduce emissions by at least 55% by 2030) it will progressively phase out free carbon allowances to aircraft operators between 2024 and 2026. From 2027 there will be no free allowances. The Commission will also reduce the emissions "cap" by 4.2% annually instead of the current 2.2%.

The EU ETS would still apply to

intra-EEA flights (as well as flights to the UK and Switzerland), exempting those flights from CORSIA offsetting requirements. (For details of the ICAO-led Carbon Offset and Reduction Scheme for International Aviation programme see *Aviation Strategy*, June 2019). Other international flights would be subject to CORSIA.

Europe had originally tried to

include all flights within its aviation ETS — having somewhat surprisingly forgotten its obligations under the Chicago convention. However, the Commission has signalled that if it be dissatisfied with the outcomes from CORSIA it would extend the ETS to all flights into and out of the EU from 2026.

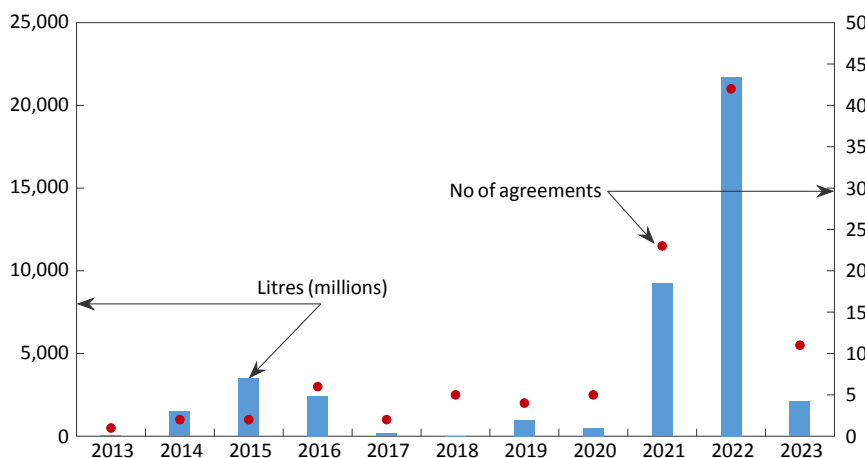
But the price of carbon has been rising. Between 2013 and 2017, according to Eurocontrol, the cost to airlines of carbon allowances (acquired from state auctioning or from the market) averaged €6 per tonne of CO₂. In 2019 this had jumped to €25. In recent trading the cost of carbon had approached €100/tonne.

This is going to be expensive, and a particular driver of costs for the short-haul point-to-point operators in Europe. Recent analysis from Bernstein suggests that carbon costs from the ETS for the airlines under their coverage will rise ten-fold from €500m in 2019 to €5bn in 2027 (assuming €100/tCO₂), potentially making it the fourth largest cost item for LCCs after fuel, airport/handling and staff costs.

EUROPE CO₂ PRICE (€/tonne)



SAF OFFTAKE AGREEMENTS



Source: ICAO

To mitigate this cost increase, the analyst concludes, would require a near 8% increase in average revenue per passenger. Is this really the end of the era for cheap flights?

Separately, Sustainable Aviation, a UK based industry lobby group, recently published its 2023 Net Zero Carbon Road Map. Their analysis and

forecasts of the additional costs to UK aviation from decarbonisation measures (see chart on the preceding page) would add some £6.5bn to airlines' costs by 2050. This, they somewhat speciously say, would have the impact of saving 9.6 million tonnes of CO₂ (compared with total emissions in 2019 of just under 40mt) by re-

ducing demand. On their figures passenger demand in 2050 (measured in terminal passengers) could be 14% lower because of these additional costs than they would otherwise have been. This translates into a 0.5% reduction in the compound growth over the period to a mere 1.5%pa.

The group's comments highlight the politically attractive idea (particularly in Europe) that heaping more costs on air travel, such as through fuel and purchase taxes, is needed in order to dampen demand.

A second element of the EU's "Fit for 55" programme, called ReFuelEU, imposes mandates on the provision of SAF requiring fuel suppliers to blend an increasing proportion into jet fuel provided at EU airports. Starting at 2% in 2025, 5% in 2030 and rising in stages to 63% by 2050. In addition the provision of synthetic fuels will have to rise from 2030 to reach 28% by 2050. To avoid "tankering", airlines will have to ensure that the annual amount of fuel uploaded

SAF OFFTAKE AGREEMENTS

	Producer	Volume (m litres)	# of agreements	Purchaser	Volume (m litres)	# of agreements
1	Gevo	9,550	14	United Airlines	10,514	6
2	Fulcrum	6,719	3	Delta	3,862	8
3	Alder Fuels	5,678	1	OneWorld	3,785	1
4	Shell	2,793	6	Lufthansa Group	3,248	2
5	Neste	2,451	16	Air France - KLM	2,998	3
6	Raven SR	1,562	1	AirBP	2,193	2
7	DG fuels	1,457	1	American Airlines	2,134	4
8	OMV	1,433	5	Japan Airlines	1,562	1
9	Aemetis	1,272	9	Cathay Pacific	1,420	1
10	Dimensional Energy	1,155	2	KLM	937	4
11	Velocys	1,105	2	Southwest Airlines	829	1
12	ECB Group	1,050	2	DHL Express	799	1
13	Total Energies	999	1	Shell	750	1
14	Air Company	999	3	Alaska Airlines	720	3
15	SkyNRG	937	1	Ryanair	650	3
	Others (21)	2,860	36	Others (50)	5,620	62
Grand total		42,022	103		42,022	103

Source: ICAO.

Note: Volumes refer to neat SAF; in case of blended SAF agreements the volumes refer to the fraction of SAF in the blend

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at EU airports is at least 90% of the fuel required for the flights operated. Furthermore, the EU has changed its Energy Taxation Directive, removing all fossil-fuel subsidies and tax exemptions for jet fuel on intra-EU passenger flights. Over the ten years from 2023 the tax will increase gradually to the full rate of €10.75/giga-joule — which possible equates to €535/tonne.

... or Carrots?

In contrast, the USA has pursued a more encouraging process. Launched in 2021, the Biden-Harris administration unveiled its “Sustainable Aviation Fuel Grand Challenge”. Its goals are to produce 3bn gallons of SAF per year by 2030 (in 2019 the US industry burned through a total of 18.3bn gallons) and reduce aviation emissions 20% in the same timeframe. New and existing funding supporting SAF production will total \$4.3 billion. The long range target is to have all US aviation fuel demand in 2050 supplied by sustainable fuel.

Rather than taxing jet kerosine to stifle demand, the administration is providing “blenders tax-credits” to producers to help lower the cost of providing sustainable fuel. The tax-credits start at \$1.50/gallon for SAF that reduces carbon intensity by 50% compared to conventional fuel. The credit scales up to \$2.00/gallon as the carbon reduction reaches 100%. This credit will help reduce the costs of SAF, making it more competitive with conventional jet fuel, and would level the playing field for sustainable aviation fuel competing with renewable diesel for feedstock and refinery capacity.

On top of that there are federal strategies to fund research to develop feedstocks, production processes and supply chain logistics; and it aims to provide loan guarantees for commercial scale SAF projects.

Oh, and the available choices for federal employees’ travel options will depend on airlines’ sustainability strategies.

Because of the scarcity of SAF,

airlines themselves have been forging commitments with refiners. The number of offtake agreements showed a major increase among the world’s airlines from 2021, according to data from ICAO. These agreements are forward purchase commitments on an annual or multi-year basis. In 2022 the number of agreements totaled 42, up from 23 the year before. Prior to that the largest number was six in 2016. In total ICAO shows there are forward commitment for 42bn litres. In the rankings, United tops the list with multi-year agreements for 10bn litres of SAF — it and the other two US majors each get through around 12-13bn litres of jet fuel in an average year.



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US Consolidation versus European Concentration

CONSOLIDATION has long been a topic in the airline industry — ever since deregulation kicked off 45 years ago.

In the domestic USA, consolidation may have finally taken place in the 2010s following the (mainly) organic growth of LCC archetype Southwest and a spate of large mergers of the large network carriers (each of which had been through Chapter 11 restructuring at least once). The last of these was American and US Airways (itself a result of a 2005 merger with America West) in 2015.

The effects of these combinations were to ease competition and remove excess capacity, resulting in the top five airlines by 2022 controlling 85% of the available seat capacity, up from 69% in 2002; and the industry had turned profitable — since 2013 (forgetting the trauma of the pandemic) as a whole it achieved the

highest profit margins of any region in the world.

European aviation in contrast is deemed to be highly fragmented and conventional wisdom suggests a need of consolidation. But the European airline market, while similar in market size as a whole, is different from that of the domestic USA.

The population distribution is centralised: the areas of highest population density run in a crescent shape from London through Paris, Northern France and the Ruhr Valley in Germany to the Po Valley in Northern Italy (missing out some empty spaces in the Alps). In contrast the population concentration in the USA is heavily weighted to the East and West coasts with very little in the intervening 3,000 miles.

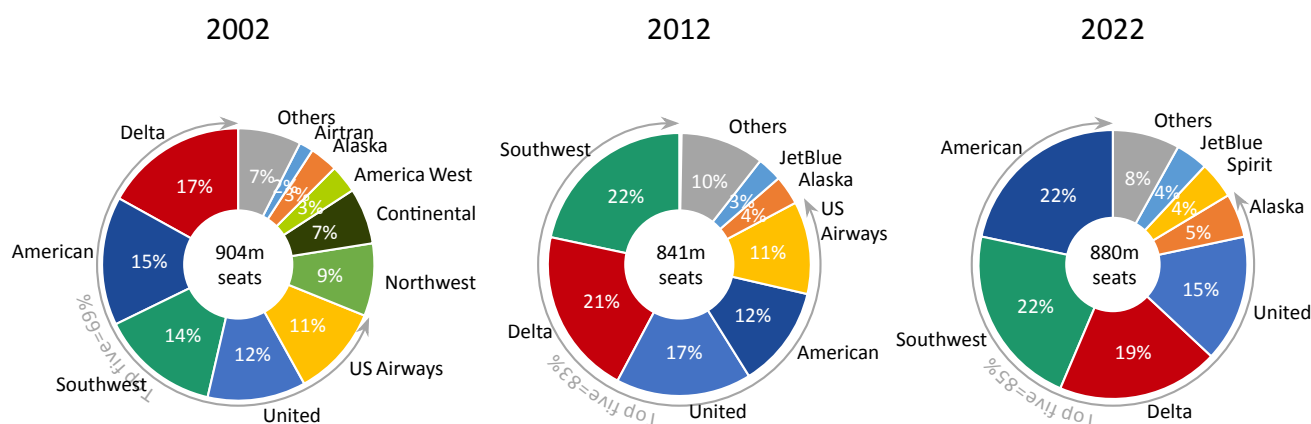
In consequence the interconnecting hubs in the centre of the country that make sense in the USA have no

role in Europe. Network hubs in Europe are primarily for intercontinental connections, and mostly rely on strong O&D demand to large capital cities.

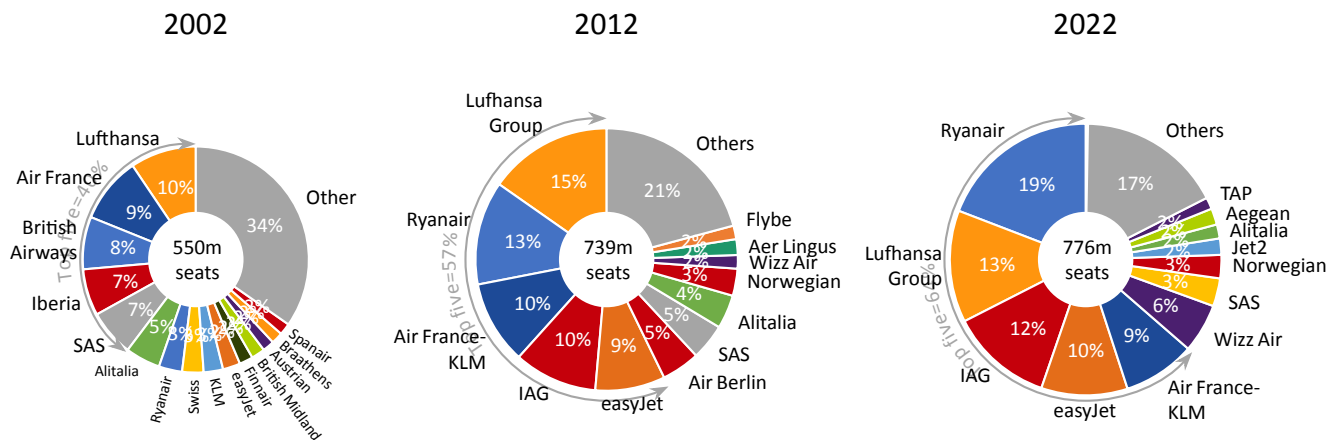
Importantly the EU is no federation, individual countries within it still have some residual need for a “flag carrier”, whether or not there is a real commercial need. (Slovenia, whose former national carrier Adria Airways collapsed in 2019, is said to be looking to create a new flag carrier). And international routes are still influenced by ownership restrictions inherent in bilaterals.

Despite all this, there has been a substantial move towards concentration. The top three network legacy groups have been formed from a series of judicious mergers — all seemingly encouraged by the European Commission: the Air France-KLM merger “of equals”

US DOMESTIC CAPACITY



INTRA-EUROPEAN CAPACITY†



Source: schedules data.

Notes: † seat capacity within and between countries of Europe (excluding Russia, Türkiye and CIS)

in 2004; Lufthansa's opportunistic acquisitions of Swiss, Austrian and SN Brussels from 2005 in order to protect its tedesco-phonie heartland; the creation of IAG in 2011 (the structure benefiting from the mistakes the other two majors had made) through the merger of British Airways and Iberia, and subsequent plug-in acquisitions of Vueling and Aer Lingus.

In 2002 the top five airlines (then all legacy network carriers) controlled 40% of the intra-European seat capacity (see graph above). By 2022 the top five had 64% of total seats. The constituent parties have changed: the ULCC Ryanair has jumped over the Lufthansa Group into the top spot with a near 20% share, LCC easyJet has overtaken Air France-KLM with a 10% share; fast-growing runner-up Wizz Air would give the top six carriers a 70% share. Meanwhile erstwhile major players such as SAS and Alitalia are much smaller in actual terms.

IAG and Lufthansa are currently going through regulatory approval for

their acquisitions respectively of Air Europe and Alitalia.

Portugal is reported to be about to put TAP up for sale (again) — see *Aviation Strategy*, May 2022, April 2015, and June 2011 — as a remedy for having bailed the carrier out during the pandemic. This should see strong interest from IAG, Lufthansa and Air France-KLM — TAP has a strong position on routes to Latin America, and particularly Brazil. But it will depend on the terms of the sale: Portugal has said it wants to keep a stake.

Likewise, The Azores has to find outside capital for its airline because it supported its carrier SATA Air Açores. That won't make much difference: it is a tiny niche player with six Dash-8s in its fleet.

Further north SAS, half the size of its former self, is on the search for the investors to allow it to emerge from Chapter 11 bankruptcy.

It is notable that the recent deals have involved a significant overlap in routes between the acquirer and ac-

quired. The Commission in Brussels in its reviews of airline mergers considers the competitive issues on a route-by-route, point-to-point basis. Where combined market shares are deemed to high it requires remedies, usually slot disposals, to new entrants. The beneficiaries are likely to be the LCCs: Ryanair, easyJet and Wizz.

Is this the way the European industry will continue to develop: the three large airline groups grow by selective opportunistic acquisition; the LCCs grow organically, helped by access to airports; the smaller, unwanted players fade into obscurity.



Rinascimento d'Alitalia: Lufthansa takes on ITA

LUFTHANSA announced at the end of May that it had finally reached agreement with the Italian Government to acquire Italia Trasporto Aero SpA (ITA Airways), the successor to Alitalia.

Under the terms of the agreement it will acquire a 41% stake by investing €325m in cash for new equity in the company, the Italian government injecting a further €250m. Lufthansa has the right to take full ownership depending on a certain pre-defined pricing mechanism relating to the operating profitability and net debt performance of ITA Airways. Italy also has the right to force Lufthansa to buy its remaining stake if ITA delivers or exceeds performance targets laid out in a jointly-agreed business plan. Neither put option dates, details of pricing nor business plan were disclosed. The deal is expected to close by the end of 2023 and is subject to regulatory approval from Brussels.

The structure of the transaction provides for joint operational control by the Lufthansa Group and the Italian Ministero dell'Economia e delle Finanze (MEF) immediately after closing. The MEF will remain "on board" to support the execution of the business plan, and Lufthansa will appoint ITA's CEO and one other member of the five-strong board of directors.

Why has Lufthansa decided to acquire the remnant of what had been for so many years as a financially inept basket case?

Lufthansa states that Italy is the fifth most important market for the group, behind the USA and

"home" German-speaking markets of Germany, Austria, Switzerland (and Belgium?) and says the group carries more passengers between the US and Italy than it does between the US and Germany. In its presentation it also states that Milan in 2019 was the second, and Rome the sixth, largest destination for local passenger traffic within the EU (now that the UK has left). More generally, Italy is the third largest economy in the EU (now that the UK has left) and the third largest airline market in Europe.

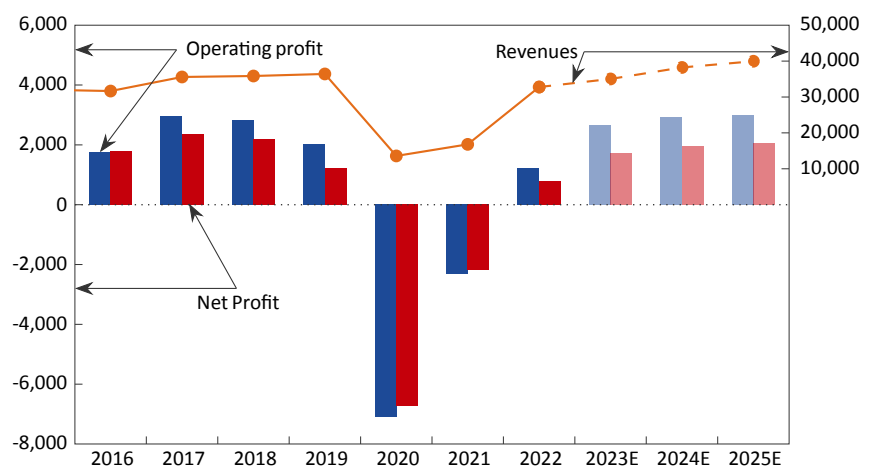
Lufthansa is not new to Italy. Its regional subsidiary Air Dolomiti, based at Verona and fully consolidated since 2003, provides useful feed from the Po valley to the group's hubs in Frankfurt, Munich and Zürich. (It did at one point try to operate a narrowbody operation in the country, dubbed Lufthansa Italia and based at Milan Malpensa with nine

A319s. Started in 2009 — following a previous implosion of Alitalia — that operation was closed after two years of operations in 2011, with the excuse that it was impossible to make money operating an airline in Italy. It was also likely that they had also chosen the wrong airport.)

Among the other arguments in the group's presentation to analysts on the announcement of the deal were:

- ➔ Attractive proposition to grow a profitable long-haul business in Rome;
- ➔ Well positioned to take advantage of Italy's importance as a "top private travel destination". (Note: for "private", read "leisure".)
- ➔ Potential to feed passengers into the group's existing long-haul network and those of its joint-venture partners;
- ➔ Significant cost synergies;

LUFTHANSA GROUP FINANCIAL RESULTS (€m)



Source: Company reports, Barclays estimates.

➔ Opportunities for Lufthansa Cargo and Lufthansa Technik.

Carsten Spohr, the group's CEO, specified three main reasons for the attraction:

➔ **Geography.** All the current LHAG hubs are northern Europe based (the most southerly being Zürich). He said: "I think we are missing a southern hub compared to our European competitors, especially for the growing traffic in and out of Africa and Latin America".

➔ **Capacity.** He felt that Zürich and Frankfurt had both reached capacity limits, and while expansion could be possible in Munich and Vienna, there is growth potential in Rome.

➔ **Local demand.** Rome is a strong point-to-point inbound market — particularly from the US and Asia. Milan is a strong point-to-point outbound market.

Flag transformed

Lufthansa is keen to point out that the airline it is buying into is a vastly different beast from the predecessor.

Alitalia, effectively bankrupt and in "extraordinary administration" since 2017, shored up by "illegal" state aid of €1.3bn, was finally re-nationalised in March 2020. In its last year of operation it had carried 23m passengers with an operating fleet of 113 aircraft and employed

nearly 11,000 people. (A strange comparison: in 2008, the year of Alitalia's previous bankruptcy, the airline had carried 23m passengers on a fleet of 178 aircraft and had 11,000 employees). There are no publicly available financial details for 2019, but Alitalia's revenues probably exceeded €3bn but it was reputed to be losing €1m a day.

The Italian government earmarked €3bn to set up a new flag carrier. The EU Commission, miffed by the previous (blatantly illegal) state aid, insisted that there should be a clear break and the investment (restricted to €1.35bn) be "in line with the terms that a private investor would have accepted": Alitalia's assets should be sold by open tender; the new carrier should not retain the Alitalia brand; the frequent flyer programme MilleMiglia should be sold to a third party (it was put up for auction in Nov 2021 and closed permanently in Jan 2023); the new carrier should not take on all the predecessor's slots, particularly at Milan Linate.

ITA Airways was, unsurprisingly, successful in acquiring the Alitalia brand for €90m in an "open" tender, and started operations in 2021.

The new airline, Lufthansa avers, has been "fully restructured and set up as a structurally cost-competitive

airline, with no legacy issues associated with the old Alitalia":

- ➔ Pilots and cabin crew contracts renegotiated with no pension obligations inherited;
- ➔ Ground handling and maintenance fully outsourced;
- ➔ Homogeneous Airbus fleet;
- ➔ "Reset" of the IT and supplier landscape;
- ➔ Smaller short-haul network, long-haul focused on high yielding markets.

In 2022, its first full year of operation, ITA Airways carried 10m passengers on a fleet of 66 leased aircraft with 3,900 employees; it generated €1.5bn in revenues, and made an EBITDA loss of €338m. It apparently ended the year with cash of €418m and gross debt (all operating-leased based) of €1bn. The cash would stand at just under €1bn on a proforma base following the envisaged capital increase from the Lufthansa deal.

Network/fleet plans

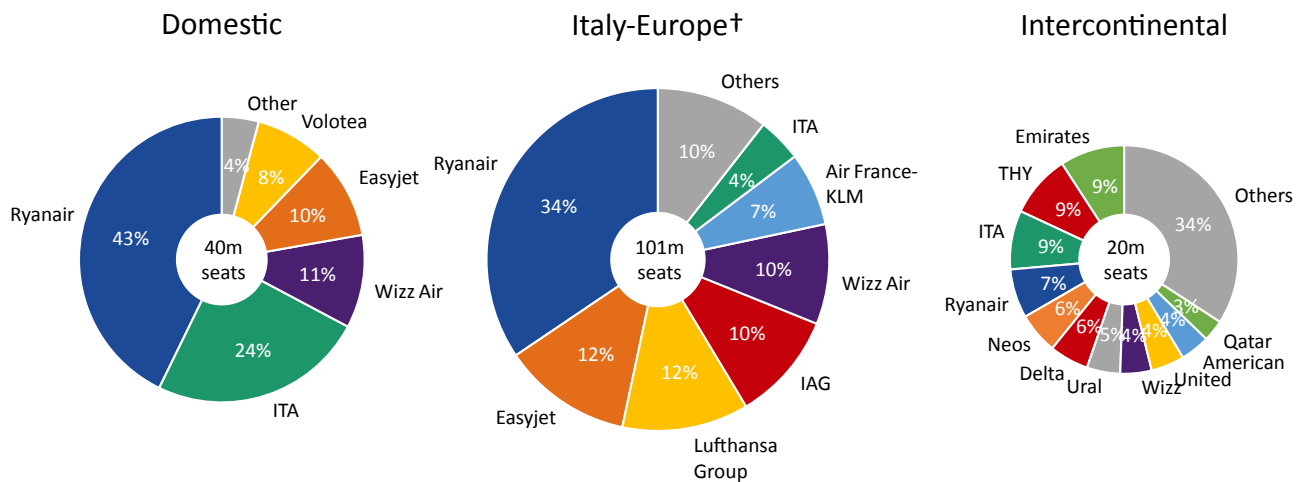
Lufthansa needs to turn ITA Airways into a profitable airline. The first steps will be to ensure the network is complementary to the existing group network, develop Rome's Fiumicino airport into a profitable hub, grow the long haul fleet from 14 to 24 aircraft, restoring connections to North and South America, and select Asian destinations. They plan to build on ITA's dominant position in Milan Linate (where it has 60% of the slots); improve the profitability of short-haul by optimising the network and "expanding intermodality".

The latter is an intriguing idea. Unfortunately, unlike at Frankfurt airport, the high speed trains do not have a stop at Rome's airport — passengers have to connect in central Rome — while Linate is not connected to the rail network at all.

ITA AIRWAYS: FLEET

	In service	Avg Age (yrs)	On Order
A220	4	0.8	7
A319	16	16.7	
A320ceo	26	15.6	
A320neo	7	0.4	6
A330	10	10.6	
A350XWB	6	3.6	
Total	69	11.8	13

ITALY: MARKET SHARES 2022



Notes: † Europe excluding, Intercontinental including Türkiye, Russia and CIS.

Maybe they are thinking of buses.

Medium-term plans see growing the fleet back to 94 aircraft by 2027 — there are seven A220s and six A320neos on order from Airbus, while apparently there are also lease commitments (primarily with Air Lease) for 10 future A330neos and a further five A320s.

Synergies will presumably come from the the superior buying power and common back-office group functions of Lufthansa Group: fleet, fuel, ground processes, finance, legal and IT.

Competitive concerns

The deal will be subject to approval by the European Commission Competition Directorate. At the meeting Lufthansa said it expects that the competition issues will be relatively benign, particularly because ITA is so weak in its home market. ITA Airways overlaps with Lufthansa group airlines on only a handful of city-pairs representing 6% of ITA's capacity. But where it does overlap, the combination could create monopolies on four

city-pairs, and high market shares on another five.

The combination would also increase the group's dominance at Linate — Lufthansa group airlines have 7% of the slots to add to ITA's 60% (in 2019 the former Alitalia had controlled 70% of the slots). There is less of a problem in Rome where ITA has only 30% of the slots, and the Lufthansa group airlines 6%. (The second largest operator is Ryanair with 16% of the slots).

It is possible that Brussels will require remedies.

A strategic struggle

The newly born ITA Airways is a shadow of its predecessor's former self. Alitalia 25 years ago was the seventh largest airline in Europe, and the 27th largest in the world. Its network has halved from the 250 routes covering 140 destinations it operated worldwide prior to European deregulation.

LUFTHANSA/ITA AIRWAYS OVERLAPPING ROUTES

	City-Pair	LHAG+ITA	#2	Share	Total Seats 2022 (m)
Milan	Brussels	66%	Ryanair	34%	1.77
	Frankfurt	51%	Ryanair	49%	2.18
	Hamburg	61%	Ryanair	35%	0.46
	Ruhrgebiet†	82%	Ryanair	18%	1.18
	Stuttgart	100%			0.27
Rome	Brussels	51%	Ryanair	49%	1.75
	Frankfurt	100%			1.02
	Munich	100%			1.33
	Zürich	100%			0.88

† Covering airports round Düsseldorf, Essen and Köln

ITA Airways has inherited a weak position in its home market, with a mere 24% of domestic seat capacity, nearly half that of market leader Ryanair (see chart on the previous page). It has only a 4% share of the market between Italy and the rest of Europe. The largest operators on routes from outside Europe into Italy are the superconnecting Emirates and THY, ITA itself having only a 9% share.

The real dilemma is that Italy is really two disparate countries within one. The north, and particularly the Po valley, is the wealthy industrial area and home to a third of the country's population of 59m. The south — the Mezzogiorno — is relatively impoverished with regional annual per capita incomes less than half that of the North. The industrial north is centred in Milan; the political centre is in Rome. There are strong traffic flows between them undermined by the development of high speed rail.

Italy, like the other Mediterranean countries, is a tourist destination. Although Rome is a cultural and religious tourist attraction in itself, inbound tourist traffic is generally intent on reaching the leisure destinations, well away from the industrial or political centres: highly seasonal and price oriented.

However, there is also strong demand from the Po valley on longer haul routes, and this (without having to go through Milan) is easily diverted to feed the major European hubs on the North Atlantic (notably Frankfurt, London, Paris, Amsterdam, Zürich and Munich), South Atlantic (Madrid and Lisbon), or with the building of services from the superconnectors to the East via the Gulf or Istanbul. (Apart from Rome, Emirates flies into Bologna, Venice and Milan Malpensa from which it operates a

fifth-freedom service to New York. THY attacks Bologna, Catania, Venice, Naples on top of Rome Fiumicino and Milan Malpensa).

Each of these is able to offer more numerous and convenient connections supported by underlying O&D demand — a factor exploited for many years by Lufthansa through its Air Dolomiti subsidiary.

Because of this, Italy is perhaps not suited to operating traditional transfer hubs in Europe. Rome is too far south to access convenient connections on the Atlantic or to the Far East except perhaps from within Italy. Milan Malpensa may be better but is stymied by the attractiveness of Milan Linate for high yield point-to-point demand required. Rebuilding the Rome hub will be a challenge.

The most important long haul routes are to the US, driven by long-standing cultural affinities from the Italian diaspora. But they tend to be highly seasonal.

Italy has strong cultural links on the South Atlantic, particularly into Argentina and Brazil (the most popular destinations, behind the USA, of the Italian diaspora of the early 20th century), but the south western European hubs of Madrid and Lisbon may have more convenient routings and timings for a feed of passengers from Northern Europe.

More importantly the LCCs have successfully moved into the vacuum left by Alitalia's implosion. Rebuilding the shorthaul network into Rome, where ITA has only 30% of the slots, to provide the necessary feed could be a costly exercise. Despite the renegotiated cost base, it seems impossible that ITA Airways' unit costs would be anywhere close to those of ULCCs Ryanair or Wizz.

Low risk acquisition

From Lufthansa's point of view, it is moving into Italy in a relatively cautious manner. For the cost of a couple of aircraft it will be able to try its hand at creating a profitable network carrier in Italy, something generations of highly proficient international airline managers have failed to do.

Importantly for the group, it is initially acquiring only a minority stake and will not need to consolidate the losses or debt. It will only take a majority once ITA Airways is profitable. (This is the same process it followed when it acquired SWISS).

It also snatches the Italian carrier out of the hands of arch-rival Air France-KLM.



Ryanair and Wizz: Implications of Moderate and Fast Growth Plans

THE FORTUNES of Europe's two ULCCs — Ryanair and Wizz Air — diverged dramatically during the pandemic. Will they converge in the future?

Ryanair carried 168.6m passengers in FY2023 (year to March 2023), which was 19m more than in FY2020, the last pre-pandemic year. Post-pandemic, it was able to ramp up operations and add capacity without the disruption that affected most other airlines. Ryanair minimised staff redundancies during the pandemic, striking deals with key unions whereby employees were retained in return for temporary pay cuts, and implemented a policy of rotating its flying crew on the greatly reduced services, so keeping their licences current.

Wizz saw commercial opportunities from the pandemic; its plan was to pursue growth aggressively, building up its A321neo fleet rapidly and entering new markets where the incumbents were perceived to be weak. Passengers carried in FY23 totalled 51.1m, 17m more than in FY2020, although its average load factor was 88% compared to 93% at Ryanair.

However, the upturn in traffic at the two airlines was associated with two contrasting financial results. Ryanair produced a net profit of €1.43bn, a 13.2% margin on revenues of €10.78bn, a remarkable turnaround from the (€355m) net loss of the previous year. Wizz reported a net loss of (€535m), a -13.7% margin on revenues of €3.89bn, only a marginal improvement on the

previous year's loss of (€642m).

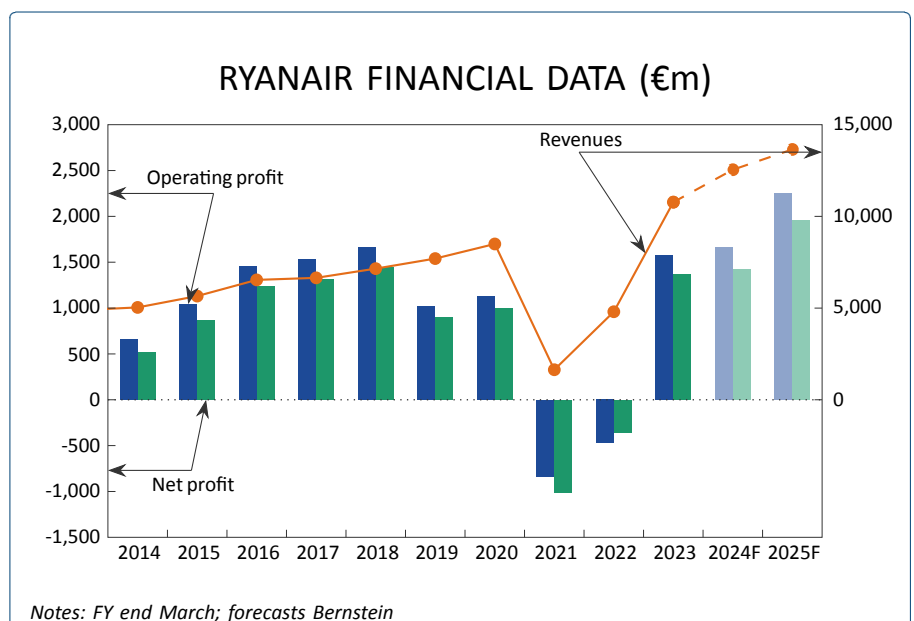
Much of Wizz's dire financial performance is related to a decision made in 2021 to go to a policy of no hedging on fuel and currency, because it had lost out on its previous hedging positions. This proved disastrous when fuel prices surged and the euro weakened against the dollar; total unit costs rose about 40% compared to pre-pandemic. Ryanair by contrast has been fully hedged.

Last year Wizz reinstated its jet fuel and currency hedging policies, and it hopes that the losses of the last two years will come to be regarded as "exceptional", and focus will shift to the airline's more robust cashflow performance (see tables on the following page).

However, the damage to the balance sheet has been done: by March this year Wizz had slipped to a negative net value of (€358m), with total debt and other liabilities exceed-

ing total assets. Ryanair, by contrast, has a very strong balance sheet with shareholders equity of €5.6bn. It also has €4.6bn in cash and near cash compared to €1.4bn at Wizz.

Financial prospects in the near term for all European airlines are positive, characterised by a surge in post-pandemic demand, a strong yield environment and a moderation in unit costs. Wizz CEO József Váradi has stated that for FY 2024 he expects the airline to grow ASKs by 30%, push up load factors to over 90% and achieve a full-year net profit of €350-450m, which will go a long way to restoring the balance sheet. Ryanair has highlighted its strong fare performance in the first quarter of FY2024, but Michael O'Leary is being very cautious about projecting for the full year. However, the transport analysis team at Barclays, now led by Andrew Lobbenberg, refreshed by his gardening leave, reckons that Ryanair's rev-



Aviation Strategy

venues in FY2024 will be €13.9bn, 12% up on FY2023, and pre-tax profits will reach €2.5bn, a 30% improvement.

Regional fortunes

A fundamental problem is indicated by these two graphs on the next page which show changes in scheduled seat capacity between 2019 and 2022 for the two ULCCs on their respective 20 top country-pairs. For Wizz, the devastating effect of Russia's invasion of Ukraine can be seen in the

Ukrainian and other eastern European markets. Only Romania shows a consistent growth pattern.

Wizz set out to exploit the pandemic by taking an opportunistic approach, and it did grow its overall capacity markedly during this period, but its strategy of entering new markets with uncertain demand and, in many cases, offering low frequencies, soon found its limits, causing the airline to close some of its new bases in Italy and the Balkans as well as pulling

back in the UK and Norway. Wizz has resolved to change this strategy by focusing almost totally on building presence, ie multi-daily frequencies, in its existing markets. Finding new markets is challenging. Its major expansion this year has been in the Albanian market, undoubtedly underserved but with limited potential.

There is also its Middle East operation. It is in the process of building its Abu Dhabi-based fleet to 15 units, and is hoping to exploit the op-

RYANAIR HOLDINGS FINANCIAL DATA (€bn)

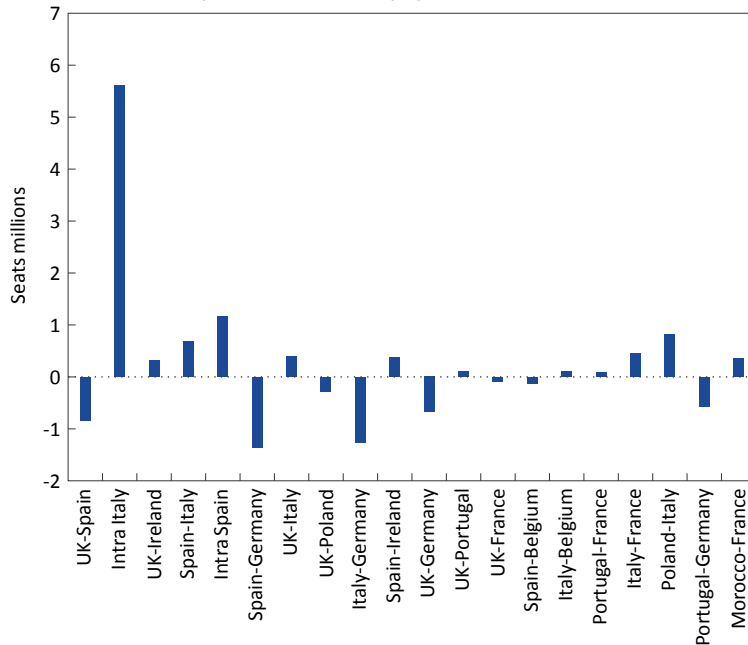
Year ending March 31	2019	2020	2021	2022	2023		Mar-23
Revenues	7.7	8.5	1.6	4.8	10.8	Fleet assets (inc lease rights)	10.1
Net result	0.9	0.7	-1.1	-0.2	1.3	Intangibles	0.1
Operating Cashflow	2.1	1.3	-2.4	1.9	3.9	Cash and short term deposits	4.6
Capex & Acquisitions	-1.5	-0.6	-0.3	-1.2	-1.9	Other current assets	1.6
Other Investment Income (Expenditure) Net	0.5	0.3	1.2	-0.2	0.0	Total Assets	16.4
Free Cashflow	1.1	1.0	-1.5	0.5	2.0		
Net increase (decrease) in debt	-0.4	0.3	1.2	-0.5	-1.1	Long term debt	3.0
Share Issues			0.4			Other long-term liabilities	0.4
Dividends & Share buy-backs	-0.5	-0.6				Other current liabilities	7.40
Total Change in Cash	0.2	0.7	0.1	0.0	0.9	Total Liabilities	10.8
						Shareholders' Equity	5.6

WIZZAIR HOLDINGS FINANCIAL DATA (€bn)

Year ending March 31	2019	2020	2021	2022	2023		Mar-23
Revenues	2.32	2.76	0.74	1.66	3.89	Fleet assets (inc lease rights)	4.67
Net result	0.13	0.30	-0.58	-0.64	-0.53	Intangibles	0.00
Operating Cashflow	0.74	0.77	-0.22	0.28	0.43	Cash and short term deposits	1.41
Capex & Acquisitions	-0.2	-0.45	-0.25	-0.54	-0.64	Other current assets	0.95
Other Investment Income (Expenditure)	0.14	-0.23	0.10	0.23	1.17	Total Assets	7.03
Free Cashflow	0.68	0.09	-0.37	-0.03	0.96		
Net increase (decrease) in debt	-0.34	-0.1	0.62	-0.32	-0.31	Long term debt	5.30
Share Issues						Other long-term liabilities	0.16
Dividends & Share buy-backs						Other current liabilities	1.93
Total Change in Cash	0.34	-0.01	0.25	-0.35	0.65	Total Liabilities	7.39
						Shareholders' Equity	-0.36

Note: 2022 restated

RYANAIR: CHANGE IN SEAT CAPACITY 2019-2022
(Top 20 country-pairs in 2019)



opportunities offered by the opening of the Saudi market. These opportunities may, however, be only temporary as Riyadh Air, having committed to 72 787s, is poised to place a narrowbody order with either Boeing or Airbus for 150 MAXs of A321neos (see *Aviation Strategy*, Dec 2022).

Ryanair has concentrated most of its growth efforts into the Italian market, both domestic and international, taking full advantage of the downsizing of the ever-declining Alitalia and its tortuous evolution into ITA (see pages 13-16). Over half of Ryanair's 737-8200 deliveries were placed in Italian markets, and the airline estimates that it now has a market share of over 40%.

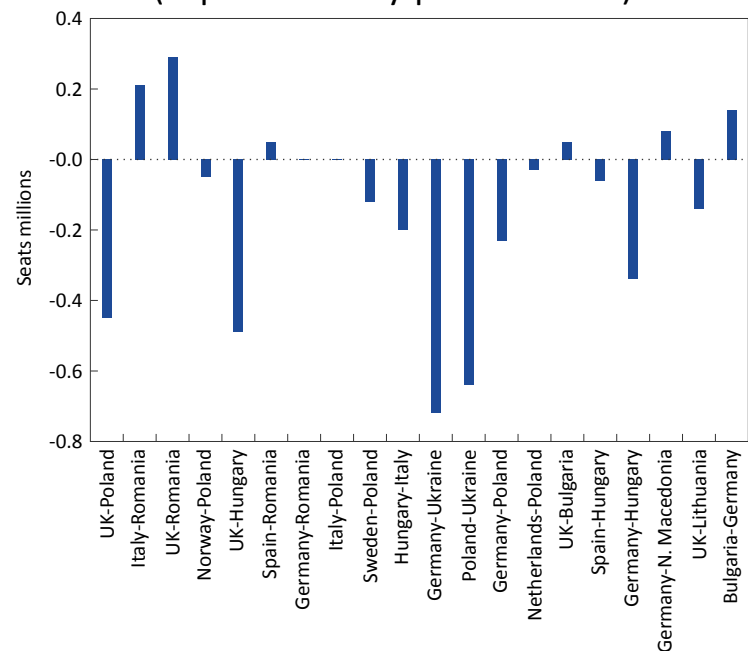
At the same time Ryanair continued its policy of airport churn, cutting capacity or pulling out of airports where it cannot get costs down to its required level. Last year Ryanair was deeply unhappy about German airport charges and pulled out of Munich, Stuttgart, Hanover, Düsseldorf and Frankfurt am Main.

Fast and moderate growth paths

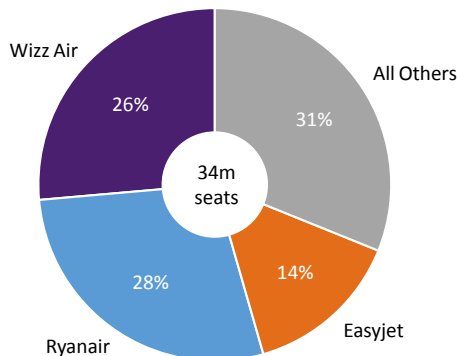
The ULCCs' longer term strategies are based on different growth paths — very rapid in Wizz's case and moderate, at least compared to historical rates, in Ryanair's case.

Building on the mega-order placed by Indigo Partners in 2017, Wizz Air last year exercised options of 75 A321neos for delivery in 2028-29 as part of its plan to be a 500 aircraft airline by 2030. Its fleet at the end of FY2023 consisted of 179 A320 family aircraft. Of its 365 firm orders, 13 were A320neos, 305 A321neos and 47 A321XLRs. With 239-seat A321neos replacing 180-seat A320neos its total capacity will triple between 2023 and 2030 with an expected increase in passengers

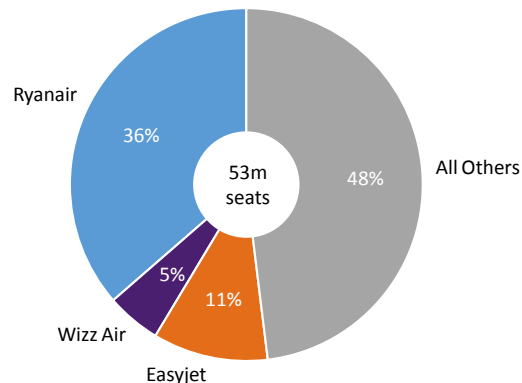
WIZZAIR: CHANGE IN SEAT CAPACITY 2019-2022
(Top 20 country-pairs in 2019)



WIZZ AIR TOP 30 CITY PAIRS
CAPACITY SHARES 2022 EST



RYANAIR TOP 30 CITY-PAIRS
CAPACITY SHARES 2022 EST



from 51m to at least 180m by 2030.

At the end of 2020, in the depth of the Covid-19 recession, Ryanair renegotiated the pricing on its 2014 MAX order for 135 units and placed an additional order for 75 737-8200s (as Ryanair designates the aircraft), the first MAX order Boeing received in the pandemic. In May this year Ryanair confirmed its long-awaited mega-order for 300 MAX-10s (150 firm and 150 options), half of which will replace older 737NGs and half allocated to growth.

Ryanair's has been able to combine its bulk purchasing power with critical timing to win very deep discounts — we would guess its unit price for the 2020 order to be in the range \$35-40m, roughly a 70% discount on the theoretical \$122m list price. Negotiations for the MAX-10 were more prolonged and made more difficult as new customers like Air India and Riyadh Air placed mega-orders, but we would still expect a 60% discount on the theoretical list price of \$135m, implying a unit price

of around \$54m and giving a total order value of about \$16bn.

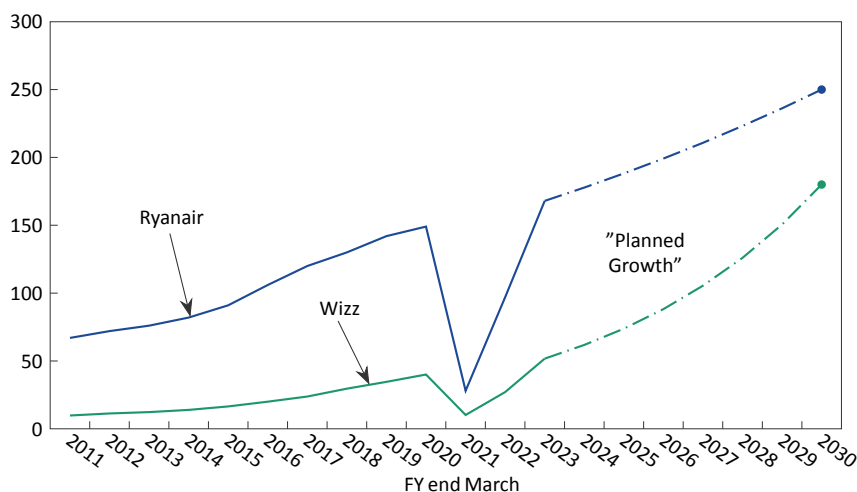
As at the end of FY2023 Ryanair was operating a fleet of 537 aircraft, all 737s NGs and MAXs except for 28 A320s at Lauda. Its firm orderbook consisted of 112 737-8200s, plus the 300 MAX-10s (assuming the options will be converted). With 197-seat 737-8200s replacing the 188-seat NGs by the end of 2024 and the 228-seat MAX-10 coming in from 2027, Ryanair expects traffic to hit 300m by FY2034, 80% up on 2023.

Ryanair expects to finance its deliveries, at least over the next few years, primarily out of cashflow. Wizz is reliant on sale and leaseback for its financing, and while the operating leasing market has remained remarkably strong, escalating interest rates will put upward pressure on lease rates and downward pressure on aircraft prices.

Traffic projections

This graph left brings together traffic projections up to 2030 for the two ULCCs based on fleet plans and public pronouncements. Wizz's "planned" CAGR is close to 20% pa whereas Ryanair is going for a stately

RYANAIR AND WIZZ TRAFFIC TO CONVERGE



Aviation Strategy

6% pa (and, as Michael O’Leary has observed, there will be some unexpected event that will make a mockery of these projections).

The implication of these growth lines is a little problematic; they indicate that, in terms of passengers carried, Wizz will be 72% the size of Ryanair by 2030 compared to 35% today. Is this trajectory feasible?

The two pie charts on the preceding page are based on scheduled seat capacity in 2022 and relate to the top 30 city-pairs (ie, all airports on all routes between two cities) for the Wizz and for Ryanair networks. It is noticeable that, although Wizz is the number one carrier on the majority of its top routes, overall Ryanair provides roughly the same amount of capacity on these routes.

By contrast, in the Ryanair top 30 city-pairs network, Ryanair is clearly the dominant carrier, dwarfing Wizz’s capacity. It is also significant that “other airlines”, which includes a large amount of Legacy capacity, occupy almost a half of Ryanair’s potential market.

It is not clear how Wizz can achieve critical mass in markets dominated by Ryanair. It could, perhaps

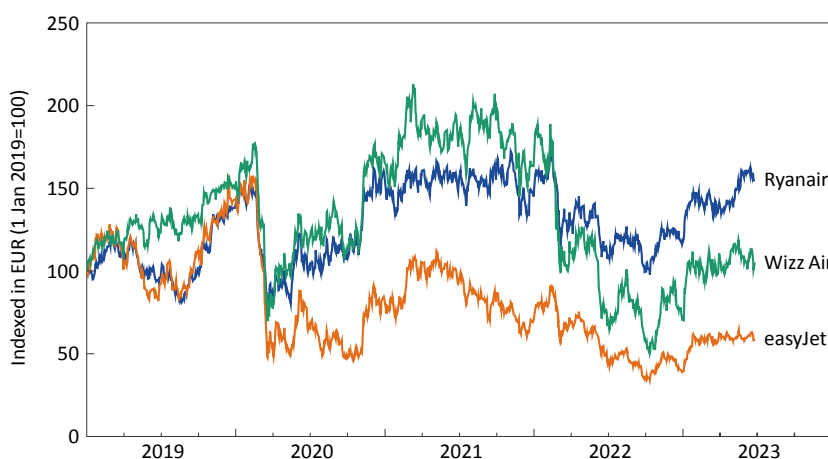
resurrect the idea of a merger with easyJet, but easyJet seems to be going in a different strategic direction and might even end up as part of IAG. In terms of unit costs the two ULCCs are by some margin the lowest cost operators in Europe, and there is little between them — Ryanair’s costs are better when measured on a per passenger basis, Wizz’s better on a CASK basis — but in head-to-head battles Ryanair has the two great advantages over Wizz — market dominance and a very strong balance sheet.

However, it is possible that, influenced by the Ukraine war, we are underestimating the potential of the Central and Eastern European (CEE) market. Bernstein, which takes a very positive view of Wizz, calculates that structural demand in the CEE market will generate the requirement for 414 additional narrowbodies by 2023. Ryanair is likely to provide 105 of these additional aircraft and the network carriers and other another 61; this leaves a residual demand opportunity of 248 units, which is equivalent to 73% of Wizz’s planned fleet growth to 2030.

Unfortunately for Wizz, Ryanair announced in June that it was going to focus expansion on the CEE, targeting not only Poland, where it has a strong position, but also Romania, Bulgaria and Hungary.



EUROPEAN LCC SHARE PRICE PERFORMANCE



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