

Even taking into consideration the effects of the current downturn, airlines are able to acquire aircraft at financing rates previously unimaginable. This raises the issue of whether new types can displace older aircraft earlier than previously expected.

The effects of reduced lease rates on fleet planning

Operating lease rates for new aircraft have fallen over the past 3-5 years, and are now at a level where replacement of aircraft is justified at an earlier age. Operating lease rates are low for the A320 and 737NG families, so can this be enough to provide a case for replacing older aircraft? An airline needs more reasons to replace a fully depreciated MD-80 than an owned 737 Classic which still may have financing charges. The economics of replacing the same aircraft on operating lease requires a different consideration.

Reasons for replacing older aircraft with modern types include 'family' benefits of spare parts, training and flight crew commonality; the ability to more easily match demand with supply; and the now lower lease rates of new aircraft on the market. A modern fleet can be acquired, while retaining a similar or lower lease structure. Moreover, the current market provides many airlines with the opportunity to acquire a new fleet at bargain financing rates, which may not be possible in a few years.

Lower lease rates are not just a product of the industry downturn. Lease rates had fallen before the downturn due to purchase discounts and the lower cost of debt that operating lessors could secure.

Market conditions

The market values of mid-production 737 Classics are estimated to be \$8-10 million, while the MD-80 has been devalued to near-zero.

The 737 Classic is relatively young. The majority of 737-300s are 10-13 years old, and 737-400s 9-12 years old. There is no realistic market demand for the MD-80, since a secondary market has not

been established. It is, nevertheless, a durable aircraft and capable of at least 10 more years of service.

Major lessors are seeking to place the 737NG and A320 families. An airline needs to consider whether the benefits of family commonality, operating efficiencies, maintenance holidays and attractive lease rates can offset the appeal of a fully depreciated aircraft, or aircraft with low lease rates and acceptable operating costs. This latter group includes the 737 Classics and younger MD-80s, and many airlines will be locked into leases or debt terms set more than five years ago. These financing rates are lower than they were for A320 or 737NG family aircraft three to five years ago. The fall in rates for new aircraft brings the cost of financing for new and middle age aircraft closer together.

Some airlines will be paying lease rates for older types that are even higher than current rates for new aircraft, because they have not renegotiated lease terms. US Airways, for example, fought hard to change its lease structures and defaulted on payments prior to entering Chapter 11 bankruptcy protection. Its aircraft lease rates have now been renegotiated.

The decision to replace older aircraft will mostly be determined by the lease rates available, and the benefits of fleet commonality. Airlines with owned aircraft may be able to use sale and leaseback techniques to provide an exit strategy, while leased aircraft could be returned if the lessor was providing the new aircraft, minimising penalty payments.

Airlines should analyse the economics of replacement by examining the difference in securing new aircraft at current lease rates and at lease rates it would have paid three to five years ago.

Prior to 1999, the market lease rate for an A320 was about \$430,000, while a 737-700 was in the region of \$410,000-430,000. Access to cheaper debt, combined with a depressed market, has resulted in lessors offering aircraft at much reduced rates. An A320 or 737-800 could now be leased at about \$300,000 and \$290,000 per month.

Family commonality

A selling point for new generation aircraft is parts and flight crew commonality.

Airbus has pushed the benefit of its A320 family's cross crew qualification (CCQ). This allows operators to match aircraft to traffic demand, while using a single aircraft type. CCQ makes crew scheduling easier and reduces training costs.

The 737NG also offers family commonality, with the -600/-700/-800/-900 providing seat capacity from 108 (-600) to 195 (-900).

The MD-80 is not able to offer the same flexibility. Other types are required to cater for different levels of demand, which increases costs because a second or third type incurs new levels of support.

The 737 Classics were the first family to be conceived. Its shortcomings are that the 145-seat -400 is its largest size, and the family does not have the extensive commonality benefits of the A320 or 737NG families.

While operators were previously willing to accept these types of shortcomings, the reduced acquisition cost of new aircraft makes the economics of moving to a new fleet, earlier than originally expected, feasible.

The aircraft family concept has had a dramatic effect on fleet planning decisions, with most major carriers



rationalising their fleets to a smaller number of aircraft types. Lufthansa, for example, simplified its short-haul fleet from four types to one revolving around the A319/320/321. USAirways has followed a similar strategy, as have many other carriers. Several carriers are now rationalising with the 737NG.

Examples of European airlines rationalising fleets are British Airways, Finnair, Air France, Swiss, Iberia, TAP and Aer Lingus. This has led to a large re-equipment process across the whole of the industry in the past five years.

An aircraft family is an effective selling tool, and offers considerable financial benefits. The sluggish sales of the 717 are partly attributed to its orphan status within the Boeing product line, significantly reducing its attractiveness.

One exception to the appeal of a variable sized aircraft family concept is the low-cost carriers. Hub carriers prefer different aircraft sizes to match supply with demand. Low cost airlines do not have this problem, and use price to fill their excess capacity. Additional demand can be addressed by offering higher

frequency. Low cost airlines have taken the process of reducing aircraft types even further by opting for single-type fleets. easyJet has ordered A319s, JetBlue operates A320s, Ryanair uses 737-800s, and AirTran 717s. These carriers use the same aircraft type to reduce complexity, maximise crew productivity and simplify operations.

Part and component commonalities are a factor in selecting aircraft families, because inventory investment is reduced. Component commonality allows family variants to share up to 90% of spares, reducing the need for the separate inventories that would be required if the airline operated several types. A family reduces inventory cost per aircraft, and so operating and maintenance costs.

Overall, traditional and low cost airlines have both followed the strategy of simplifying fleets with a reduced number of types. It is generally accepted that reducing aircraft types in favour of fleet/family commonality results in reduced costs and scheduling complexities, while offering the flexibility to meet varied passenger demands.

The A320 family offers lower cash operating costs than older types through low fuel burn and maintenance requirements, and also the benefits of parts and crew commonality. Until five years ago, the technological benefits of new aircraft were not enough to justify their acquisition, since they also had high financing charges. The low lease rates new aircraft can now be acquired for means airlines can enjoy dual benefits.

Lease options

The reduction in aircraft lease rates is a combination of reduced aircraft purchase price, financially stronger lessors, and the current market downturn. Lessors are able to negotiate large discounts from manufacturers for large orders. This saving can be passed on to lessees in the form of reduced charges. Manufacturers offer lower purchase rates for new aircraft, both to win orders and maintain production lines. Despite a weak industry in 2002, Airbus and Boeing both won large orders for their narrowbodies; Boeing sold 100 737-800s to Ryanair, while Airbus sold 120 A319s to easyJet. While the value of neither deal has been disclosed, market analysts believe Ryanair would have received a discount of up to 50% per aircraft. It is speculated that easyJet's discount was similar, since Airbus was determined to gain a strategic low-cost airline customer, previously a preserve of Boeing.

The increased discounts offered by manufacturers have made it easier for lessors to maintain profits, even in the current environment, enabling carriers to secure good lease rates. The ability of lessors to offer new aircraft at attractive lease rates has also enabled them to place them in airlines that previously could not consider new types. This has increased lessors' market share, and also pushed older aircraft down into the third and fourth tiers of the used market earlier than expected.

The growth in operating leasing has been significant, from 10% of the market less than eight years ago, to 25-30% of all current aircraft transactions. This growth is partly driven by the increase in economic power that the lessors have, because of the lower cost of debt, allowing them to offer cheaper lease rates. It is also driven by the proliferation of second and third tier carriers, which do not have the required credit rating or financial strength to use other methods of aircraft financing.

Lessors have consolidated, generally through large finance institutions purchasing a lessor. AIG purchased ILFC, General Electric owns GECAS, and West LB owns Bouillion.

In each of the previous examples, the credit rating of the parent companies is

The 737NG family is an improvement on the 737 Classics. The 737NG has four types and larger aircraft to better match supply with demand. The 737NG also has better operating performance, lower fuel burn and maintenance costs and more extensive parts and crew commonality than the 737 Classics.

AAA or higher. The benefit to a lessor in having a strong ownership structure is in its ability to borrow internally, and take advantage of the lower interest rates offered to a company with a higher credit rating. This effectively allows them to source debt at a cost lower than market rate, and this benefit is passed on to lessees via lower lease rates. Industry estimates place the benefit of acquiring debt via a parent with a high credit rating in the range of 90-250 base points.

Operating leases have developed fast since 1973, when ILFC offered the first ever lease to Aeromexico. The increased popularity of operating leases is also due to declining interest in aircraft purchase options. While second and third tier carriers are unable to secure sufficient debt funding to purchase an aircraft, stronger carriers are also following this route. Carriers like BA are assuming more operating leases, and moving aircraft away from the balance sheet. Operating leasing provides fleet management flexibility and allows airlines to change aircraft types in a short period. Early retirement places a higher disposal charge on an airlines balance sheet, but does improve airline liquidity if aircraft ownership is replaced with leasing. Sale and leaseback is popular for airlines that want to phase out aircraft. This enables the release of equity back into the airline, thereby improving the balance sheet situation and making the company more attractive to investors. Cash reserves and balance sheets are strengthened by sale and leaseback deals.

The 737 Classic would be readily accepted by lessors for a sale and leaseback function, since the value of the aircraft will remain for some time, allowing the lessor to benefit from the residual value realised at the conclusion of the lease. Alternatively, a lessor may assume the aircraft and dispose of it on the airline's behalf. The MD-80 would also be accepted for sale and leaseback, or disposal, but the value would be very low, reflecting the aircraft's worth in the current market. Moreover, the lease rentals received over the short leaseback term would have to be high enough to completely amortise the cost of acquisition, as residual value is not available to offset the transaction cost.

Aircraft may still be on airline balance



sheets at rates higher than market values. The purchase price offered by a lessor would be low, and this may be unacceptable to an airline. Airlines are therefore not always in a position to dispose of older types and take advantage of the low lease rates of new ones. In these cases airlines could follow a strategy similar to the one that Northwest has used for its DC-9s, whereby a proportion of revenue generated by the aircraft is re-invested in the fleet, with the aircraft value run out over the residual airframe life. All maintenance reserves are depleted, and the aircraft retirement date coincides with a significant maintenance visit.

Economic analysis

Considering the cheap lease rates are available for new aircraft, should an airline seek to replace its ageing fleet?

This can be analysed by examining the economic performance, in terms of gross profit generation, of new aircraft and older types. Two scenarios need to be analysed where the MD-80 and 737 Classic are compared to new aircraft, the A320 and 737NG families, financed at previously available lease rates and currently available lease rates.

Financing rates

Comparing the gross profit performance of these aircraft should indicate if lower lease rates for new aircraft have fallen to levels low enough to make an economic case for replacing older fleets.

This assumes MD-80 and 737 Classic operators are locked into the same financing rates they would have had three to five years ago. These would be \$160,000 per month for the MD-80 (see table, page 12), \$250,000 per month for the 737-300, while the 737-400 was \$320,000.

These rates compare favourably to lease rates paid three to five years ago for modern types. Rates for an A320 was about \$430,000 per month, or a 737-800 at \$385,000 (see table, page 12).

These relative lease rates gave the MD-80 and 737 Classic cost advantages that more than offset the operational advantage offered by the 737NG/A320 families. This cost advantage is reversed when the new aircraft are offered at lower lease rates.

Lease rates for the 737NG and A320 have been reduced, making them more economic. The A320 can now be leased for \$300,000, while the 737-800 can be leased for \$290,000 (see table, page 12).

This offers a significant benefit to an airline, providing it is able to replace its existing fleet to take advantage of current market conditions. If the MD-80's and 737 Classics' lease can be renegotiated to a much lower level, or they are owned and fully depreciated, then it would be harder to justify their replacement on pure economic grounds. This illustrates why several major US carriers have said they will not retire their MD-80s.

A 737 Classic is easier to replace on economic grounds, since these aircraft can be remarketed relatively easily by lessors. Some lessors would consider swapping 737 Classics for 737NG or

OPERATING PARAMETERS FOR MD-80, 737 CLASSIC, 737NG & A320 FAMILIES FOR 600NM SECTOR

Aircraft type	MD-82	737-300	737-400	737-700	737-800	737-900	A319	A320	A321
SEATS	145	128	146	128	160	177	124	150	186
Monthly lease rate -Previously available for new aircraft	165,000	235,000	320,000	330,000	385,000	475,000	306,000	430,000	465,000
Monthly lease rate -Currently available for new aircraft	165,000	235,000	320,000	240,000	290,000	310,000	265,000	300,000	330,000

A320 family aircraft. Depending on when a lease contract was signed, an airline could secure a 737NG or A320 from a lessor for a competitive rate compared to what it is paying for a 737 Classic.

A 737 Classic, 737NG and A320 family aircraft would therefore have closer financing charges, but the younger types would have a cash operating cost advantage. The airline could therefore justify renewing its fleet sooner than planned, and benefit from increased fleet commonality and operating efficiency.

Despite zero or low financing costs, MD-80 operators need to consider the opportunity of securing very cheap lease rates for new aircraft and fleets. MD-80 operators would also better match supply to demand with different family variants of new aircraft. Finally, the same lease rates for new aircraft may not be available in 3-6 years.

Operating scenario

The gross profit performance of the aircraft (see charts, page 13), demonstrates the various economics of each family type in these two scenarios. The saw-tooth charts demonstrate the gross profit performance of each aircraft, relative to the daily frequency required to sustain demand.

The charts compare gross profit against daily passenger demand and revenue. As demand and revenue increase, the gross profit rises for the same daily frequencies because trip costs remain constant. Gross profit rises until passenger demand reaches a level where frequency has to be added to avoid passenger spill. Therefore, to cater for an incremental passenger, airlines must incur trip costs for one additional frequency. This drives the profitability of the operation down, until passenger numbers increase and attain a break-even point again.

Passenger load factor has to be considered. Passenger spill begins at about 65%, and a maximum attainable

load factor is about 85%. Spill and recapture calculations are included to mirror operating conditions. Spill and recapture is inversely related, with limited spill and maximum recapture occurring with low load factors, while high spill and little recapture occurs with load factors above 80%.

The load factor constraint at which another frequency for each type is added has been set at 70% to reduce spill and yield erosion. Therefore, when an aircraft reaches this load factor ceiling, a new frequency is added, reducing the profit earning capacity of each aircraft.

In this model, slightly larger aircraft have an advantage, as airlines can fill more seats before they begin to spill. A 737-800 can carry seven more passengers per departure than an A320 before another frequency is required to meet demand.

The daily passenger demand in this scenario ranges from 200 to 400, since the majority of these aircraft will operate within this bandwidth. This results in three to five daily flights, depending on aircraft type and size (see charts, page 13). Each aircraft type has a different seating capacity, and therefore a different passenger load constraint before an additional frequency is required.

Generally, larger aircraft benefit because they can carry more passengers before an additional frequency is added. However, when a new frequency is added they take longer to return to profitability, as they require more passengers to break even.

While the cost of operation varies by airline and route, *Aircraft Commerce* has sought to show a representative picture of an average operation. Sector length has been set at 600nm, while the analysis has used a fare of \$110 per passenger for both scenarios. While airlines are currently experiencing reduced yields, this will not continue. The intention of the analysis is to directly compare the economics of replacing older aircraft with the new lease rates available, with all

other cost and revenue factors unchanged. The same revenue earning potential has therefore been applied to both scenarios. This reflects the future operating environment that carriers will face, rather than the existing environment.

High lease rates

The addition of frequencies and so trip costs as passenger numbers increase means load factors and gross profit vary for each type. One aircraft will therefore not be consistently more or less profitable than another.

Under the scenario of high lease rates for new aircraft (see first chart, page 13), for passenger volumes of 200-260, the 737-900 and A321 generate a higher gross profit than the MD-80. The 737-400 is just behind the MD-80's profit generation when passenger volumes are below 250.

For passenger volumes of 260-300, The MD-80 and 737-400 outperform the A320 and 737-800. This is because the latter aircraft have to add a third frequency to meet demand, and load factors are low for both.

The 737-800 adds one more frequency at 270 passengers; at a point when load factor on the 737-400 is high. The 737-400 and MD-80 add another frequency at volumes of 295 and 300 respectively, giving them an advantage at lower passenger volumes.

There is a narrow passenger volume in this scenario over which the MD-80 and 737 Classic outperform the new aircraft. The gross profit potential of the MD-80/737 Classic are close to the 737NG/A320, so carriers gain little benefit from operating the older aircraft. This means that both older types should be replaced.

Low lease rates

In the scenario of low lease rates for new aircraft (see second chart, page 13),

the decision to replace older aircraft is easier. The MD-80 and the 737 Classics have the lease rates operators are probably locked into, rather than the current market rates airlines could now acquire the aircraft for. While the MD-80 is a zero-worth asset, airlines are still paying higher lease rates because of earlier contracts.

The lower lease rates of new A320 and A321 family aircraft place them closer to the MD-80 and 737 Classic in terms of gross profit performance. Replacement of both types is therefore easier to justify in the current reduced lease environment.

For daily passenger volumes of 200-245, the 737-900 and A321 have a revenue advantage over the MD-80 and 737-400, although the 737-400 and MD-80 have virtually equal performance. The MD-80 produces the highest gross profit on a daily passenger volume of 250-300.

Beyond 300 passengers, the MD-80 and 737 Classic are outperformed by the 737-NG and the A320 families in most scenarios.

This makes the 737 Classic and MD-80 immediate candidates for replacement, since gross profit performance of both types are exceeded in most scenarios by the 737-NG and A320 families.

The lower lease rates of new aircraft means airlines can replace the MD-80 and 737 Classics, and a new fleet with a higher profit potential.

When the benefit of aircraft commonality and fleet rationalisation are included, the replacement becomes even more economically viable.

The direct comparison shows that the 737-900 and A321 are often the best matched aircraft for the 200-400 passenger volume market.

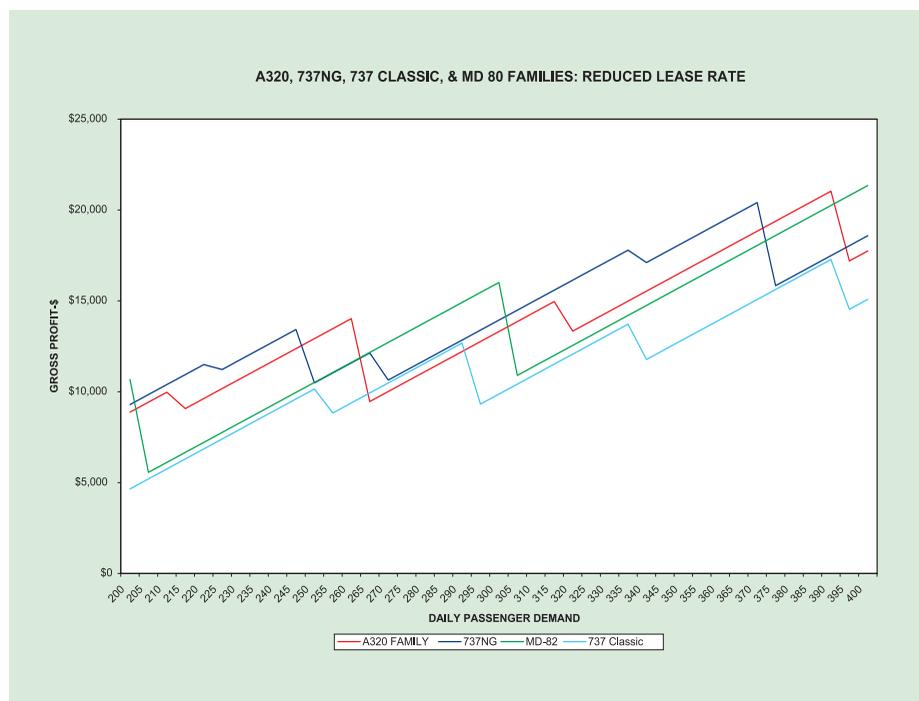
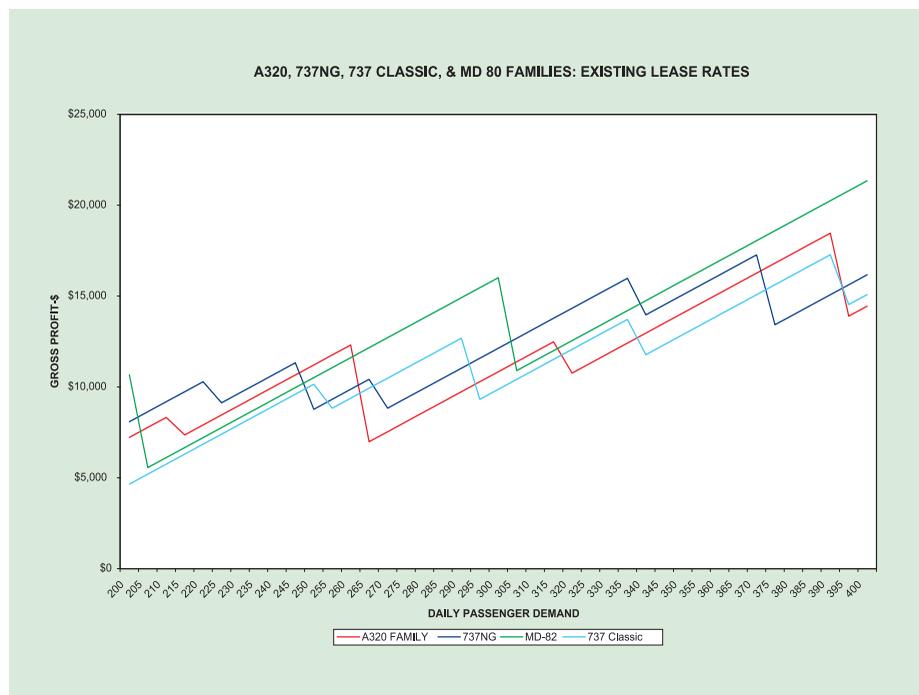
To determine the overall benefit of families of aircraft, the optimal performance of each family can be compared. This is demonstrated by comparing the highest profit potential of each family.

The MD-80 has poorer performance than the 737-NG and A320 families in the high lease scenario (see first chart, this page). The MD-80 is also only just ahead of the 737 Classic when passenger volumes are in excess of 200.

The 737-NG and A320 offer the better revenue performance beyond 300 passengers. This illustrates the benefit of the family option, since the right aircraft can be used to match demand with supply.

The MD-80 is unable to do this, and so begins to suffer when compared to an aircraft family. The 737 Classic does not have the same family flexibility to compete with the 737-NG or A320, and it too suffers in comparison.

Not surprisingly, the 737-NG and A320 perform better in the low lease



comparison (see second chart, this page). They are able to leverage a lower cost base, as well as provide family commonality.

The 737-NG and A320 have better performance below 250 daily passengers and above 300 daily passengers.

The 737 Classic has the poorest performance of the three aircraft families. This is not surprising considering its limited capacity options compared to the 737-NG/A320.

The new generation aircraft offer a superior performance than the MD-80 and 737 Classic where the lease rates are reduced. While the scenario modelled here is limited in scope the basic principle can apply to any scenario, that cheap new aircraft families are superior to the older aircraft.

Summary

Replacement of older aircraft is a viable option for airlines, since they would be able to source new fleets at bargain lease rates. What must also be considered is that lease rates may rise again with a traffic recovery.

Replacing the 737 Classic is an easy decision, because its performance is poorer than the 737-NG/A320's.

Replacing the MD-80 is a more difficult decision, especially if it is fully depreciated. Airlines would benefit from returning a leased MD-80, providing excessive penalties were avoided. Airlines should consider the value of gaining a lease rate that is lower than might be negotiated if they replace their fleets in several years. **AC**