

Differing book and tax depreciation regimes between countries makes the unit costs of aircraft ownership vary between airlines. This is illustrated by a study of the UK, US, Germany and Japan book and tax depreciation regimes as examples.

# Contrasting aircraft depreciation policies

**A**ccounting policies not only vary between jurisdictions, but also from airline to airline. Depreciation of long-life assets, such as aircraft, is subjective. The variance between carriers has a great effect on their year-end results.

In simplest terms, depreciation is the systematic reduction in the book value of a corporate fixed asset over its economic or useful life. The application of depreciation is far more complex, in that it has accounting and tax components.

Accounting or book depreciation is stated in the airline's annual accounts. It is a book calculation that an airline uses to reflect the life of an asset.

Tax depreciation is what is reported to the carrier's local tax authority and determines the amount of corporate tax on its profits that can be reduced.

It is the interplay between the two components that provides the tax benefit of owning an aircraft. The calculation of the tax benefit is simply by how much tax depreciation exceeds book depreciation. That is, an annual book profit of \$100 million by an airline with \$200 million of aircraft assets will have an annual depreciation charge of \$20 million if it uses a 10% straight-line depreciation rate. A 25% reducing balance will allow a tax depreciation of \$50 million in the first year of ownership. Rather than have corporate tax assessed on a profit of \$100 million, the tax authority will add back the book depreciation of \$20 million and deduct the tax depreciation of \$50 million. The assessed profit will be \$30 million lower at \$70 million. The tax benefit is equal to the tax saved on the difference between book and tax depreciation, that is, \$30 million. Thus, if high profits are being generated, it is in an airline's interests to have as wide a gap as possible between its annual book and tax

depreciation, and to own enough assets to minimise taxable profits. An airline can control its book depreciation, but is subject to its local tax depreciation rules.

## Book depreciation

In book depreciation, the airline agrees the writing-down period for assets with its auditors. This period is based on guidelines that comply with local or international accounting standards. Most airlines use the straight-line method in their annual accounts. There is variation between airlines' terms of depreciation, such as the useful life of the aircraft and the residual value assigned to that asset.

Some carriers, such as Singapore Airlines (SIA), practice what is considered an accelerated book depreciation policy. In its 1998/99 annual accounts, SIA depreciated new 777s, A340s and 747s over just 10 years to a 20% residual value. It depreciates new freighter aircraft over 15 years to 20%. This fast rate of book depreciation is advantageous in reducing book profits.

SIA also depreciates used aircraft more than five years old over five years or six years if they are freighters. Although SIA considers its aircraft depreciation policy "rather conservative compared with other airlines", Singapore's system of tax benefits encourages faster depreciation. This, in turn, encourages new capital investment.

Airlines generally choose a slow or fast writing-down schedule depending on their objectives with respect to book profits.

If an airline takes a more aggressive depreciation schedule this will reduce its profit and loss statement income in the early years of that asset's life. For example, Air Tran had all its DC-9s hushkitted. It took a large depreciation

charge in its 1999 earnings to reflect the change in its fleet retention policy, while accelerating the write-off for a better profit and loss result in later years.

The reverse is true if a slower rate of depreciation is chosen. Airlines in financial difficulty, says Mort Beyer, president of Mort Beyer & Agnew, will often revise their depreciation policy to extend the life of their aircraft, thereby reducing their annual depreciation and increasing profits.

Beyer also notes a tendency now to extend depreciation beyond 10 years reflecting longer financing terms and the aircraft's longer operational life. Beyer suggests that the primary life of aircraft today is about 25 years before it enters a secondary life, often as a converted freighter.

In its 1999 accounts, American Airlines announced it would depreciate 737-800s and 777-200IGWs over 30 years, extend the useful life of its other aircraft from 20 to 25 years, and increase residual value from 5% to 10%.

This change by airlines may also reflect the trend to lengthen the tax life of aircraft in some jurisdictions. Although not originally intended for aircraft assets only, the UK extended the tax life of aircraft three years ago and the German tax authorities are considering following suit.

What follows is a survey of airline tax and book depreciation in four jurisdictions: the US, UK, Germany and Japan.

## United States

A review of annual reports of US carriers demonstrates that most use straight-line book depreciation. It is slower than the reducing balance method, keeps depreciation charges low and

## US TAX DEPRECIATION: MACRS VS STRAIGHT-LINE

Assumptions: Asset cost of \$100 million and US federal tax rate is 35%

Year	MACRS double-declining rate over seven years	Straight-line over 12 years
1	\$14,285,714	\$4,166,667
2	\$24,489,796	\$8,333,333
3	\$17,492,711	\$8,333,333
4	\$12,494,794	\$8,333,333
5	\$8,924,853	\$8,333,333
6	\$8,924,853	\$8,333,333
7	\$8,924,853	\$8,333,333
8	\$4,462,426	\$8,333,333
9	0	\$8,333,333
10	0	\$8,333,333
11	0	\$8,333,333
12	0	\$8,333,333
13	0	\$4,166,667

*\*Please note the full depreciation period actually spans eight and 13 years respectively, due to assumption of half-year depreciation being taken in the first and last year of the schedules.*

Source: D'Accord Financial Services

improves earnings.

Carriers, such as UPS, FedEx, Airborne Express, American Airlines and America West, all depreciate their owned fleets on a straight-line basis over the useful life of the aircraft. Depending on the asset type and age, this ranges from just a few to 20 years or more.

US airlines have the choice of an accelerated or straight-line tax depreciation policy. "It is a fairly standard practice for US carriers", says Douglas Kelly, director of asset valuations at Avitas, "to use the straight-line method in their accounting and annual report to shareholders, but to use a different tax depreciation. For the latter they would choose the more accelerated form of depreciation, known as seven-year MACRS".

Howard Weber, managing director of D'Accord Financial Services, adds, "About the only time you would use a straight-line method of tax depreciation is if an airline is in a non-profit making and non-taxable situation over a long period of time and owns its own aircraft".

The fact is that most aircraft financed today are on US leveraged leases with the tax depreciation taken by US investors and they use the MACRS method.

MACRS is a highly aggressive depreciation schedule that can be applied to aircraft financed under domestic leveraged lease structures or the Commission Foreign Sales Corp (C-FSC) structure. The investors in leases to foreign carriers, such as the Ownership FSC, can only use the straight-line

method of depreciation that stretches out depreciation to 125% of the lease term.

MACRS uses a double-declining and straight-line depreciation method which fully depreciates the aircraft in seven years. A double-declining rate is used in the first four years of a seven-year depreciation period. Straight-line methodology is switched to in the fifth year (see table, this page). Weber points out that in most cases the full tax depreciation period actually spans eight years due to the assumption of half-year depreciation being taken in the first and eighth year of the schedules (see table, this page).

This compares with a straight-line method of depreciation over 12 years, equal to 8.33% per year. Again, half-year depreciation is used in the first and last year, taking the depreciation term to 13 years.

The table shows the higher reducing balance charges taken in the first four years of the MACRS system. By the fifth year the annual write-down is only marginally higher than for the 12-year straight-line method.

For a \$100 million aircraft, which is fully depreciated by either method, with the assumption that the owner is a full federal taxpayer at the rate of 35%, the total tax benefit on the depreciation of \$100 million over either term will be \$35 million. Despite this, Weber points out that the present value of the MACRS depreciation will obviously be greater due to the higher tax write-downs in the early years.

## US carrier policy

Book depreciation used by UPS is provided by the straight-line method over the estimated useful lives of the asset. This is 12-20 years for aircraft.

SkyWest, which operates Bombardier CRJs and Embraer Brasilias, uses a straight-line method of 3-14 years to their estimated residual values (including rotatable spares).

FedEx, which has a fleet of used DC-10s and MD-11s and new A300s, has a straight-line basis over the asset's service life or related lease term. Aircraft are depreciated over 5-20 years and airframes and engines are assigned residual values ranging from 10% to 20% of asset cost.

Airborne Express also depreciates on a straight-line basis over the asset's useful life or lease term. This is 7-18 years. The airline's DC-8s and DC-9s generally carry residual values of 10% and 15% of asset cost. From 1999, once aircraft have been depreciated to their residual value, the residual value will be further depreciated over another seven years for DC-8s and 10 years for DC-9s.

American Airlines has a varied fleet of new types. This includes A300-600s, 727-200s, 757-200s, 767-200/-200ER/-300s, Fokker 100s, DC-10-10/-30s, MD-11/-80s, ATR 42/72s, ERJ-145s and Saab 340Bs.

American's straight-line basis of depreciation, depreciable lives and residual values for each type are:

- 1 727-200 Stage II will be fully depreciated by 31 December 1999 to zero residual value.
- 1 727-200 to be converted to Stage III will be fully depreciated by 31 December 2003 to zero residual value.
- 1 DC-10: fully depreciated by 31 December 2002.
- 1 Other jets: depreciated over 20 years to 5% residual value.
- 1 Regional jet aircraft: depreciated over 16 years to a guaranteed residual value).
- 1 Other regional aircraft and engines: depreciated over 17 years to 10% residual value.

In Jan 1999, "in order to more accurately reflect the expected useful life of its aircraft", American changed its estimate of depreciable lives of certain aircraft types from 20 to 25 years and increased the residual value from 5% to 10%; both reducing the annual depreciation charge. In addition, it will depreciate its new 737-800s and 777-200IGWs over a period of 25 to 30 years, respectively, with a 10% residual value.

Equipment and property under capital leases are amortised over the term of the lease, or over the expected useful life of the aircraft. Lease terms vary, but are generally 10-25 years for aircraft.

America West operates 757s, 737-100/-200/-300s, A320s and A319s.

Aircraft are depreciated and amortised to residual values over the estimated useful lives or the lease term, whichever is shorter, using the straight-line method. Estimated useful lives of the company's owned aircraft, rotables and engines are 11-22 years.

In 1998, America West extended the estimated depreciable service lives of owned 737-200s which will be modified to meet the FAA Stage III noise reduction requirements. This change extended the average depreciable life by about four years and reduced depreciation expenses from the 1998 fourth quarter by \$2 million.

## United Kingdom

As a rule, UK airlines do not have particularly aggressive book depreciation policies. Fleet assets owned on finance lease or hire purchase arrangement, are depreciated at rates calculated to write down the cost or valuation to the estimated residual value at the end of their planned operational lives.

Unlike Japan, there is no mandated tax life for aircraft assets. This means there is some variation in the calculation of useful life among the UK carriers. The general range for aircraft accounting depreciation in the UK is usually 20 years or longer for larger jets, 15-20 years for regional jets and 12-15 years for turboprops.

For example, British Airways (BA) depreciates its fleet over 16-27 years. BA's 1998/99 accounts state that the effective depreciation rates were 4.2% for 747-100/-200/-400s, DC-10-30s and 777-200s; 4.6% for 767-300s and 757-200s; 5.9% for the A320, 737-200, 737-400, MD-83, Fokker 100 and F-28; and 6.5% for the de Havilland Dash 8s and ATR-42/72s operated by its regional subsidiaries.

Brymon Airways, which operates the Dash 8s and the ERJ-145, depreciates its aircraft over 12-15 years.

British Midland sets an economic life of 19 years from the date of construction for all its aircraft. British Regional Airlines calculates an economic life of 10 years for its older owned fleet of BAe 146s and Jetstream 41s.

UK tax depreciation rates have fallen considerably following 1997's tax legislation. Prior to this the rates were 25% reducing balance. It was proposed that this be changed to a much lower reducing balance rate of 6%.

This policy aimed to classify aircraft as long-life assets of 25 years or more. Airline lobbying managed to secure a compromise with the tax authorities to classify jet aircraft as part long-life and part normal-life assets.

The result was that the writing-down

## TAX BENEFITS OF AIRCRAFT OWNERSHIP FOR A UK AIRLINE

### Large or regional jet

Straight-line book depreciation over 20 years for a \$20 million asset.

Corporate tax rate of 30 million.

Year	Old 25%	New 25%/6%		declining balance	
	Annual book depreciation	Annual tax depreciation	Depreciation difference	Annual tax depreciation	Depreciation difference
1	1,000,000	5,000,000	4,000,000	3,100,000	2,100,000
2	1,000,000	3,750,000	2,750,000	2,439,000	1,439,000
3	1,000,000	2,812,500	1,812,500	1,936,410	936,410
4	1,000,000	2,109,375	1,109,375	1,553,038	553,038
5	1,000,000	1,582,031	582,031	1,259,465	259,465
6	1,000,000	1,186,523	186,523	1,033,604	33,604
7	1,000,000	889,893	(110,107)	858,868	(141,132)
8	1,000,000	667,419	(332,581)	722,796	(277,204)
9	1,000,000	500,565	(499,435)	616,024	(383,976)
10	1,000,000	375,423	(624,577)	531,509	(468,491)
11	1,000,000	281,568	(718,432)	463,953	(536,047)
12	1,000,000	211,176	(788,824)	409,367	(590,633)
13	1,000,000	158,382	(841,618)	364,743	(635,257)
14	1,000,000	118,786	(881,214)	327,812	(672,188)
15	1,000,000	89,090	(910,910)	296,859	(703,141)
16	1,000,000	66,817	(933,183)	270,584	(729,416)
17	1,000,000	50,113	(949,887)	248,001	(751,999)
18	1,000,000	37,585	(962,415)	228,360	(771,640)
19	1,000,000	28,189	(971,811)	211,088	(788,912)
20	1,000,000	84,566	(915,434)	3,128,519	2,128,519
PV of tax benefit			1,616,097 (8.1%)		718,829 (3.6%)

allowance is split 50/50 between 25% reducing balance and 6% reducing balance. Some transactions, such as BA's 777s, which were already delivered or under order contract before the legislation came into effect, were given grandfather rights.

This compromise pertained to commercial jets of 60 or more seats, with no mention of the increasingly popular 50-seat regional jets and turboprops.

A government tax bulletin published in April 2000 has since clarified the tax depreciation treatment of regional jets to treat them "on the same terms and for the same period" as the larger jets. This means the 50/50 tax allowance split of 25% and 6% also applies to all regional jets delivered or on firm contract after 26 November 1996.

The tax authorities contend that "the change in the market and the move towards regional jets suggests that they are unlikely to have a life expectancy of more than 25 years in commercial use".

The one small piece of good news for UK airlines is that turboprops with a maximum take-off weight of more than 5,700 kgs still qualify as normal-life assets, qualifying them for a reducing balance tax allowance of 25%.

The majority of regional jets currently operated by UK carriers, such as Brymon, British Midland, Jersey European or British Regional, were neither delivered nor under firm contract before 26 November 1996. This means they will be ineligible for any grandfather rights. However, almost all of these aircraft have been financed on operating leases so it will be the UK lessors who see a significant reduction in their tax benefits. They are likely to pass these costs on to airlines in the form of a 5-6% increase in monthly lease rentals.

The table (*see table, this page*) shows the straight-line book depreciation and old 25% reducing balance and new 50/50 25% and 6% reducing balance tax depreciation of a \$20 million asset.

Paul Clark of MDTAF, calculates that the present value (PV) on a regional jet



will be just 3.6% for the full term under the new system, compared with 8.1% under the old system. Clark says his PV calculation is based on the difference between tax depreciation and accounting depreciation multiplied by the UK corporate tax rate of 30%.

The same calculation for turboprop yields a PV of 5.6%, which remains unchanged. Clark points out that “although the tax depreciation on the turboprop matches that applicable to the regional jet (RJ) under the old regime, the shorter economic life and faster book depreciation of the turboprop made the overall tax benefit less”. However, adds Clark, “Under the new system the tax benefit for the RJ will now be less than the turboprop and the longer-life, larger jet aircraft. This suggests that applying the same 50/50 treatment for RJs will be unduly harsh on the regional airlines”.

## Germany

Led by Lufthansa, Germany's airlines have a reputation for younger fleets, partly supported by aggressive fleet depreciation policies. With a corporate tax rate of 45-48%, they can offset higher tax depreciation charges against their profits. Profitable carriers therefore prefer shorter depreciation periods.

Germany's airlines can use two methods of book depreciation. The first is the straight-line method in which the purchase price of the aircraft is divided by the years of assigned life. This period depends on aircraft type. A turboprop, for example, which may have an assigned useful life of 14 years, is depreciated by one-fourteenth of the purchase price in each year's tax declaration.

The accelerated method is declining-balance depreciation, which essentially uses the same formula as the straight-line, but is multiplied by a factor of three. Therefore, the same 14-year depreciated turboprop would have the formula of one-fourteenth multiplied by three to give an annual depreciation rate of 21.4%, as opposed to 7.14% for the straight-line method.

In the first year, the aircraft's purchase price would be depreciated by 21.4%, but in subsequent years it will be 21.4% of the remaining residual value. The depreciation as a portion of purchase price thus declines each year.

Using the declining-depreciation method, the undepreciated value at the end of 14 years will be 3.4% of the purchase price. The straight-line version results in full depreciation.

Joerg Schwingeler, vice president, finance, of the German regional airline, Augsburg Airways, says, “The advantage of using declining-balance book depreciation is that the airline takes the higher costs in the beginning, which reduces book profit during the first few years. As we often buy new aircraft as replacements, the combination of profit on sales and costs of high depreciation in the same year is the best choice for us in relation to tax”.

Aircraft lease periods for many German airlines, tend to be shorter than the depreciation periods, with the average about 8-10 years.

Lufthansa CityLine had for some time depreciated its fleet on a straight-line basis, but in 1998 switched to the declining-balance method that brought additional depreciation charges of Dm7 million (US\$3.5 million). It should

*Following the UK government's proposal to change the tax depreciation status of an aircraft from a 25% to 6% declining balance basis on recognition that it is a long-life asset, airlines successfully persuaded the government to allow a 50/50 declining balance of 25% and 6%. This reduced the PV of the tax benefit from 8.1% to 3.6%.*

be noted that 1998 was also a year of record earnings and expansion for the Lufthansa subsidiary. The extra charges to the profit and loss accounts helped to reduce a higher tax bill.

Lufthansa CityLine now writes down its fleet of BAe RJ85s and Bombardier CRJ-100s over 12 years to a residual book value of 15%. CityLine's finance director, Manfred Gaertner, says the depreciation schedule is in line with its parent company, Lufthansa. Therefore, these aircraft with a 12-year tax life will generate a triple declining book depreciation rate equal to an annual 25% reducing value compared to 8.33% for the annual straight-line rate.

Over the past 12 months there has been talk that Germany's tax authorities will extend the depreciable tax life of aircraft from 12 to 25 years. This would reduce annual allowable tax depreciation and so tax benefits of ownership.

Germany's tax legislation currently provides guidelines for an asset's tax life, but the airline determines with its auditors the period over which it will depreciate the aircraft. The depreciation schedule can go as high as 25 years. Most airlines, such as Lufthansa and its subsidiaries, take a more aggressive view on depreciation and assign a useful life of 12 years for its jet aircraft.

Should this legislation of a longer tax depreciation life of 25 years be passed, a generous tax benefit would be halved.

Lufthansa CityLine's Gaertner says no one can predict if or when new legislation will be passed. “What is certain,” adds Gaertner, “is that a law was passed that provides for grandfather rights for current tax depreciation to aircraft already delivered or under firm contract”.

German carriers account for any profits on the disposal of aircraft as book value less actual re-sale value in the year of sale. There is no tax exemption on the profit of disposed aircraft if the capital is reinvested in new aircraft. Airlines will aim, however, to have the profits reported from disposals coincide with the introduction of new aircraft into the fleet. The higher, first-year depreciation charges of new aircraft, therefore, help to offset the sales profit on used aircraft.

*Tax depreciation rates for aircraft in Japan are either straight-line or double-declining. Double-declining rates are no longer used for cross-border leveraged leases, but are permitted for domestic finance leases and cross-border operating leases.*

## Japan

Japan also allows two methods of calculating tax depreciation on aircraft, with airlines and leasing companies using either the straight-line or double-declining method.

The straight-line method is less advantageous. Japanese carriers using the straight-line method depreciate their aircraft by the same amount every year to a residual value of 10% of the original equipment cost. Therefore, a \$100 million aircraft with a 10-year life would attract an annual tax depreciation of \$9 million. That is, 90% over 10 years. Japan Airlines (JAL) says it often depreciates to a residual value of 5%, for an annual depreciation rate of \$9.5 million.

Since October 1998, the rules covering leasing under finance leases by Japanese lessors have been changed. In the case of cross-border finance leases (Japanese Leveraged Leases; JLL), the lessor is only permitted to tax-depreciate the asset on a straight-line basis, over the lease term, and not on a declining-balance basis. This has reduced the annual tax depreciation charges in the early years of the lease.

In Japan, aircraft have a statutory legal life, which is eight years for narrow-body aircraft and 10 years for widebody aircraft. This change in depreciation rules to straight-line tax depreciation effectively killed the cross-border JLL market in the last quarter of 1998, which relied on declining-balance tax depreciation.

The second tax depreciation method is double-declining depreciation, which results in an accelerated write-down of the asset. The rate allowed depends on whether it is an eight-year or 10-year life asset and the residual value at the end. This method can only be applied to aircraft that are not leased under cross-border finance leases. The domestic JLL is still available, since double-declining depreciation can be applied.

Using the increasingly popular Japanese Operating Lease (JOL) transaction as an example, a new narrow-body aircraft will have an eight-year legal life and would attract an annual depreciation rate of 25% calculated on a double-declining balance to a 10% residual value after eight annual accounting periods. In the case of a new widebody with the longer 10-year legal life the written-down value at the end of the first year would be 79.4%. The



JOL allows the lessor to use double-declining depreciation on cross-border operating leases.

The double-declining balance method can also be applied to used aircraft, although the rules are more complex. Unlike new aircraft, the depreciation schedule is also dependent on the life of the operating lease in addition to the tax life of the aircraft.

The detailed calculation involves two steps. The first step takes account of the age of the aircraft and the length of the operating lease remaining on the aircraft to compute a tax life. In the second step, depreciation life is determined as the longer of the operating lease life remaining and the tax life as calculated under step one. This can produce interesting results. For example, a 1998 vintage aircraft with a five-year operating lease remaining will have a depreciation life of six years, while a 1996 vintage aircraft with the same operating lease life remaining can be depreciated in five years.

Compared to new aircraft transactions, used aircraft financed on JOL structures can attract a higher rate of depreciation if the lease term is short. This type of transaction also illustrates the advantage of the shorter depreciation schedule. The optimal lease term is five to seven years. This combines the accelerated depreciation with a good portion of debt amortisation to decrease the lessor's risk in the aircraft residual value. From the lessor's point of view, longer leases of eight to 10 years are attractive to investors because cumulative lease rentals are higher and give larger pay-down on the investment in the aircraft, minimising the residual value risk.

In terms of the book depreciation

treatment of its aircraft, JAL principally uses the straight-line accounting method of depreciation for all its aircraft, with the exception of its two oldest types: the 747s and DC-10s. JAL explains that it uses the declining-balance method on the early 747s and DC-10s because "they are already depreciated to the utmost level Japanese corporate law allows". JAL operates a fleet of 737s, 747s, 767s, 777s, DC-10s and MD-11s.

Three years ago, JAL revised the estimated useful life of flight equipment from 15 years for international use and 13 years for domestic use to a range of 13-22 years depending on aircraft type. The effect of this revision was to decrease operating expenses and increase operating income by Yen 17,381 million and decrease loss before income taxes and minority interests by Yen 17,343 million for the year ended 31 March 1998. It says it has no plans to change its accounting policy in the near future. This change of policy may reflect the carrier's drop in fortunes since the 1990s.

The accounting treatment used by All Nippon Airways is quite similar in that it also assigns a 13-year life to domestic aircraft and a 15-year life for its internationally operated aircraft.

In Japan, the profit or loss on sale (based on the net sales proceeds and book value) of assets is credited or charged to income in the year of the sale or disposal.

The Japanese tax lease market is still attractive thanks to Japan's high corporate tax rate, which starts at 40.87%. That is, despite low tax-depreciation rates, tax benefits will be high. With the disallowance of many expenses, corporation tax rate will often approach the 50% level.