The Logic of International Airline Valuation

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Abstract:

Stockbroker valuation reports on international and domestic airlines focus on measures such as cash flow multiples and the price/book ratio Price/ earnings ratios are viewed with caution due to the fact that very few airlines expected to return to profit in fiscal 1993 Earnings figures are distorted by widely varying accounting techniques - especially depreciation policies Further complications are introduced by off balance sheet operating leases Discounted Cash Flow (DCF) modelling is difficult in the airline industry due to its cyclicality, capital intensity and embedded option values As a result, most reliance is placed on multiples of EBDRIT (earnings before depreciation, all rentals, interest and taxes) and relative discounts from home exchange averages for these multiples

The current paper argues that total value to EBDRIT multiplier may be distortive due to varying market values of debt, while discounts (premiums) from home exchanges are rejected on the grounds that different markets are not directly comparable In order to gain a better understanding of EBDRIT multiples, their theoretical relationship to the dept/capital structure is examined An eclectic approach to valuing airlines is suggested, combining elements of DCF modelling and a future share price to EBDRIT multiple

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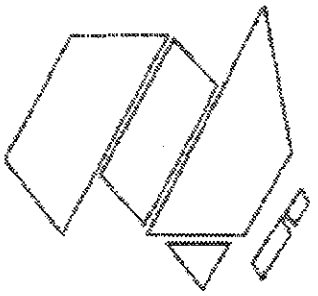


"Valuation is getting more difficult in the airline industry."

Derchin and Orme (1993)

Introduction

In the June quarter of 1993 the Australian Government decided to defer the privatisation and public float of Qantas Airways due to continued difficult trading conditions in the world airline industry. This decision came at the same time that airline analysts around the world revised downwards their earnings estimates for 1993-94. Indeed, one of the challenges of raising equity in the industry is that the world investment community, and in particular the Australian investment community, are not yet comfortable with airline valuation.

This paper identifies some of the major problems involved in valuing airlines and reviews the methodologies employed by analysts, corporate advisers and airlines. General problems such as accounting differences, government regulatory changes, "golden" shares, dual class shares and the value of strategic shareholdings are explored first. Then the merits and disadvantages of the three major valuation approaches: net realisable value (NRV); discounted cash flow (DCF); and earnings or cash flow multipliers, are reviewed. While DCF valuations are theoretically appealing because the assumptions underlying the analysis are made explicit, they must be approached with caution since they are highly sensitive to capital expenditure assumptions. However cash flow earnings multiples must also be viewed with care since a multiplicity of factors, rarely explicitly stated, must be considered.

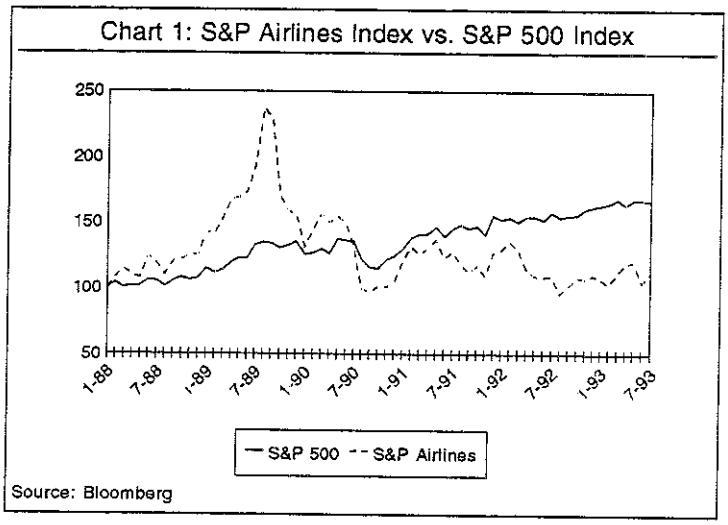
A model relating cash flow multiples to capital structure is sketched out which assists understanding the relativities in multiples accorded to major US and international airlines. It is concluded that a combination of approaches should be employed in order to maximise information inputs and reduce the scope for mispricing.

Investors and the World Airline Industry

Since 1990, the US airline industry has, at least in nominal terms, lost more money than it made in all the years since commercial aviation began. The once strong US international airline Pan Am has disappeared, while others struggle in technical default of their debts (i.e. "Chapter 11"). Debt levels have accumulated to high levels, yet the major US and international players still have positive equity value. Apparently the market believes that airlines have a profitable future which outweighs the risks.

Airline stocks exhibit high volatility relative to the rest of the economy, as displayed by the behaviour of the US Airlines Index relative to the S&P 500 Index in Chart 1. This prospect of a tripling in value within a short space of time makes airline stocks an exciting proposition for many investors. Not all investors in airline stocks have been damaged by the recent downturn in the industry. Over the last three years

Southwest Airlines and British Airways have provided very good returns to shareholders under the circumstances (compound annual returns of 90.7% and 21.9% respectively). Furthermore, some senior US airline analysts believe the international investment community views investment in a country's airlines as a proxy for investment in the economy of that country.



In an "event study" of 24 airline mergers in the US, Kyle, Strickland and Fayissa (1992) found that both offeree and offerer shareholders benefit from restructuring. Tretheway (1992) argues that globalisation pressures will emerge from marketing economies such as frequent flier networks rather than from operating economies of scale (see Caves, Christensen and Tretheway, 1984). Therefore, in future we are likely to see further amalgamations and extensions of cross-border shareholdings, corporate debt restructuring and floats of new or privatising companies. The need for valuations of airline assets will be high at a time when they are most difficult.

Problems in Valuing Airlines

Accounting Problems

In 1992 the extent of divergences in airline accounting practices was highlighted by a joint KPMG/IATA report of a survey of 25 airlines (Nuutinen, 1992). Differences begin with the way that aircraft purchase transactions are accounted for. For example, the extent and timing of capitalisation of interest on deposits and progress

payments and foreign exchange gains or losses differs. Aircraft depreciation policies have a large impact on reported profit, and distort comparisons between Asian and non-Asian airlines. The former countries' airlines tend to depreciate their aircraft at a significantly faster rate, thereby reducing profits relative to European and North American companies. The extent and treatment of operating leases on aircraft has a large distortionary effect on the apparent debt structure. Operating leases are invariably kept off-balance sheet, which necessitates analysts and financiers making notional adjustments to arrive at comparable effective debt levels. However, finance leases can also reduce comparability and simultaneously "improve" the balance sheet, as was demonstrated by Swissair, which reduced its 1991 debt/equity ratio from 9:1 to 0.5:1 by not capitalising its finance leases.

It can be argued that an efficient market will "see through" cosmetic accounting differences to value the underlying cash flow potential of airlines. However, this argument does not comfort airline analysts and valuers, who need to do considerable "surgery" on unadjusted airline accounting statements. But these tactics could add value to airlines if they enable greater financial flexibility to take advantage of new opportunities. That is, if restrictive debt covenants can be circumvented. It should be remembered, however, that some or all of this value might come as a wealth transfer from debt to equity holders.

Government Regulation

The value of an airline will be determined to a large degree by the nature and certainty of the regulatory framework which the market perceives it will operate within for the foreseeable future. When an industry is deregulated, or a regulated industry is privatised, it is highly desirable that all the uncertainties about regulation are resolved, as this will reduce the required cost of capital and raise value independently of any competitive or cost efficiency effects. Peltzman (1976) argued that tight regulation tends to reduce the volatility of earnings, and should therefore act to reduce risks. This issue was examined by Cunningham, Slovin, Wood and Zaima (1988), in the context of the US airline industry deregulation during the early 1980s. They found that in the early years of deregulation the beta (or systematic) risks of airline stocks were raised, but that this was a temporary phenomenon reflecting a period of industry "shake out". Beta risk was significantly reduced in the longer term compared with the pre-deregulation period. For the US Beneish (1991) concluded that the airlines least adversely affected by announcements of changing government regulations were those which could reorganise operations around hubs, were differentiated in servicing first-class passengers and had strong balance sheets.

Government "Golden" Shareholdings

Several privatised airlines, eg. British Airways, have a "golden" share which allows the government to restrict the passage of ownership or control in future. As another example, the privatisation of Qantas has guaranteed that there will be:

- maintenance of the Qantas name;
- a majority of board members being Australian citizens;
- retention of the headquarters in Australia; and
- a maximum 35% foreign voting interest.

While these requirements are established to protect the public interest, they also curtail certain opportunities. Other things being equal, a "golden" share reduces the value that can be obtained for an airline, but British Airways and others have operated successfully under these arrangements. The same could be said of any businesses which have legislated ownership restrictions placed on them, such as banks and media.

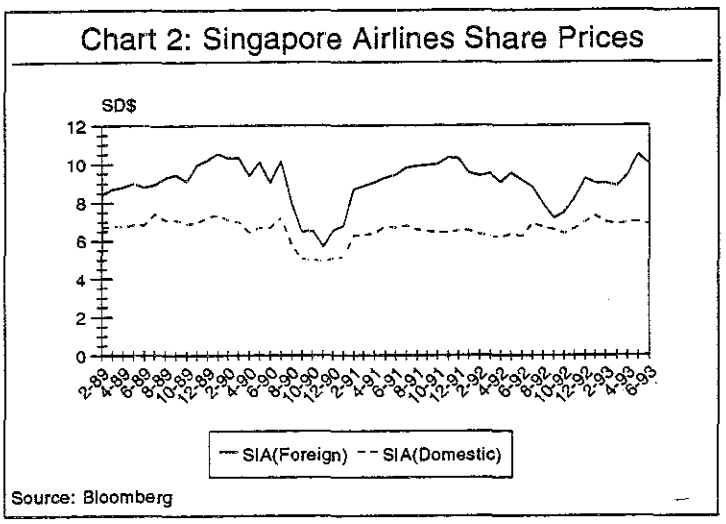
Strategic shareholders

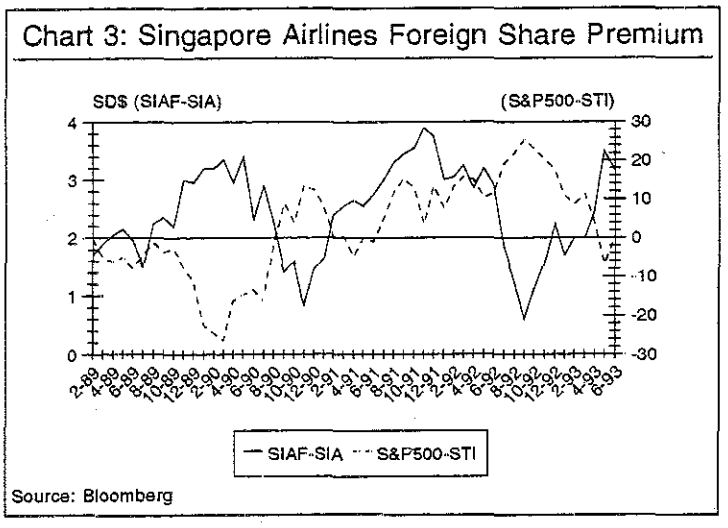
Owing to the "national character" of most international carriers, the externalities associated with international airline travel, and the value of control of international aviation capacity and route entitlements in a bilateral aviation environment, true international mergers are not yet feasible because individual governments will not allow them. If there are significant marketing and other technical synergies from international mergers of airlines some part of this value can be realised through international alliances. Valuing these synergies poses a problem.

Dual class shares

There are now a number of instances in which dual class shares in airline companies have been issued in the course of privatisations. Examples include Singapore Airlines and Air New Zealand. In general, both local and foreign shareholders may purchase the "foreign" designated class of shares, which is set at a percentage limit of total share capital. However, foreigners may not purchase "local" designated shares. A premium invariably develops for the foreign shares, although its size varies with several factors. Chart 2 shows the premium attracted by foreign shares in Singapore Airlines.

A fundamental reason for the premium is the excess demand created by setting a foreign ownership limit. The level of that excess demand pressure is affected by relative returns prospects for foreign investors in other countries. If the relative prospects of investing in Singapore (via SIAF shares) can be proxied by the differential performance of the American S&P500 Index (S&P500) and the Singapore Straights Times Index (STI), we find a statistically significant negative relationship with the SIA Premium (SIAF-SIA).





A simple regression of 53 months of returns data yields an average premium of SD$2.51 when the index returns are equal, and a reduction of 2.3 cents (t ratio = 2.5) in the premium for every 1% increase in the S&P500 relative to the STI. In other words, when opportunities in the world's major capital markets are high relative to

Singapore's, foreign based demand is diverted away from SIAF shares, which fall in value relative to SIA shares. This relationship can be seen in Chart 3. Relative international investment opportunities explain only 13.5% of the variance in the premium. Other explanatory factors would include speculation about changes in the Singapore Government's policy regarding foreign shareholdings, and changes in the $SD and $US exchange rate, and the higher inherent volatility of the foreign shares.

Net Realisable Value

The net realisable value of assets provides a lower bound to an airline's value. It is also an important benchmark in valuations because the knowledge of asset backing is useful information when assessing the potential risk of a business. The normal approach is to take the book value of net assets and make adjustments. Such adjustments will have regard to potential discrepancies that may exist between the book value of assets, and the prices which may reasonably be expected from their orderly realisation. The net worth of a business is the excess of assets over liabilities after making such adjustments.

In addition to balance sheet assets, liabilities and off balance sheet lease obligations, the NRV of an airline business would include the value of routes held by an airline. A number of route valuation precedents established by sale of routes over recent years are displayed in Table 1, however, a number of these transactions were made under difficult conditions and might not be appropriate benchmarks in more halcyon times. In effect, the corporate value of a profitable airline business will equal the NRV of its assets plus the value of routes, plus the value of its brand name and the value of growth opportunities

Valuing brands is itself a complex exercise which seeks to separate the capitalised value of "super profits" attributable to reputation and recognition in the market above the returns necessary to justify investment in the industry based on its risk profile. Almost by definition, if an airline has defaulted its brand value is not likely to be positive. Numerous airline names have disappeared through merger, as is currently happening with the "Australian" name being submerged into the Qantas identity. This doesn't mean that the Australian name is not valuable, rather it indicates that greater leverage can be obtained from developing a single, better known and respected identity. In the case of Compass Airlines, it is instructive to note that the name (and associated badging, uniforms etc.) was retained by the Southern Cross syndicate when the company was re-floated.

Table 1: North American Route Sales

Purchaser	Date	Route	Other Assets	Price $US m
American Airlines	Jan 1990	TWA - Chicago to London (Heathrow)	Chicago slots	195
	Apr 1990	Eastern's South American network & Continental's - Miami to London (Gatwick)	New York (JFK), Chicago (O'Hare), Washington (National) slots	470
	Dec 1990	Continental - Seattle to Tokyo	Honolulu	140
	May 1991	3 TWA routes to London (Heathrow)	-	445
United Airlines	Oct 1990	5 Pan Am routes to London (Heathrow)	2 Boeing 747s, facilities, 5th freedom	400
	Jan 1991	-	Chicago (O'Hare) slots	54
Delta Airlines	Jan 1991	Eastern's Canadian routes	10 Lockhead L10-11 slots and gates	97
		Pan Am shuttle, US-European routes Frankfurt hub	slots, gates and 45 aircraft	380
	July 1991	Pan Am's New York to Mexico	-	25
North West Airlines	July 1991	Hawaiian's Pacific routes - Australian services	25% of airline	20
	1991	America West's Honolulu - Japan (Nogoya)	Option to purchase	10
Lufthansa	1990	Pan Am - Internal Germany Service	Berlin and other gates	150

Source: Avmark Inc.

Price $US m
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Discounted Cash Flow

The Discounted Cash Flow (DCF) valuation approach tends to be favoured by academics and more technically equipped financial economists, because of its more rigorous theoretical appeal. Cash flows (rather than accounting earnings) are discounted by a risk adjusted discount rate. Except for certain market "anomalies", which are themselves questioned, the bulk of academic research demonstrates that markets "see through" the vagaries of accounting numbers to value assets on the basis of cash flows taking account of systematic risk differentials. There is no question that the DCF approach works very well in valuing utilities with relatively stable cash flow streams. It also has the advantage of allowing analysts to make explicit their assumptions about future revenues and costs. However, the airline business has several characteristics which reduce the applicability of the DCF approach.

Cyclicality

Airlines suffer large cyclical movements in cash flows through the business cycle. This added risk is adjusted for by applying a higher required rate of return in discounting the cash flow estimates. The airline industry is also highly capital intensive. Unlike utilities, airlines do not have the advantage of long term contracts to underwrite large and lumpy capital outlays. Some protection is achieved through options over future aircraft purchases. Between 1989 and 1992, for example, world jet aircraft orders fell from almost 1,700 to 450. Airlines such as Singapore and Qantas have average aircraft ages in the vicinity of six years, while many airlines maintain fleets with an average vintage of 12 or more years. The timing of an investment cycle can be very important for a DCF valuation which often calculates a "terminal" or "horizon" value five to ten years away. This perpetuity calculation will be extremely sensitive to assumptions about the "perpetuity" capital expenditure amount, and the airline's ability to earn at better than the cost of capital into the future.

Embedded options are undervalued

The DCF approach also suffers from not accommodating options embedded in airline operations. Airlines can have supply (aircraft orders) and demand-side (route structure) options which enable expansion or contraction of capacity once uncertainties have been resolved in the future. Such options provide considerable leverage from the fact that a small initial outlay may be required to secure the possibility of large up-side potential. For an application of this approach to infrastructure projects see Lee and Martin (1993).

Capital structure and the cost of capital

The required rate of return used to discount an airlines' forecast cash flow is a weighted average of the after tax costs of equity and debt capital. The level of debt in a company

will affect the returns required by both debt and equity holders. Capital structure (i.e. the ratio of debt to debt plus equity) relative to earning capacity has a marked influence on the debt rating assigned to a company. Companies with higher debt ratings obtain debt capital more cheaply, but this does not necessarily maximise shareholder value. The marked decline in debt ratings of many airlines in the late 1980s is demonstrated in Table 2, where it is clear that a number of airlines need to restructure their debt in order to return to traditional ratings. However, the capital markets are currently not overly receptive to equity issues. In the case of government owned airlines, perceived to be (if not explicitly) guaranteed by the government the market rating is higher than it would be on a stand alone basis. For example, Australian Airlines maintained an A- rating, when an objective rating given its high debt level could have been as low as BB (see Hereford, 1992).

Table 2: Airline Companies' Senior Unsecured Debt Rating History

USA airlines	**1991**	**1990**	**1989**	**1988**	**1987**	**1986**
Alaska Air Group Inc	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-
America West Airlines Inc	D	B	B	B	B	B+
American Airlines Inc.	BBB+	A-	A	A	A	A
Continental Airlines Inc.	D	D	B	B	B	B
Continental Airlines Holdings	D	D	B	B	B	B
Delta Air Lines, Inc.	A-	A	A	A	A-	A-
Northwest Airlines Inc.	B+	B+	B+	A-	A-	A-
NWA Inc.	B	B+	B+	BBB	BBB	BBB
Pan Amer. World Airways Inc.	D	CCC+	CCC+	B-	B-	B-
Southwest Airlines Co.	A-	A-	A-	A-	A-	A
Trans World Airlines Inc.	D	B-	B-	B-	B-	B-
United Air Lines Inc.	BBB	BBB-	BBB	BBB-	BBB	BBB-
USAir Inc.	BB+	BBB-	BBB+	BBB+	A	A
USAir Group Inc	BB+	N.R.	N.R.	N.R.	N.R.	N.R.
Air Wis Services Inc.	BBB-	BBB-	BBB-	BBB-	B+	BB
Metro Airlines Inc	D	B	B	B+	N.R.	N.R.
Midway Airlines Inc.	D	D	B-	N.R.	N.R.	N.R.
Other Airlines						
Australian Airlines *	A-	-	-	-	-	-
Ansett Transport Industries *	B+	-	-	-	-	-
Japan Airlines	AA-	N.R.	N.R.	N.R.	N.R.	N.R.
Air New Zealand *	BBB	-	-	-	-	-
* Rated by S&P-Australian Ratings						
N.R. Not Rated						

Source: S&P Australian Ratings Monthly Ratings Bulletin, October 1991

In an earlier paper Lawriwsky (1992) found that high debt and high beta airline companies are attracting very low ratings, and therefore a high cost of capital. Airline companies with higher debt structures tended to have higher beta risks, while for a given level of debt, domestic airlines had a higher beta than international airlines. In the case of Australian Airlines prior to its merger with Qantas, its A- rating was inconsistent with other airlines with similar debt levels. This indicated that a debt restructuring would have been required to maintain that rating on a stand alone basis. Indeed, the BBB+ S&P rating now attached to Qantas on a stand alone, privatised basis has come after an injection of $1.35 billion in Australian government equity.

In the airline industry it is important that the measure of market debt to capital (i.e. debt plus equity) includes the effect of operating lease payments capitalised as a debt equivalent, and measures equity as market capitalisation. As a rule of thumb the capitalised value of operating leases is calculated as 7.5 or 8 times the current annual rentals. In most cases there is a reasonably close correspondence with book values, however, in cases such as USAir Group, where there are significant operating lease payments the level of book gearing falls below economic values. This was reflected in the high levered beta and low financial strength of USAir Group (as rated by Value Line) prior to its association with British Airway and its recent capital raising.

Non-systematic risks

Sensitivity analysis is generally undertaken to understand the sensitivity of an airline's value to movements in specific factors such as oil prices and currency movements. Another area of concern is the risk exposure from accidents, which have a devastating effect in the airline industry. Chance and Ferris (1987) found that the market reacts swiftly in marking down the value of airlines on the day that a fatal accident occurs, but this effect is generally less than 1% of stockholder wealth. The largest effect was a loss of 11.4% sustained by Alaska Air in 1971. The value of airline manufacturers was not at all affected by these events. These results contrast to the marked reduction in the values of US electric utilities with nuclear facilities following the Three-Mile Island accident, where there may have been a perception that negative public opinion would translate into the imposition of expensive regulatory requirements for all participants (see Hill and Schneeweis, 1983).

The need for an eclectic approach

Given the problems of DCF analysis outlined above, analysts have focussed on earnings and cash flow multipliers as indicators of airline value. However, airline managements analysing restructuring, capital raising or merger opportunities will need to make a direct assessment of the investment programme envisaged over the next 3 to 4 years. For example, synergistic opportunities may be identified and revenue growth explicitly estimated over this time frame. The resulting valuation would be compared with a current valuation (perhaps a market quotation if the company or companies are listed) to establish the scope for shareholder value creation. Such a valuation will need to estimate a terminal

value at the end of the current investment programme, and there will be a search for applicable earnings or cash flow multiples of comparable firms. The terminal value calculated in this way may be discounted to the present and added to the DCF estimated value of the investment programme. This approach is used by market practitioners in a number of industries (see Kidd, 1990), but raises the question of the validity of the multipliers in the airline industry.

Earnings and Cash Flow Multiples

Price Earnings Multiple (P/E)

The Price Earning Multiple approach to business valuation is well understood and widespread among financial analysts. All that is required is an estimate of the earnings that an airline can sustain in the future, and the required rate of return that determines the acceptability of those earnings. As a rule, comparisons of P/E multiples are difficult to make due to different accounting procedures, leasing policies, tax regimes, ownership and debt structures. In the current market many senior airline analysts reject the P/E methodology outright.

Due to recent losses and some unusual airline behaviour (e.g. the US fare war), many of the P/E multiples are not meaningful (i.e. not positive), and averages of the positive multiples are biased upwards by companies where the market is expecting strong profit growth in coming years. It is apparent from Table 3 that where historical P/E multiples are higher, there is an expectation of greater future earnings growth. That is why such companies as Singapore Airlines, with a 1994-95 expected EPS growth rate of 3% are trading at a historical P/E of 10.4, while Southwest Air, with expected EPS growth of 35% is trading at a 41 historical and 30.5 prospective 1994 P/E multiple.

Table 3: Current consensus EPS and P/E Multiples

	Earnings Per Share			Price/Earnings Multiple		
Company	1993	1994	1995	1993	1994	1995
Singapore Airlines	66	68	.84	10.4	15	12.1
British Airways	3.26	32.74	.93	15.3	1.5	18.5
KLM	-6.1	-1.09	.9	NMF	NMF	16.8
US Air	-9.96	-2.03	8.45	NMF	NMF	25.3
United Airlines	-17.34	- 14	1.35	NMF	NMF	12.4
Southwest Airlines	.83	1.12	4	41	30.5	12.8
Delta Airlines	-10.54	1.65	4.93	NMF	30	
AMR Corp.	-4.02	1.66		NMF	38	

Source: Bloomberg (Nelson Publications)

In 1992, many analysts and observers of the global airline industry were expecting a turnaround in airline profits in 1993-1994. On these expectations the float of Qantas would have been well timed to coincide with a rising market for airline stocks. However, in the June quarter of 1993, analysts expectations were revised downwards. While expectations of 1994-95 earnings results were generally maintained, expectations for AMR Corp. reduced from 4 cents to 2 cents, with even more dramatic reassessments of other companies (e.g. United Airlines, 7 cents to 1 cent; Singapore Airlines, $1.55 to 68 cents; and Air New Zealand 44 cents to 0 cents). It was in the face of this consensus view of delayed recovery for the airline industry that the Australian Government deferred the float of Qantas to 1994-95.

Dividend Yield

Airline stocks are not, in brokers' parlance, a "yield story". They are a growth story. Dividend yields are currently highly variable and unstable, with many companies having reduced capacity to pay dividends. The average yield for profitable airlines is low (e.g. Singapore Airlines 2.23%) with British Airways constituting an exception at 6.04%. As a comparison, the average yield of the Australian All Industrials Index is currently 3.6% (not including franking credits).

Table 4: Dividend Yields

Company	Dividend Yield (%)
Singapore Airlines	2.23
British Airways	6.04
KLM	3.46
US Air	0
United Airlines	0
Southwest Airlines	.12
Delta Airlines	.4
AMR Corp.	0

Source: Bloomberg

Price/Book Ratio (P/B)

One check on valuation levels often referred to by analysts is the ratio of Market Price to Book Value of Net Assets. Extreme caution must be exercised, as the P/B ratio can be highly sensitive to different accounting procedures. The 1992 ratios for a number of international airlines are shown in Table 5. The average P/B ratio of 1.59 is raised by three companies which have shown considerable resilience in the recent downturn in the world airline industry. It may be noted that Qantas purchased Australian Airlines for $400 million, which represented a P/B ratio of 1.33 times Australian's 1991 net assets.

Table 5: International Airlines Price/Book Ratios

Air New Zealand	0.79
British Airways	2.17
Cathay Pacific	3.36
Delta Airlines	1.19
KLM	0.73
Lufthansa	1.52
Singapore Airlines	1.27
Southwest Airlines	2.65
Swissair	1.09
Average	1.59

Source: Murphy and Chew, 1992

Operating cash flow multiples (S/EBDRIT and V/EBDRIT)

Operating cash flow is defined as Earnings Before Depreciation, Rentals Interest and Taxes (EBDRIT). This measure overcomes most of the major accounting problems which render other multipliers unworkable in a period of depressed airline profits. For example, the use of an operating cash flow fixed charges coverage ratio (EBDRIT/Interest + Rentals) provides more valid rankings of companies' relative abilities to make contractual

payments. In mid 1992 Morgan Stanley reported that while EBDIT/Interest expense was 5.23 for British Airways and 4.97 for Japan Airlines, the coverage was reversed on the EBDRIT/Interest + Rent Expense measure (2.12 for BA and 4.97 for JAL) Thus, excluding the effect of operating leases masks the relative effective interest coverage.

The V/EBDRIT and S/EBDRIT multipliers for several US and international airlines are displayed in Table 6. However, analysts seldom appear to adjust fully for the differential capital structures of airlines or explore the full implications of S/EBDRIT and its relationship to V/EBDRIT, which is taken up later in this paper.

Table 6: Cash Flow Multiples

	V/EBDRIT	S/EBDRIT
British Airways	7.18	2.43
KLM	6.98	1.07
Singapore Airlines	6.35	5.82
AMR Corp	8.06	1.92
Delta Airlines	6.20	1.37
Southwest Airlines	10.95	7.95
United Airlines	7.40	1.71
US Air	6.84	.77

Valuation relative to local market

Some US airline analysts, including Derchin and Orme (1993, p.12) believe that relative operating cash flow to local market index is the best basis for value comparisons. They have constructed a subjective ranking of airlines derived from scores allocated to 8 fundamentals: Balance Sheet; Cost Structure; Labour Relations; Growth Prospects; Competitive Position; Fleet; Service; and, Marketing. On this basis, however, their relative subjective ranking did not fully accord with the relative rating of price/operating cash flow to local markets.

Table 7: Subjective and Relative Market Valuations, Feb. 1993

Airline	Subjective Ranking	Price/Cash Flow to local Market Index
Singapore Airlines	1	-50%
Southwest Airlines	2	-5%
Cathay Pacific	3	-22%
British Airways	4	-68%
AMR Corp.	5	-62%
UAL Corp.	6	-55%
Delta Air Lines	6	-63%
KLM	6	-86%
ANA	6	59%
Japan Airlines	7	67%
Malaysian Airlines	7	-75%
Alaska Air group	8	-41%
USAir	9	-80%

Source: Derchin and Orme (1993)

From this analysis it would be bold to conclude that Singapore Airlines is undervalued. Key players in the market would be fully aware of this apparent "anomaly". Market valuation relative to current operating cash flow depends on relative improvement in the future cash flow position. Thus, a relatively poorly performing company which is expected to improve substantially could earn a higher multiple than a company which is already operating efficiently and will continue to do so. In fact, it is difficult to see how the valuation of an airline based on comparatives in other countries relative to their home stockmarkets can improve accuracy. Having largely eliminated accounting bias by focusing on operating cash flow (EBDRIT), this extra step appears to reintroduce a significant biasing factor in the non-comparability of markets. Just as in the international comparison of betas, it must be recognised that the basis of comparison (the "market") is different in each case. In addition, the movements of share prices in individual stock markets are generally not highly correlated.

Value/EBDRIT and Capital Structure

Modelling V/EBDRIT

The relationship between V/EBDRIT and capital structure can be best understood in the context of a traditional valuation model in which firm value (V) is the sum of debt (B) and equity (S) values. Thus,

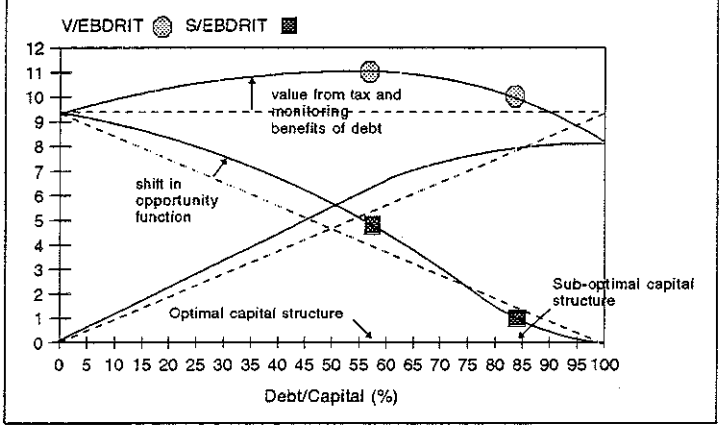
$$V = B + S$$

Dividing through by EBDRIT, we see that V/EBDRIT is simply the sum of B/EBDRIT and S/EBDRIT,

$$V/EBDRIT = B/EBDRIT + S/EBDRIT$$

The relationship between these three variables and capital structure is shown in Chart 4. When the capital structure is all equity (i.e. S/B+S = 1), S/EBDRIT equals V/EBDRIT, while an all debt capital structure implies that B/EBDRIT equals V/EBDRIT. The diagram assumes an investment opportunity function which reflects the operating profit potential of a specific company at a point in time. With a given EBDRIT, this function will be higher when future operating profit growth opportunities are high after relative risks have been considered. Therefore, it will be higher for companies with the best prospects, and will shift over time as recessions and booms in economic activity impact on a given firm. The S/EBDRIT multiplier, like the P/E multiplier, declines as more debt is taken on by the firm.

Chart 4: V/EBDRIT and Capital Structure



If there were no agency, risk or tax shield consequences arising from the introduction of debt, the relationship between V/EBDRIT, S/EBDRIT and B/EBDRIT would be described by the broken straight lines in Chart 4. Capital structure would be a matter of indifference as the decline in S/EBDRIT would be matched exactly by the rise in B/EBDRIT. Thus, V/EBDRIT would remain constant.

Relaxing these assumptions, as soon as debt is introduced into the firm value increases because of the impounding into share price of the present value of the tax shield on debt (in effect, the cost of capital falls). Another reason for increased value is the expected future cash flow effects of increased monitoring of management by debtholders (i.e. reduced agency costs). An optimal capital structure is reached when V/EBDRIT is a maximum. When too much debt is introduced, or the operating potential deteriorates markedly this will have negative effects on the S/EBDRIT multiplier, since a rapidly rising probability of default will be factored into the share price. Similarly, the B/EBDRIT multiple will suffer as debtholders realise that the security which had been assumed is no longer available. Due to these costs, at a given operating potential, the firm value multiplier (V/EBDRIT) is likely to be lower at close to a 100% debt structure than for a 100% equity structure.

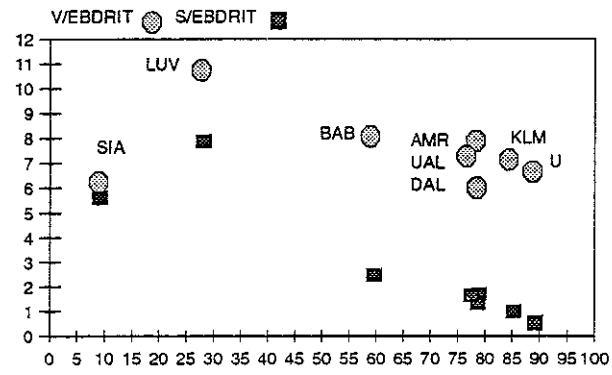
Recent valuations and capital structures

A capital structure is optimal in the sense that it maximises the total value of the corporation. In countries which have a "classical" system of corporate taxation with high rates, there is a bias toward debt from the tax deductibility of interest. In countries with full tax imputation (e.g. Australia and New Zealand), or partial imputation (e.g. Britain and France) the argument for debt is not as strong. Thus, different tax structures will make international comparisons difficult.

The empirical values of V/EBDRIT and S/EBDRIT as at March 1993 are shown ranked by capital structure in Chart 5. There we find that Southwest Airlines is clearly considered by the market to have the best profit growth opportunities. Without debt it is likely that this multiple would have been lower. This raises the issue of whether Southwest is undergeared. Here it must be recalled that Southwest has a high beta risk (1.5), which when taking account of its low debt level, implies a high degree of business risk. This means that Southwest's cost of equity capital is already high, and would be pushed up further if more debt were introduced. Singapore Airlines (SIA) has a lower V/EBDRIT multiple because its immediate profit growth opportunities were not considered as good as Southwest's. Furthermore, it does not carry much debt (8%) and would not receive much tax shield benefit because of its 53% government ownership and low tax structure. It would be difficult to conclude that SIA is undergeared.

At this time the three large US airlines, American (AMR), United (UAL) and Delta (DAL) had very similar market based capital structures, although AMR was considered to have the best recovery potential. On the other hand, the US Air (U) and KLM multiples appeared to be restrained by large debt burdens, indicating a need for injections of equity.

Chart 5: V/EBDRIT and S/EBDRIT for Selected Airlines



This has recently been achieved by USAir through a US$500 million capital raising associated with the alliance with British Airways. A potential problem in looking at such a chart, however is that the debt values are book values, while the equity values are market values. To be more precise, market values of debt would need to be estimated. To this writer's knowledge, no analyst undertakes such an exercise.

Conclusion

It has been argued that given the difficulties in airline valuation, DCF should be used in conjunction with a future EBDRIT multiple which overcomes most of the accounting problems associated with measuring an airline's financial performance. This eclectic approach combines the advantages of making specific assumptions about short term (3-4 year) revenue and cost forecasts with a more stable future EBDRIT multiplier which incorporates a long term view of the industry. While DCF modelling is a theoretically appealing approach it is questioned for not incorporating the value of growth options. As a result using DCF alone could underestimate an airline's value. EBDRIT multiples look less theoretically appealing on the surface, but implicitly incorporate option value. The disadvantage of EBDRIT is that "comparable" companies may not be true comparables.

Making international comparisons of price/cash flow multipliers relative to local market has been discounted on the grounds that it introduces a further element of bias. It is also important that EBDRIT multiples take account of capital structure and future earnings growth potential. Valuers must look at future relative growth of EBDRIT taking account of the business and financial risks. The V/EBDRIT multiple is the overall indicator of future potential, but is a crude instrument for estimating equity value when there is much

debt in the capital structure Hence, equity valuations based on V/EBDRIT are likely to be highly sensitive to alternative assumptions and may not be comparable unless the market value of debt is calculated accurately Sensitivity is reduced by focusing on S/EBDRIT, but this requires an estimate of equity (S) to know what the capital structure is, thereby introducing an element of circularity Thus, a degree of subjective judgement is required to be exercised At the end of the day, the choice between EBDRIT multiple and DCF analysis may be a classic case of being "approximately right" rather than "precisely wrong"

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