International Transport Forum

Airports in the Aviation Value Chain: Financing, Returns, Risk and Investment

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Mike Tretheway, Kate Markhvida
InterVISTAS Consulting Inc.,
Vancouver, Canada

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Dr. Michael W. TRETHEWAY
Kate MARKHVIDA

InterVISTAS Consulting Inc.[1]

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1. Mike Tretheway is Senior Economist and Kate Markhvida is Manager, Economic Analysis, with InterVISTAS Consulting Inc., Vancouver, Canada. Mike Tretheway is corresponding author and can be reached at Mike.Tretheway@InterVISTAS.com or +1-604-717-1801.

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1. INTRODUCTION

The global airline industry is slowly returning to profitability, but there is a long and difficult road ahead. According to IATA, the industry raised a profit of $8 billion in 2011[2] and it is forecasted to make a profit of $11 billion in 2013.[3] However, these improved profit margins continue to be razor thin – in the best of times the airline industry earns only a modest 1-2% net profit margin on revenue. Volatile fuel prices, economic downturns, impacts of terrorism and natural disasters (hurricanes, volcanic ash, tsunamis), pandemics and government austerity measures are among the key factors that will continue to affect airline profitability.

If profit margin improvement leads only to a 1-2% return on revenues, a key question is whether the airline industry is currently capable of ever achieving financial sustainability. A classic paper by researcher Ken Button asks whether the airline industry has an empty core,[4] economist jargon for conditions under which airline competition can never reach a financially sustainable equilibrium. A simplistic way of stating this is that competition between airlines may be so intense that they will always compete price down to the marginal cost of providing service, leaving fixed costs uncovered.

The airline industry needs to find some means of earning revenues sufficiently above marginal cost to cover its fixed costs. One view of this is driven by a capacity argument – there is too much capacity in air transport markets and returns will be below the cost of capital until capacity is driven out. The challenge is that the industry has had decades of weak returns, yet capacity continues to be added in almost every geographic market in the world. There are also differences in business models among the airlines, with some carriers achieving a return adequate to cover their costs of capital. They will continue to add capacity, even as carriers with inadequate return maintain their capacity to protect market share, rather than shed it.

Another view is that the overall aviation value chain is financially sustainable, but that certain segments of the industry's value chain have market power and have been able to transfer profits from the air carriers to themselves.[5] As will be seen, the airlines, while arguably the most important member of the value chain, also achieve the lowest return. A recent article by *The Economist* succinctly summarized the key problem faced by the airline industry: it makes profit for everyone along the aviation value chain except for itself.[6]

2. IATA, 2012 Annual Review, June 2012, p. 6. The figure is $7.9 billion.

3. Reuters, "IATA raises profit outlook for world's airlines", 20 March 2013. The figure is $10.6 billion.

4. Add citation.

5. NTD: sources.

6. The Economist, "The ineluctable middlemen", 25 August 2012.

In the last decade, airlines have consistently posted lower rates of return for their shareholders than aircraft manufacturers, airports, air navigation services providers (ANSPs), global distribution systems (GDSs), travel agents, freight forwarders and other players along the value chain. In this view, the solution may partly lie with rebalancing the value chain, injecting competition in segments which are earning economic (above cost of capital) profits or removing regulatory impediments to air carriers reaping some benefit from other parts of the value chain.

Airports also face challenges. While they have been able to achieve somewhat better financial returns, collectively they are barely covering their cost of capital or falling slight it. A particular challenge for airports is that while the account for roughly 7-10% of airline costs, they must finance 36% of the aviation value chain's capital, compared to 46% for airlines. Unlike the airlines, airport capital is not mobile. Airports also represent an opportunity for improving the performance of the aviation value chain. Many airports have relatively low financial risk and with different pricing policies and changes to regulation could bear a greater share of business cycle risk. Currently airport pricing can be countercyclical, raising charges when airline traffic falls. With regulatory changes airports could be empowered to hold rates down in recessions, but this would need to be offset by higher than average returns in the better years of the business cycle.

This paper addresses the value chain issues in aviation.

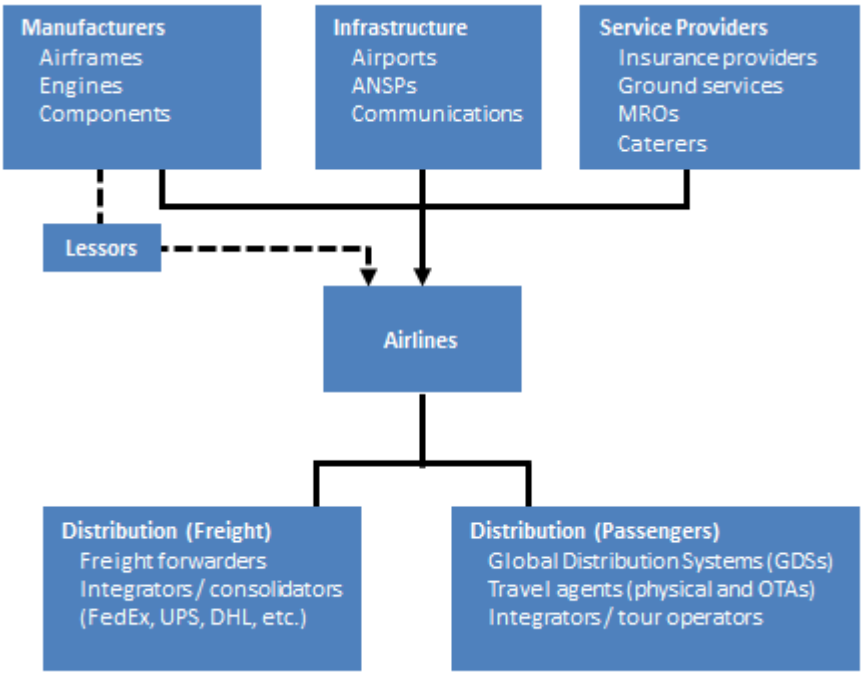
- Section 2 describes the aviation value chain and its participants.
- Section 3 addresses financial performance and sustainability of the aviation value chain. [7]
- Section 4 focuses on the airport sector of the aviation value chain, discussing trends in sources of finance for airports.
- Section 5 discusses a number of policy issues and provides several recommendations.

7. Sections 2 and 3 draw on materials in a forthcoming paper by Tretheway and Markhvida based on their presentation at the November 2012 European Aviation Conference.

2. THE AVIATION VALUE CHAIN

The commercial air transport value chain consists of a number of interlinked segments. It can be broadly divided into upstream and downstream segments, as indicated in Figure 1. With the air carriers as the centre of the value chain, the upstream and downstream sectors consist of:

Figure 1. **The Commercial Aviation Value Chain**



- Upstream
  - Aircraft manufacturers
  - Leasing firms and other sources of financial capital
  - Aviation infrastructure
    - Airports
    - Air navigation service providers (ANSPs)
    - Aviation communications (air-to-air, between ground stations, etc.)[8]
  - Other suppliers
    - Caterers
    - Fuelling firms
    - Insurance providers
    - Ground services
    - Etc.

- Downstream
  - Distribution of the airline product – passengers
    - Global distribution systems (GDS), formerly computerised reservation systems (CRS)
    - Travel agents (online and brick & mortar)
    - Travel integrators (tour operators packing air ticket with hotel and/or other travel service)
  - Distribution of the airline product – cargo
    - Freight forwarders
    - Cargo integrators (who package air lift with trucking pick-up and delivery, and/or customs services, etc.)

Since the pendulum of regulation swung in the direction of greater market liberalization of the airline industry in the 1970s-90s, the main goal of policy makers has been to encourage horizontal competition between airlines. Increased airline competition has borne fruit in the form of lower overall fares and enhanced choice of air travel options in many markets.[9] However, there has been a substantial cost in the form of lower profitability for the air carrier industry itself. Of course, many segments and carriers in the industry have achieved reasonable profitability, in particular with some of the low cost carriers and the integrator cargo carriers. Financial viability was a challenge even during the regulated era, but then the solution was often regulator induced or sanctioned mergers. These provided continuity for travellers and allowed some shareholders to maintain some equity even when their carriers' business models and operations were effectively failures.

8. These services are provided by organisations such as SITA and AIRINC.

9. See Tretheway, Michael W. and Ian S. Kincaid (2005), "The Effect of Market Structure on Airline Prices: A Review of Empirical Results", Journal of Air Law and Commerce, Voume 70, Issue 3, pp.467-498; A.R. Goetz and T.M. Vowles (2009), "The good, the bad, and the ugly: 30 years of US airline deregulation," Journal of Transport Geography, Volume 17, pp. 251-263; Barrett, Sean D. (2000), "Airport competition in the deregulated European aviation market," Journal of Air Transport Management, Issue 6, pp. 13-27; Bennet, R. & Craun, J. (1993), "The Airline Deregulation Evolution Continues: The Southwest Effect," Office of Aviation Analysis, U.S. Department of Transportation Paper; De Wit, Jaap G., "An Urge to Merge?", Journal of Air Transport Management, Volume 2, Issue 3/4 (special issue), pp. 173-180.

It is important to note that the aviation value chain is not a collection of firms that operate in isolation of each other. There has been significant facilitation in terms of creating standards and operating procedures across the value chain members, and this has lowered industry costs and increased customer service levels. ICAO and certain national air safety regulators have established standards and recommended regulations that facilitate, for example, airport design so that air carriers can operate aircraft to a broad range of similarly regulated/ designed/ equipped/ operated facilities.

IATA has established standards for sale and exchange of travel documents, facilitated clearing of financial transactions between value chain partners, set up a process for carriers to apply for slots at airports in different time zones, etc.

3. PERFORMANCE OF THE AVIATION VALUE CHAIN

3.1. Investment

An economically sustainable industry has to cover the cost of operations and provide a reasonable return on investment so that capital can be renewed. This must be achieved not only by the value chain in aggregate, but each sector of the value chain must achieve viability and financial sustainability. As will be seen, the weakest link in the aviation value chain are the airlines themselves.

Figure 2 shows the level of investments made in the air transport value chain in 2011. The largest investments are made by the air carriers, primarily in new or replacement aircraft, airframes, engines and other flight components, but also in ground equipment and corporate resources. In 2009, airlines around the globe invested $500 billion.[10] In 2011, airline investment was $587 billion.[11] The next largest component is for the airport sector with $308 billion in annual investment in 2009 and $436 billion in 2011.[12] It is often overlooked that airport investments are substantial and amount to 36% of the total investment in the aviation value chain. Airports have very low asset turnovers relative to the airlines. The ratio of annual revenues to invested capital is 1.0 for the airlines[13] but only 0.2 for the airports.[14] ANSPs account for an addition $35 billion in investment.[15] Aircraft manufacturers had $35 billion in invested capital while leasing companies had $71 billion in assets in 2011.[16]

10. McKinsey & Company, "Air Travel Value Chain Analysis", February 2011, p. 7.

11. McKinsey & Company, "Air Travel Value Chain Analysis", February 2013, p. 8.

12. Supra note 10, p. 7 and supra note 11, p. 8.

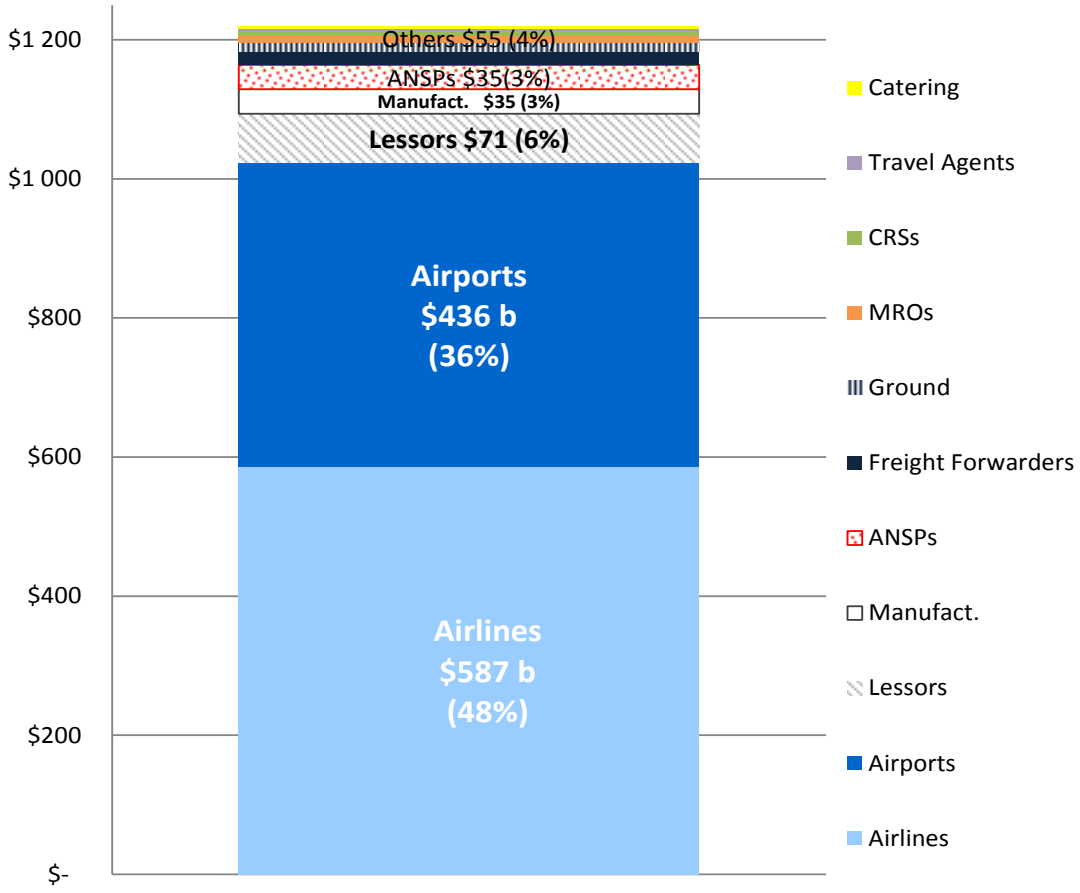
13. According to IATA, total revenue for the global airline industry was $597 billion in 2011. Total investment by airlines around the world was $587 billion in the same year, resulting in a revenue/investment ratio of 1.0. Source: International Air Transport Association, Industry Financial Forecast, December 2012, p. 4.

14. According to ACI, total revenue for airports worldwide was $101.8 billion in 2011. Total investment by airports was $436 billion in the same year, yielding a revenue/investment ratio of 0.2. Source: Airports Council International, 2011 Annual Report, p. 12.

15. Supra note 11, p. 8.

16. *Ibid.*

Figure 2. **Capital Investment by Air Transport Value Chain Sectors 2011**

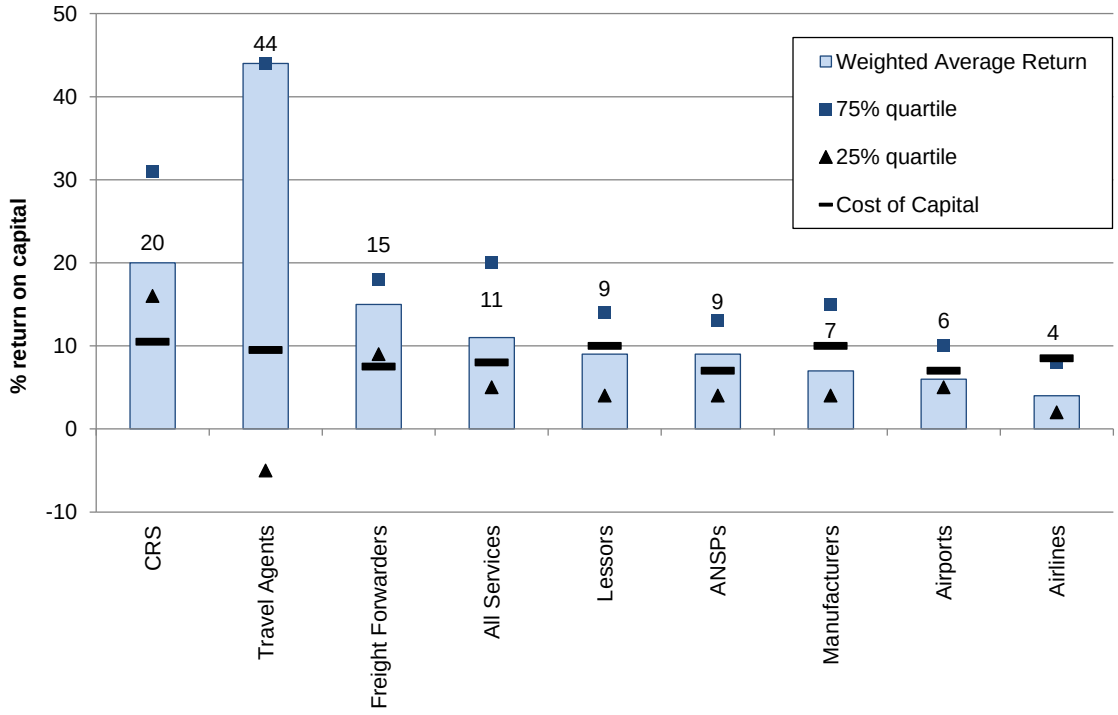


Source: McKinsey & Company, Air Travel Value Chain Analysis, February 2013.

3.2. Rate of Return on Investment

IATA commissioned a major study by McKinsey & Company to estimate the returns on invested capital in the aviation sector. Figure 3 provides a breakdown of average returns on invested capital for different sectors in the aviation value chain.

Figure 3. **Return on Invested Capital in the Commercial Air Transport Value Chain 2004-2011**



Source: McKinsey & Company, Air Travel Value Chain Analysis, February 2013.

The findings of this study showed that globally airlines have consistently posted a lower return on capital invested by shareholders than other players in the aviation value chain. Further, this return was below the airlines' cost of capital. The average return on invested capital in the airline industry was a meager 3% in 2002-2009, compared with a cost of capital of 7-10%.[17] In 2004-2011, the average return on capital across the industry was somewhat higher (4%), but still falling short of the industry's cost of capital requirements.[18] Compare this to top value chain performers such as global distribution systems (20%), travel agents (44%) and freight forwarders (15%) in 2004-2011. Each of these are achieving returns well in excess of their respective costs of capital, suggesting a substantial degree of market power.

Return on invested capital for the airline sector varies by region, with some regions performing better than others. According to a joint study by the Association of European Airlines and Seabury, the typical return on capital employed (ROCE) in the European airline industry fluctuated around the zero mark in 2004-2007, whereas aircraft manufacturers, lessors, MROs (maintenance, repair and overhaul companies), airports and GDSs not only posted positive returns but had higher average returns compared to airlines.[19] Most European carriers did not meet the threshold of a sustainable return on

17. McKinsey & Company, "Air Travel Value Chain Analysis", February 2011, p. 8.

18. McKinsey & Company, "Air Travel Value Chain Analysis", February 2013, p. 9.

19. Association of European Airlines and Seabury, "Sustainable European Aviation", November 12, p. 10.

capital of 7% in the past decade.[20] Select airlines in the Middle East, Asia and Latin America have posted somewhat higher returns (in the 6-12% range) in the past decade,[21] but even in those regions airlines have often fallen behind other players along the value chain.

Returns in the airline sector also differ by business model, to some extent. Many of the current top performing airlines follow some variant of the low cost carrier (LCC) business model, although not all LCCs are profitable, much less sustainably profitable. Similarly, some of the legacy carriers have been able to achieve profitability, such as COPA (consistently), LAN (recently), Alaska and All Nippon Airways.

Inadequate returns on invested capital have far-reaching implications. Specifically, the air carrier sector industry is the centre or anchor of the value chain, but is the least profitable node in the chain. Collectively, for many years the industry has failed to achieve sufficient returns to cover the cost of capital.[22] Despite a continuing trend of unit cost reductions in the airline industry, investors derive no value or benefit from the improved cost performance as the value is entirely passed on to the customers downstream. This poor return at the value centre of the aviation supply chain puts other members of the value chain at some risk.

Airports have fared better than airlines in terms of financial returns, but are still the 2nd lowest earner in the value chain, according to the McKinsey study. The average return on invested capital is roughly 1% below the industry's 6% average cost of capital, although a few airports have been able to achieve overall returns above their cost of capital. 25% of airport operating companies have achieved returns above 10%, far below the returns of other value chain sectors such as CRS, travel agents and freight forwarders. The higher returns of some airports is largely attributable to non-aeronautical services (e.g., parking and net income from concessions and operations of retail/food/beverage/advertising). Most airports have their aeronautical fees limited to cost recovery or less, either by economic conditions or by regulation.

3.3. Credit Rating

Another metric that can be used to examine sustainability performance along the value chain is debt and equity credit rating for companies in different aviation sectors. With very few exceptions, airline shares are not rated as investment grade, often being rated as "junk" or "speculative" grade. This increases the cost of capital for air carriers. Figure 4 provides a selection of bond ratings for air carriers. Only three of the selected carriers meet the criteria of investment grade (BBB- or higher, represented by the dashed horizontal line in Figure 4).

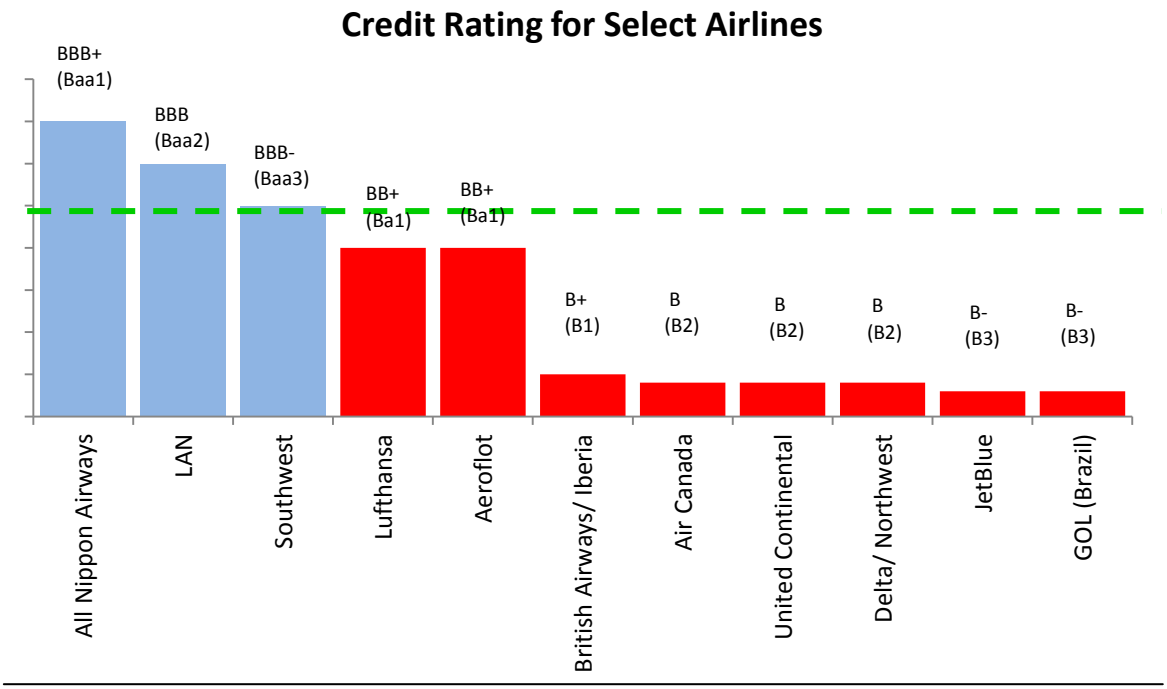
By contrast, airports are generally rated as "investment" grade and thus have lower costs of debt capital (Figure 5).

20. *Ibid.,* p. 5.

21. *Ibid.,* p. 7.

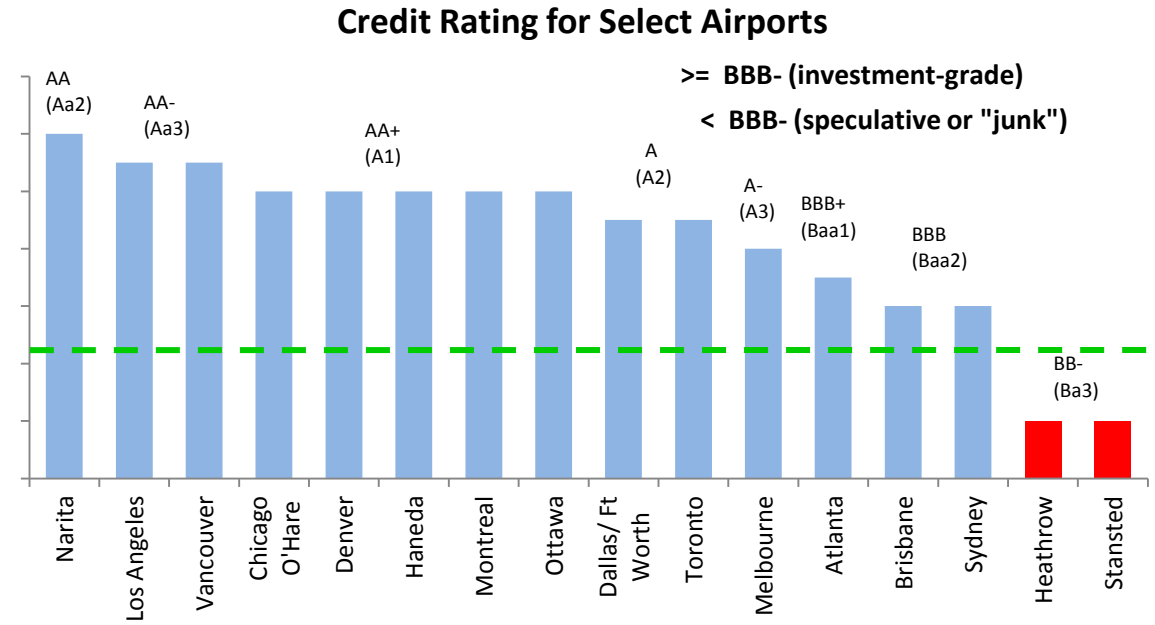
22. McKinsey & Company, "Air Travel Value Chain Analysis", February 2013, p. 9.

Figure 4. **Airline Credit Ratings for Select Airlines**



Sources: Moody's, DBRS, Fitch and R&I.

Figure 5. **Airport Credit Ratings for Select Airports**



Source: Moody's, DBRS and R&I.

Low credit rating for airlines is problematic for the airlines in particular and the value chain in general for a number of reasons. First, it narrows the pool of potential investors for the airlines, the centre of the value chain, and thus limits access to capital for the airlines and expansion of activity in the overall value chain. In many jurisdictions, institutional investors such as pension funds, insurance companies, banks and others are prevented by their internal regulations from investing in assets with ratings below investment grade. Pension funds are the largest institutional investor sector class, accounting for over 20% of global asset management,[23] and are among the groups of investors who are not allowed to invest in "junk" bonds. The long life of aircraft assets might otherwise be a good match for investment objectives of pension funds (and also insurance companies).

One trend observed over the years is an increasing portion of the global fleet financed by long term capital leases rather than by the carriers. The reasons for this are complex, and are due in part to tax law incentives in some jurisdictions favouring leasing rather than purchase of long lived assets. However, the inability of air carriers to obtain low rate investment grade financing from pension funds and insurance companies is a major factor.

Second, the high cost of capital of airlines also raises issues as to who should bear risk in the industry. Optimisation across the value chain may favour different value chain partners financing some capital assets and different institutional arrangements on risk bearing and sharing. This is a topic to which we shall return shortly.

Despite the fact that airlines around the globe consistently post low returns on invested capital and earn small profit margins in the best of times, the industry has generally managed to attract capital investment. One cannot help but wonder why investors would put money in an industry that does generate a reasonable rate of return. A possible explanation lies in the fact that the airline industry is highly leveraged and generates a higher return on investors' equity (or net worth).[24] Financial investment decisions therefore depend not only on the level of profits in a given industry, but also on how efficiently industry management utilizes available assets to generate sales (i.e., the industry's return on net worth).

Return on shareholders' equity or return on net worth is equal to net profit divided by shareholders' equity. Alternatively, it can be thought of as a product of return on assets and the financial leverage ratio of a firm (or industry). [25] Other things being equal, an industry with a higher return on assets or a higher financial leverage would have a higher return on equity. We used a strategic profit model[26] to compute returns on net worth for a sample of air carriers based on their financial statements for 2012. Table 1 summarizes returns on shareholders' equity for a sample of seven carriers that offer commercial scheduled service.

23. The Economist, "Asset-backed insecurity", 17 January 2008.

24. Shareholders' equity or net worth is comprised of the shareholders' investment in capital stock plus retained earnings. Stock, James R. and Douglas M. Lambert, Strategic Logistics Management, Second Edition (Homewood, Illinois: Irwin, 1987), p. 51.

25. Stock, James R. and Douglas M. Lambert, Strategic Logistics Management, Second Edition (Homewood, Illinois: Irwin, 1987), p. 52.

26. *Ibid.,* p. 52.

Table 1. **Net Profit (Loss) and Return on Shareholders' Equity 2012**

Carrier	Net Profit Margin	Return on Net Worth
WestJet	7.1%	16.5%
United/Continental	-1.9%	-16.6%
Southwest	2.5%	6.0%
LAN	4.9%	5.0%
Qantas	-1.6%	-4.1%
All Nippon Airways	2.0%	5.1%
Lufthansa	3.6%	14.9%

Source: InterVISTAS analysis based on 2012 annual reports for All Nippon Airways, LAN, Qantas and WestJet; 2012 operating statement for Southwest; 2012 financial statement for Lufthansa and K-10 Form for United/Continental.

While net profit margin has often been the focus of commentary on airline industry performance, the relevant measure in terms of investment is return on equity. Because the airline industry typically has financial leverage factors of 2-3, return on net worth will generally be 2 to 3 times net profit margins. For four carriers in our sample in Table 1 (WestJet, Southwest, Qantas and All Nippon Airways), the return on equity (whether positive or negative) exceeded in magnitude the profit margin in 2012 by a factor between 2 and 3. For two carriers (United/Continental and Lufthansa) the difference was even more substantial. Only for one carrier in the sample (LAN), the 2012 profit margin was roughly equal to the return on net worth. This brief analysis provides an important insight as to why the industry continues to attract investment, in spite of low net profit margins. While returns on equity are still low relative to some other sectors (e.g., information and communications technologies, energy), moderate equity returns in general and high equity returns for some carries (e.g., WestJet and Lufthansa) explain how the airline sector has attracted investment.

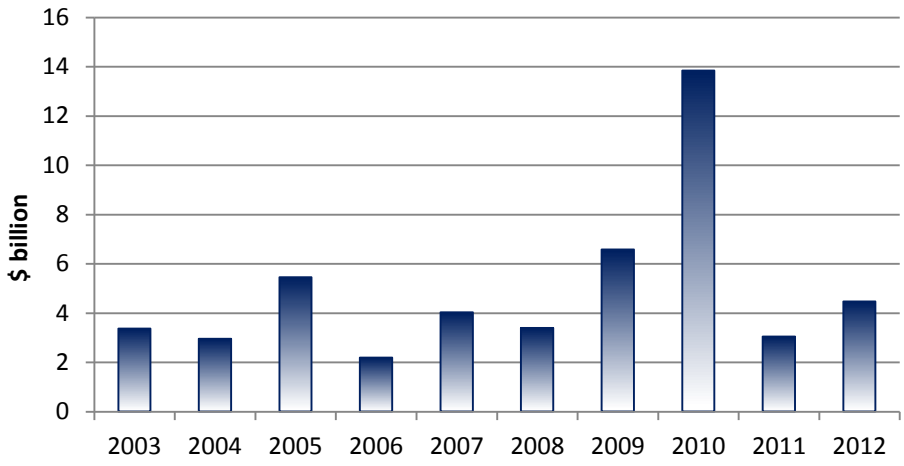
4. AIRPORT FINANCING

This section focuses on the airport sector of the aviation value chain, discussing trends in sources of finance for airports. Global data on the magnitude of airport financing is not readily available.[27] Nevertheless there is some information that is available in some jurisdictions.

Airports are generally low risk bond investment. Section 3 already discussed the generally high bond risk ratings of airports. This is an important point – in general, airports are low risk enterprises, at least for medium to large airports.

Active Debt Markets. Data is available on debt financing for U.S. airports, and since U.S. airports are operated by governments or not-for-profit authorities, debt is an important component of U.S. airport financing. Figure 6 graphs the annual level of new U.S. airport bond issues.

Figure 6. **Annual US Airport Bond Issues 2003-2012**



Source: National Associations of Counties, National League of Cities and The United States Conference of Mayors, "Protecting Bonds to Save Infrastructure and Jobs," 2013

27. One policy issue is that while airline industry organisations such as ICAO, IATA and ACI provide some basic data on income and expenses, none of the industry organisations collect and report balance sheet information on airlines, airports or ANSPs. This should be rectified as the income statement is part of the financial performance of the aviation sectors.

Ignoring the 2010 spike, US airports are able to access between $2 and $6 billion in long term bond financing each year. However, to put this in perspective, Airports Council International – North America conducted an airport capital needs survey and found that American airports need to make $71 billion in investments over a five year period to 2017.[28] Even at an annual rate of $6 billion, debt will cover less than half of the need. In the case of the U.S., there are two other major sources of financing (recall that U.S. airports have no access to paid in equity capital). These are government grants from the Airport Improvement Program (AIP), and funding via Passenger Facilitation Charges (PFCs, discussed further later in this report). The AIP generally is funded at $2.5 billion per year for commercial airports. PFCs vary by airport, but generally generate roughly $2 per enplaned/deplaned passenger. Thus, a passenger base of 500 million passengers would generate in the range of $1b per year. Adding debt, AIP and PFC funding sources, the U.S. currently finances perhaps $9 billion per year, or under $45 billion for the five year period to 2017. Clearly not all airport capital needs will be met.

Equity Capital. Another dimension of airport financing is access to equity capital. Not all jurisdictions allow access to paid-in equity, of course. While global figures are not available, there are some data that give us a glimpse at this financing source. CAPA provides a list of market capitalisations of private sector airport operators. Of the 28 airport operators it tracks, market capitalisation totals $55 billion. Of course, some of this value is not paid in equity capital, but it does represent what the equity markets have been willing to pay for airport equity. The leading airport operating company (in terms of market capitalisation) is AdP (Aéroports de Paris) which operates not only the three Paris airports but also some airports outside of France. The CAPA article notes that airports in the developing world are accessing equity. Three of the top ten airports on their list are East Asian airports, and 10 of the 28 are Asian. Clearly, equity capital is playing an important role in financing airport infrastructure in part of the developing world.

Equity secondary/resale markets. In the past 20 years, a large number of airports have been privatised. A question is whether this equity has any liquidity. The answer seems to be yes. There is a resale market for airport equity. Table 2 provide a list of recent examples of airports whose share have been sold in an emerging secondary market. Individual resale transactions of up to $2.5 billion have been observed. Some of these transactions reflect equity investors seeking to exit their investment while others have been forced sales, particularly the divestiture of London Gatwick, London Stansted and Edinburgh. While the table is focussed on larger transactions, we are aware of several small airport transactions. It would be incorrect to claim that the airport resale market is an active and highly liquid market, but we do observe regular transactions.

28. "ACI-NA Releases 2013 Capital Needs Survey", http://www.aci-na.org/newsroom/press-releases/aci-na-releases-2013-capital-needs-survey.

Table 2. **Secondary Market for Airport Transactions**: **Examples of Privatised Airport Resale**

Airport(s)	Partial/Full Sale	Seller	Buyer	Value of Sale
Athens[29] **Budapest Dusseldorf Hamburg Sydney Tirana**	Partial	Hotchief AG (*German construction company)* and business partners	Public Sector Pension Investment Board of Canada	$2 billion
Cardiff Airport (Cardiff, UK)[30]	Full	Abertis *(Spanish toll-road operator, runs 29 airports around the world)*	Welsh government	£52 million *($81 million)*
Stansted (London, UK)[31]	Full	Heathrow Airport Holdings *(formerly British Airport Authority)*	Manchester Airports Group (MAG)	£1.5 billion *($2.3 billion)*
Gatwick (London, UK)[32]	Full	British Airport Authority (BAA)	Global Infrastructure Partners (GIP)	£1.5 billion *($2.3 billion)*
Edinburgh Airport (Edinburgh, UK)[33]	Full	British Airport Authority (BAA)	Global Infrastructure Partners (GIP)	£807 million*($1.3 billion)*
Auckland Intl Airport (Auckland, NZ)[34]	7.6% partial sale	New Zealand Superannuation Fund	Various institutions	$276 million

No airport financial investment funds have emerged. One observation that can be made is that thus far, the size of the airport financial markets has not become large enough to result in dedicated airport infrastructure investment funds. Industry sector funds allow pension plans and individuals to invest in a sector but diversify their risk by using a broad based fund invested in a wide range of individual equity or debt instruments. There are infrastructure funds which include airports in a broad portfolio including electric utilities, toll roads, etc., but thus far, a dedicated airport fund has not emerged. This suggests that airport equity markets are still emerging and have not reached a critical mass.

29. Bloomberg, "Canada's public sector pension fund buys European airports division from Hochtief for $2 billion", 7 May 2013.

30. The Guardian, "Cardiff airport sold to Welsh government for £52m", 28 March 2013.

31. The Guardian, "Stansted airport to be sold for £1.5bn to Manchester Airports Group", 18 January 2013.

32. Financial Times, "BAA sells Gatwick for £1.5bn", 21 October 2009.

33. BBC News, "Edinburgh Airport sold to Global Infrastructure Partners for £807m", 23 April 2012.

34. Scoop Independent News, "NZ Super Fund sells 7.6% of Auckland Airport, raising $276m", 15 February 2013.

Small Airports Are Financially Challenged. Medium and large airports have access to a range of financial sources, including equity (in some jurisdictions), bonds/debt, government grants and funding devices such as US PFCs. However, many small airports are financially challenged. A study by Transport Canada found that the overwhelming majority of Canada's small/regional airports are not able to cover their operating and capital costs. In Australia, the economic viability report for a proposed second Sydney airport posited the smallest size of a financially sustainable airport was 5 million enplaned/deplaned passengers.

To meet this challenge, a number of jurisdictions have provided government grants to airports, typically to smaller airports. These grants generally are only available to cover airport capital costs, and cannot be used for operating costs. The U.S. AIP, for example, is heavily weighted toward small airports (and an additional $1 billion is provided for general aviation airports annually). This is a particular challenge in many parts of the developing world. Tiger economies such as China are presently able to fund significant airport investment but the poorer nations do not have government resources to do so. Africa is an example, where other priorities limit airport access to infrastructure funding. This is an area where development banks can play a critical role. A study conducted by InterVISTAS Consulting for IATA measured the national rate of return on investment in the aviation sector.[35] The key findings were that a) airport investments often provide high rates of return, and b) investing in airport infrastructure improves overall national economic productivity.

Even for developed nations, access to public grants to small airports is threatened. US sequestration is threatening to reduce AIP funds. Canada has a capital assistance program for small airports, but has been reducing the annual grant awards, in part by narrowing the criteria for eligible airport capital projects. On the other hand, during the two years immediately following the 2008 global financial collapse, a number of nations sought to stimulate their economies by providing one time funding for infrastructure projects and some airports were able to access such funds.

35. See IATA Economics Briefing #9, Aviation Economic Benefits, July 2007 In particular, see Section 3 on productivity and economic growth.

5. POLICY ISSUES

Having discussed airport financing, this section addresses some policy issues for airport pricing and funding. Some of these directly address airport issues, while others deal with how changes in policy can provide an overall benefit to the aviation value chain.

5.1. Airports Have Lower Financial Risk Than Airlines. This could be Levered to Enhance the Aviation Value Chain.

Airlines bear much, if not all, of the business cycle risk in their pricing arrangements with airports. This is the case in spite of the lower inherent business risk for airports because they are less substitutable than airlines.

Airlines face pro-cyclical demand. While estimates of income elasticities vary, most studies find that air travel demand is highly income elastic. A major study of air travel elasticities found income elasticities to be in a range of 1.5 to 2.7, depending on the market (developing countries have the highest income elasticities) and the length of haul (elasticities are higher the longer the haul).[36] This means that when economies contract, air travel demand falls at roughly double the rate. There is also a fare effect resulting in dual pressure on airline revenues: falling demand and falling average prices.

Airports also face falling demand in a downturn but most airports have regulatory policies and/or agreements with carriers that allow them to set fees *each year* to allow full recovery of the airport's aeronautical charges. Because much of an airport's costs are fixed, this results in airports often raising their fees in low traffic years, in order to generate revenue to cover their fixed costs with lower traffic levels. This results in air carriers being subjected to a third pressure on their profits: revenues fall doubly from reduced demand and lower fares, while unit costs rise due to higher airport fees per flight.

From a value chain point of view, this is neither economically efficient nor financially desirable. Airports have lower business risk than individual airlines. If an airline fails, its shareholders will typically lose all of their equity investment. In contrast, if an airline fails, the airport will experience a loss of revenue for a period of time but the underlying demand for air access from the airport's catchment area remains and in most cases eventually other or new airlines will offer capacity to fill the service gap. This is not to say that there is no airport risk. Airports with high connecting traffic are especially vulnerable but it is rare for any but the smallest of airports to face losing their entire revenue stream. This lower risk for airports is reflected in the bond ratings provided in Section 3; most airports are of investment grade while most airlines are not.

36. InterVISTAS Consulting, "Estimating Air Travel Demand Elasticities," study prepared for IATA, December 2007.

Is there an alternative policy that could reduce business risk for airlines and better stabilise their financial sustainability? In our opinion, the answer is yes. There could be a transfer of business cycle risk from airports to airlines. This would be accomplished by allowing airports to run deficits in weak traffic years to enable them to maintain (or lower) rather than increase aeronautical fees. This would require airports to then earn above average returns in high demand years. Essentially, the concept would be to seek the assessment of airport returns over an entire business/traffic cycle rather than in individual years.

There are many benefits to such a change in policy. Airports have lower costs of capital than airlines due to their higher bond ratings, and this would reduce costs in the airport value chain, and likely result in somewhat lower fares for travellers. It would result in the removal of a pro-cyclical airline cost factor, providing somewhat improved airline financial stability over the business cycle. If airports used this new structure to somewhat reduce charges during temporary traffic declines, the policy could introduce a counter cyclical element to airline costs.

This would require changes to government policies, in some jurisdictions. Where airports fees are regulated, typically with 4 or 5 year review cycles, the regulator would need to be empowered to allow above normal returns for an airport during a high traffic segment of the business cycle, and would have to judge airport returns over the entire business cycle (which may not coincide with the regulatory cycle). One mechanism could be similar to the fuel price adjustment provisions found in electric utility and ferry regulation,[37] where fuel cost increases are temporarily banked during an energy price uptick, keeping rates down, with the bank offset by maintaining higher utility prices to consumers when fuel prices decline, until the banked costs are used up.

This change would also require airlines to change their approach to assessing airport charges through airport-airline use agreements. Ironically, it was the airlines who originally proposed guaranteeing airport cost coverage, but limiting the airport to only a normal return on capital.[38]

5.2. Consideration Might be given to Vertical Integration/Partnerships Between Airlines and Airports, Provided Airport Access is Protected and Constraints on Charges are Put in Place.

One solution that might be proposed to improve the profitability of the airline industry is to allow air carriers to invest in other sectors of the aviation value chain through a vertical integration process. The concept would be to allow the air carriers to derive some of the value that their airline services have enabled in other sectors.

Such arrangements existed in the past when airline manufactures held ownership in airlines.

37. Add citation to BC Ferries or other fuel cost adjustment mechanisms.

38. This is reflected in the original airport residual pricing agreements negotiated between airlines and airports in the U.S., where a formula was developed for annual airport fees based on traffic projected for the year, thus introducing the undesirable pro-cyclical pricing policy, which effectively transferred airport financing risk to the airlines. While U.S. style residual pricing agreements are generally not replicated elsewhere, the basic concept is reflected in airport-airline use agreements, enabling airports to adjust their charges every year to ensure full coverage, but no more, of airport aeronautical costs.

- While this example is dated, historically, one of the largest US carriers, United Airlines, was originally developed by a partnership between an aircraft manufacturer (Boeing) and an engine manufacturer (Pratt & Whitney). A subsequent legislative intervention through the passage of the Air Mail Act in the US in 1934 forced holding companies to break up, with the result that aircraft manufacturers and airlines could not reside under the same holding umbrella.

- More recently, CRSs, which later evolved into GDSs, were initially developed by airlines in the 1960s and proved to be an important competitive advantage for host airlines.

- Airlines have also invested in (and many currently have investment in) supply chain partners for the provision of fuel (typically through airline owned and airport based fuelling consortia), for ground handling services, for in-airport customer services, for catering and for other services.

- Airlines have invested in cargo terminal facilities and cargo handling operations.

- Historically, carriers invested in trucking operations for pick up and delivery of air cargo shipments.

- In some markets, airlines have invested in and operated their own airport terminals. In Australia, for example, Qantas operates its own domestic terminals in several airports, retaining their non-aeronautical net revenues for their own use.[39] United operates its own terminal in Chicago (O'Hare), and consortia of airlines operate some of the terminals at New York JFK airport.

- There are also cases of airlines investing in downstream markets, such as hotels (SAS, All Nippon Airways, United Airlines) or rental car businesses.

- While not common, there are cases of airlines making or proposing investments in airports.[40] Some of these are portfolio diversification strategies to provide some stability in overall corporate earnings across the business cycle.

Economic benefits. Economists identify a number of benefits of vertical integration. One is the elimination of double marginalisation, where each value chain member adds its own markups to the price. Another is the reduction of transactions costs, by making transactions internal to the airline. A third is to capture external benefits. Increased airline traffic may often increase revenues and profits for other value chain members. Because these benefits are not captured by the airline, it can lead to underinvestment and lower levels of airline service, which could be enabled by vertical integration which internalises these returns.

39. However, it should be expected that at least part of non-aeronautical profits are recaptured by the airport operator through the annual ground lease payment.

40. See previously cited CAPA report.

Competition concerns. While vertical integration may improve financial performance of integrating air carriers, it also raises serious competition concerns regarding, among other things, access to essential facilities or supplies by rival airlines. An airline that owns an airport, for example, could try to deny competitors access to scarce slots or terminal facilities. Alternatively, it could decide to underinvest in facilities to limit activity by competitors and/or to earn profits from competitors through the creation of monopoly/scarcity rents.

These are not hypothetical concerns. Past ownership of CRSs by airlines caused strife between the host airlines on the one hand and rival airlines that wished to (needed to) access the CRSs owned and operated by rivals. Unconstrained by competition, airlines that owned CRSs engaged in display bias by giving priority to their own flights on CRS display and extracted higher prices from competing carriers who wished to access their distribution systems. There were also concerns with host airlines obtaining commercially sensitive information about rivals, e.g., on the timing of fare changes. Consequently, formal regulation was adopted in the United States in 1984 to prevent abusive market power practices by CRS owners. These restrictions were lifted in the U.S. in 2004, but only after CRSs had been substantially divested by the host airlines. Europe followed a similar path by adopting an industry code of conduct to curtain anticompetitive practices by CRSs.

Airline integration into the airport, manufacturing, freight forwarding or other segments of the aviation value chain may raise similar concerns. Partly as a result of competition concerns, modern aviation value chain is characterized by a high degree of vertical disintegration.

Reconsideration – the key issue is competitive access. Policy that discourages or forbids vertical integration in the commercial air transport value chain might be reconsidered. To the extent that airline service generates external benefits for other value chain partners, internalising these would both increase economic efficiency (internalising the benefit leads to higher investment and activity by the airlines) and could increase financial returns and sustainability for the airlines. The challenge would be to ensure that vertical integration does not deny competitors access to scarce facilities and resources.

The rail sector is an example where some jurisdictions have allowed continued vertical integration while enhancing competition. E.g., in Australia railway companies are allowed to both operate trains and invest in and operate the tracks that they use. But access to the track must be provided to competing train operators. An arbitration process is available when the track owner/operator and the competing train operator are unable to agree on a price for track access. This approach allows the track owner/operator to realise benefits from vertical integration, while preserving (or enhancing) train competition for shippers.

One key vertical issue is whether or not to allow airlines to invest in and operate airports. As a general rule, airport privatisation policies forbid airlines from investing in airports but there are significant exceptions – Lufthansa and Fraport for example. This policy remains, as shares in the privatised airport operating companies are bought and sold in the market. Would it be economically desirable to allow carriers to invest in airports? We address this in two parts, separating out airport terminal services from airfield services.

With respect to terminal services, the benefits of vertical integration could be considerable. Airport non-aeronautical revenues are concentrated in two major areas: airport retail and parking,[41] and both of these are terminal and not airfield services. These revenues have as their fundamental driver, the level of passenger traffic through a terminal, and this is largely the result of airline decisions on capacity and air ticket price. Vertical integration of airline and one or more airport terminals would internalise an important external benefit from airline management decisions, increasing economic efficiency and increasing airline profits. While not prevalent, there is precedent for airlines investing in terminals at airports. The critical issue is one of access to terminal services by competing airlines. This can be dealt with in a number of ways. In Australia, the operators of the major airports have one domestic terminal that is airport and not airline operated, providing access to existing and future new airlines.[42] Just as in other vertically integrated markets, access can be provided either by directly regulating such access or by legislation (e.g., access to rail lines). It is our opinion that with the right access regime, there may be a case for allowing vertical integration of airport terminals by airlines. This is worthy of further study of the external benefits and access policy design.[43]

With regard to airfield services, it is our view that the case for vertical integration is much weaker. It is unlikely that there are any above normal profits being earned by airports for their airfield services, as fees are either regulated (e.g., price cap regulation in the UK and Germany, among others), or are constrained in airport-airline use agreements which limit charges to only covering costs (with a normal rate of return on invested capital). Thus there would be no profits to be internalised to the airline's benefit. Further, an airfield that is vertically integrated into an airline, would undoubtedly face a stringent access regime, that would likely be similar to today's slot access rules, and the mechanics of the access regime would be such as to eliminate possibilities of savings in transactions costs and double marginalisation.

In sum, vertical integration of airlines into airport terminals (passenger and cargo) may be worthy of consideration as a mechanism to increase air transport economic efficiency and improvement in and stabilisation of airline financial performance. Vertical integration of airlines into airfield operations is unlikely to provide any benefits.

41. Add citation to Anne Graham paper from 2010? Hamburg conference in the Journal of Air Transport Management.

42. In Australia, the domestic terminals were originally developed exclusively by the two domestic carriers, Ansett and Australian (which later was merged into international carrier Qantas). New entrants in the Australian domestic market experienced difficulty accessing terminal space controlled by the two carriers, with some failures of entrant carriers attributed, at least in part, to inability to obtain access to terminal services. With the failure of Ansett, all the operators of major Australian airports acquired the Ansett terminals, establishing a regime of airport-controlled access to terminal facilities for carriers competing with Qantas. The government of Australia has also subsequently established a broad infrastructure access regime under which incumbent airlines could be forced to grant access to terminal facilities to competing airlines.

43. There is an issue of redistribution of benefits for airports currently using single till pricing policies. With the single till, airport profits from terminal based non-aeronautical services are shared, with a lag, with all carriers (potentially including all-cargo carriers). With vertical integration, these profits would accrue to vertically integrated airline(s). One solution would be to design the policy so that the access price for competing airlines shares some of the non-aeronautical profits.

5.3. Airport Advance Charges and Airport Investment. PFCs have Economic Efficiency Challenges.

In North America, airports levy passenger facility charges (PFCs in the United States and Airport Improvement Fees in Canada). These are charges levied on today's passengers to finance current capital expenditures. These charges are the result of the use of not-for-profit or government business enterprise governance models. Private sector businesses, airports or other private sector businesses, generally finance capital investments by raising paid-in equity capital and issuing debt. Then, when the capital investment is complete and the new assets are put into service, rates are increased. The users pay higher charges but they also benefit from the new investment. The challenge for not-for-profit or government business enterprises is that they do not have access to financing by raising paid in equity. Debt markets are often unwilling to provide 100% debt financing.

This creates a quandary for such airports. In order to finance capital programs, they either need guarantees of their debt (giving comfort to debt investors for the risk of 100% debt financing), or they need some other form of equity capital. The U.S., in particular, used debt guarantees, by airlines, to enable 100% debt financing of U.S. airport capital programs. This, however, gave airlines certain veto powers over airport decisions, which some allege distorted airline competition, e.g., by incumbent airlines vetoing investments that would improve airport access for competitors. The alternative was PFC/AIF. These levy charges on today's passengers to generate funds which can be levered with debt to finance capital programs. Today's passengers pay higher charges but do not enjoy the benefits of the new capital.[44] Effectively, PFCs and AIFs generate equity funds for capital projects, but the mechanism is not paid in equity by investors but rather retained earnings on higher fees for today's users.

While the reasons for PFCs and AIFs for not-for-profit or government business enterprises is understandable, even if not fully justifiable from an economic efficiency point of view, there are cases where private sector airports have been allowed access to PFC type funding mechanisms. This seems to run counter the reason why airports were privatised and allowed access to equity funds.

From a value chain point of view, the use of charges on today's passengers for airport capital investment is another example of the transfer of airport risk to airlines. PFCs are added to airline ticket prices, increasing the price of travel to consumers and thus reducing demand. It is interesting to note that some oppose privatisation of airports claiming that it increases airport costs by the need to pay equity premiums rather than the lower cost of debt. However, the use of PFCs appears to have the effect of raising airport charges anyway, making claims of lower costs with not-for-profit or government business enterprise governance models unclear. These governance models have their strengths, but the use of PFCs and AIFs are a weakness.

44. A rationalisation often given is that because airline passengers often are repeat customers, Passenger A may pay a PFC for travel today and the same passenger will enjoy the benefit of the improved capital for future flights. Depending on the accounting, airport charges for future flights would not rise as much as they would with private sector financing which puts all the burden of capital costs on those (future) passengers who get the benefit. With PFCs there are higher airport charges today and not as high tomorrow. Critics would say that it is not always the case that Passenger A will actually fly tomorrow, and thus there is an inequity. Accounting/regulatory rules for utilities, such as electric power, natural gas and water/sewer would not allow such pre-charging.

5.4. The Use of Rate Balancing Funds Might be Revisited.

Rate balancing funds are reserves of funds held for "rainy days", i.e., traffic downturns. The concept is that in good years, rates are increased to build a fund which can be drawn on should traffic decline. This has the advantage of eliminating or reducing the need to raise fees by airport operators or ANSPs when traffic weakens, thus not subjecting airlines to pro-cyclical increases in charges at the time when they can least bear such charges. NavCanada is Canada's not-for-profit ANSP and it has used such a fund.

However, it must be recognised that these reserves are a regulatory artifact. Airports or ANSPs who are required by regulation or contract to break even every year can only hold down their charges in weak traffic years by drawing on a fund. They are not allowed to hold down their charges in weak traffic years if it results in a deficit. But there is an alternative. Simply revise the regulations to allow the airport or ANSP to run a revenue deficit in weak years, offsetting this by higher revenues is *subsequent* years. This is way of most businesses and it could be applied to airports and ANSPs. Such an approach would not burden airlines and their customers with higher charges *in advance* in anticipation of future weak years. This seems particularly desirable in that ANSPs and airports are less risky as enterprises than airlines. If an airline fails, ANSPs and most airports (but not all, especially those airports with high levels of connecting traffic) will eventually see replacement service, either by new carriers or increased capacity of surviving incumbent carriers. The experience in Australia with the failure of Ansett is a good example. Its capacity was relatively quickly replaced by increased capacity of Qantas and Virgin Blue.

Regulators and government policy makers may wish to revisit any requirements that ANSPs and airports must break even every year, as it imposes costs on airlines and their passengers in advance of downturns, or else forces them into pro-cyclical pricing behaviour.

6. CONCLUSIONS

We conclude this paper with a highlight of key concepts.

- There is a value chain for commercial air transport services, with airlines as the centre or anchor of the value chain. Upstream value chain partners include manufacturers, lessors, airports, ANSPs and other suppliers. Downstream partners include GDSs, travel agents (online and physical) and freight forwarders.

- Within the value chain, airlines achieve the lowest rate of return on assets, with average rates below the cost of capital. This suggests that financial sustainability of the industry is problematic.

- There are some value chain members, GDSs, travel agents and freight forwarders, who are earning returns substantially above their costs of capital, suggesting some exercise of market power.

- Airports access to financing for capital projects varies by jurisdiction. Almost all airports have access to debt financing, but seldom can airports obtain 100% debt financing for large capital projects.

    - Privatisation allowed access to equity financing and a sizeable airport equity market has emerged. This has been an important source of funding for some airports in Asia, and must be viewed as a positive development.

    - Small airports are financially challenged and access to government capital grants is critical to the long term viability of many of these. Recent developments narrowing access to such grants may need to be reconsidered if small airport viability is to be maintained for the long run.

    - Jurisdictions that do not allow airport access to paid-in equity capital have allowed use of PFCs, which effectively generate equity via retained earnings. There are economic efficiency problems however, since users today are paying for capital investments which will only benefit airport users tomorrow. While many of tomorrow's travellers also use airports today, there can be an economic efficiency loss. Airports with access to equity capital generally should not be allowed to utilise PFC's.

- A number of policy alternatives were discussed that might enhance airline financial sustainability. These included:

- Changing the airport-airline relationship, which presently transfers airport financial risk to airlines in an undesirable pro-cyclical way. Government regulatory policy and airport-airline use agreements could be changed to allow airports to hold down fees during economic contractions, but being allowed to earn offsetting, above normal returns during traffic expansions. Regulation should seek to limit airport aeronautical fees to costs plus a normal return *over an entire business cycle, rather than year-by-year*. The latter increases costs to airlines during contractions, worsening their financial sustainability. Regulators and governments should consider elimination of any requirement that airports and ANSPs must break even every single year.

- Vertical integration of airlines into other parts of the value chain might be reconsidered. To the extent that airline investment and pricing decisions generate external revenues for other value chain members, some types of vertical integration may improve economic efficiency (by internalising the external values) and improve airline financial viability. The key policy concern should not be on preventing vertical integration but rather should focus on ensuring access for airline competitors to essential facilities. Other sectors of the economy can be models for such access provisions. In particular, airline vertical integration into airport terminal investment and operation, with an appropriate access regime, might be studied further, although vertical integration to include airfield operations is unlikely to produce benefits.

International Transport Forum

International Transport Forum
2 rue André Pascal
75775 Paris Cedex 16
itf.contact@oecd.org
www.internationaltransportforum.org