Profitability and the air transport value chain

IATA ECONOMICS BRIEFING Nº 10

An analysis of investor returns within the airline industry and its supply chain

IATA Economics Briefing N°10
PROFITABILITY AND THE AIR TRANSPORT VALUE CHAIN

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v1.1

01 | Introduction

The purpose of this study is to provide updated quantitative analysis of profitability along the air transport value chain, in order to inform the debate and suggest actions to improve the persistently poor profitability of the airline industry.

In 2005 we first looked at this issue using analysis commissioned from McKinsey & Company, which was published in Value Chain Profitability. This study documented the wide divergence of returns on invested capital across the value chain over a full business cycle, 1996-2004, and the airline industry's position generating the lowest returns in that chain. In 2010 we asked McKinsey to update this analysis over the period 2002-2009, which covered the next business cycle. There was no change in the divergence of returns nor in the airline industry's position at the bottom. At this time we also worked with Harvard's Professor Michael Porter on some of the reasons why airline profitability has been persistently poor. One conclusion was that there were problems in the value chain, but additional causes included inefficiently designed regulation, poor industry structure and the commoditization of the airline product. The result of this work was published in 2011 in IATA's Vision 2050 report.

In this current study McKinsey have updated the quantification of profitability to cover the most recent full business cycle, from 2004 to 2011, and also deepened the assessment with a more complete sample of companies in each sector. The sample of companies is used to estimate returns for the whole sector. The analysis also, for the first time, is extended to examine the value captured in the fuel supply chain and by labor.

This study provides a baseline of evidence and current remedies to problems which will inform the debate about how best to improve the efficiency of the air transport value chain, to the benefit of consumers and suppliers, including providers of equity capital to the airline industry – who currently, on average, see no return at all for providing their capital and taking risk.

The approach taken in this study has been to use return on invested capital compared to a firm's weighted average cost of capital to measure 'normal' profits in a sector. Accounting measures of profit such as operating or post-tax net margins are not comparable across sectors where it takes a very different amount of invested capital to generate a dollar of revenue. One of the principal public policy concerns about poor airline industry profitability is a potential inability to attract the $4-5 trillion of new capital estimated to be required to serve the expansion of emerging markets over the next 20 years. So taking the perspective of the investor providing capital seemed to be the appropriate lens through which to view the current situation. More detail on measurement issues are provided in the annexes.

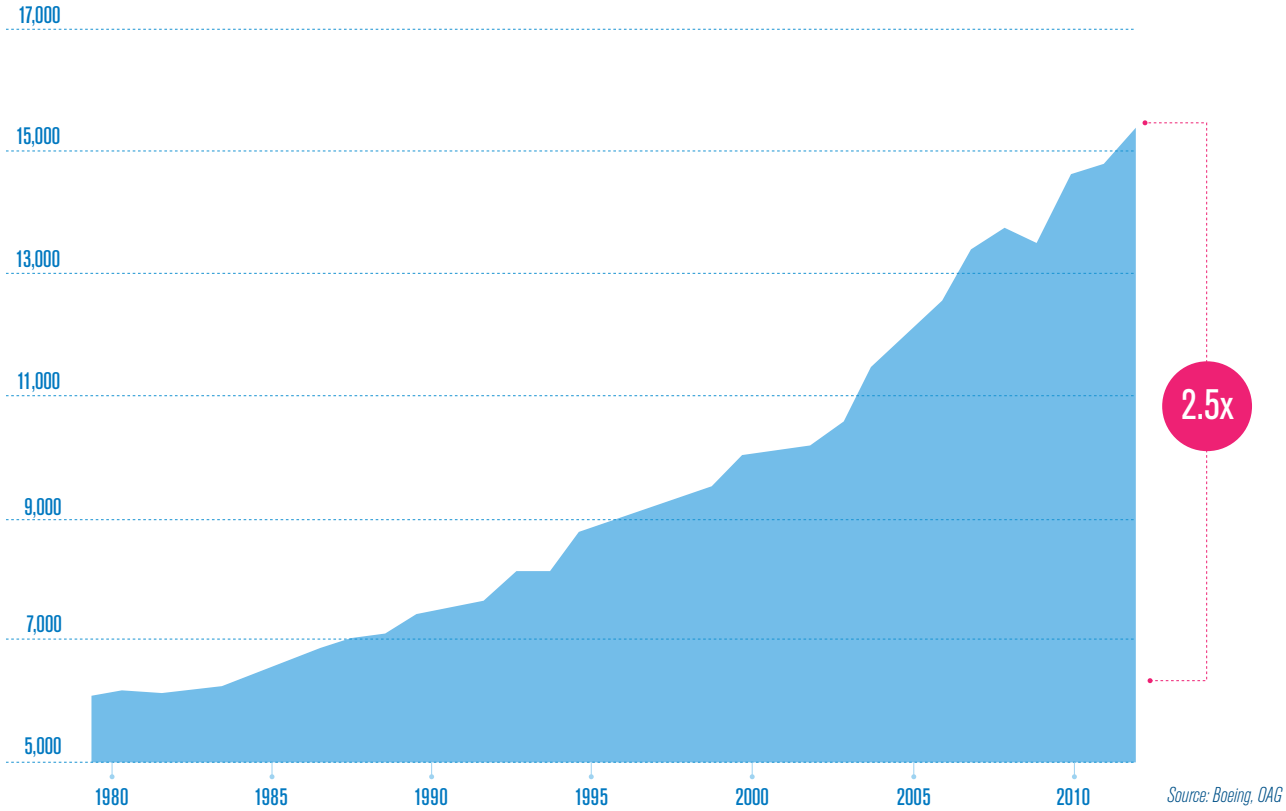
The study is structured with, first, an assessment of the challenge of poor airline profitability and the amount of new capital that will be needed in future. This is followed by a diagnosis, using the latest analysis by McKinsey & Company but also drawing on earlier work undertaken for IATA by Professor Porter. The final section sets out a framework for looking at current actions considered as remedies to the various problems existing in the air transport value chain today.

02 The challenge

Air transport continues to create tremendous value for its users, passengers and shippers, and others in the value chain but destroys value for its airline equity investors.

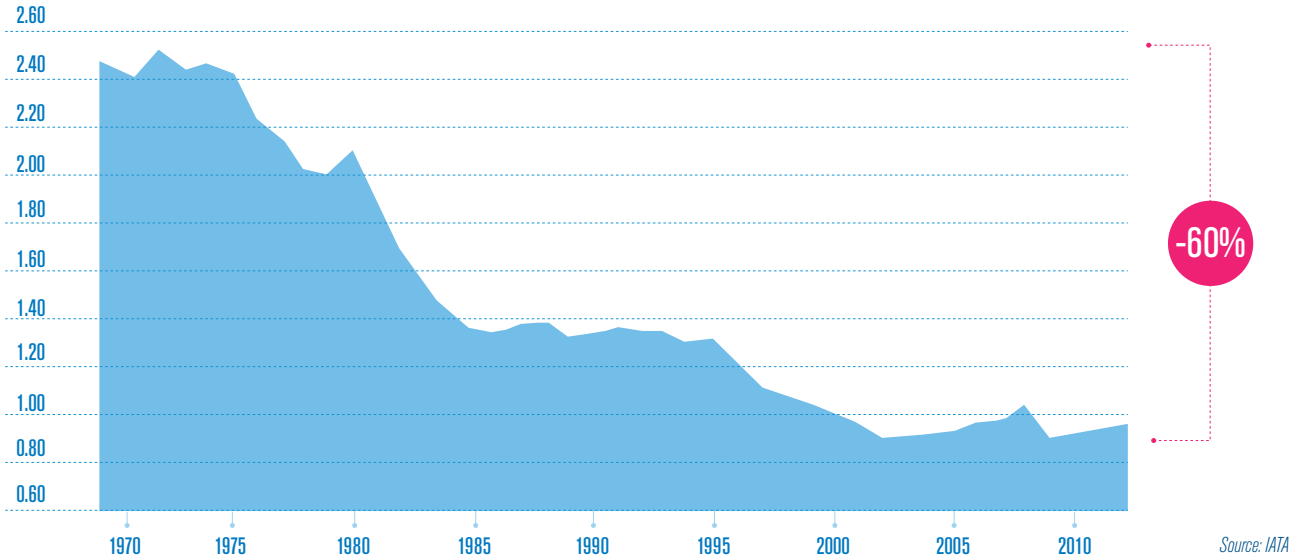
The challenge is that in order to continue increasing the value delivered to customers and the wider economy, returns for investors will have to be improved. They will need to improve sufficiently to attract the US$ 4-5 trillion of new capital required over the next two decades to finance the new aircraft needed to serve the expansion in the Asia-Pacific and other emerging regions.

CHART 1: THE NUMBER OF DIRECT CITY PAIR AIR SERVICES



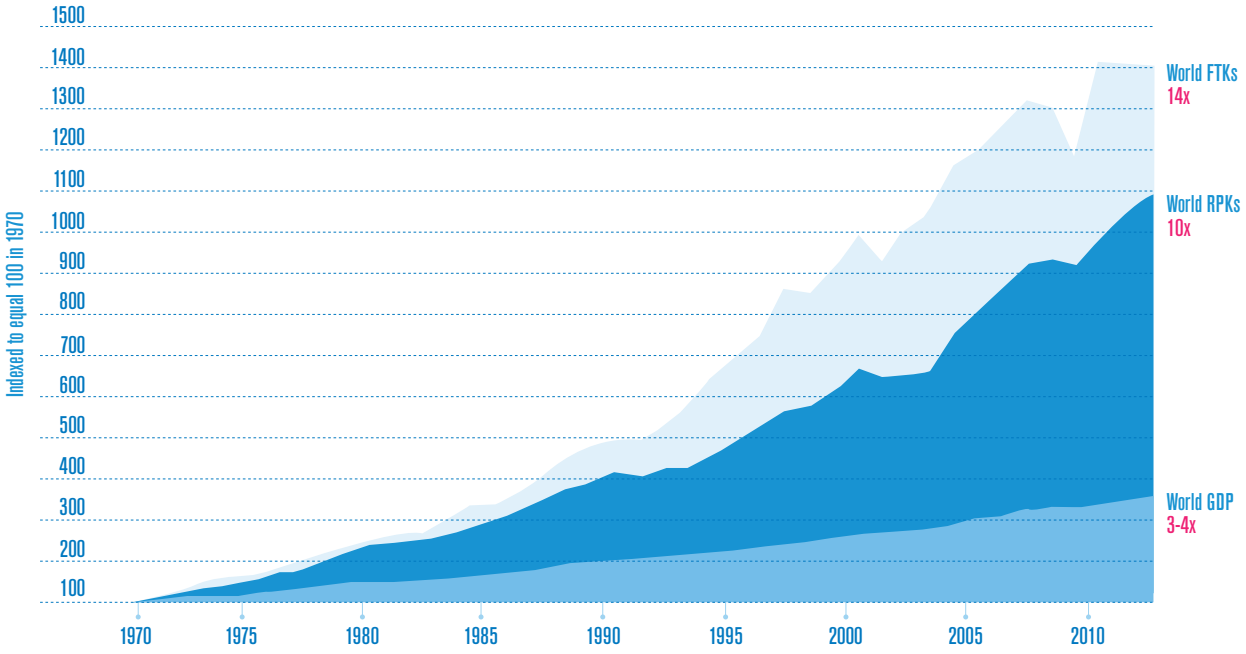
Over the past 30 years the industry has connected more and more cities with direct services. There has been a 2.5 times rise in the number of unique city pair services, from just over 6,000 in 1980 to more than 15,000 in 2012.

CHART 2: THE REAL PRICE OF AIR TRANSPORT (US$/RTK IN 2009$)



Taking a slightly longer term perspective, from 1970, after adjusting for general price inflation, air transport services have also more than halved the prices charged to customers.

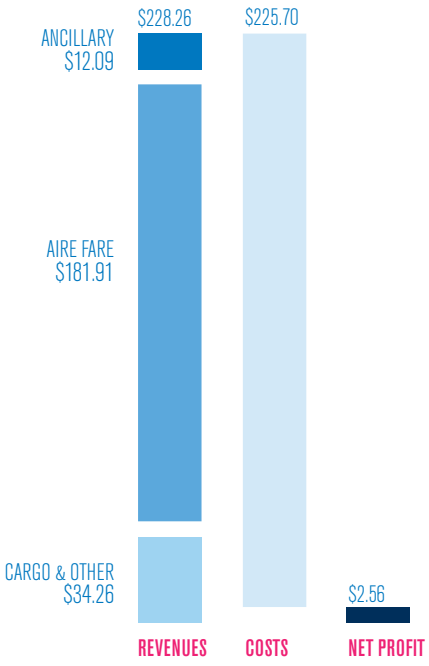
CHART 3: WORLD SCHEDULED AIR TRAVEL, FREIGHT AND WORLD GDP



Source: ICAO, IATA, Haver

The demand for air transport services has risen much faster than demand for most other goods and services in the world economy. Since 1970 air travel demand, measured by Revenue Passenger Kilometers flown (RPKs) has risen 10-fold, compared to a 3-4-fold expansion of the world economy. Air cargo demand, both reflecting and facilitating the globalization of business supply chains and economies generally, rose 14-fold.

CHART 4: 2012 WORLDWIDE AIRLINE FINANCIAL RESULTS PER DEPARTING PASSENGER

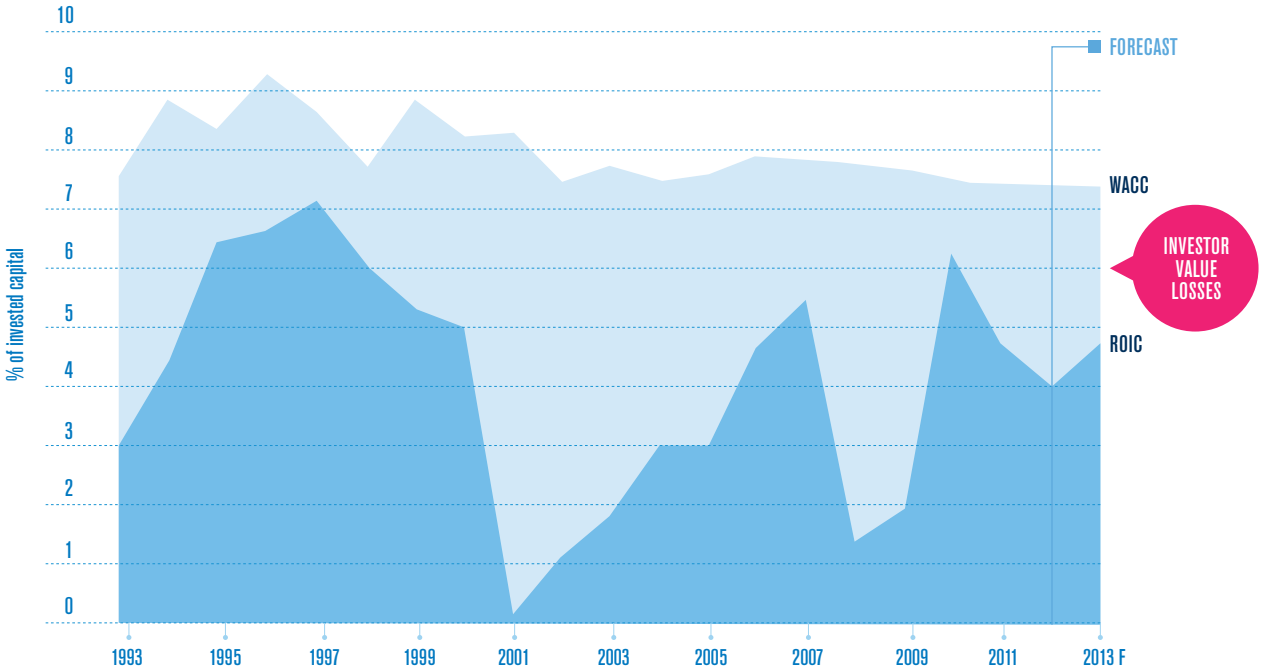


Source: Ancillary revenues from Idea Works 2012 estimate, other data IATA. Costs include operating items and debt interest.

Despite the clear value being created for customers, the airline industry has found it difficult to make an adequate level of profits. Last year was a fairly typical point in the middle of the cycle. Airlines generated revenues averaging a little over $228 per passenger. That included just over $12 per passenger in ancillary revenues. However, after paying tax and debt interest, net profits per passenger were just $2.56. It does not take much of a rise in costs, government tax or demand shock to eliminate such a thin level of profit.

The net profit figure in chart 4 is after airlines have paid interest costs on their debt as well as payments of tax to governments. It shows there was little left to pay equity investors in 2012 for risking their capital. Profit is of course a reward for risk.

CHART 5: RETURN ON INVESTED CAPITAL IN AIRLINES AND THEIR WACC



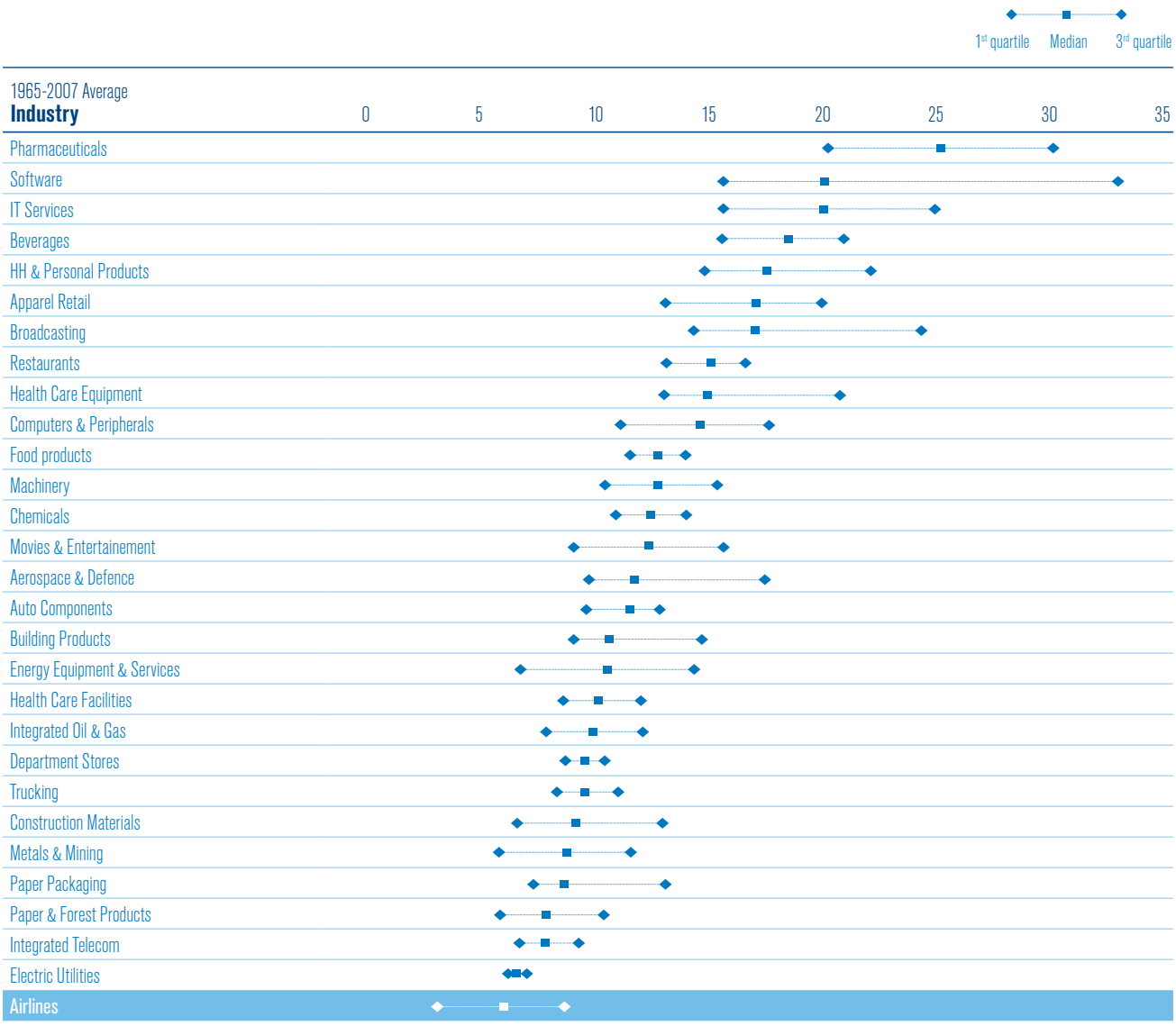
Source: McKinsey & Company for IATA

Investors, providing funds, will expect to be paid for risking their capital in the airline business. They will measure profitability by what that profit represents as a return on invested capital (ROIC). That return is calculated before payments of debt interest. It shows the earnings available to pay both debt and equity investors.

The Weighted Average Cost of Capital (WACC) shows what both debt and equity investors expect to earn from investing their capital in airlines.

Industries with innovations protected by patent, or strong reputations, reward investors with returns well above their WACC. In a competitive industry new entry competes down returns to the WACC. It is a measure of the intensely competitive structure in the airlines industry that even at the top of the cycles over the past twenty years, the industry on average have never managed to generate returns that meet what investors would normally consider the minimum for a competitive industry.

CHART 6: INDUSTRY MEDIAN ROIC, WITHOUT GOODWILL

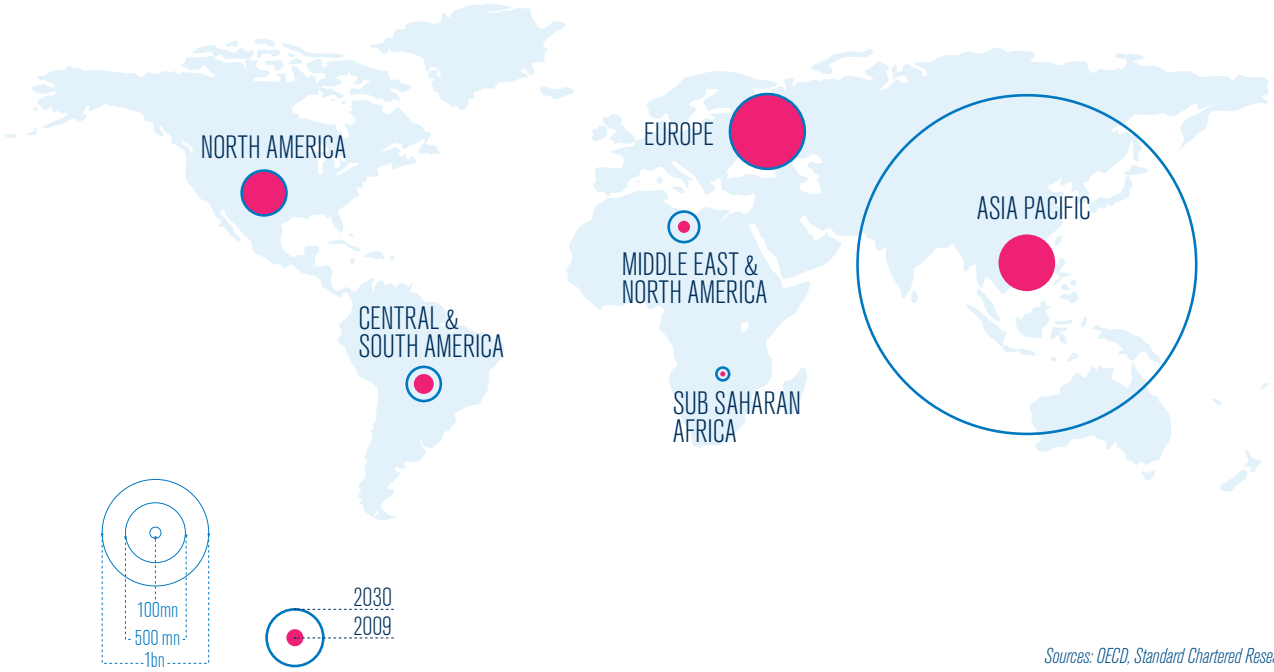


[1] ROIC after tax, excluding goodwill; For charting purposes, ROIC values are cut off if beyond (-5%, 50%)

Source: McKinsey & Company for IATA

Over the past 30-40 years the airline industry has generated one of the lowest returns on invested capital among all industries. Since the industry has survived and expanded while this state of extremely poor profitability has persisted it might be asked: does this matter?

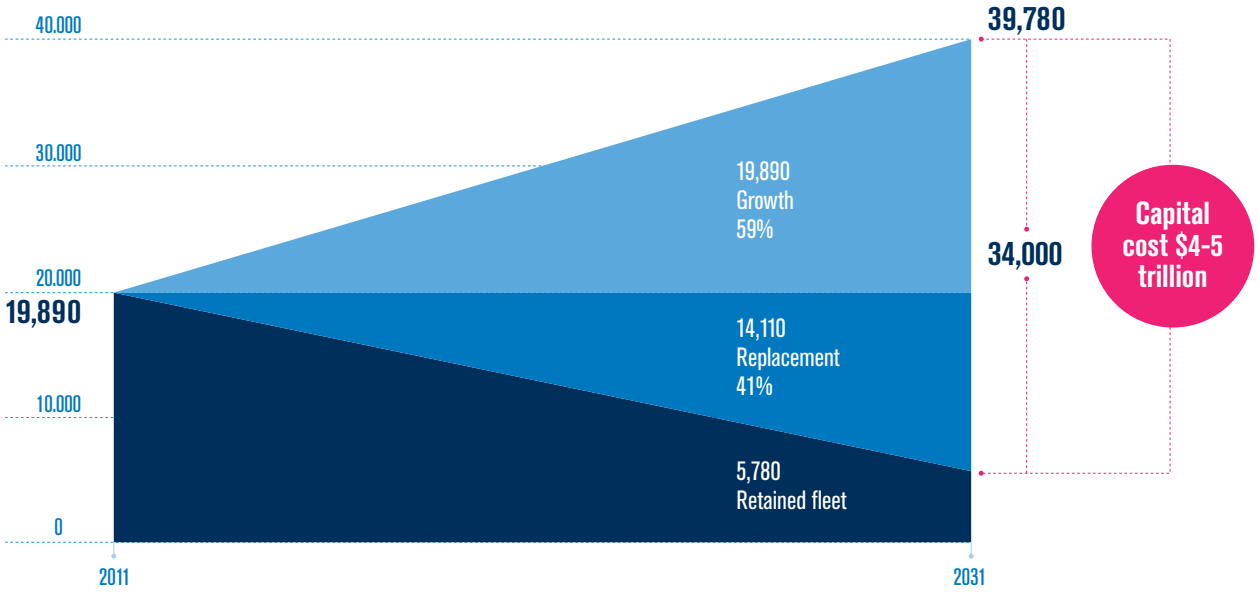
CHART 7: GLOBAL MIDDLE INCOME CLASS IN 2009 AND PREDICTION FOR 2030



Sources: OECD, Standard Chartered Research

Well over the next twenty years the airline industry is expecting to triple or quadruple its services in order to serve the demand for air travel and cargo services generated by the expansion of the middle income classes in Asia-Pacific and emerging economies in Latin America, MENA and Sub Saharan Africa.

CHART 8: THE NUMBER OF NEW COMMERCIAL AIRCRAFT REQUIRED



Source: Boeing 2012 Global Market Outlook

On current estimates for the number of new aircraft needed to supply this scale of expansion from the emerging economies, the airline industry will have to attract $4-5 trillion of new capital. Without an improvement in the return on capital invested in the airline industry it may well be difficult to attract such investment capital.

03 | Diagnosis

Why is the profitability of the airline industry so poor on average?

This question requires a careful diagnosis. The first issue is what exactly to measure, as there are countless metrics for profitability. Since the public policy concern is a potential inability to attract the US$ 4-5 trillion of new capital required to support the development of the emerging economies, the appropriate profitability measure is the one most used by investors - the Return on Invested Capital.

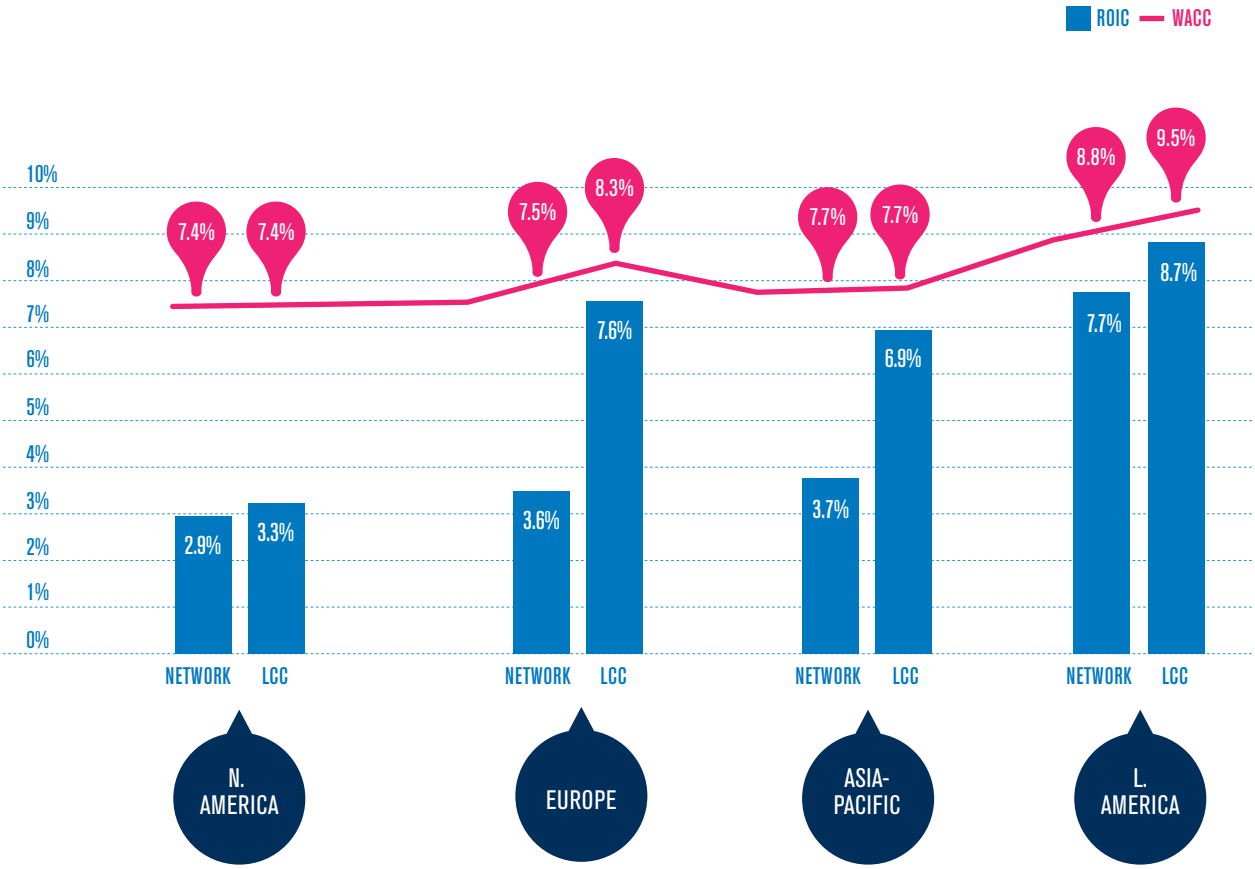
MEASURING PROFITABILITY

There are many ways of measuring profit and many accounting conventions. Since we concerned in this study about the long-term ability of airlines to attract capital we have taken the perspective of the investor and measure profitability by the Return on Invested Capital (ROIC). The ROIC is essentially the after-tax operating profit, adjusted for operating leases, expressed as a percentage of invested capital. Annex A and B provide more detail. It will differ from, for example, the net after-tax profit margin because it is calculated before payments of debt interest and is a return not on revenues but on the capital invested.

The ROIC is the payment investors receive for providing capital and, in the case of equity investors, bearing risk. The question is how to judge what the 'appropriate' level of ROIC is. The standard approach which we follow here is to measure the 'opportunity cost' for the investor i.e. what would the investor earn if their capital were invested elsewhere in an asset of similar risk in the same country. This opportunity cost is measured by the Weighted Average Cost of Capital (WACC), which aggregates expected returns on equity with expected returns on debt. More detail on this can be found in Annex C.

So what is an 'appropriate' WACC? In a competitive industry investors will invest more capital if returns are high until the ROIC has been competed down the level of returns they could get elsewhere, in assets of similar risk, i.e. the WACC. Some industries and companies do generate returns much higher than their WACC. If sustained this is because of barriers to new capital which could be due to innovation (e.g. Apple) or a strong reputation for quality (e.g. BMW), or it could be because of market power (e.g. national oil companies in the OPEC cartel). It is very unusual for ROIC to be persistently below its WACC, like the airline industry, since then investors would have an incentive to withdraw capital until returns have been pushed up to the opportunity cost.

CHART 9: ROIC AND WACC BY REGION AND BUSINESS MODEL, 2004-2011



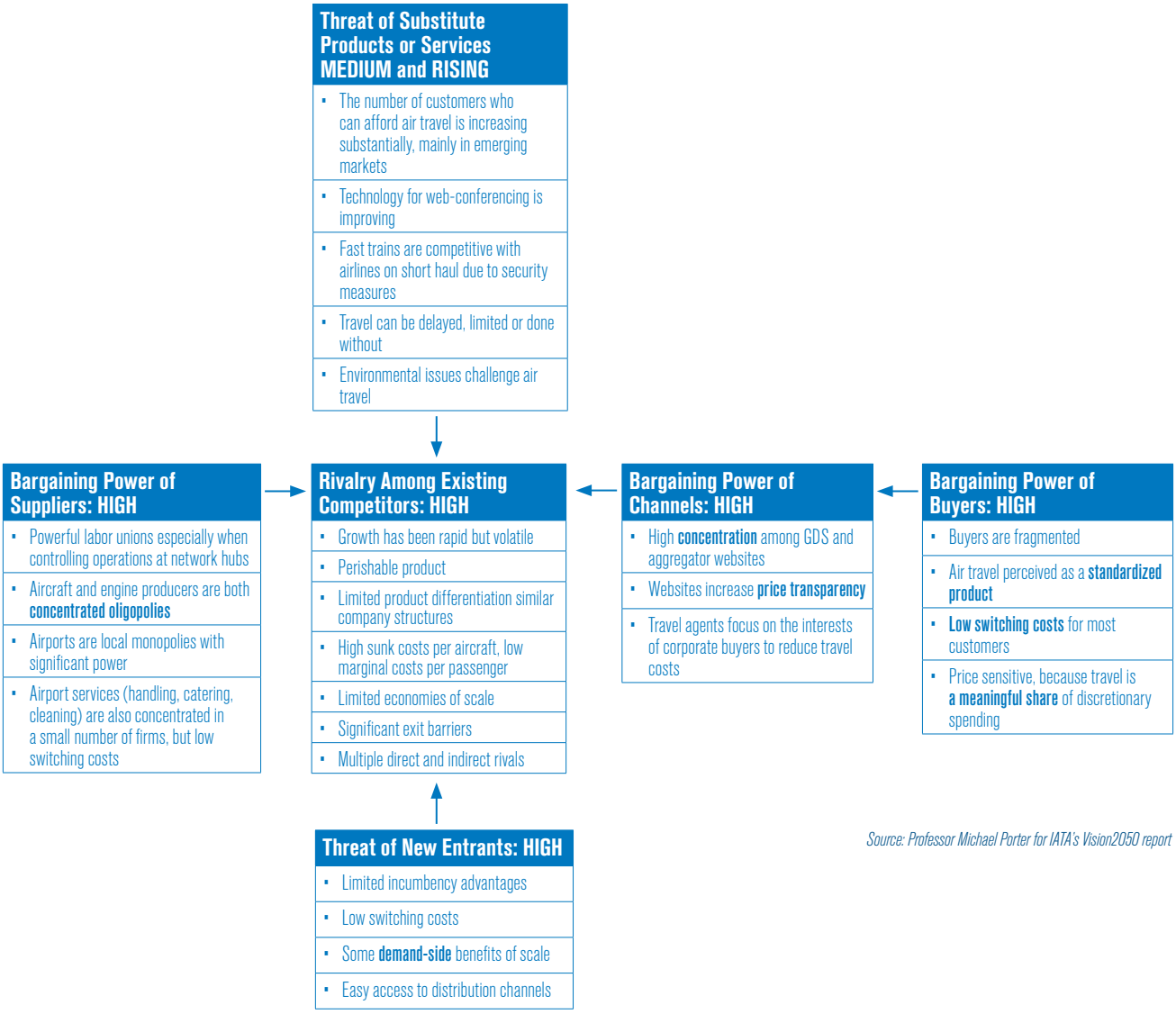
Source: McKinsey & Company for IATA

BUSINESS MODEL OR GEOGRAPHY

As we have seen, the airline industry is unusual in persistently generating ROIC below its WACC. There are some airlines that consistently create value for their equity owners, but these airlines are in the minority. Is this poor profitability due to inappropriate business models? After all new entrant LCCs often appear to be more profitable than the incumbent network airlines against whom they compete? Is poor profitability limited to one or a few geographical regions? Is this a feature just of mature markets, like North America and Europe?

The evidence of the last cycle suggests that poor airline profitability is certainly not fully explained by business model nor geography. It is true that LCCs as a group tend to have a higher return on capital than network airlines in their region. It is also the case that network airline profitability has been lowest on the more mature N. American and European regions. However, none have managed to generate a ROIC sufficient to meet the minimum expected by investors. Airlines from all regions and business models, over the last full business cycle, generated average ROICs below their WACCs. In all business models and in all regions investors would have been able to earn a higher return by investing their capital in assets of similar risk outside the airline industry. The ubiquity of this under-performance points to system wide issues affecting all airlines, either a problem with the supply chain or with the industry structure.

CHART 10: Porter's 5-forces model of the airline industry



Source: Professor Michael Porter for IATA's Vision2050 report

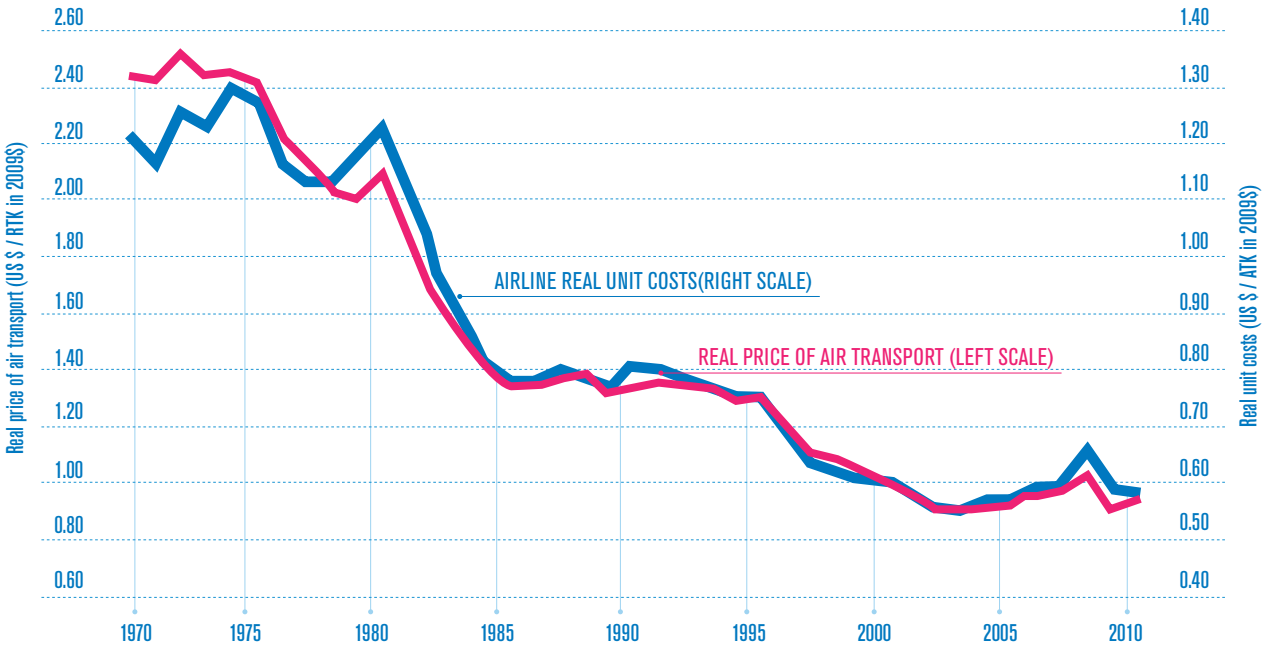
PORTER'S 5-FORCES

One way of looking at the problems is through the lens of the well-known Porter 5-forces model. This approach looks at rivalry among existing competitors, the threat of new entrants, the threat of substitute products, the bargaining power of customers and the bargaining power of suppliers. In 2011 IATA worked with Harvard's Professor Michael Porter to look at these competitive interactions and their influence on airline profitability.

He concluded that there were few industries where the "5-forces" were as strong as in the airline industry:

- The bargaining power of suppliers is high, with powerful labor unions especially at hub operations, concentrated oligopolies in aircraft and engine manufacturing, local monopolies at airports and increasing concentration in the supply of services;
- The bargaining power of the GDSs is very high, since each of the three major GDSs is insulated from competition by their market power.
- Buyer bargaining power is also high, largely because of the perceived commoditization of air travel and low switching costs;
- The threat of substitute services is medium and rising, with improving technology for web-conferencing and competition from high speed rail on short haul markets;
- The threat of new entrants is high, with easy entry into many markets, easy access to distribution channels and limited incumbency advantages;
- Rivalry among existing competitors is high, partly because of the economics (high sunk costs per aircraft, low marginal cost per passenger, perishable product, limited economies of scale) but also because of government constraints restricting consolidation through exit or cross-border merger. Also because indirect distribution channels currently encourage commoditization and competition on price and schedule alone.

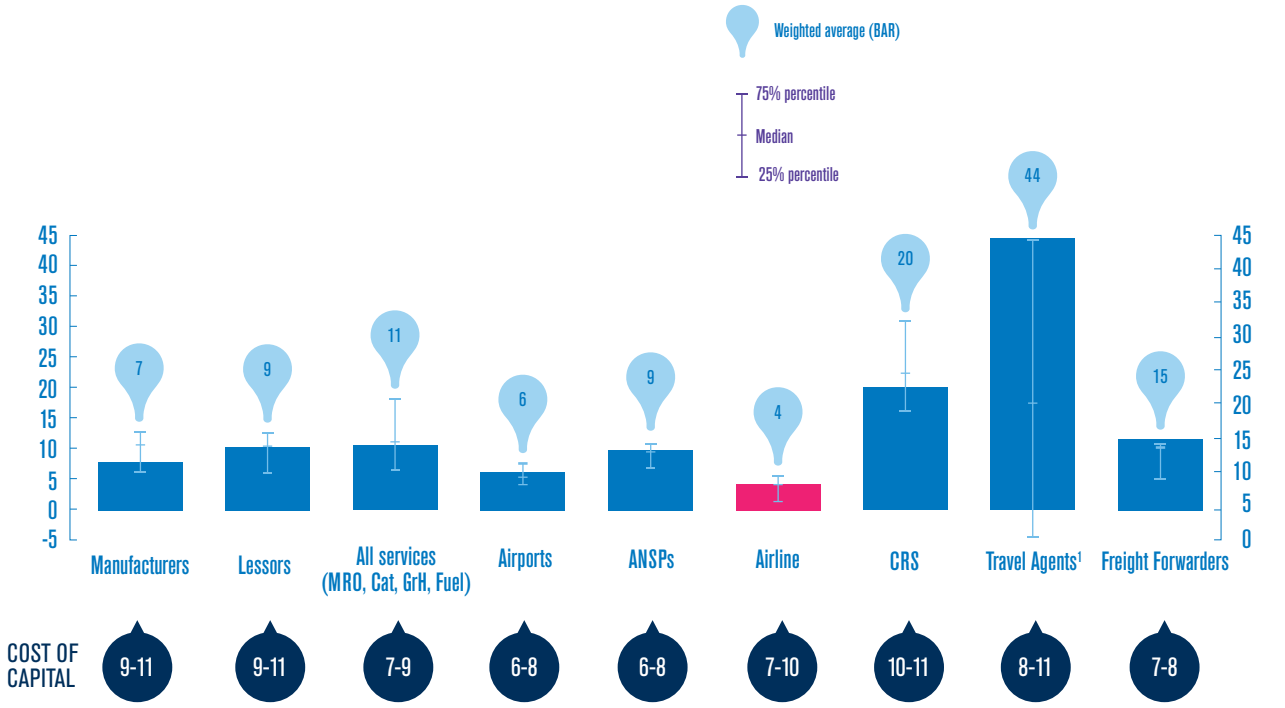
CHART 11: REAL PRICE OF AIR TRANSPORT AND REAL UNIT COSTS



Source: ICAO, IATA

One indication that commoditization and industry structure may be important causes of poor profitability can be seen in chart 11. The industry has managed to successfully halve unit costs in real terms over the past 40 years. However, all of those efficiency gains have been passed through to customers in lower prices. This has created a lot of value for customers, a good thing, but the problem is that it has left airline equity investors unrewarded for providing their capital.

CHART 12: RETURN ON CAPITAL VARIES THROUGHOUT THE VALUE CHAIN
ROIC excluding goodwill of sample, period 2004-2011, %



[1] Limited sample

Source: McKinsey & Company for IATA

SUPPLY CHAIN AND DISTRIBUTION

The evidence of returns on invested capital makes it clear that airlines are surrounded by stronger business partners. Every supply sector and every distribution sector earned a higher return on capital during the past business cycle than airlines. Most earn more than or close to their WACC.

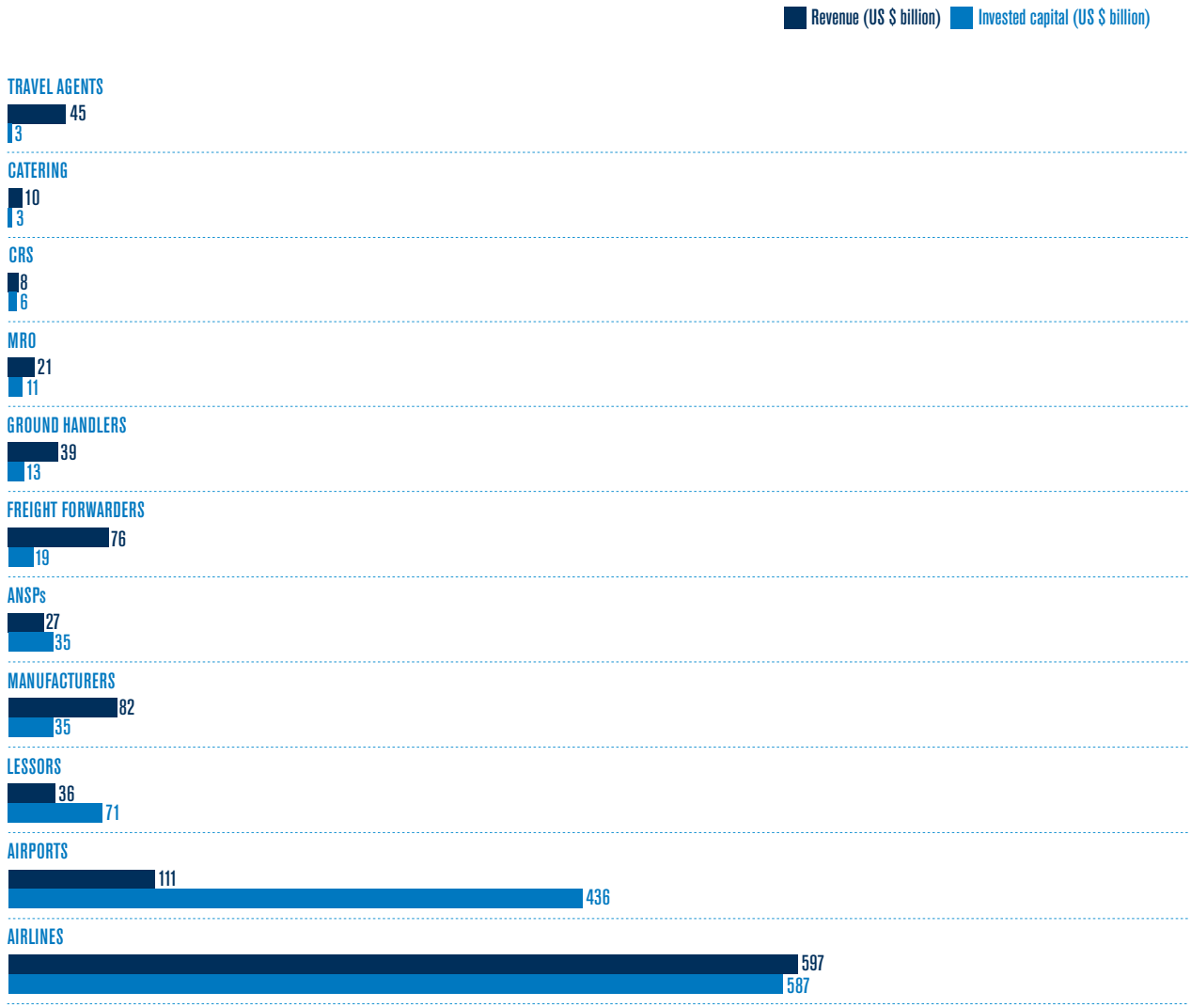
Many of the suppliers to the left of airlines in the chart above earn returns on capital higher than their cost of capital (WACC). Services (MRO, catering, ground services), which have been outsourced by around half the industry, earn an average return of 11% compared to a WACC of 7-9%. ANSPs, only a few of which have been privatized, earn an average return of 9% compared to a WACC of 6-8%. However, during the past cycle, manufacturers, lessors and airports have earned no more or less than their cost of capital.

The highest returns in the air transport supply chain are earned in the distribution sectors. Computer Reservation System (CRS) services provided by the Global Distribution Services (GDSs) earn an average return on capital of 20%, double their 10-11% cost of capital. Travel agents also seem to earn high returns but these estimates are highly uncertain as it is very difficult to separate revenue flows from non-air travel business. However, it is clear that the distribution end of the air cargo supply chain is also very profitable with freight forwarders earning an average return of 15% compared to a WACC of 7-8%.

It is clear that returns are unevenly and inefficiently distributed across the air transport supply chain. But is this the principle cause of poor profitability in the airline industry?

The problem for this explanation is that the profitable sectors in air transport are relatively small, with the exception of fuel.

CHART 13: INVESTED CAPITAL AND REVENUE IN THE VALUE CHAIN

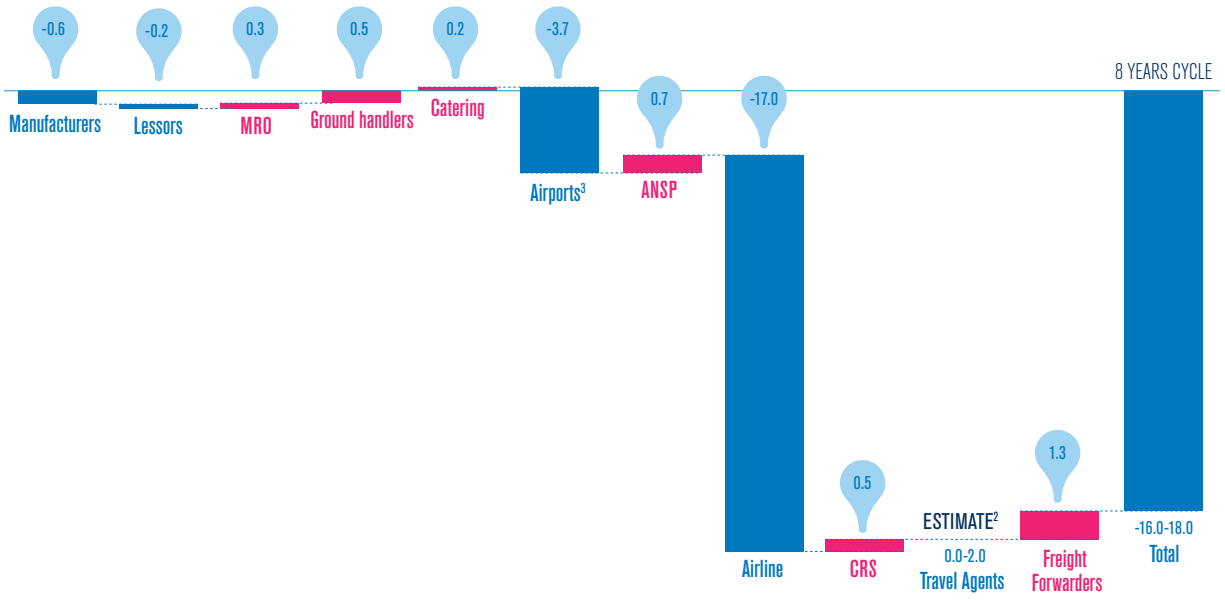


Source: McKinsey & Company for IATA

Excluding fuel and labor for the moment, the sectors earning a ROIC in excess of their WACC (Travel agents, catering, CRS, MRO, ground services, freight forwarders and ANSPs) represent just 7% of the $1.2 trillion capital invested in the air transport supply chain. The profits of suppliers and the distributers are far from offsetting the losses of the airline industry. This becomes clear if the returns spread (ROIC-WACC) is measured in absolute dollars, by multiplying the sector's returns spread by its invested capital. It should be noted that these economic profit numbers compare what investors earn in air transport compared to what they would expect to earn by taking their capital and investing it in other sectors of similar risk. It shows the economic efficiency and sustainability of investment in air transport, and not actual or accounting profits and losses.

CHART 14: ECONOMIC PROFITS IN THE AIR TRANSPORT VALUE CHAIN (EXCLUDING FUEL AND LABOR)

Average economic profit[1], (ROIC-WACC) × invested capital, USD billion, 2004-2011



[1] Based on invested capital excluding goodwill, extrapolated to total industry
[2] Sample too small to give meaningful estimate
[3] Economic profit for airport sector extrapolated based on weighted average of sample excluding AENA. AENA subsequently added back to sector estimate

Source: McKinsey & Company for IATA

Over the past full business cycle investors in airlines have received a return on their invested capital which has been on average $17 billion less each year than they would have earned by taking their capital and investing it elsewhere in assets of similar risk.

Investors in airports have also earned less than 'normal' returns in aggregate. However, it is important to note that this does not mean airports have been making accounting losses. It is also the case that airports outside the US typically do generate very good returns for equity investors. But these airport economic profits in Europe, Asia-Pacific, and Latin America are more than offset by economic losses in the US. Economic losses, it should be remembered, means that returns on invested capital are less than the investor's opportunity cost of committing those funds (i.e. could earn more investing elsewhere), but not necessarily less than the actual costs to the company of raising capital. Moreover, the US is a special case. Airports are owned by local governments and financed cheaply on tax-efficient local government bonds. They are run for their wider economic benefits, but even so they do make accounting profits. The estimates in chart 14 show that equity investors could earn more by investing in assets of similar risk in the US, but in this case there aren't private investors in airport equity, apart from airline owners of terminals. The airport owners are local government, who have a wider economic benefit objective, and finance is provided by cheap bonds. The analysis shows that these local government owners could earn a higher commercial return by investing elsewhere, but of course they will not do that because their objective is to generate wider economic benefits for their communities. All US airport bonds rated by Standard and Poors are investment grade (15% AA and 70% A grade), which shows that US airports have very good cash flows, in very substantial contrast to the sub-investment-grade-rated airline sector.

Investors have earned 'excess profits' i.e. a higher return than they would have got by investing elsewhere, in the MRO, catering, ground services, ANSP, CRS, travel agents and freight forwarding sectors.

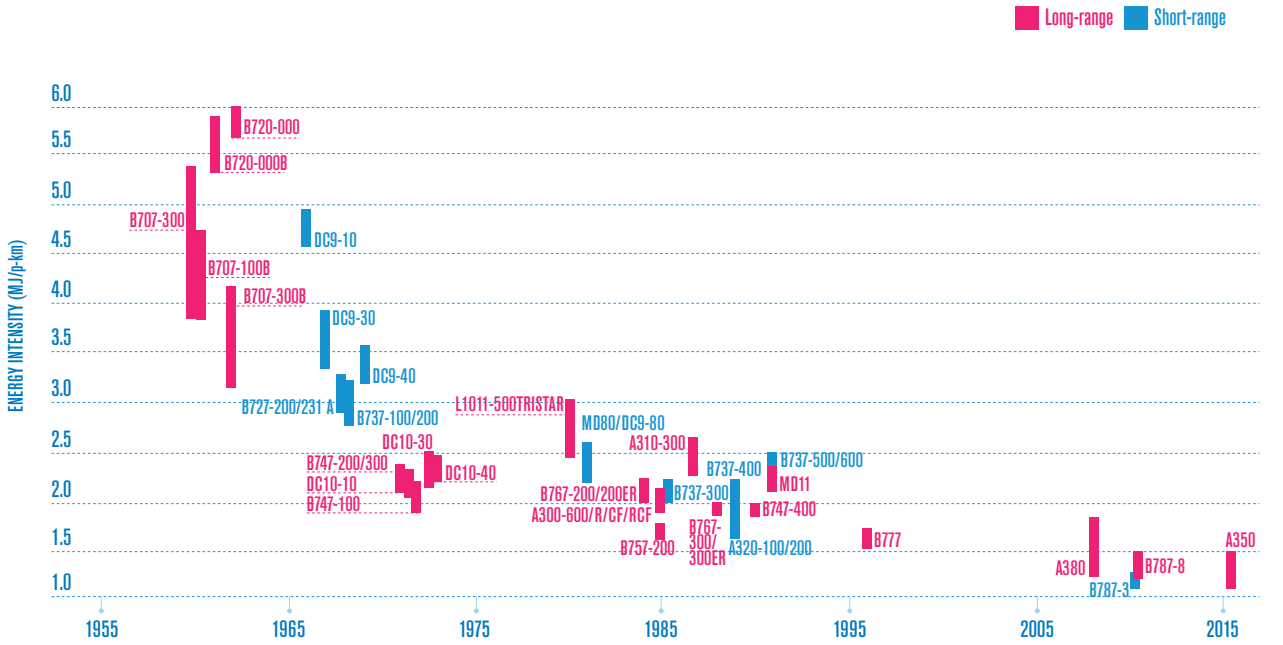
However, adding up all these economic profits totals just $3.5 billion annually. The large losses for investors in airlines and somewhat smaller losses in the airports sector leave a net economic loss for investors of $16-18 billion a year.

Of course these members of the air transport supply chain exclude fuel and labor. These two supply sectors turn out to benefit from more than $16-18 billion of value created by air transport.

FUEL

Fuel costs have risen dramatically between 2004 and 2011 from 17% to 30% of operating costs. But fuel costs are not high because of poor technology or inefficient operations. Over the past forty years the amount of fuel used to fly a tonne kilometer has more than halved because of improved engine and airframe technologies.

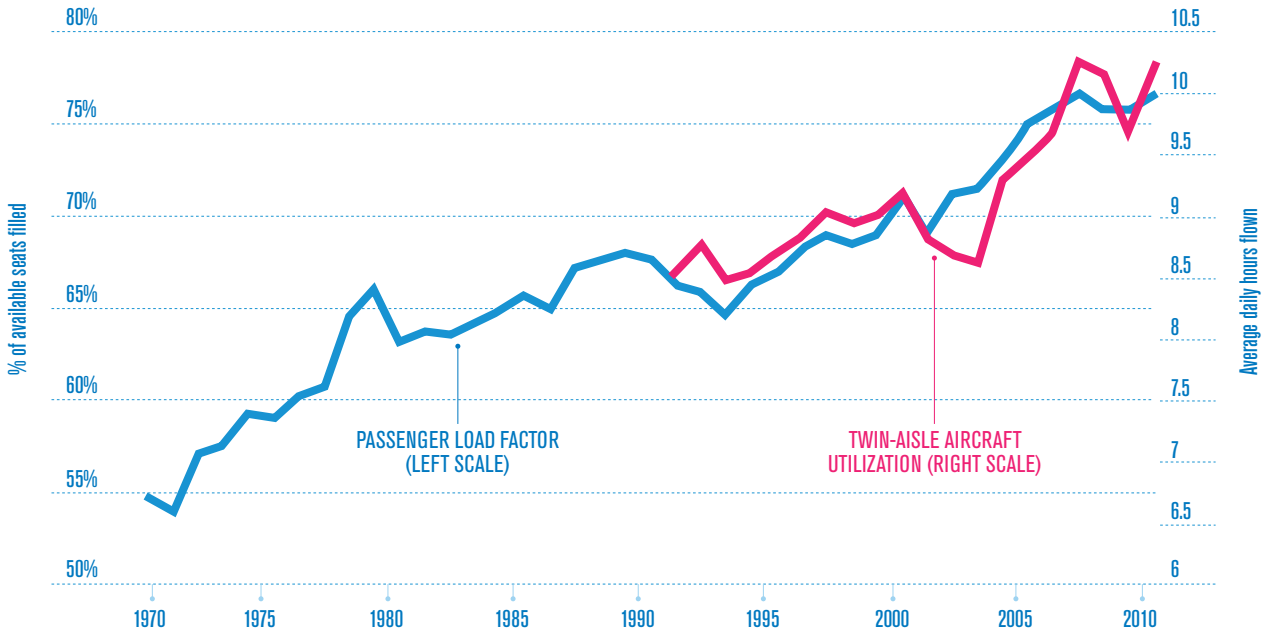
CHART 15: ENERGY INTENSITY OF NEW AIRCRAFT MODELS



Source: IATA Vision2050 report

Airlines have also substantially improved their utilization of aircraft.

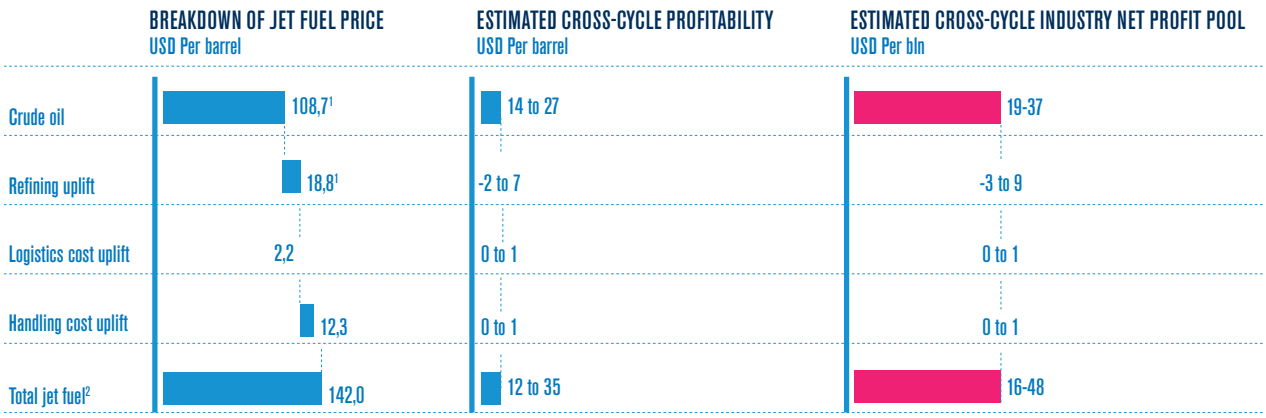
CHART 16: UTILIZATION OF PASSENGER AIRCRAFT



Sources: ICAO, ACAS

Air transport is an energy intensive business but productivity improvements have been substantial. Fuel is the biggest cost today because jet fuel prices are high. The question is whether airlines must remain fuel price-takers or whether any action could be taken to reduce this cost.

CHART 17: THE JET FUEL SUPPLY CHAIN



[1] Used average 2011 jet fuel price of USD 127.5 per barrel as stated by IATA
[2] Excludes taxes, royalties as differs widely by region and because they are not relevant for profit pool calculation.

Source: McKinsey & Company for IATA

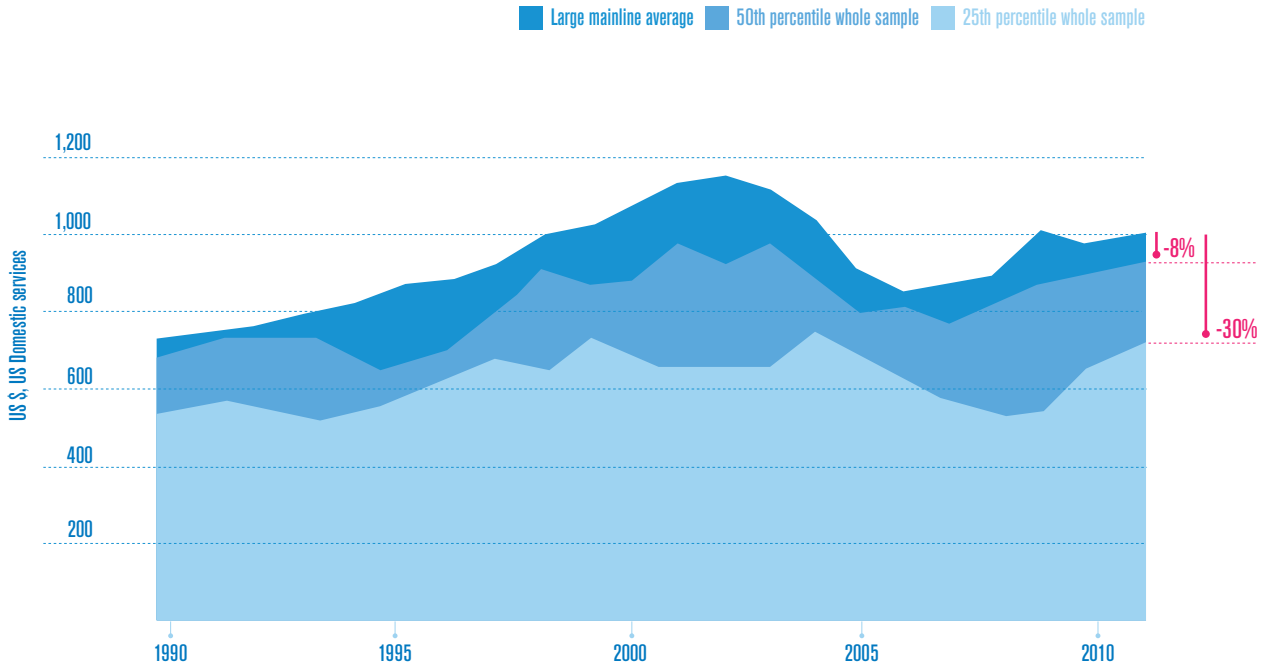
The cost structure of jet fuel today shows how dominant upstream costs are. Some 75% of in-plane jet costs, excluding any taxes, consist of the cost of crude oil. Refinery costs and profits represent 13% of the jet fuel price. Transportation, storage and logistics can add a further 8-12%. Taxes and royalties vary a lot, from zero up to the 27-34% paid on domestic jet fuel in Brazil, India and Japan.

At current levels of jet prices, air transport generates very substantial profits for the fuel industry estimated at between $16 and 48 billion. The vast majority of those profits are generated upstream, for crude oil suppliers. There is very little profit generated on average in transportation, storage and logistics, where airlines often have joint ventures with fuel supply companies. In the refinery sector there is a wide range of outcomes, with some refineries profitable but others making losses. The profit pool in this sector is estimated at between a loss of $3 billion to a profit of $9 billion. However, upstream in the jet fuel supply chain, crude oil supply companies are estimated to be generating $19-37 billion of profit.

LABOR

Labor is another major cost for the airline industry and analysis suggests that flight and and cabin crew do capture a portion of the value created in the industry. Pay per block hour has fallen from its peak in the early 2000s but the gap between the large airline average and the cost leaders in the industry have persisted, even in the US.

CHART 18: NOMINAL PILOT AND FLIGHT ATTENDANT PAY PER BLOCK HOUR

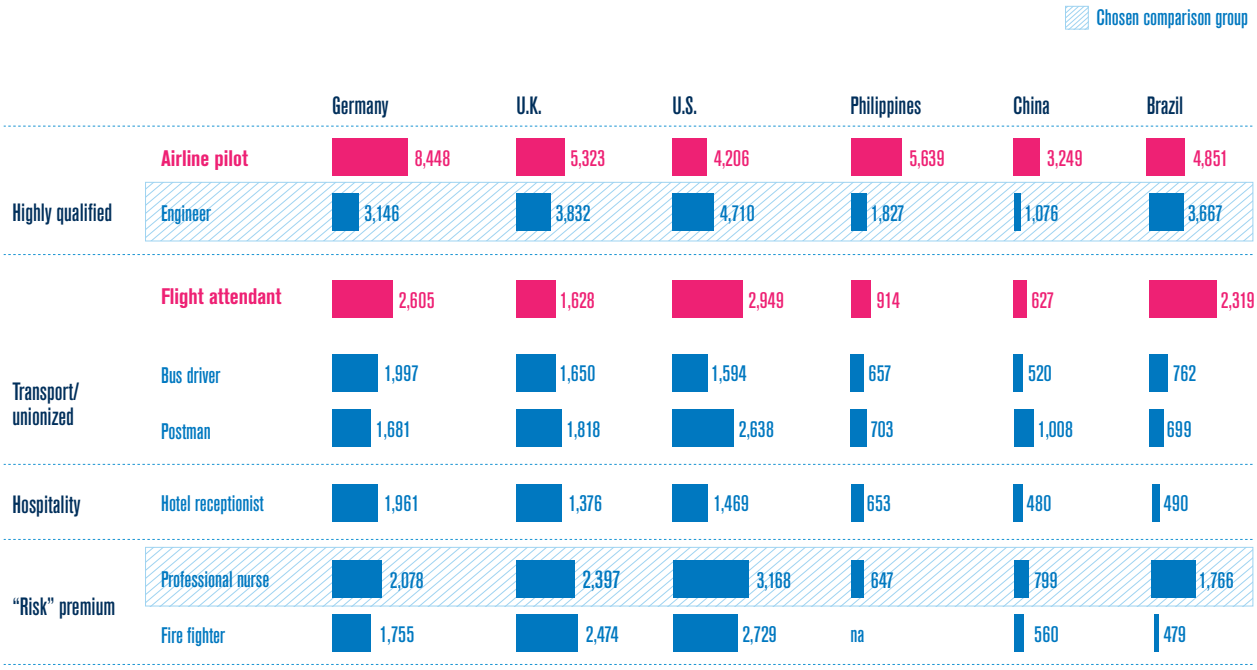


Source: McKinsey & Company for IATA

These gaps allow an estimate to be made of the 'surplus' being earned in aggregate worldwide by flight and cabin crews. On the basis of the smaller gap between large mainline airlines and the median airlines (50th percentile) that surplus is around $4 billion.

Another way of estimating the value going to flight and cabin crews is to compare average pay rates with comparable jobs outside the industry. Clearly this cannot be done perfectly. Skilled engineers do not have the safety of passengers as their responsibility. However, it does provide a rough benchmark.

CHART 19: NET MONTHLY INCOME
USD, 2005 Constant, PPP



Source: McKinsey & Company for IATA

On this basis regional comparisons can also be made. In the US there is no evidence of a surplus being earned by flight crews; their pay is comparable with similar jobs outside the airline industry. European airlines have not been through the Chapter 11 bankruptcy processes and court mandated labor cost reductions seen in the US in past years. In this region and others there is evidence of flight crews benefiting from the value created by the industry, with relatively high pay. At a global level this approach suggests a 'surplus' of $3-4 billion earned by flight crews, an estimate similar to that made by comparing labor costs to levels at the median airline.

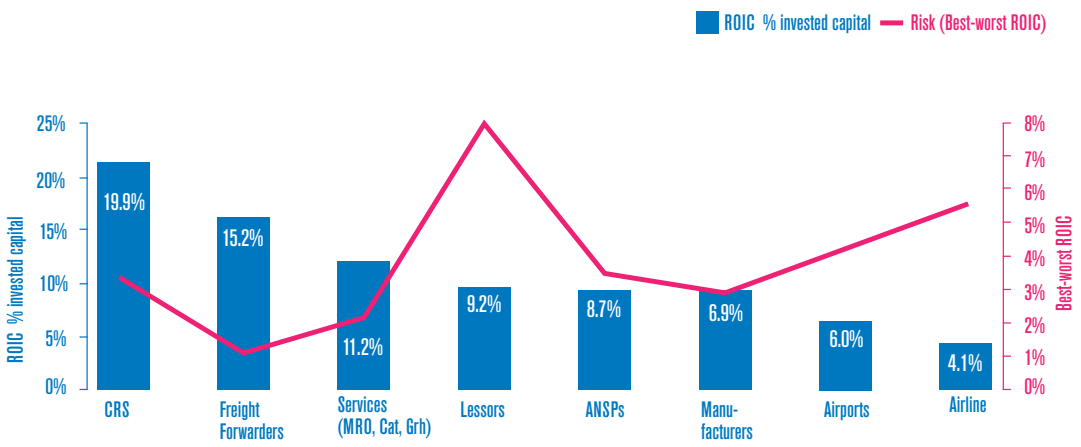
Overall, and before looking at the value extracted by government taxation or the value created for the wider economy and for customers, the air transport supply chain looks like it at least breaks even for investors. But returns are highly unevenly distributed.

RISK

Risk is also very unevenly distributed across the air transport supply chain. In competitive markets investors would expect to earn a higher return on investment if they face a higher risk or volatility or returns. Investors are prepared to accept lower returns if they face lower risk.

That rule does not seem to apply to the air transport supply chain. Some of the sectors with the highest returns, CRS/ GDS, freight forwarders, ground handling face the lowest volatility of returns. The airline sector earns the lowest return on capital yet faces the second highest volatility of returns or risk. This indicates that market forces are not working to allocate risk efficiently.

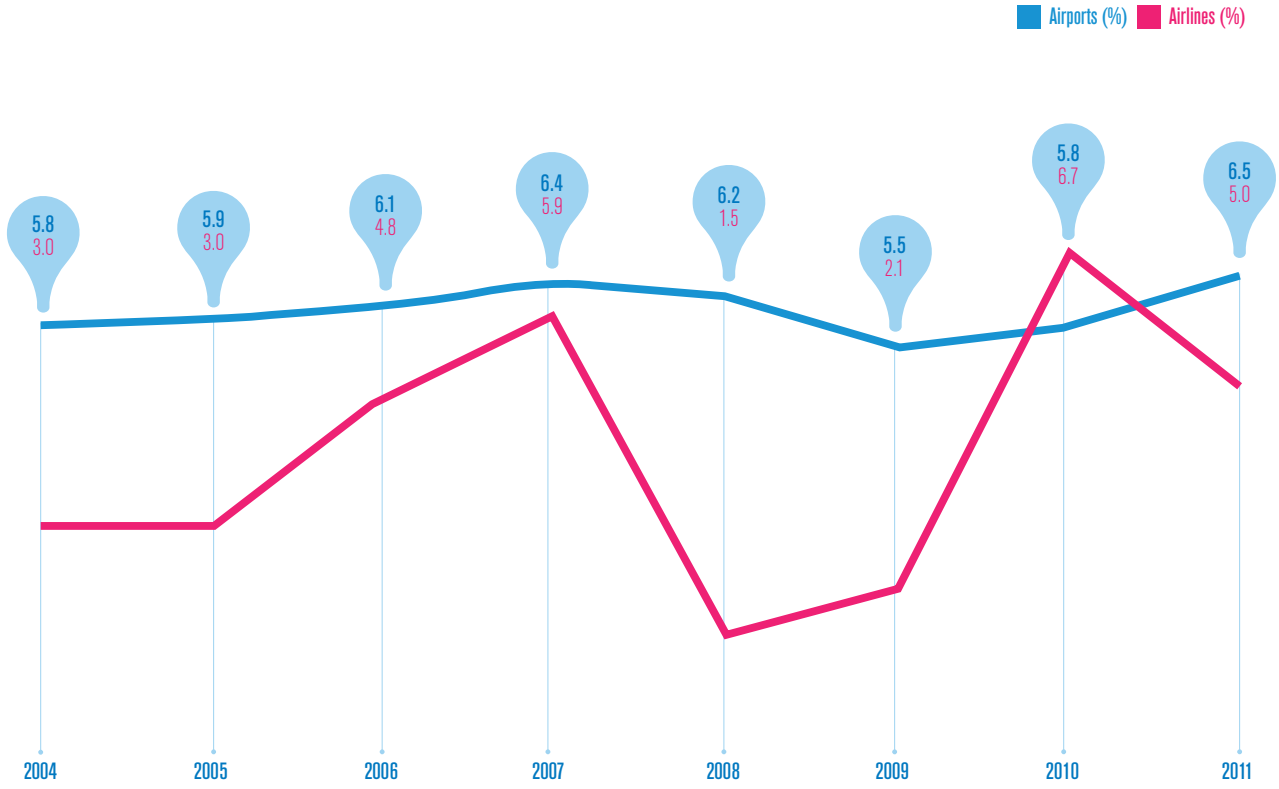
CHART 20: RISK VERSUS RETURN ALONG THE AIR TRANSPORT VALUE CHAIN



Source: McKinsey & Company for IATA

The misallocation of risk in air transport can be further illustrated by comparing returns in the airports sector over the past cycle with airlines.

CHART 21: ROIC AIRPORTS VERSUS AIRLINES



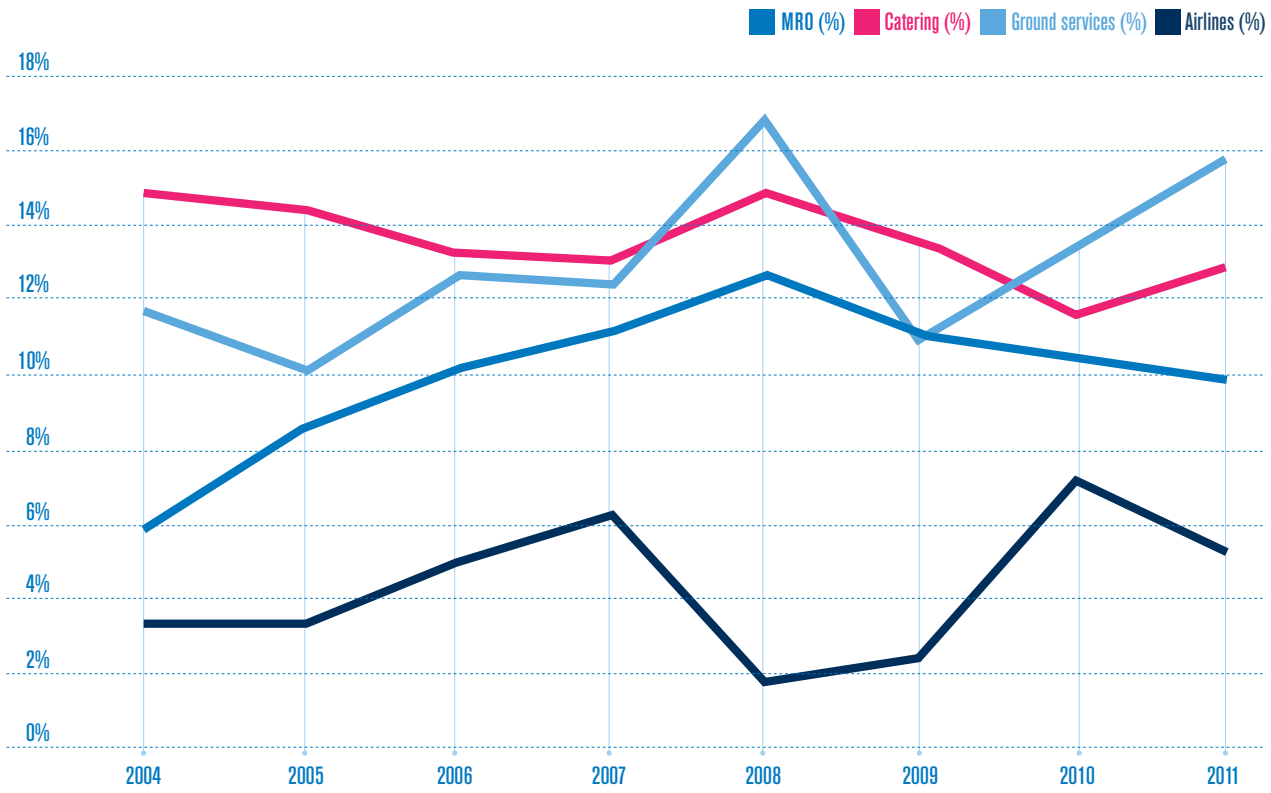
Source: McKinsey & Company for IATA

Airline returns are highly cyclical in response to the economic cycle and various demand and cost shocks. When demand falls airlines cut prices, as in any other competitive market. In contrast, airports raise charges to recover fixed costs when demand falls. This counter-cyclical rise in costs accentuates the decline in airline returns.

Airports have transferred volume risk onto airlines. Yet airlines are probably the least able in the air transport supply chain to be able to bear this risk. Very few airlines have investment grade credit ratings, yet most airports are highly rated and can obtain debt finance much more cheaply.

If airports operated in competitive markets they would cut charges during downturns and could fund periods of under-recovering fixed cost through their favorable access to debt markets. Some airports have partnered with airlines to share the volume risk, by levying charges on passengers rather than aircraft.

CHART 22: ROIC SERVICES VERSUS AIRLINES



Source: McKinsey & Company for IATA

Returns are more volatile in the services sector, but there is little sign of these suppliers bearing much of the risk of the ups and downs of the air transport cycle.

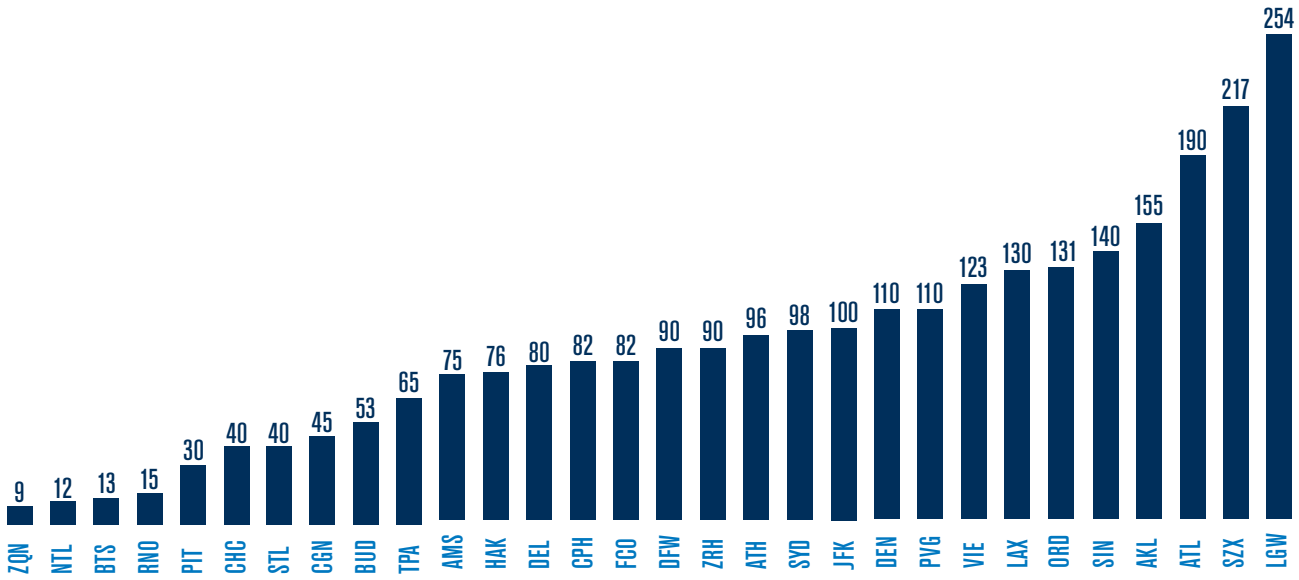
Another major risk for air transport is the under-utilization of assets, since the business is very capital intensive, at least in the airlines and airports sectors, where it takes between $1 and $3 of invested capital to generate $1 of revenue. We have already seen that airports do not face that risk, since they mostly pass that risk on to airlines, with higher charges during downturns. One sector that has considered risk allocation is engine manufacturing, which sells "power by the hour" In principle the risk of unexpected maintenance costs and under-utilization is taken by the engine manufacturer. In practice these contracts do not seem to protect airlines from escalating costs.

INEFFICIENCY

The focus of the analysis in this study is on profitability. That is because good data is available to make a robust assessment. But market power is not always exploited in 'excess' profit. A lack of competitive pressures can also lead to inefficiency. That certainly seems to be the case among infrastructure providers. Airports may not be natural monopolies but they do have local monopoly power, particularly if they are a hub. ANSPs are numerous but are typically sole providers of ATC services in their airspace.

Cost and efficiency benchmarking data on airports has been provided for a number of years by the Air Transport Research Society (ATRS). Evidence of inefficient provision of airport services is suggested by the wide variation in runway productivity. The same can be seen in other measures of input productivity such as passengers handled per employee.

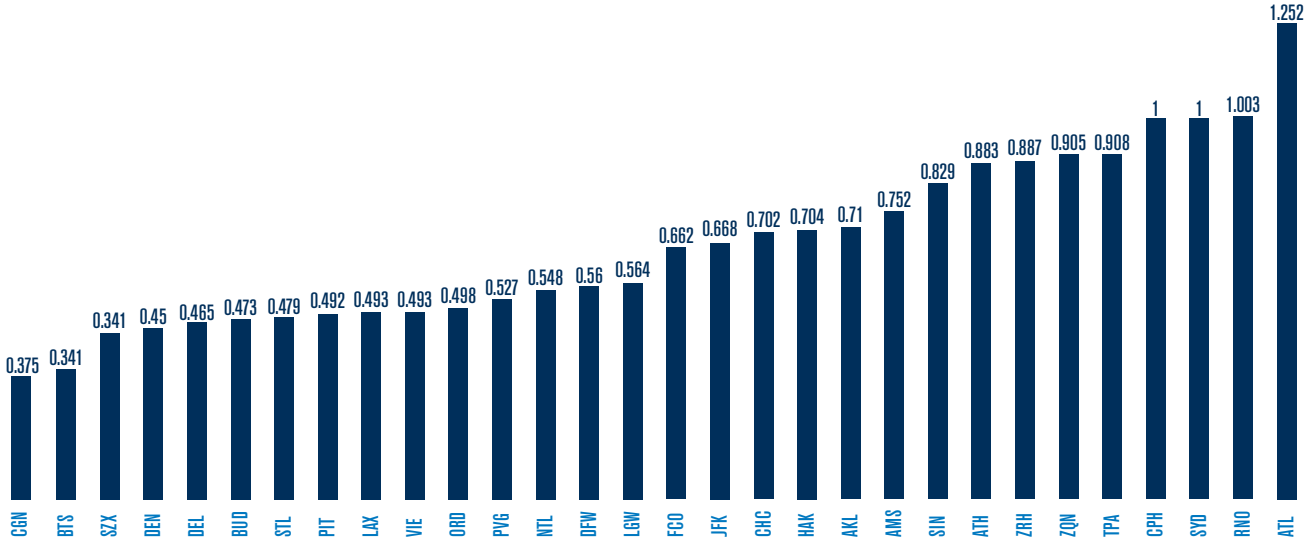
CHART 23: AIRCRAFT MOVEMENTS PER RUNWAY 2010



Source: ATRS

However, these sorts of comparisons are very partial and do not take into account the influence of many other factors, such as airport size, the percentage of international operations, the proportion of cargo business, any capacity constraints, agreed passenger service levels, non-aeronautical service provision and any airline or independent management of terminals. These factors can certainly make direct comparisons of crude efficiency measures, such as aircraft movements per runway invalid.

CHART 24: RESIDUAL VARIABLE FACTOR PRODUCTIVITY 2010



Source: ATRS

To address these problems the ATRS have constructed a measure of airport output (a combination of passenger numbers, cargo, aircraft movements and non-aeronautical output) to assess the efficiency of using non-capital inputs (labor and other 'soft' inputs). In constructing this measure they have explicitly controlled for the influence of size, international and cargo operations, capacity constraints, passenger service levels, non-aeronautical services and terminal management. Despite this there remain wide variation in the productivity or efficiency between airports, which shows that even if profitability or ROIC is not higher than the WACC there are issues of inefficiency.

04 | Actions

What actions are required by airlines and their business partners to improve the economic efficiency of the value chain, in order to increase the value it creates and ensure its financial sustainability? None if the market works as it should, but that is not the case. Market forces are certainly operating in some areas but in others market and government failures or high transactions costs require positive actions to bring about favorable change.

The range of changes that would improve value creation include: reducing inefficiency, reducing 'excess' profits, reducing risk and improving the customer experience. These types of change are shown on the horizontal axis in the table below. What could bring about these changes? Market forces may bring about these improvements unless blocked by some of the problems outlined above. In the absence of properly functioning markets, actions can be categorized as: regulation, standards, partnership, vertical integration and information. These are shown on the vertical axis.

To illustrate this framework some (by no means comprehensive) examples of such actions and the changes they might bring about are shown in the table cells. The purpose of this framework and the examples of market forces and actions currently being taken is to stimulate debate and new thinking. The various actions listed have had a beneficial effect. However, to improve the value chain for the benefit of consumers, supply chain partners, and to provide airline investors with a "normal" return on their investment, more is needed.

CHART 25: REMEDIES FRAMEWORK

	Reduce inefficiency	Reduce excess profits	Reduce risk	Improve customer experience
Market forces	New entry, new technology	New entry		New technology
Regulation	Incentive-based economic regulation (CPI-X)	Competition law used to break up monopoly	Debt financed rate stabilization fund	Service level agreements
Standards	E-ticketing			NDC, Fast Travel, Checkpoint of the Future
Partnership	JV with airport on e.g. duty free		Engine "rental"	
Vertical integration			Buy e.g. oil refinery, airport terminal	Cargo integrators
Information	Cost benchmarking			

FUEL

At current jet fuel prices air transport creates large profits for the fuel supply chain estimated at $16-48 billion a year. However, the vast majority of that profit is located upstream with the crude oil suppliers. Some parts of the refinery sector make a profit. Others are in loss.

Market forces are very limited with the OPEC cartel remaining powerful.

Regulation: Upstream profits are hard to reach through the traditional means of competition law because market power still resides with the OPEC cartel. To the extent that upstream profits are driven by upward pressure on oil prices from speculation then a 'Stop Oil Speculation' type of campaign may produce some benefits. It would need to avoid raising airline hedging costs. Support for alternative fuel supplies could also help in the long-term.

Vertical integration: Airlines have spent much of the past decade contracting out non-core services. However, vertical integration does offer the potential of sharing in profits or reducing risk. The purchase of the Trainer refinery by Delta has generated reported benefits that, if extended industry wide, could generate an estimated $5 billion in gross savings on fuel expenses. However, it is not clear that the specifics of Delta ownership could be replicated across the industry.

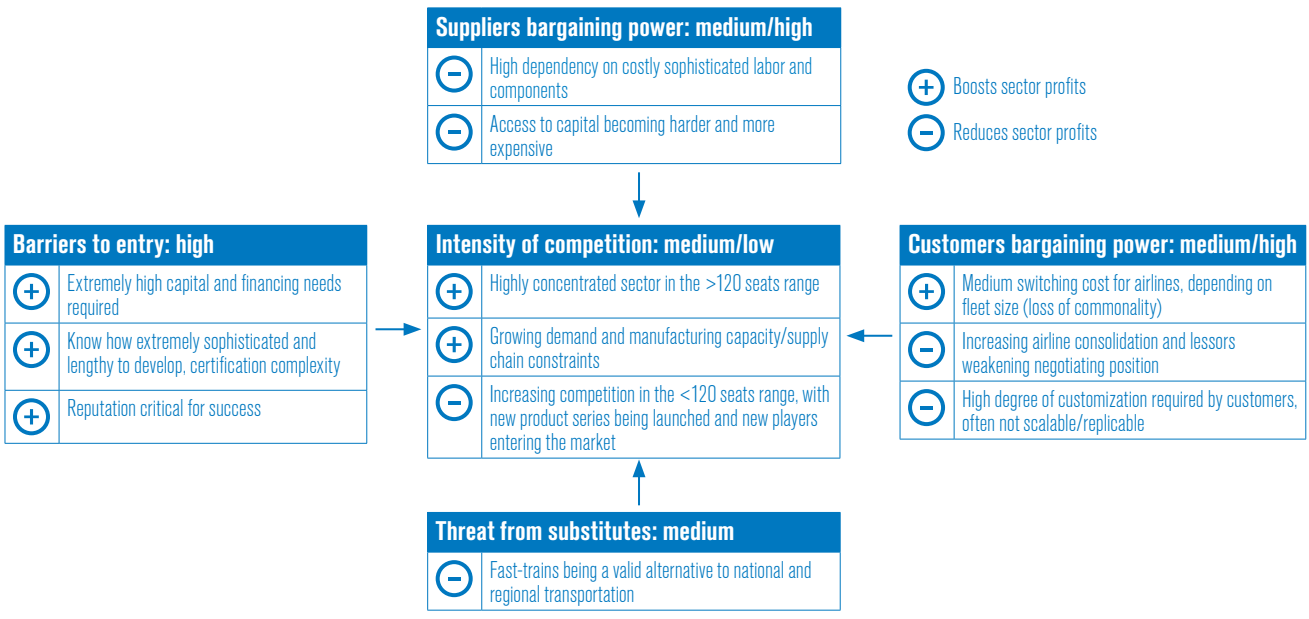
MANUFACTURING

Over the last full business cycle aircraft manufacturers generated an average ROIC of 7%, with a mixed performance within the sector. This was less than the WACC or the 9-11% investors would expect to earn and so the sector generated a small economic loss of $0.6 billion annually. Aircraft manufacturing is not a competitive market, at least not for large aircraft where the industry only has two players. However, as with some other suppliers of capital equipment the higher returns are made on repair and parts. This is evident in the MRO sector covered below.

Market forces are still limited but are slowly exerting an impact on aircraft manufacturing. There is increasing competition for the less than 120 seat aircraft and new companies are entering the market. Barriers to entry in the large aircraft market remain high, although consolidation is starting to increase the bargaining power of some airline groups and lessors.

Partnerships: Innovative thinking on partnerships is evident in engine manufacturing. Engine manufacturers introduced a rental service "power by the hour", where in principle the airline does not face some of the risk of unexpected cost and under-utilization. In practice this promising attempt to spread risk has not delivered all the airlines need. In particular, certainty over engine rental costs seems to come at the expense of above inflation rental increases and rapid inflation in the cost of parts. However, this is an area worth looking at again since the excess capacity issues that have plagued the airlines sector could be, at least in part, addressed by manufacturers bearing asset under-utilization risk. This applies to the airframe as much as the engine.

CHART 26: MARKET CONDITIONS FOR MANUFACTURERS



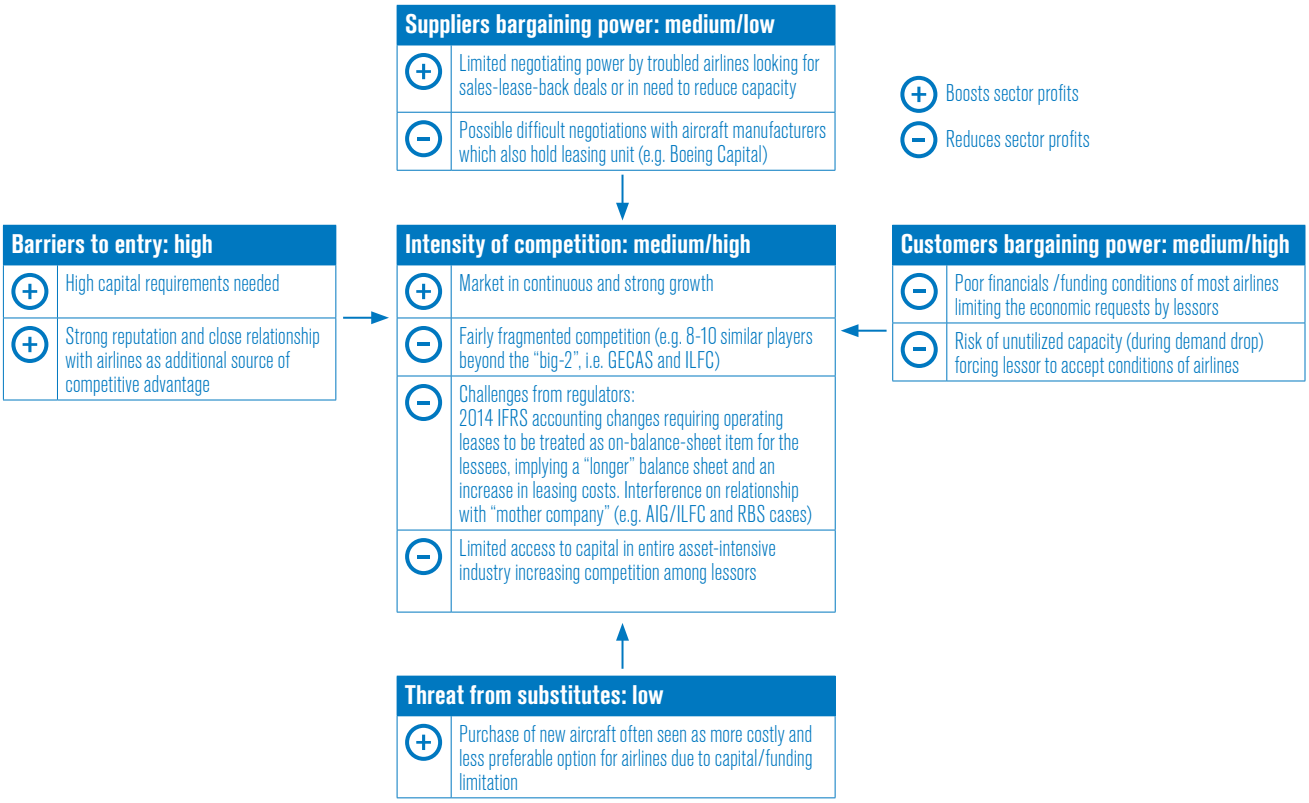
LESSORS

Lessors generated an average return on capital of 9% over the last business cycle, which was at the very bottom of the 9-11% range of their WACC. As a result the sector generated small economic losses of -$0.2 billion annually. The leasing market is growing strongly and barriers to entry are high, but the industry is fairly fragmented, with 8-10 similarly sized firms beyond the big two (GECAS and ILFC).

Market forces: After the financial crisis the more limited access to capital for all asset-backed finance has increased competition between lessors.

Regulation: Accounting changes in the 2014 IFRS will require operating leases to be treated as on-balance sheet items for lessees. This removes one advantage of leasing for airlines with weak balance sheets and will raise aircraft costs for those airlines, in the absence of other changes.

CHART 27: MARKET CONDITIONS FOR LESSORS

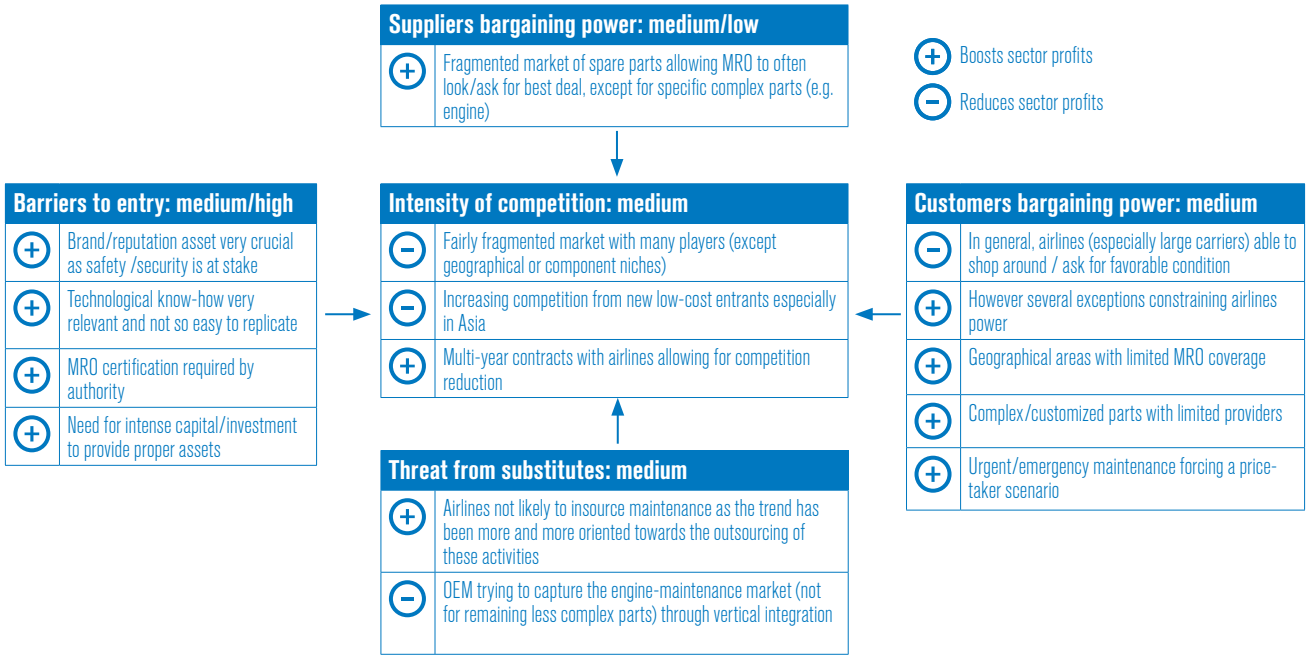


SERVICES (MRO, CATERING, GROUND HANDLING)

Over the last full business cycle the group of service companies (MRO, catering, ground handling) generated a ROIC averaging 11%. This was significantly more than the WACC or the 7-9% investors would expect to earn and so this group of sectors generated an economic profit of $1.1 billion annually.

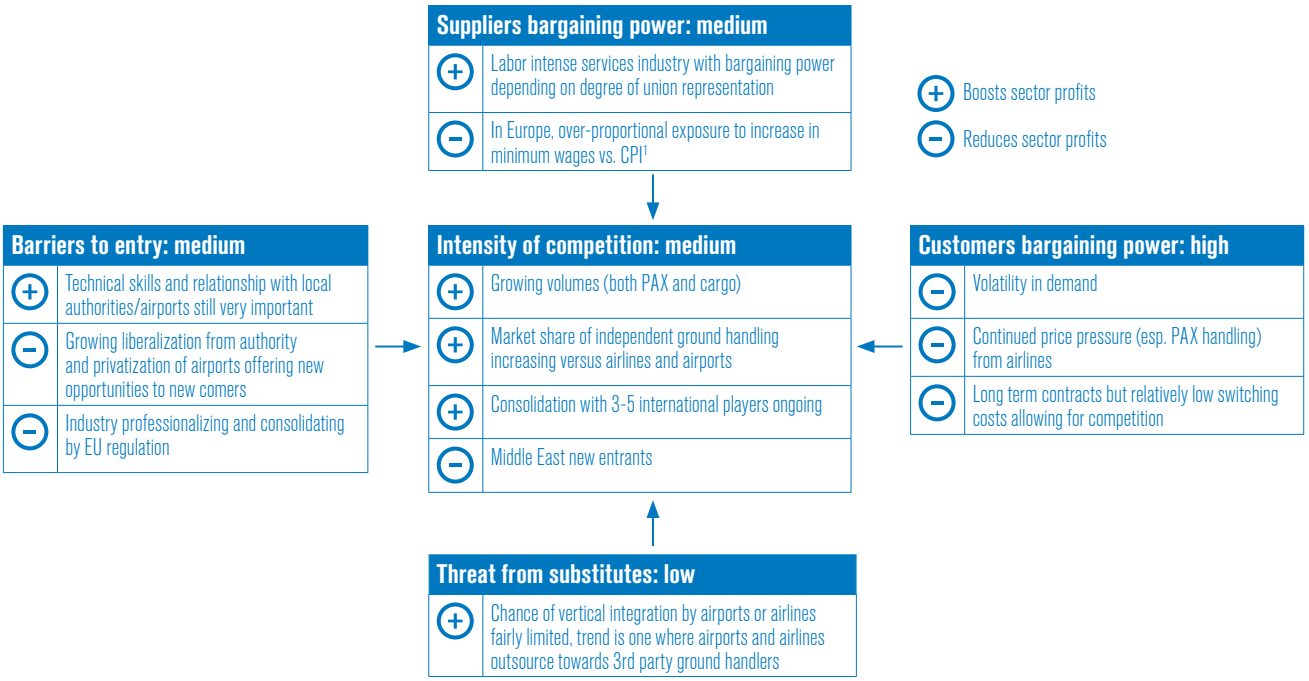
All these services have been substantially outsourced by airlines in recent years, though two of the most profitable firms in the MRO sector are owned by airlines (LH and SIA). ROIC in excess of their WACC suggests these firms are benefiting from market power.

CHART 28: MARKET CONDITIONS FOR MRO



Market forces are evident in some regions, for instance some low cost new entrants in Asia. However, the considerable escalation in parts costs suggests that competition is not working. Although the trend in recent years has been for airlines to outsource MRO, **vertical integration** is being undertaken by some airlines to deal with the aftermarket cost risk and in some cases to diversify their revenue streams. **Information** measures to provide parts data and cost benchmarking may address some of the existing problems in the market.

CHART 29: MARKET CONDITIONS FOR GROUND-HANDLERS
[1] CPI drives airline price adjustment, often lower than adjustment of minimum wages



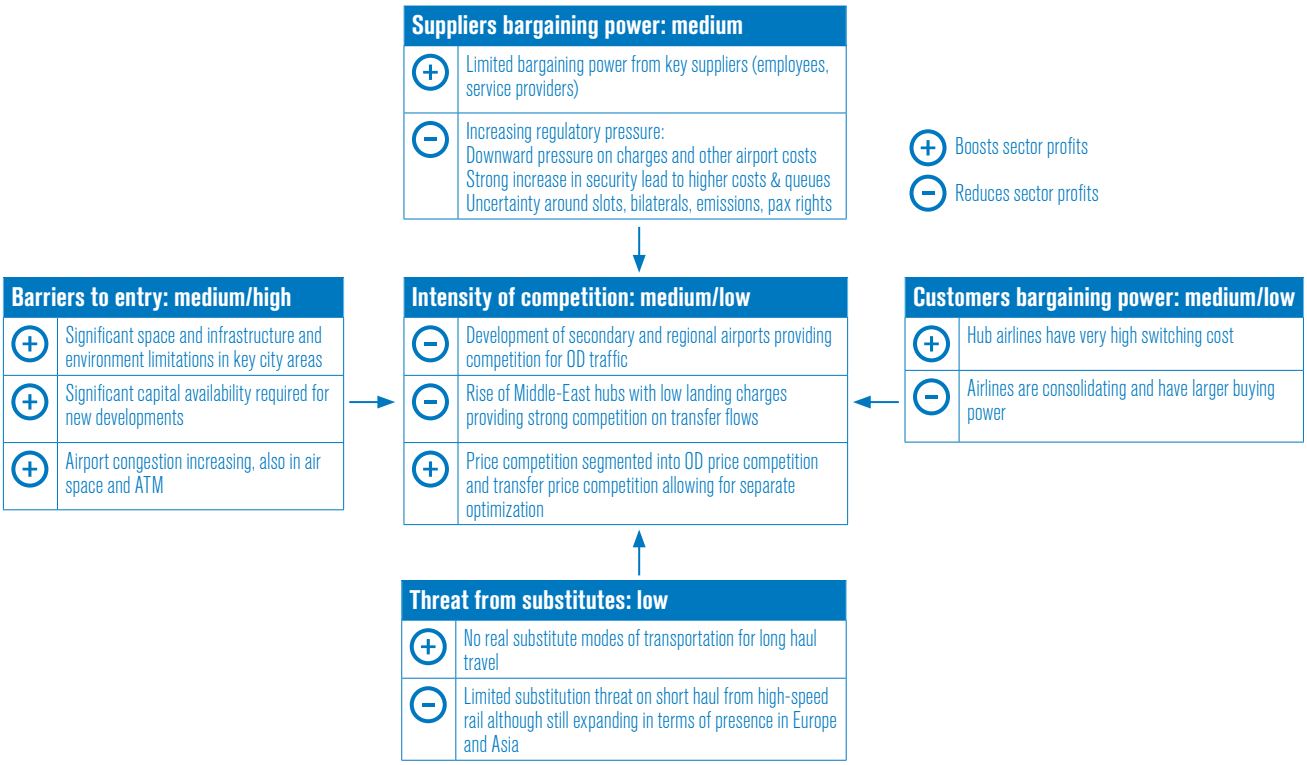
Market forces: The ground handling sector is getting much more concentrated and consolidation has taken place leaving 3-5 major international companies.

Regulation: Switching costs for airlines between ground handlers is low, if a choice is available at an airport. Growing liberalization as well as airport privatization could introduce more competition into this sector. Certainly more competition is needed in this sector.

AIRPORTS

As a worldwide sector airports generated returns averaging 6% compared to a WACC of 6-8%. That result was largely driven by US airports which are run for local economic benefit not for shareholders and by large losses for Spanish airports during this period. There is a wide spread of loss and profit-making airports. Some airports are exploiting local market power to generate high returns. Evidence of wide variance of cost performance suggests that market power is resulting in inefficiency in many airports. Addressing this problem offers benefit for both airlines and airports.

CHART 30: MARKET CONDITIONS FOR AIRPORTS



Market forces: Some competition is emerging in the airports sector, largely for regional airports and for some transfer markets. There is little evidence that this is sufficient to constrain charges at large hub airports.

Regulation: Economic regulation needs to be independent of government and incentive-based (CPI-X) not rate of return. Where an airport has significant market power incentive-based regulation is the only price regulation that will deliver efficiency gains. Airports usually have high credit ratings and can bear risk more easily than airlines. Regulation should be designed to facilitate this.

Standards: Poor passenger experience with check-in and security processes is another factor leading to a commoditization of the airline product and a low customer willingness to pay. Standards being introduced and proposed by the Fast Travel and Checkpoint of the Future programs and others could play an important role in improving passenger experience and willingness to pay.

Partnership: There are strong incentives for partnership between airports and airlines. Efficiency measures will benefit both. There may also be revenue opportunities, for instance joint ventures on non-aeronautical services like duty free.

Information: A lack of information does make commercial discussions between airports and their airline partners difficult. Properly done cost benchmarking can identify scope for efficiency improvements that would benefit all parties.

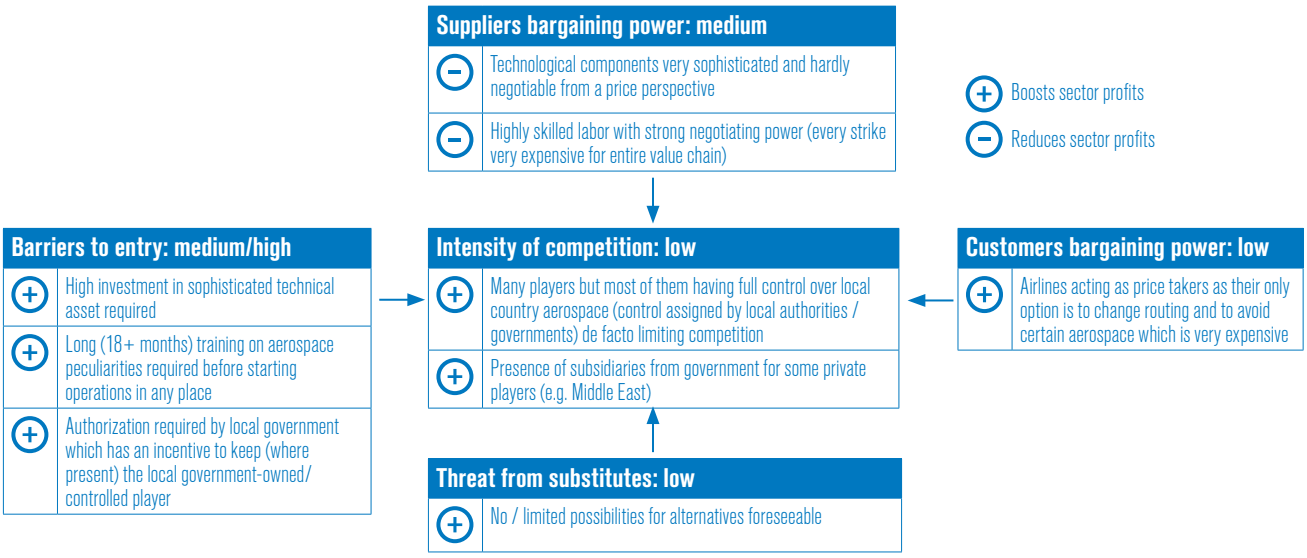
ANSPS

The ANSPs that are now in the private sector as a group generated a ROIC of 9%, compared to a WACC of 6-8%. The sector generated economic profits of $0.7 billion. There are many ANSPs but since they typically have exclusive control of their airspace, they do have monopoly power. Economic regulation has not been as effective as it should in setting allowed rates of return to equal WACC. Also evidence of wide variance in cost performance suggests market power is also leading to inefficiency.

Regulation: Economic regulation needs to be independent of government and incentive-based (CPI-X) not rate of return. Incentive-based regulation is the only price regulation that will deliver the efficiency gains needed. ANSPs have high credit ratings and can bear risk more easily than airlines. Regulation should be designed to facilitate this. A debt-financed (not pre-financed with higher charges) rate stabilization fund is an example that has been proposed.

Information: Cost benchmarking properly done can identify efficiency gains that would benefit all parties.

CHART 31: MARKET CONDITIONS FOR ANSPS



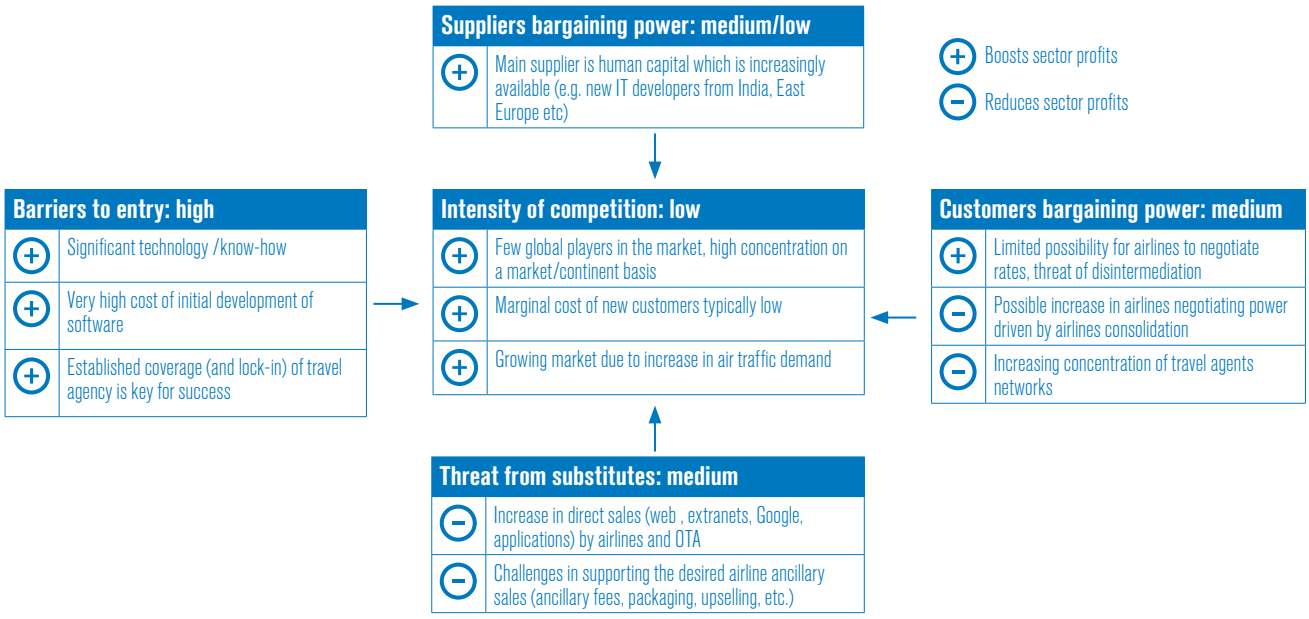
CRS/GDS

The Computer Reservation System businesses of the Global Distribution System companies generated an average ROIC of 20% over the last business cycle, well above their 10-11% WACC, and producing an average annual economic profit of $0.5 billion. This sector is highly concentrated and airline customers have little bargaining power. Probably more important than high distribution costs has been the commoditization of airline products in this channel.

Market forces: Barriers to entry are high but the disintermediation of the GDSs is starting to happen with the increase in direct sales by airlines and on-line travel agents. Entry by innovative companies like Google suggests that market forces are starting to move. But at present GDSs continue to impose terms on airlines and agents, ensuring that each travel agent is locked into a single GDS, and which inhibit agents from using alternative booking channels or switching technology providers.

Standards: The technology standard being introduced by the New Distribution Capability (NDC) offers the potential to broaden the airline product away from just price and schedule to include all the ancillary services that allow better differentiation. Its impact may go further than the standard itself by stimulating competitive responses among existing players.

CHART 32: MARKET CONDITIONS FOR THE CRS BUSINESSES OF GDSS



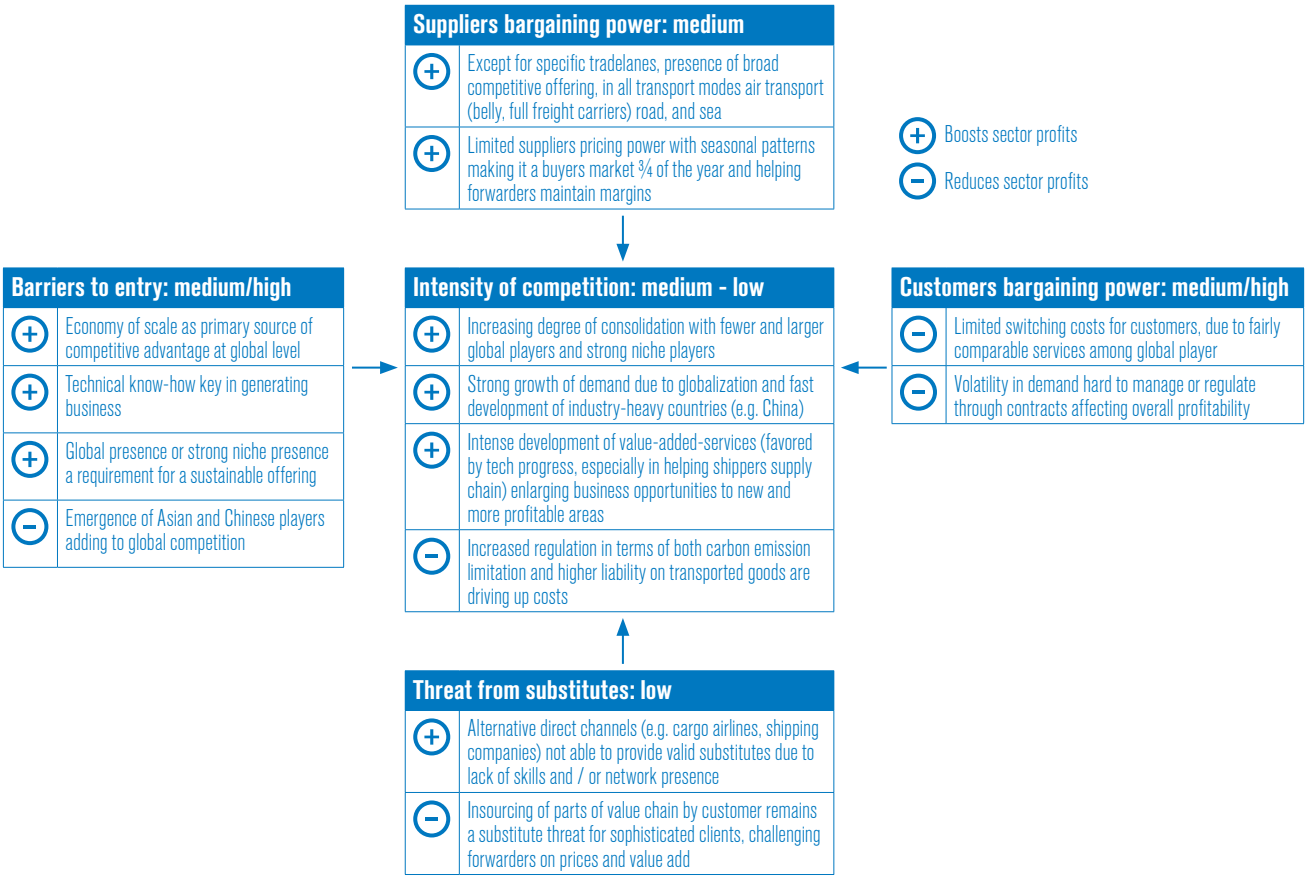
FREIGHT FORWARDERS

Freight forwarding has generated an average ROIC of 15% over the past business cycle, above its WACC of 7-8%, producing an annual economic profit of $1.3 billion. There is clearly market power in this sector, partly a return to economies of scale but also to increasing concentration with fewer and larger global players and strong niche companies.

Market forces: Barriers to entry are high due to global economies of scale. The sector is also seeing consolidation. But the emergence of Chinese and other Asian players is starting to provide some more competition.

Partnership between freight forwarders and airlines is generating speed and predictability efficiencies for both parties through initiatives such as e-freight and e-AWB.

CHART 33: MARKET CONDITIONS FOR FREIGHT FORWARDERS



05 Conclusion

Returns on invested capital have only improved from 3.8% in the 1996-2004 cycle to 4.1% in the 2004-2011 cycle, still way below the level of returns that an investor would consider "normal".

New thinking is required to bring about the improvement required. The intention of this study is to provide a baseline for that new thinking to take place.

There has been only a minor improvement in returns for investors in airlines over this past business cycle. During the period 2004-2011 returns on invested capital in the worldwide airline industry averaged 4.1%. This compares with an average of 3.8% during 1996-2004. There were demand and supply shocks challenging the industry during both of these business cycles. In the first airlines faced the impact of the bursting of the technology bubble, the 9-11 terrorist attack and SARS. During the most recent cycle the global financial crisis was followed by the deepest economic downturn since the 1930s. However, even in the good years of these two cycles, airline returns were on average inadequate. The shocks themselves were not the main cause of persistently poor airline profitability.

During both of these periods the airline industry's WACC, the return on invested capital investors would expect to earn by taking their capital and investing in assets of similar risk outside the airline industry, averaged just over 7.5%. Clearly an average return of 4.1%, for the capital already invested in the airline industry, was inadequate. Even in the good years of the past two cycles average airline returns failed to reach the level of the WACC. This is the average or aggregate picture of the airline industry. There are some airlines that have consistently created shareholder value, but there are very few airlines that achieve this. On average returns were just sufficient for the industry to service its debt. But there was nothing left to reward equity investors for risking their capital. During the period 1996-2004 investors in the airline industry would have earned $12 billion more, and in the 2004-2011 period $17 billion more, annually, by taking their capital and investing it elsewhere.

Over this period of fifteen years both tonne kilometers flown and the amount of invested capital in the airline industry have doubled, which does not immediately suggest an impending investor strike. However, the world has changed over this period. The global financial crisis and great recession has left developed economy banks short of capital and governments heavily indebted. Debt finance may never again be as easily obtained

as cheaply as during the credit boom of the 2000s. Increasing privatization has left 75% of the worldwide commercial airline industry majority owned by the private sector. Providers of equity capital will increasingly demand a return on their investment in airlines as a result. Debt will be more expensive. In order to attract the $4-5 trillion of new capital estimated to be required over the next 20 years, to meet the demand for air services arising from emerging markets, airline returns on capital must improve.

The rest of the air transport value chain continues to make money. Fuel suppliers are major beneficiaries of the value created by air transport, but the $16-48 billion of annual profits generated at current fuel prices are mostly located upstream in the fuel supply chain. Labor is also a significant beneficiary in some regions, but at a much smaller scale than fuel suppliers. The most profitable part of the rest of the value chain is in distribution, with CRS/GDS companies generating an average return of 20% and freight forwarders a return of 15%. Travel agents are also profitable, though it is hard to disentangle the air travel part of their business from other revenue streams.

There are problems in the value chain that need fixing. A lack of competition in some sectors leads to prices and investment returns being much higher than a competitive market would deliver. Upstream fuel suppliers and the distribution sectors show clear evidence of this. Market power also leads to inefficiency, even if that does not show up in excess profits, which is a feature of the airports and ANSP sectors. Risk is very inefficiently allocated along the value chain with the weakest player – airlines – bearing much of it, despite its investors receiving the lowest returns on their capital. There cannot be many markets where firms face rising supplier costs during recessions, which is the case for infrastructure costs in air transport.

However, excessive profit in the value chain is only part of the explanation for persistently poor airline profitability. In fact over the past forty years the airline industry has more than halved the cost of air transport in real terms, due to better fuel efficiency, asset utilization and input productivity. Yet these efficiency gains have ended up in lower air transport costs rather than improved investor returns. That has created tremendous value for customers and the wider economy, but has left equity investors in the airline industry unpaid.

The explanation for this feature of airline performance lies more in the industry's structure and the nature of competition than in the supply chain, although distribution is a key part of the puzzle. The commoditization of the airline product is partly a result of how indirect distribution has always taken place, with an almost exclusive focus on price and schedule. The 'perishable' nature of aircraft seats and the very low marginal cost of flying an additional passenger is another reason why prices often get competed below full cost. Driving much of this pressure is the highly fragmented and unconsolidated industry structure in most regions, a result of relatively easy entry conditions and the difficulties for capacity to exit or consolidate. Aircraft are mobile assets in a way that manufacturing plant is not, but government regulation prevents much needed cross-border consolidation and other government intervention has kept capacity operating on some markets which, in private hands, would have closed. Persistent excess capacity is the result. High load factors sometimes obscure this feature of the industry, but seats need to provide a sufficient yield to offset full costs in order to generate profit and often they do not. Persistently and exceptionally low returns on invested capital are the clear symptom of this problem.

Remedies to some of these problems are available, though some are fraught with political difficulty. This study documents the actions that have been taken up to now. Market forces are starting to have an influence in some sectors, but in most these forces are either inadequate or absent. Economic regulation is still necessary where competition is largely absent, as in the airports and ANSP sectors, but it does need to be designed to focus on incentivizing efficiency improvements to be effective. This focus will of course bring benefits to both parties. Introducing technology and process standards can also bring joint benefits and provide opportunities for new entrants. IATA's Simplifying the Business initiatives and the New Distribution Capability are both examples of this. The most productive way forward in many circumstances may be partnership, where there are benefits to both parties in doing business differently. Managing risk efficiently is one area that has already benefited from partnerships. A step on from this is vertical integration, which may work well in some circumstances but given the lack of success of many mergers in most industries needs to be assessed on a case-by-case basis. In some sectors better and more transparent information will make supplier markets work more efficiently. Cost benchmarking can sometimes enable more efficient commercial negotiations.

These are the actions being taken today to address the problem of persistently poor profitability in the airline industry. However, returns on invested capital have only improved from 3.8% in the 1996-2004 cycle to 4.1% in the 2004-2011 cycle, still way below the level of returns that an investors would consider 'normal'. New thinking is required to bring about the improvement required. The intention of this study is to provide a baseline for that new thinking to take place. •

06 | Annexes

ANNEX A: DEFINITIONS

	Definitions	Calculation methodology
ROIC	▪ "Return on invested capital" measures the operating performance of the company. ▪ Calculation excludes goodwill (= premiums paid for acquisitions).	▪ ROIC = NOPLAT/end of year invested capital ▪ Used end of year values for simplicity (e.g. avoid discrepancies due to M&A)
Invested capital	▪ Invested capital represents the amount invested in the operations of the business ▪ Adjusted for operating leases	▪ IC = Operating working capital + net PP&E[1]+ net other assets ▪ Adjustment made for operating leases by capitalizing the operating leases using the cost of debt ▪ Intangibles included (excl. goodwill)
NOPLAT	▪ After tax operating profit, adjusted for operating leases	▪ NOPLAT = Adjusted EBITA[2] – Taxes ▪ Marginal tax rate usually around 30-35% ▪ Adjustment for leases (interest component of lease expense added back to EBITA
Economic profit	▪ "Excess profit" earned above the cost of capital, expressed in USD million p.a. ▪ Economic profit spread ▪ Economic profit margin	▪ (ROIC-WACC) * Invested Capital ▪ ROIC-WACC ▪ Economic Profit/Revenues
WACC	▪ "Weighted Average Cost of Capital" measures nominal post-tax opportunity cost of funds invested	▪ WACC = Cost of equity * equity weight + Cost of Debt * debt weight

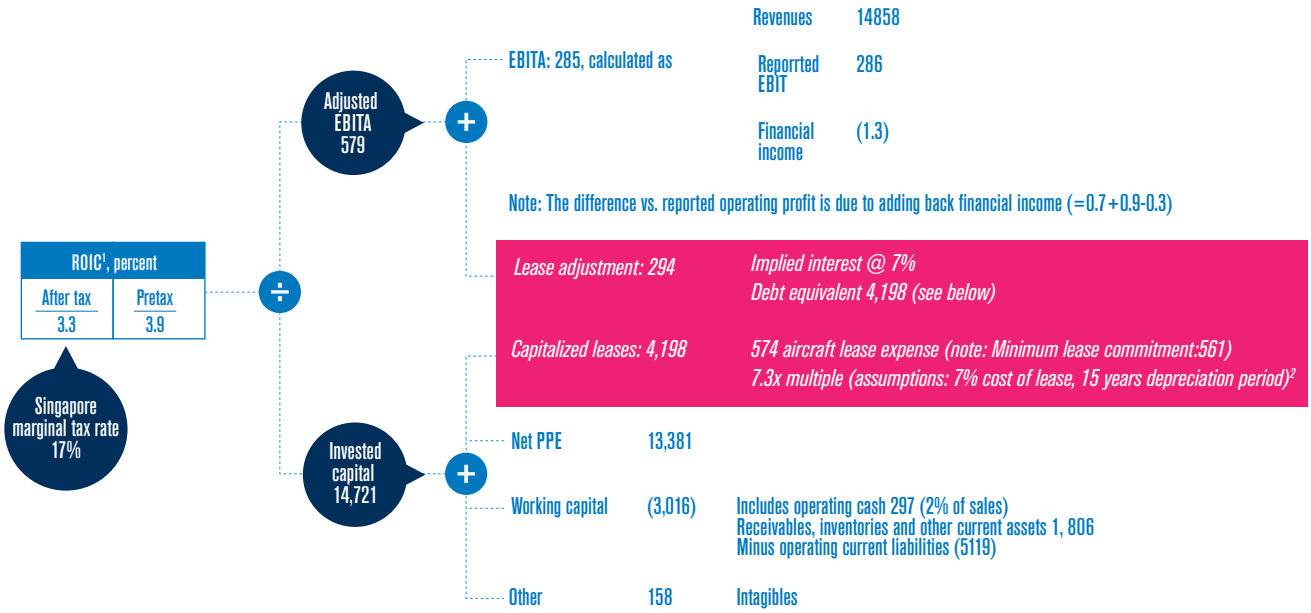
[1] PP&E = Plant, Property & Equipment
[2] EBITA = Earnings before Interest, Taxes and Amortization

ANNEX B: AN EXAMPLE ROIC CALCULATION

Singapore Airlines (SQ) in 2011

CHART 34

[1] Adjusted for operating leases, including goodwill
[2] Capitalization multiple: 1 / (1/Depreciation period+Cost of lease)



Source: McKinsey & Company for IATA

ANNEX C: ESTIMATING THE WACC

It is important to note that the weighted average cost of capital (WACC) used in this analysis is the opportunity cost for investors. It does not measure the actual cost of capital for the individual companies, but rather what investors would expect to earn on an asset with similar risk characteristics.

Nominal post-tax WACC = cost of equity × (1 – gearing) + cost of debt × gearing
Gearing = debt / (debt+equity)

THE COST OF EQUITY

The cost of equity is estimated using the standard Capital Asset Pricing Model (CAPM).

Cost of equity = risk free rate + re-leveraged equity beta × equity market risk premium
Re-leveraged equity beta = (asset beta – debt beta × gearing)/(1 – gearing)

The equity market risk premium is estimated at 5% throughout the period. Asset betas, debt betas and debt/equity target ratios are estimated as shown in the table below:

	Asset beta	Debt beta	Debt/equity ratio
Airline	0.80	0.30	100%
Airport	0.55	0.10	200%
ANSP	0.40	0.10	80%
Catering	0.70	0.20	50%
CRS	1.30	0.20	20%
Freight forwarder	0.80	0.20	80%
Ground services	0.70	0.20	50%
Leasing	1.10	0.00	0%
Maintenance	0.70	0.20	20%
Manufacturer	1.10	0.20	15%
Travel agent	1.00	0.20	100%

Source: McKinsey & Company for IATA

THE COST OF DEBT

Cost of debt = (risk free rate + debt premium) × (1 – corporate tax rate)

The cost of debt is the post-tax return on investing in the debt varying by sector specific debt premiums, by country specific risk-free rates and by country specific marginal tax rates. As noted above this does not represent the actual cost of debt for individual companies, but rather the return an investor would earn by investing in debt in that country with that sector's risk characteristics. It is the opportunity cost for investors.

The following assumptions have been used:

- Tax rates are based on marginal tax rates from the country of origin;
- Debt premiums are held unchanged over time: Airlines: 3%; Airports and ANSP: 1.5%, others 2%;
- Risk free rates are taken to be nominal 10 year rates for each country (at year end). For airlines located in countries with lesser credit quality (and reporting in USD), we have used USD rates (Argentina, Jordan, Panama, Russia, Taiwan, Turkey ...). There is a particular problem in using this methodology to measure the opportunity cost or target rates for investors during recent years because of the distortions in debt markets caused by the global financial crisis. We have mitigated this impact by adjusting the published risk free (Rf) rates in 2008 and 2011: 2008 based on average 2007 and 2009, 2011 equal to 2010.

	Rf assumed					Rf actual	
	2007	2008	2009	2010	2011	2008	2011
Australia	6.3%	6.0%	5.6%	5.5%	5.5%	4.0%	3.7%
France	4.4%	4.0%	3.6%	3.4%	3.4%	3.4%	3.2%
Germany	4.3%	3.8%	3.4%	3.0%	3.0%	3.0%	1.8%
Japan	1.5%	1.4%	1.3%	1.1%	1.1%	1.2%	1.0%
Singapore	2.7%	2.7%	2.7%	2.7%	2.7%	2.1%	1.6%
Switzerland	3.0%	2.5%	1.9%	1.7%	1.7%	2.1%	0.7%
UK	4.5%	4.3%	4.0%	3.4%	3.4%	3.0%	2.0%
USA	4.0%	3.9%	3.8%	3.3%	3.3%	2.2%	1.9%

Source: McKinsey & Company for IATA

ANNEX D: FIRMS USED IN THE ANALYSIS

AIRLINES

The airlines used in this analysis represent 80-90% of regional revenues over the period, except for the Middle East & Africa where the sample is 50-60%. To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $597 billion in 2011).

Europe	Asia Pacific	North America	Latin America	Middle East & Africa
Aegean Airlines	Air New Zealand	Air Canada	Aeromexico	Air Arabia
Aer Lingus	All Nippon	Airtran (+)	Avianca/TACA	El Al Israel Airlines
Aeroflot	Asiana	Alaska	COPA Holdings SA	Emirates
Air Berlin	Cathay Pacific	Allegiant Travel	GOL Linhas Aereas	Royal Jordanian
Air France/ AFKLM	China Airlines	America West (+)	Lan Chile/ LATAM	Kenya airways
Alitalia (+)	China Eastern	American	TAM Linhas Aereas	SAA
Austrian Airlines	China Southern	Continental (+)	Varig (+)	Ethiopian
British Airways/IAG	EVA Airways	Delta		
EasyJet	Japan Airlines (+)	Frontier (+)		
Finnair	Jet Airways	JetBlue		
FlyBE (+)	Korean Airlines	Northwest (+)		
Iberia (+)	Malaysian Airlines	Southwest		
KLM (+)	Qantas	US Airways		
Lufthansa	Shenzhen airlines (+)	United		
Norwegian Air Shuttle	Singapore Airlines	Westjet		
Ryanair	Thai Airways	Spirit		
SAir/Swissair Group (+)	Virgin Blue			
Swiss International (+)	Air Asia			
SAS	Tiger Airways			
Turk Hava Yollari				
SkyEurope (+)				
Vueling				

(+) Denotes a company that has subsequently merged with another.

AIRPORTS

The airports used in this analysis represent 30-50% of regional revenues over the period, except for the Middle East & Africa where the sample is around 10%. To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $111 billion in 2011).

Europe	Asia Pacific and Africa	North America	Latin America
AENA	ACSA (South Africa)	Atlanta	Aeropuertos Argentina
Aeroports de Paris	Auckland	Chicago-Midway	Aeropuerto Cerro Moreno (Chile)
Aeroporto di Firenze	Airports of Thailand	Chicago-O'Hare	Grupo Aeroportuario
BAA plc	Beijing	Dallas Fort Worth	del Centro Norte (Mexico)
Copenhagen	Guangzhou Baiyun	Denver	Grupo Aeroportuario del Pacífico (Mexico)
Flughafen Wien	Hainan Meilan	Los Angeles Int'l/LAWA	SCL (Chile)
Fraport	Hong Kong	New York City	
Save Aeroporto di Venezia	JATC	Tampa	
Schiphol	Malaysia Airports	Toronto	
TBI plc (+)	Melbourne (APAC)		
Zurich Unique	Shanghai Hongqiao		
	Shenzen		
	Sydney		
	Xiamen International		

ANSPS

The ANSPs used in this analysis represent 20-25% of global revenues over the period.
To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $27 billion in 2011).

NATS	Aerothai	Air Services Australia	ATNS
DFS	CAAS	Nav Canada	

MANUFACTURERS

The manufacturers used in this analysis produce a mix of civil and military aircraft. Revenues from military have been excluded where possible, but this has not been possible in all cases. To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled using its proportion of total sector revenues (estimated as $82 billion in 2011 based on the value of aircraft and engines delivered).

Airbus	Boeing	Bombardier	Embraer

LESSORS

The lessors used in this analysis represent 20-30% of global revenues over the period.
To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $36 billion in 2011).

Aercap	Aircastle	ALAFCO	Aeromexico	AWAS
Babcock & Brown	Boeing Capital	GATX (until 2006)	Avianca/TACA	Genesis Lease
ILFC				

GROUND SERVICES

The ground services firms used in this analysis represent 30-47% of global revenues over the period. Airlines outsource 25-40% of their ground services. To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $39 billion in 2011 based on outsourced services only).

Alitalia Servizi (+)	Alpha (+)	Aviance (Go Ahead Group) (+)	BBA Aviation (Ground Services)
Celebi	Derichebourg/Penauille	Dnata	John Menzies
Plane Hnadling	RAM (Milan) (+)	SATS	Serviceair UK
Swissport	World Fuel Services (Aviation)	Worldwide Flight Services (+)	

CATERING

The catering firms used in this analysis represent 40-50% of global revenues over the period.
To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $12 billion in 2011).

Alpha (+)	Gate Gourmet (+)	Gate Group	Journey Group
LSG Skychefs (+)	Olympic Catering	SATS (Catering)	Servair

MAINTENANCE

The MRO firms used in this analysis represent 80-90% of global revenues over the period. Airlines outsource approximately 50% of MRO. To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $21 billion in 2011 based on outsourced services only).

AAR Corp	Ameco	BBA Aviation	British Airways Avionic Engineering
Guangzhuo Aircraft Maintenance	HAECO	Lufthansa Technik	Sabena Technics
SIA	SR Technics	Taikoo Xiamen	TAT Group
Timco			

GDS/CRS

The CRS businesses of the GDSs used in this analysis represent 60-80% of global revenues over the period. To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $8 billion in 2011).

Amadeus	Galileo	Sabre	Travelport
Travelsky			

TRAVEL AGENTS

The travel agents used in this analysis represent a relatively small percentage of global revenues over the period. It has also been difficult to separate the different revenue sources reported by the firms (which also include corporate services and a mix of hotel and airline commissions). To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $45 billion in 2011).

Amex corporate travel	Carlson Wagon-Lit (France)	Expedia	Flight Centre
Hogg Robinson	Navigant	Travelport (GTA+Orbitz)	

FREIGHT FORWARDERS

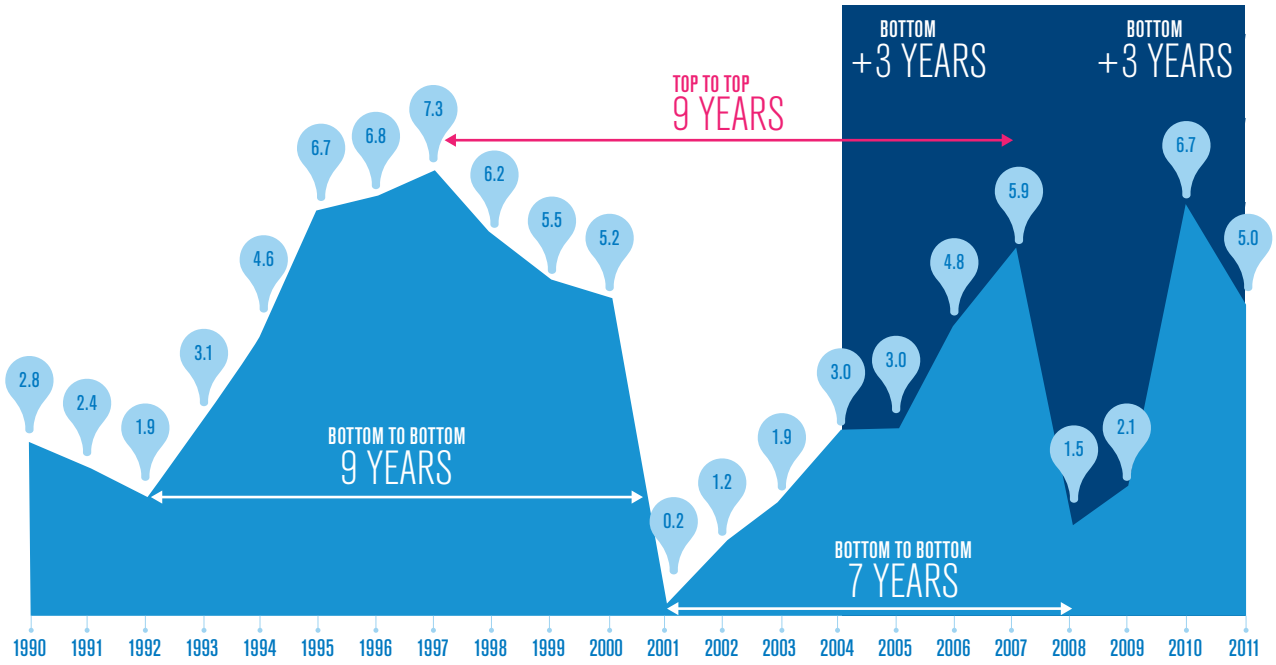
The freight forwarders used in this analysis report a mixture of contract logistics and freight forwarding revenues, which in some cases have been difficult to separate. To calculate sector aggregates for ROIC, economic profits etc. this sample is scaled up using its proportion of total sector revenues (estimated as $76 billion in 2011 after excluding customs brokerage revenues).

Air Express	Circle	EGL	Excel (FF division)
Expeditors	Fritz	Kintetsu	Kuehne & Nagal
Ocean	Panalpina	UTI Worldwide	Yusen Air & Sea Service

ANNEX E: PERIOD OF ANALYSIS

The period 2004 to 2011 was taken as the period of analysis as it captures both the latest full data (2011) and the last full business cycle. 2011 was 3 years after the most recent cyclical low point in 2008. The starting point was taken at an equivalent point 3 years after the 2001 bottom of the previous cycle.

CHART 35: AIRLINES RETURN ON INVESTED CAPITAL



Taking a full business cycle should give as representative as possible a picture of average annual returns on invested capital, for airlines and the rest of the air transport supply chain.

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