

OXFORD ECONOMICS

Explaining Dubai's Aviation Model

June 2011

A report for Emirates and Dubai Airports
June 2011



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ECONOMICS

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Executive Summary

The aviation sector makes a substantial contribution to Dubai's economy...

- In this report Dubai's aviation sector is defined as the airport operator, Dubai Airports, the aircraft ground handling company and the passenger and cargo services provided by all the airlines operating out of Dubai International.
- The aviation sector contributes to Dubai's economy through a number of channels. We group these into two broad categories - the sector's 'economic footprint' and its 'catalytic benefits'.

...and today it supports 125,000 jobs in Dubai including direct, supply chain and induced jobs...

- The aviation sector directly employs 58,000 people and contributes US\$6.2 billion to Dubai's GDP.
- The aviation sector indirectly supports 43,000 jobs and contributes US\$3.5 billion to Dubai's GDP, through its purchases of goods and services from local businesses.
- The aviation sector supports a further 23,900 jobs and contributes US\$2.0 billion to Dubai's GDP, through the spending of those directly and indirectly employed in the aviation sector.
- Altogether, the aviation sector's economic footprint today supports over 125,000 jobs and contributes US\$11.7 billion to Dubai's GDP.

...and a further 134,000 jobs in Dubai's tourism industry...

- Aviation supports Dubai's economy in more ways than its own economic footprint. The key sectors of travel and tourism, financial and professional services, and logistics all depend on the aviation sector for their success. Indeed, without the aviation sector it is hard to imagine Dubai as it is today, with its distinctive skyline and large retail developments, a

magnet for foreign visitors, expatriate workers and foreign businesses. We quantify these wider 'catalytic' benefits of aviation through two channels: tourism and connectivity.

- Travel and tourism, whether for business or leisure, make a large contribution to the Dubai economy. The overwhelming majority of foreign visitors who travel to Dubai arrive by air, and we calculate that their spending supports nearly 134,000 jobs and contributes US\$7.9 billion to Dubai's GDP.
- The connections created between cities and markets represent an important infrastructure asset that generates benefits through attracting foreign direct investment and talent, enabling business clusters, specialisation and other spill-over impacts on the economy's productive capacity. We calculate that these 'connectivity' benefits contribute US\$2.5 billion to Dubai's GDP.
- Taking into account all the ways in which the aviation sector contributes to Dubai's economy, we calculate that today it supports over 250,000 jobs and contributes over US\$22 billion to Dubai's GDP. To give a sense of the scale of these benefits, they represent around 19% of total employment in Dubai, and 28% of Dubai's GDP.

...and also generates benefits for the global economy and consumers

- Not only is the success of Dubai's aviation sector good for Dubai's economy, it also benefits the global economy. It promotes global tourism. It creates connections between cities and countries. These connections represent an important infrastructure asset that benefits passengers, and businesses from many countries. It promotes strong competition, ensuring for passengers efficient and high quality air services.
- We calculate the economic benefits for 10 countries: Australia, Brazil, China, France, Germany, India, Mauritius, South Africa, the United Kingdom and the United States, focusing on the air transport services provided by Emirates Airline, Dubai's home carrier.
- For Mauritius the tourism benefits are substantial, equivalent to 1.0% of GDP. For others the benefits are significant in absolute terms. For instance, the tourism benefits contribute over US\$1.0 billion to GDP for both Australia and India.
- India, Mauritius and South Africa gain the most from improved connectivity, which contributes a further 0.1% to 0.2% to their GDP. Connectivity benefits are significant in

absolute terms for China (equivalent to US\$1.4 billion of GDP), and for the UK and the US (US\$0.8 billion each).

- Consumer benefits, in the form of the difference between what the consumer is willing to pay and the actual fare, are high for travellers flying to and from Mauritius, South Africa and India, where consumer benefits are equivalent to 0.7%, 0.6% and 0.4% of these countries' GDPs respectively. For India and the UK we calculate that consumer benefits exceed US\$1.0 billion. The benefits were also significant in absolute terms for Australia (US\$0.8 billion), together with China, Germany and the United States (US\$0.5 billion each).

What factors account for the success of Dubai's aviation sector?

- The success of Dubai's aviation sector derives from a number of strengths, which are the product of strategic decisions that the government of Dubai and the aviation sector have taken in the past. These strengths include: an awareness of aviation's economic importance on the part of the government of Dubai; openness; a consensus based approach to investment; a focus on growth and linking underserved markets; and efficient operations. Added to these is Dubai's favourable location at the intersection of Europe, Asia and Africa. We look at these strengths in turn.

Government awareness...

The government has played a leading role in Dubai's economic development. The relationship between the government and the aviation sector is a consensus-based partnership that allows important decisions to be made quickly and carried through effectively. The success of the partnership is dependant on the government's awareness of the importance of aviation to Dubai's economy and the shared vision provided by the Strategic Plan of the Dubai Government.

...openness...

- Dubai favours open competition among airlines. Over 150 airlines operate out of Dubai International, benefiting from its investment in aviation infrastructure and competitive landing charges. Moreover, Dubai's Civil Aviation Authority has pushed for greater freedoms for all airlines to enable them to operate without undue restrictions on their commercial decisions. The main obstacle to this is restrictive air access rights elsewhere and Dubai has sought, through negotiation with other governments, to improve this situation.

- Based on a comparison of airport charges, competition among the majority of the largest 100 international airports, including Dubai International, is conducted on a level playing field. For a minority of the largest 100 international airports, however, airport charges are seriously distorted by taxes. Among the ten airports with the highest airport charges, for instance, tax accounts for over half of the total charge.
- Ranked according to their airport charges (whether taxes are included or not), Dubai International lies close to the middle of the largest 100 international airports, with roughly an equal number of airports above it as there are below it in terms of their charges.
- We compare Dubai International to a panel of 16 airports chosen either because of their scale of operations, or for their proximity to Dubai. This panel comprises: Abu Dhabi, Amsterdam, Ataturk (Istanbul), Bangkok, Beijing, Cairo, Charles De Gaulle (Paris), Doha, Frankfurt, Hong Kong, Incheon, Jeddah, London Heathrow, Narita (Tokyo), Shanghai and Singapore. The average airport charge (excluding taxes) at Tokyo and the four European airports was US\$55.5 per passenger, compared with US\$26.6 per passenger at the remaining eleven airports. Among this eleven, Dubai International is most similar to Bangkok, Incheon and Shanghai in its level of charges. Excluding taxes, Dubai International's airport charges are only 4% below the average charge for these eleven airports.

...a consensus based approach to investment...

- Dubai's aviation sector has benefited from its consensus based approach to investment that has helped Dubai Airports and Emirates expand together, supporting each other's growth. This success has been possible because of the importance given to investing in transport infrastructure. Dubai's Strategic Plan identifies transport infrastructure as a priority area for investment ('world-class infrastructure designed to suit the requirements of all users'), and its guiding principles to economic development include: innovation in launching initiatives, speed and accuracy in project execution and unique relationship and partnership with the private sector.

...focus on growth and underserved markets...

- Dubai's aviation sector has benefited from a focus on growth that has allowed it to capitalise on the growing demand from passengers in Asia and Africa. In 2000, Dubai International had the capacity to handle 22 million passengers. Through heavy investment in upgrading its facilities, the airport had the capacity to handle 60 million passengers in

2010. Over the same period, the actual number of passengers handled by the airport increased from around 12 million to 47 million.

- Emirates has targeted underserved routes. Through tapping into pent-up demand, the airline has increased passenger numbers six-fold over the course of a decade. Emirates has expanded its fleet almost four-fold to accommodate this demand. The success of this strategy is reflected by the airline's overall passenger seat load factor that has averaged 76% over the past decade.

...efficient operations...

- While Dubai Airports is directly owned by the government and Emirates is owned by Investment Corporation of Dubai (ICD), a government owned investment company, this is not unusual in the global aviation industry. What is more unusual is that despite government ownership, Emirates is run on a commercial basis without government financial support.
- Dubai's success is exemplified by the efficiency of Emirates' operations. To help us to evaluate Emirates' operating performance, we compare Emirates to a panel of 13 other airline companies during the financial year ending in 2009/10. These companies are: American Airlines, Air France-KLM, Air India, British Airways, Cathay Pacific, Jet Airways, Lufthansa, Malaysia Airlines, Qantas, Singapore Airlines, SriLankan Airlines, Thai Airways, and United Airlines. Among this panel of airlines there is a disparity between the average labour costs among the European and North American airlines and the rest (US\$94,575 and US\$49,510 per employee, respectively).
- Emirates operates a young and modern fleet of aircraft. This brings many benefits for Emirates' passengers and also benefits the airline through lower maintenance and fuel costs.
- Among our panel of airlines, Emirates has one of the highest operating margins (0.6 cents per available seat kilometre). Only Cathay Pacific and Thai Airways operate with larger margins. American Airlines and Singapore Airlines manage to break even with slender operating margins. Six of the panel operate with a negative margin.
- Emirates profits have been sufficient to pay for all the investment in its fleet and repay its loans over the past decade. Moreover, contrary to widely held belief, Emirates does not receive government support through subsidies or other financial interventions, but has in

fact paid out annual dividends to the government of Dubai totalling US\$1.6 billion since 2002.

...and its strategic location

- Dubai's aviation sector has benefited from the emirate's strategic location within eight hours flight of most major destinations and two-thirds of the world's population. For many air travellers who do not stay in Dubai but instead use it as a place to connect as they go to other countries, Dubai's location is its principle attraction. However, tourism, trade and commerce in Dubai depends on Dubai's aviation sector, and clear synergies have developed as the aviation sector's success has assisted the growth of other key sectors which in turn have generated additional demand for air transport services.

Aviation's importance to Dubai is expected to continue to grow over the next decade

- We expect the economic contribution of Dubai's aviation sector to rise to 32% of Dubai's GDP and about 22% of its employment by 2020.

Financial results for 2010/11

- Emirates released its annual report for the financial year 2010/11 on 10 May. Although its release came too late for the data to be incorporated into our analysis, the information contained in the latest numbers is consistent with our findings. Emirates continues to be profitable despite difficult trading conditions. In 2010/11, it reported its highest profit in its 25 year history. Robust revenue growth (25% higher on the year) was driven by strong growth in passenger numbers (revenue per passenger kilometre (RPKM) increased by 16.0% on the year), a 80% passenger seat factor, the highest in the airline's history, and a rebound in the Cargo business as world trade improved (tonnage increased 12% on the year). The Annual Report, marking the company's silver jubilee, notes that the airline has become the world's largest airline by scheduled international passenger-kilometres flown.

1 The benefits created by Dubai's aviation sector

Key points

- We calculate that the aviation sector today supports over 259,000 jobs and contributes US\$22.1 billion to Dubai's GDP.¹ To give a sense of the scale, these benefits represent around 19% of total employment in Dubai and 28% of Dubai's GDP.
- The aviation sector supports 125,100 jobs and contributes US\$11.7 billion to Dubai's GDP through its economic footprint.
- Moreover, Dubai's travel and tourism sector depends almost entirely on foreign visitors who arrive by air. We calculate that the spending by air travellers supports nearly 134,000 jobs and contributes US\$7.9 billion to Dubai's GDP.
- Air connections between cities and countries constitute an important infrastructure asset that increases the productivity of key sectors in Dubai's economy by attracting foreign direct investment and talent, enabling business clusters, and specialisation. We calculate that these 'connectivity benefits' contribute US\$2.5 billion to Dubai's GDP.
- Not only is the success of Dubai's aviation sector good for Dubai's economy it also benefits the global economy. In this report we have calculated the benefits created through tourism and connectivity together with the benefits created for air passengers for 10 countries: Australia, Brazil, China, France, Germany, India, Mauritius, South Africa, the United Kingdom and the United States.
- Spending by air travellers flying with Emirates makes an important contribution to many of these countries' economies. For Mauritius the tourism benefits are substantial, equivalent to 1.0% of GDP. For others, such as Australia and India, the benefits are significant in absolute terms.
- India, Mauritius and South Africa gain the most from improved connectivity, which contributes a further 0.1% to 0.2% to their GDP. Connectivity benefits are significant in absolute terms for China, the United Kingdom and the United States.
- Consumer benefits, explained in a later section, are also high. For Mauritius and South Africa they are equivalent to 0.7% and 0.6% of these countries' GDPs. For Australia, China, Germany, India, the United Kingdom and the United States the annual benefit exceeds US\$0.5 billion.

¹ Dubai is one of seven emirates that comprise the United Arab Emirates (UAE). Unless specifically stated, all numbers in the report refer to Dubai and not to the UAE.

Introduction

This report looks at the economic benefits created by Dubai's aviation sector. In doing so the report attempts to answer three related questions. The first question concerns the nature of these economic benefits – how they arise and the extent of their reach. Dubai's aviation sector has experienced rapid growth over the past decade. In part this success reflects the rapid growth in Dubai's economy which will have generated demand for air transport services. But Dubai's investment in its aviation sector has also contributed to the success of sectors such as travel and tourism, logistics, financial services and professional services that depend on being well connected to the global economy. We call such spillovers the 'catalytic benefits' of the aviation sector, which we calculate to be substantial.

The success of Dubai's aviation sector also benefits the global economy. Through improving connections between cities and countries, Dubai's aviation sector promotes international tourism, generates connectivity benefits for businesses in many countries, and expands the choices open to air passengers, many of whom are not staying in Dubai but are using it as a place to connect as they go to other countries. We look at these global benefits for a number of countries and find that they can be significant.

Second, given the benefits that Dubai's aviation sector creates for Dubai and for the global economy, it is natural to ask what factors underlie this success. In some quarters this success is viewed with suspicion, being seen as evidence of government support and unfair competition. We look at this in some depth and we conclude that this view is incorrect. Instead, in our view the success of Dubai's aviation sector derives from a number of strengths, which are the product of strategic decisions that the government of Dubai and the aviation sector have taken in the past. These strengths include openness, efficient operations, a focus on growth and underserved markets and a consensus based approach to investment.

The third question concerns the future. Will Dubai's aviation sector continue to play as important a role in Dubai's economy as it currently does? Based on our view about the sector's underlying strengths and forecasts for air passenger demand published by Airbus and Boeing, we conclude that it most probably will. We calculate that in 2020 the sector will be continuing to generate substantial benefits for Dubai's economy, and that the catalytic benefits will play an even more prominent role than they do today.

These three questions provide the structure for this report. Section 1 continues with a brief look at how several key sectors, including transport, have made an important contribution to Dubai's economic growth over the past decade and a half. We discuss the channels through which the aviation sector creates economic benefits, where we distinguish between the sector's economic footprint and the sector's catalytic benefits. We then quantify the benefits that Dubai's aviation sector currently generates both for Dubai and for 10 other countries. Section 2 looks at the factors that have underpinned the success of Dubai's aviation model and Section 3 looks ahead to 2020.

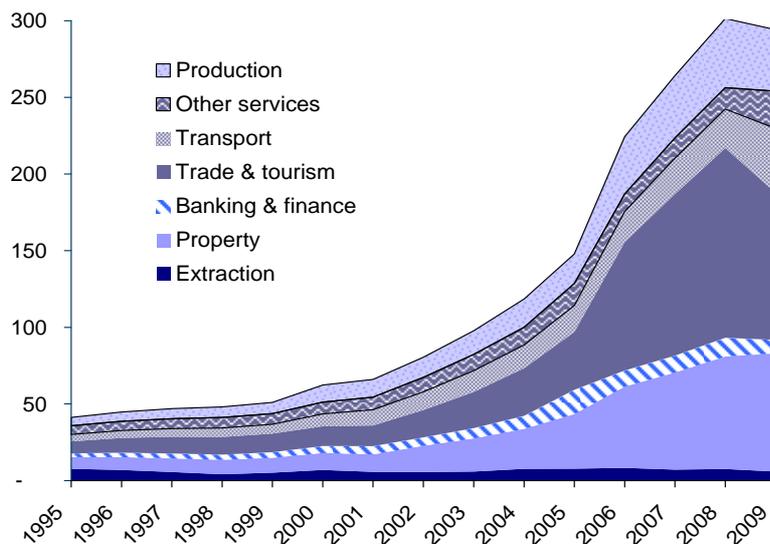
How transport and a number of other key sectors have driven Dubai's economic growth over the past decade

Today, Dubai's economy is built around tourism; service industries, such as IT and finance; a vibrant re-export business, centred on well integrated transport and logistical hubs; and real estate. While the retail and wholesale sectors (distributive trades) benefit from the large numbers of foreign visitors that shop at landmark developments, such as the Dubai Mall and Dubai Duty Free.

Chart 1.1 shows the growth in Dubai's nominal Gross Domestic Product (GDP) over the past 15 years, together with the contributions made from individual sectors of the economy. Given the attention often paid to Dubai's property sector, perhaps the most striking feature of Chart 1.1 is how important distributive trades, tourism and transport have been in driving growth in Dubai's economy.

Chart 1.1: Nominal GDP since 1995

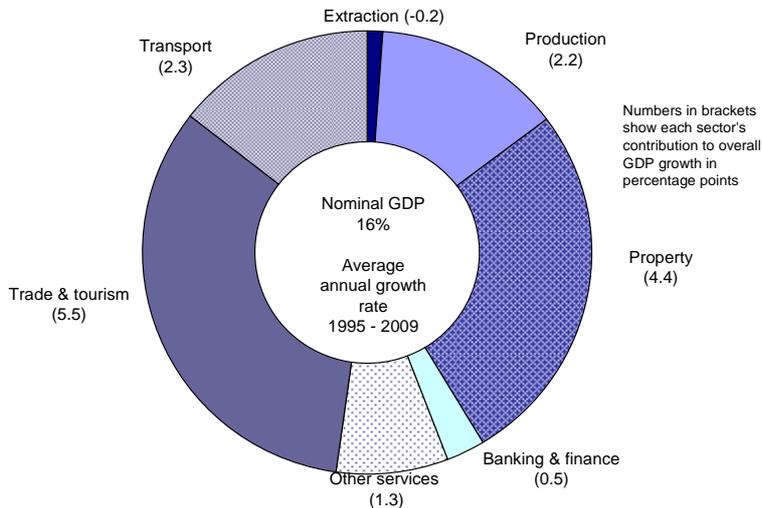
Nominal GDP
(billion Dirhams)



Source: Various, Dubai Statistical Centre

Chart 1.2 explores sectoral growth more fully. Between 1995 and 2009, annual growth of nominal GDP averaged 16%.² Of this, 2.3 percentage points is accounted for by the growth in the transport and communications sector.

Chart 1.2: Contribution to nominal GDP growth, by sector ^{(a) (b)}



Source: Dubai Statistical Centre

(a) The series labels refer to the following sectors: transport and storage and communications (Transport); mining and quarrying (Extraction); manufacturing, electricity, gas and water (Production); real estate and business services, construction (Property); financial corporations sector (Banking and finance); government services, non-profit organisation, social and personal services, domestic services of households (Other services); hotels and restaurants, wholesale, retail trade and repairing services (Trade and tourism).

An important engine of growth in its own right, the transport sector has also played an important role in enabling growth in other key sectors of the economy. For example, transport and the sectors most closely related to tourism - the distributive trades, hotels and the restaurants - together account for almost half of Dubai's overall growth in nominal GDP over the past 15 years.

Moreover other key sectors, such as financial services, also rely on being well connected to the global economy. Dubai's aviation sector is crucial in providing these global connections. Indeed 95% of foreign visitors travel to Dubai by air. In the rest of this section we look in detail at how the aviation sector supports Dubai's economy both through its own growth and the connections it creates between cities and countries.

Clear synergies have developed between the aviation sector and other key sectors of Dubai's economy. The aviation sector has benefited from the economy's growth as this increases the demand for air transport services. While the aviation sector, through its own growth and by creating connections between

² The growth rate of Nominal GDP reflects both the growth in output and inflation. We would ideally only report the output component, but this data is not available over the timeframe discussed in this section.

Dubai and other countries has assisted the growth in other key sectors of the economy.

How the aviation sector benefits Dubai's economy

In this report benefits are measured in two ways: (1) the contribution the sector makes towards GDP, a measure of the total output produced in the economy, and (2) the employment that this production supports.

This report quantifies several types of benefits that are explained below.

Direct benefits

Direct benefits are the contributions to Dubai's GDP and employment that are attributable directly to the aviation sector, through the activities of the airport operator, ground support activities and the airline operations based out of Dubai.

The direct employment benefit is the total number of people employed in the sector, which in 2010 equalled 58,200 jobs.

When measured in terms of its contribution to GDP, the direct benefit is calculated as the total "value added" generated by the firms that comprise Dubai's aviation sector. A firm's value added is calculated as the difference between its total sales and the cost of its purchases from other firms. As its name implies, were we to add up the value added along an entire production chain we would arrive at the sales value of the final good. Much the same applies at the national level. Here the value of all final output is GDP, and value added provides a measure of how much each firm (and sector) contributes to this total.

On this basis, the aviation sector contributed US\$6.2 billion to Dubai's GDP in 2010.

In 2010, the aviation sector generated value added of US\$93,700 for each person it employed, almost 60% above the average labour productivity for the whole economy. This high level of productivity reflects the relatively high proportion of engineers, pilots and other skilled workers in the workforce with the fact that aviation is a relatively capital-intensive sector.

Indirect benefits

To run an airport and to operate flights to and from it requires not only the services of the airport operator, ground handling and airlines. All these firms depend heavily on locally produced goods and services supplied by firms outside the aviation sector. The aviation sector therefore generates indirect benefits by supporting jobs and economic activity along its supply chain.

Similar to the direct benefits, the indirect contribution is also measured in terms of value added. In this case the value added is embodied in the goods and services supplied to the aviation sector from firms in other sectors of the Dubai economy. To capture the full supply chain, we need to add up the value added

along the whole production chain – not only the direct suppliers, but the firms that supply them, and so on.

We calculate that in 2010, the aviation sector contributed US\$3.5 billion to Dubai's GDP and supported 43,000 jobs along its supply chain.

Induced effect

A further stimulus to GDP and employment comes about through the spending of those employed in the sector and its local supply chain. These benefits would be felt by general retail, in restaurants, by leisure services and many other local businesses.

We calculate that the induced benefit contributes around US\$2.0 billion to Dubai's GDP, and supports almost 23,900 jobs.

Catalytic benefits

In addition to this economic footprint, this report also quantifies the catalytic benefits which the aviation sector generates for other sectors of Dubai's economy. These catalytic benefits arise (1) through the impetus that the aviation sector gives to Dubai's travel and tourism sector and (2) the wider spillover impacts created through the air connections between cities and countries. We look at each of these catalytic benefits in turn.

Tourism benefits

Dubai is an important tourist destination, and travel and tourism, whether for business or leisure, makes a large contribution to the Dubai economy. Many landmark developments in Dubai are tourism attractions in their own right, such as the Burj Khalifa, the tallest building in the world. Large numbers of visitors also take advantage of developments such as the Dubai Mall and Dubai Duty Free that are among the world's largest retail operations of their type.³ Indeed, retail tourism, where foreign visitors come to Dubai primarily to shop at its premier retail developments, is big business. These developments act as an important growth engine.

The overwhelming majority of foreign visitors who travel to Dubai arrive by air. Based on the number of passengers arriving at Dubai International who stopped over in Dubai, the average length of stay and the average spend per visitor (based on data for the UAE as a whole), we estimate that aviation facilitated Dubai's tourism sector to the tune of US\$7.9 billion (in valued added terms), and supported almost 133,900 jobs within Dubai. These benefits came through the direct and indirect channels. These estimates appear reasonable when compared with the number of visitor stays reported by Dubai's official tourism statistics.

³ Based on its turnover in 2009, Dubai Duty Free was the largest Duty Free operation in the world, according to a study conducted by Generation Research. Dubai Mall is one of the world's largest shopping malls whether measured by its area or number of shops,

Wider connectivity benefits

Connectivity, as we explain below, contributes US\$2.5 billion in value added to Dubai's economy.

Dubai's aviation sector benefits from the emirates' strategic location within eight hours flight of most major destinations and two-thirds of the world's population. Benefiting from this location, the over 150 airlines that currently operate out of Dubai International provide nonstop services to 220 destinations around the world.

Studies on aviation call these linkages 'connectivity'. Dubai's connectivity reflects both the overall passenger traffic that its airports handle, together with the importance of destinations that can be flown to. Increased connectivity benefits passengers by reducing the time spent in transit, increasing the frequency of service, allowing for shorter waiting times and better targeting of departure and arrival times.

Improvements in connectivity give Dubai-based businesses greater access to foreign markets, encouraging exports. Opening domestic markets to foreign competitors can also be an important driver behind reducing unit production costs, either by forcing domestic firms to adopt best international practices in production and management methods or by encouraging innovation. These competitive pressures improve productivity of firms throughout the economy: a process given further impetus through the free movement of investment capital and workers between countries.

Research has shown that economies that are more connected, relative to their size, will experience faster growth in the long term. For instance, research by Oxford Economics, has found that a 10% change in connectivity relative to GDP increases an economy's long-run productivity by around 1.1%.⁴ Drawing on detailed data on passenger traffic supplied by Emirates and Dubai Airports, we estimate that Dubai's connectivity has increased by 80% over the last decade. Much of this improvement is down to the considerable investment that Dubai has made in its aviation sector, together with its openness to other airlines. Through the positive impact that this has had on Dubai's connectivity, we estimate that this policy today contributes US\$2.5 billion in value added to Dubai's economy.

Total impact

Table 1.1 summarises the analysis, by reporting the benefits from each of the channels we have discussed above.

The total economic benefit to Dubai's economy is the sum of the benefits flowing through these five channels. In terms of gross value added, the total benefit was US\$ 22.1 billion in 2010, equivalent to 28% of Dubai's GDP.

⁴ See 'TFP growth and the transport sector: a dynamic industry panel analysis' (1999), by Simon Price.

Of this total, aviation's economic footprint contributed US\$11.7 billion, with the direct, indirect and induced components contributing US\$6.2 billion, US\$3.5 billion and US\$2.0 billion respectively.

Table 1.1: Aviation's contribution to Dubai's GDP and Employment

| 2010 | |
|--|--------------------|
| Panel A: Contribution to GDP (US\$ billion) | |
| Total Contribution to GDP | 22.1 (28%) |
| <i>Comprised of:</i> | |
| (1) Economic Footprint | 11.7 |
| <i>Comprised of :</i> | |
| (1a) Direct | 6.2 |
| (1b) Indirect | 3.5 |
| (1c) Induced | 2.0 |
| (2) Catalytic Benefit | 10.4 |
| <i>Comprised of:</i> | |
| (2a) Tourism | 7.9 |
| (2b) Connectivity | 2.5 |
| Panel B: Contribution to employment (000's) | |
| Total Employment Contribution | 259.0 (19%) |
| <i>Comprised of:</i> | |
| (1) Economic Footprint | 125.1 |
| <i>Comprised of :</i> | |
| (1a) Direct | 58.2 |
| (1b) Indirect | 43.0 |
| (1c) Induced | 23.9 |
| (2) Catalytic Benefit | 133.9 |
| <i>Comprised of:</i> | |
| (2a) Tourism | 133.9 |

Footnote

In brackets are shown aviation's contributions as a proportion of Dubai's GDP and as a proportion of total employment in the Dubai economy.

Catalytic benefit contributed US\$ 10.4 billion to Dubai's GDP. Of this, tourism accounted for US\$ 7.9 billion and connectivity US\$ 2.5 billion.

In total, the aviation sector supported 259,000 jobs in 2010, 19% of total employment in Dubai. Of this total, just over 125,000 are supported through the aviation sector's economic footprint. The jobs supported through the direct, indirect and induced channels are 58,200, 43,000, and 23,900 respectively. The catalytic benefits (tourism) supported a further 125,100 jobs.

Dubai Benefiting Others: Ethiopian Airlines

Ethiopian Airlines is expanding rapidly. In the five years ending in FY2009/10, its passenger numbers increased on average by 15% each year. In FY2009/10

it carried 3.15 million passengers, with direct services to 56 international destinations.

Dubai is a key destination for Ethiopian Airlines. The airline operates approximately 9 services per week to Dubai. Around 8.4% of Ethiopian's passengers fly to Dubai, representing 7.7% of all international passengers who fly to and from Ethiopia.

Dubai offers Ethiopian Airlines a wealth of onward connections. By flying to Dubai, the airline can offer its passengers the benefit of one-stop connections to 85 destinations in the Middle East and Asia. These onward connections are additional to the 17 destinations in these regions that Ethiopian Airlines flies to directly. This significantly improves the connectivity of the services offered by Ethiopian's own flights. Of the 245,000 passengers that flew between Addis Ababa and Dubai 2010, many continued their journey onwards from Dubai, with JFK, Beijing and Shanghai being popular destinations.

These connections also benefit Ethiopia's rapidly expanding economy, which has grown by 7.0% a year over the past five years. The tourism sector accounts for over 4% of Ethiopia's GDP. Over 85% of foreign tourists arrive by air. We calculate that tourists travelling with Ethiopian Airlines through Dubai contribute almost US\$75 million to Ethiopian GDP.

How Dubai's aviation sector creates benefits for global economy and international air travellers

Not only is the success of Dubai's aviation sector good for Dubai's economy, it also benefits the global economy. It promotes global tourism. It creates connections between cities and countries - what we have termed 'connectivity' – which represents an important infrastructure asset that enables the flow of investment and people between countries, the transfer of knowledge and other 'spillover' benefits. Connectivity also benefits air passengers, and through strong competition they benefit from efficient and high-quality air services.

We calculate these economic benefits for the following 10 countries

| | | | | |
|-----------|-----------|--------------|----------------|---------------|
| Australia | Brazil | China | France | Germany |
| India | Mauritius | South Africa | United Kingdom | United States |

which we present in the pages that follow as a series of one page case studies. On each page, the information is organised into five sections.

Background – reports the country's population and GDP, important statistics concerning the country's aviation sector, such as the number of aircraft movements each year and the number of passengers and tonnage of freight carried. It also reports the Airbus and Boeing forecasts for the growth in passenger traffic.

Emirates - provides a snap shot of Emirates presence in each market. It reports the year that Emirates first flew to the country; the number of passengers and the tonnage of freight carried by Emirates, and the share these represented of the total market; the airports Emirates flies to; and the amount Emirates spends in advertising and sponsorship.

Connectivity benefits - reports the country's connectivity expressed as a ratio to its GDP. As we have discussed in the context of Dubai's economy, this ratio is useful when thinking about the spillover benefits that the aviation sector can generate for other sectors of the economy. This ratio indicates whether the connections offered by a country's aviation infrastructure are 'adequate' given the size of the economy.

We base our calculations on Emirates' passenger flows. This simplifies the calculations as it uses Dubai International as its home base. The international benefits arise, however, from Dubai's connectivity. This reflects the connections provided by the services offered by all the airlines that operate from the airport (of which there are currently over 150). As such, our estimates should be interpreted as illustrating the benefits created by the whole of Dubai's aviation sector. The results show how much a country's connectivity index would change without Emirates and if this change alters a country's connectivity ranking.

Consumer benefits - Dubai's aviation sector creates benefits for international air travellers. Strong competition among airlines benefits air travellers by ensuring that air services are efficient, responsive to their needs and that air fares remain competitive.

The fares that air travellers pay for their flights do not necessarily reflect the full value they place on the air services they use. Instead, for many travellers the full value (the maximum they would be willing to pay for the ticket) will typically be above the actual fare. Economists call this additional benefit enjoyed by the consumer, consumer surplus.

Emirates demonstrates competitively priced fares, based on overall market demand and conditions. Strong competition benefits all air travellers through increasing their consumer surplus. For the ten countries we estimate the additional consumer surplus passengers enjoy due to Emirates presence in the market.

Our estimates should be treated as indicative only. For instance, our modelling does not attempt to account for a number of complex issues - for instance, how airlines respond to each others actions, or how they compete on quality of service. We believe our calculations are, however, a useful guide to the potential benefits enjoyed by international air travellers from Emirates presence in the market.

Tourism benefits - estimates the benefit to the tourism industry in each country created through the visitors who fly with Emirates.

We use the travel and tourism data published by the World Travel and Tourism Council (WTTC) for data on the level of foreign visitor spending in each country. We then use mode of transport data from the World Tourism Organisation

(UNWTO) to assign a share of this to the aviation industry and we derive our tourism benefit by attributing part of this aviation share to Emirates based on its share of international passenger traffic to the country. .

AUSTRALIA

Background

Population (2009): 22,165,000
GDP (2009): US\$848.8 billion

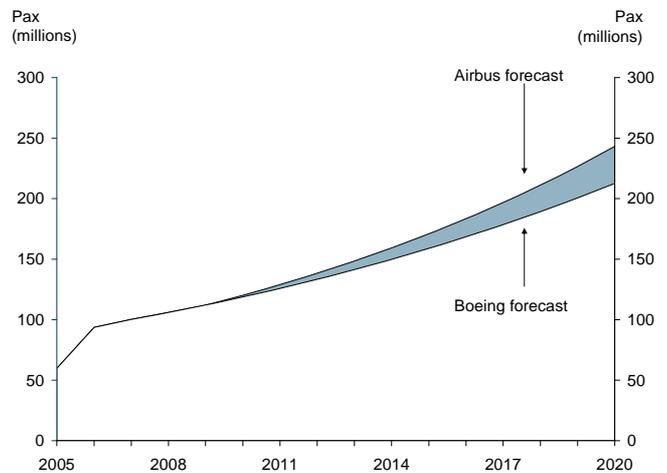
Aviation in 2009

Total international pax: 24,476,536

Forecast growth

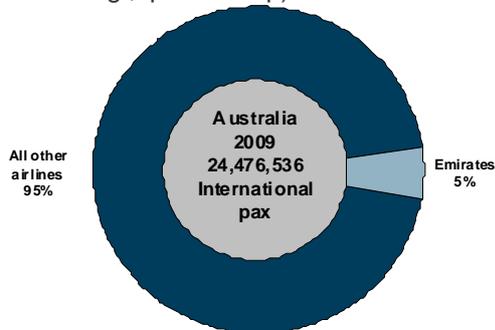
Airbus forecast: 7.3% per annum
Boeing Forecast: 6.0% per annum

Aviation growth forecast: Australia



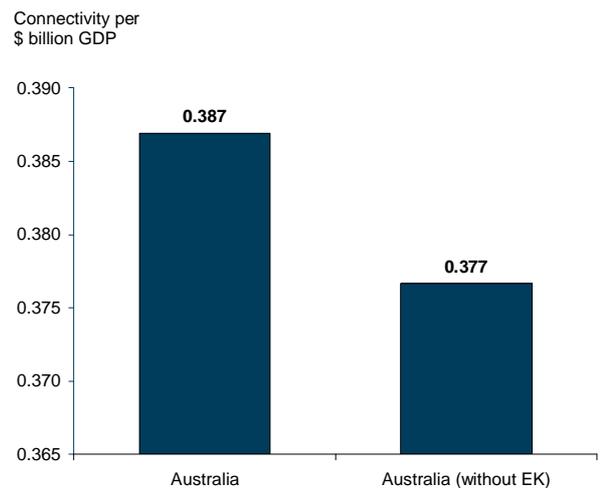
Emirates in Australia

Year of first flight: 1996
Emirates pax to/from Australia in 2009: 1,225,123
Emirates share of international pax: 5.0%
Emirates freight to/from Australia 2009: 31,204 tns
Emirates share of freight: n/a
Airports served by Emirates: Sydney, Melbourne, Brisbane, Perth
Emirates spending in Australia (advertising, sponsorship): US\$39.5m



Connectivity benefits

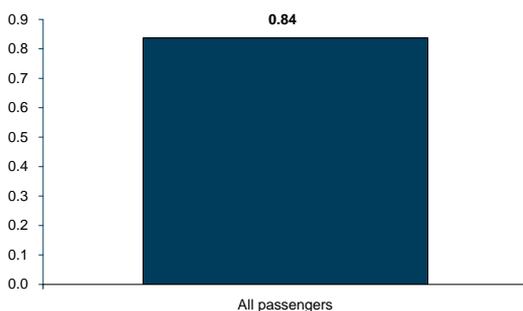
Australia connectivity density index 2009: 0.39
Impact without Emirates on:
- GDP loss: US\$248m



Consumer benefits

Monetary benefit to air travellers: US\$0.84bn

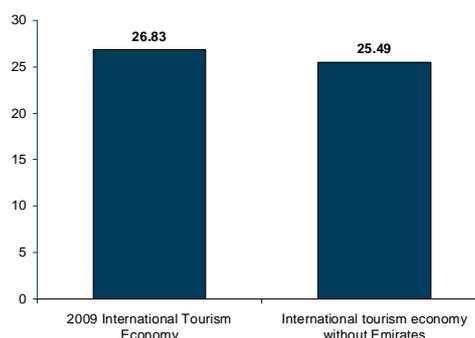
Passenger benefits (\$ billion)



Tourism benefits

2009 International Tourism GDP (including indirect): US\$26.8 bn
Proportion of tourists arriving by air: almost 100%
Tourism GDP due to Emirates: US\$1.33 bn

International Tourism Economy GDP (\$ billion)



BRAZIL

Background

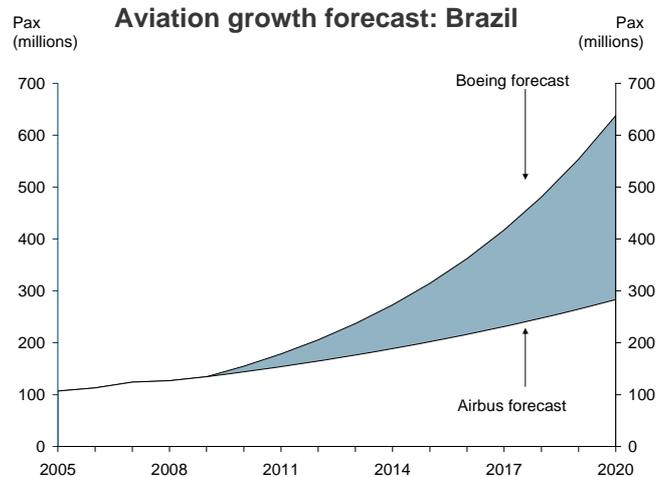
Population (2009): 191,481,000
GDP (2009): US\$2,010 billion

Aviation in 2009

Total international pax: 13,115,010
Total freight: 511,399 tonnes

Forecast growth

Airbus forecast: 7.0% per annum
Boeing Forecast: 15.2% per annum



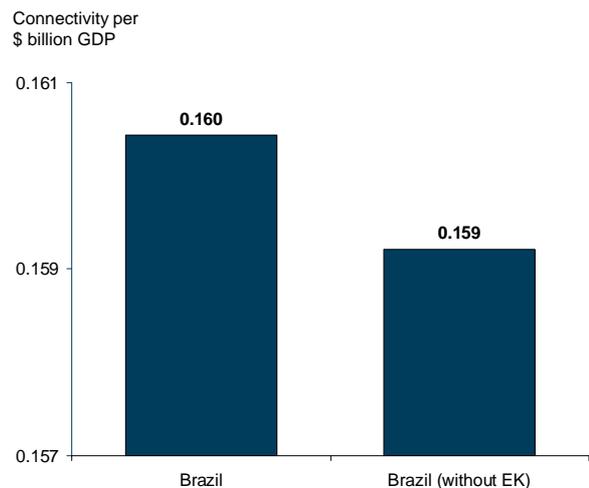
Emirates in Brazil

Year of first flight: 2007
Emirates pax to/from Brazil in 2009: 151,900
Emirates share of international pax: 1.2%
Emirates freight to/from Brazil in 2009: 6,264 tns
Emirates share of freight: 1.2%
Airports served by Emirates: Sao Paulo
Emirates spending in Brazil (advertising, sponsorship): US\$5.4m



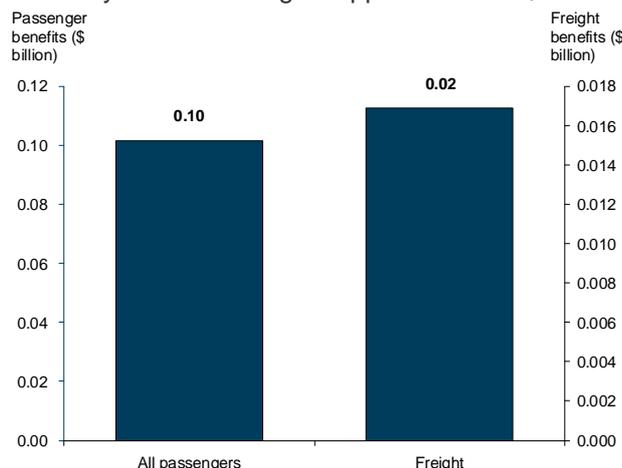
Connectivity benefits

Brazil connectivity density index 2009: 0.16
Impact without Emirates on:
- GDP loss: US\$260m



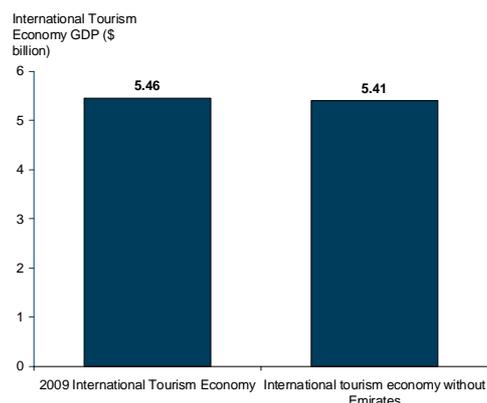
Consumer benefits

Monetary benefit to air travellers: US\$0.1bn
Monetary benefit to cargo shippers: US\$0.02bn



Tourism benefits

2009 International Tourism GDP (including indirect): US\$5.5 bn
Proportion of tourists arriving by air: 74%
Tourism GDP due to Emirates: US\$0.05 bn



CHINA

Background

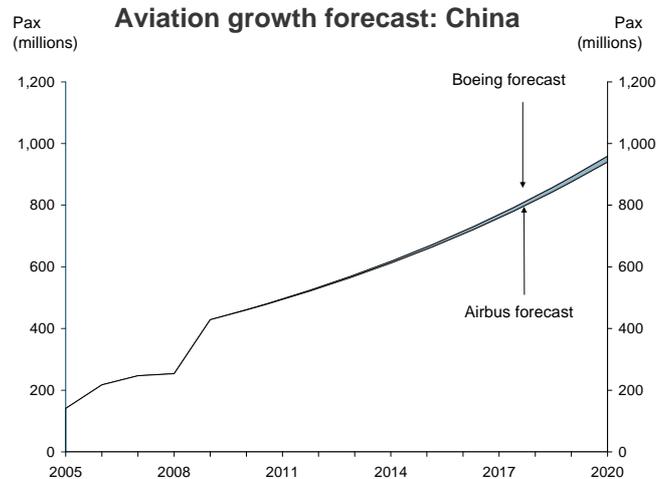
Population (2009): 1,334,740,000
GDP (2009): US\$9,047 billion

Aviation in 2009

Total international pax: 87,214,257
Total freight: 6,277,003 tonnes

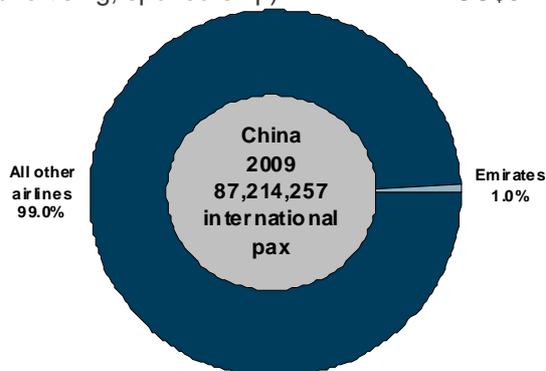
Forecast growth

Airbus forecast: 7.4% per annum
Boeing Forecast: 7.6% per annum



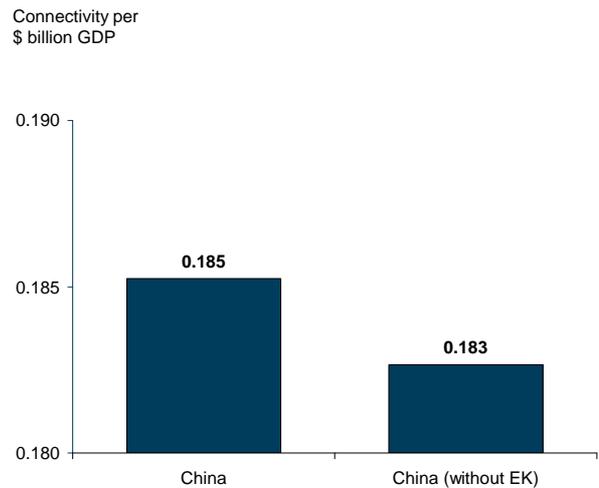
Emirates in China

Year of first flight: 2004
Emirates pax to/from China in 2009: 834,791
Emirates share of international pax: 1.0%
Emirates freight to/from China in 2009: 55,442 tns
Emirates share of freight: 0.9%
Airports served by Emirates: Shanghai, Beijing, Guangzhou
Emirates spending in China: (advertising, sponsorship): US\$8.7m



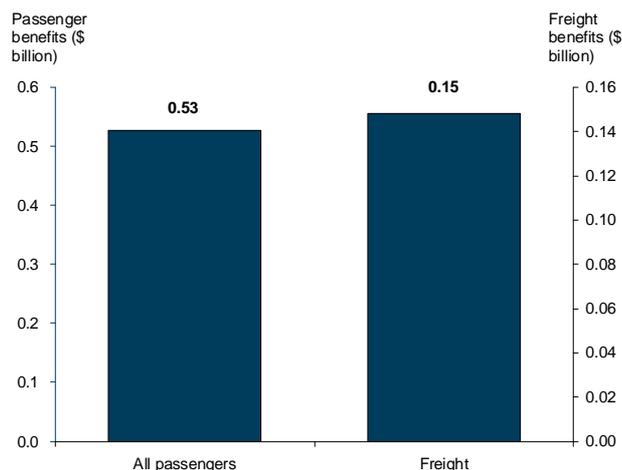
Connectivity benefits

China connectivity density index 2009: 0.19
Impact without Emirates on:
- GDP loss: US\$1.4bn



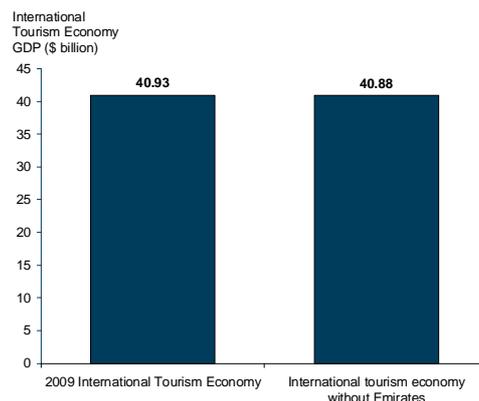
Consumer benefits

Monetary benefit to air travellers: US\$0.53bn
Monetary benefit to cargo shippers: US\$0.15bn



Tourism benefits

2009 International Tourism GDP (including indirect): US\$40.9 bn
Proportion of tourists arriving by air: 13%
Tourism GDP due to Emirates: US\$0.05 bn



FRANCE

Background

Population (2009): 62,610,000
GDP (2009): US\$2,094 billion

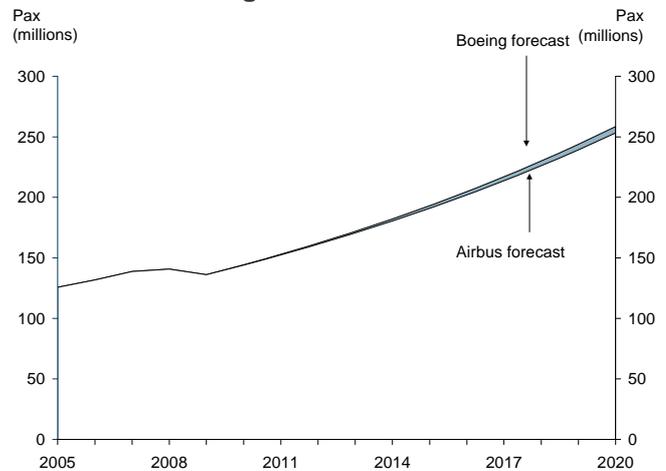
Aviation in 2009

Total international pax: 92,180,491
Total freight: 2,008,542 tonnes

Forecast growth

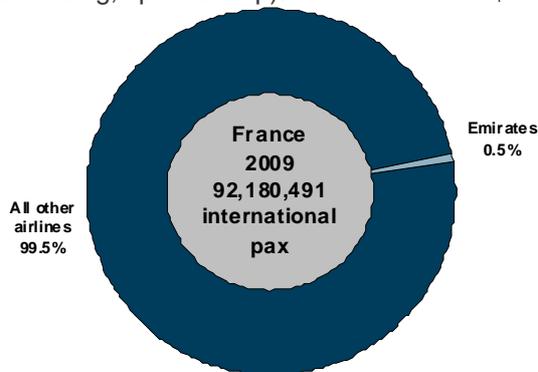
Airbus forecast: 5.8% per annum
Boeing Forecast: 6.0% per annum

Aviation growth forecast: France



Emirates in France

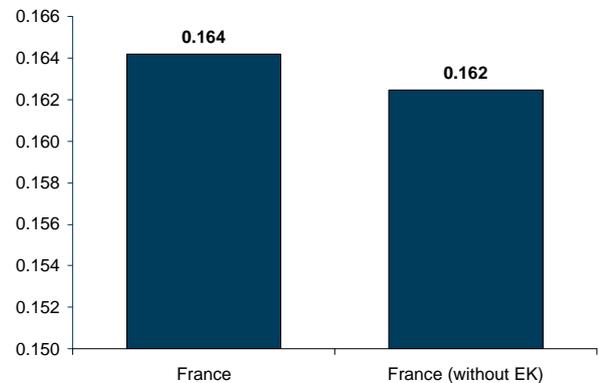
Year of first flight: 1992
Emirates pax to/from France in 2009: 492,562
Emirates share of international pax: 0.5%
Emirates freight to/from France in 2009: 28,469 tns
Emirates share of freight: 1.4%
Airports served by Emirates: Paris – Charles de Gaulle, Nice
Emirates spending in France: (advertising, sponsorship): US\$10.9m



Connectivity benefits

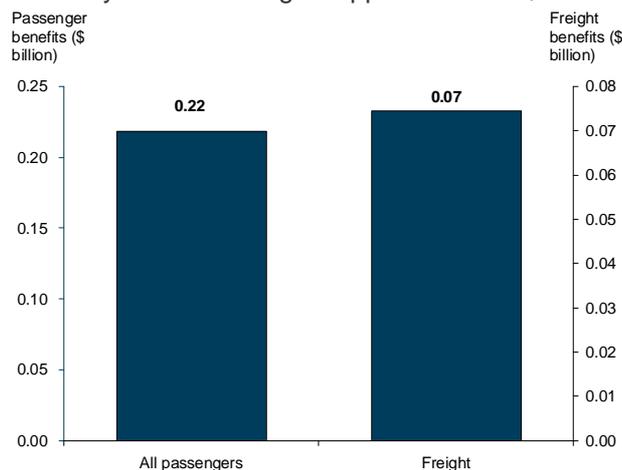
France connectivity density index 2009: 0.16
Impact without Emirates on:
- GDP loss: US\$244m

Connectivity per \$ billion GDP



Consumer benefits

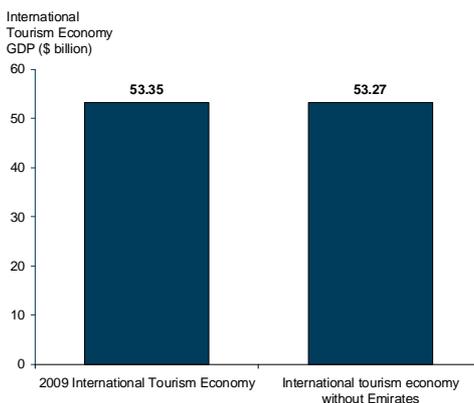
Monetary benefit to air travellers: US\$0.22bn
Monetary benefit to cargo shippers: US\$0.07bn



Tourism benefits

2009 International Tourism GDP (including indirect): US\$53.3 bn

Proportion of tourists arriving by air: 28%
Tourism GDP due to Emirates: US\$0.08 bn



GERMANY

Background

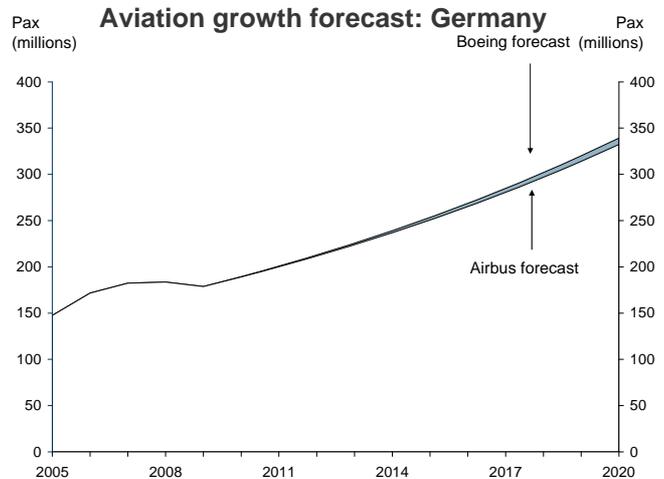
Population (2009): 81,802,000
GDP (2009): US\$2,812 billion

Aviation in 2009

Total international pax: 130,576,488
Total freight: 3,162,626

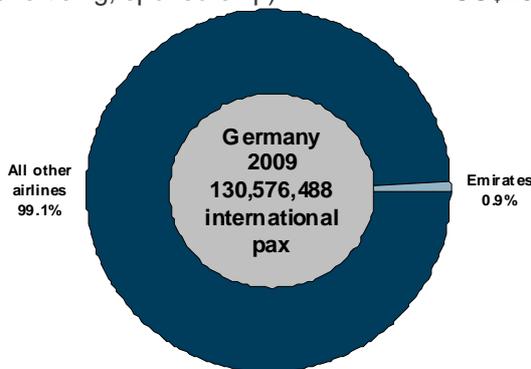
Forecast growth

Airbus forecast: 5.8% per annum
Boeing Forecast: 6.0% per annum



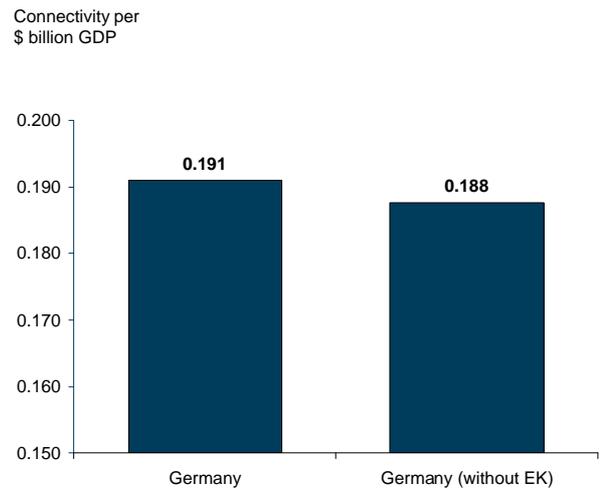
Emirates in Germany

Year of first flight: 1987
Emirates pax to/from Germany in 2009: 1,202,204
Emirates share of international pax: 0.9%
Emirates freight to/from Germany 2009: 96,457 tns
Emirates share of freight: 3.1%
Airports served by Emirates: Frankfurt, Munich, Dusseldorf, Hamburg
Emirates spending in Germany: (advertising, sponsorship): US\$28.3m



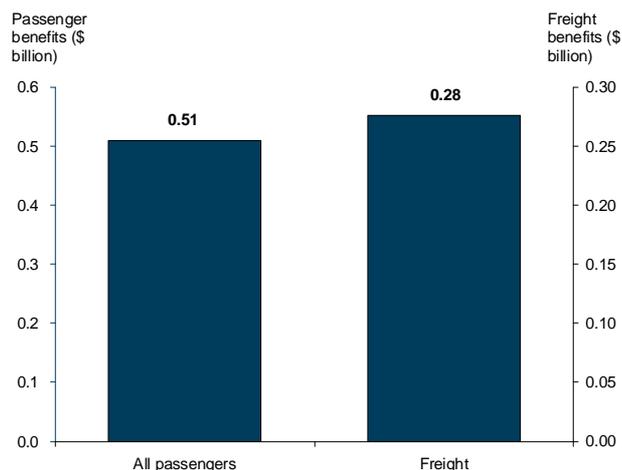
Connectivity benefits

Germany connectivity density index 2009: 0.19
Impact without Emirates on:
- GDP loss: US\$551m



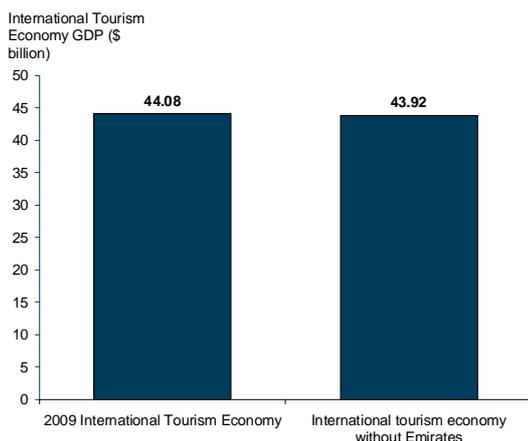
Consumer benefits

Monetary benefit to air travellers: US\$0.51bn
Monetary benefit to cargo shippers: US\$0.28bn



Tourism benefits

2009 International Tourism GDP (including indirect): US\$44.1 bn
Proportion of tourists arriving by air: 38%
Tourism GDP due to Emirates: US\$0.16 bn



INDIA

Background

Population (2008): 1,154,000,000
GDP (2009): US\$3,615 billion

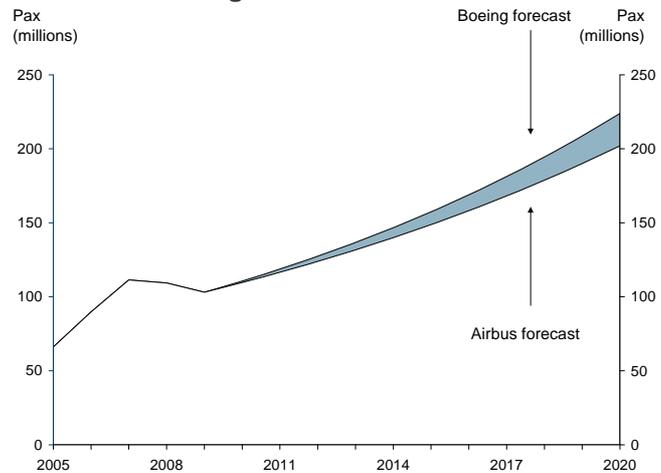
Aviation in 2009

Total international pax: 31,191,631
Total freight: 1,190,881 tonnes

Forecast growth

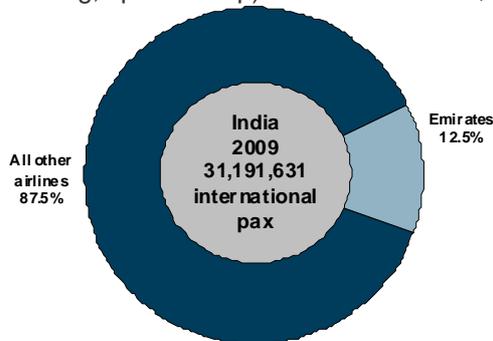
Airbus forecast: 6.3% per annum
Boeing Forecast: 7.3% per annum

Aviation growth forecast: India



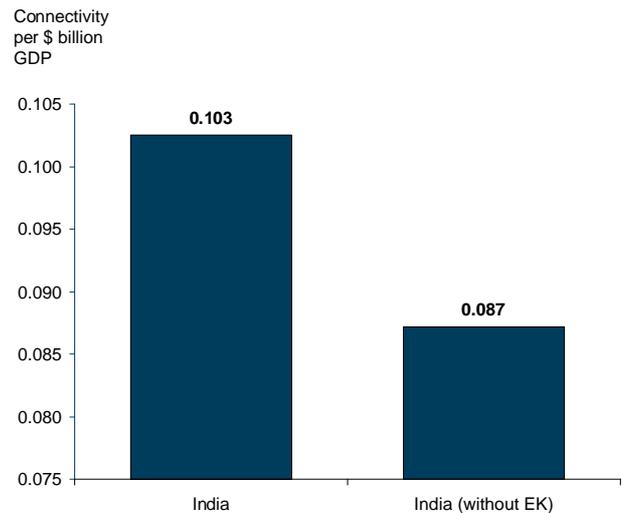
Emirates in India

Year of first flight: 1985
Emirates pax to/from India in 2009: 3,901,206
Emirates share of international pax: 12.5%
Emirates freight to/from India in 2009: 161,164 tns
Emirates share of freight: 13.5%
Airports served by Emirates: Mumbai, Ahmedabad, Bengaluru, Chennai, Delhi, Hyderabad, Kochi, Kolkata, Kozhikode, Thiruvananthapuram
Emirates spending in India (advertising, sponsorship): US\$18.2m



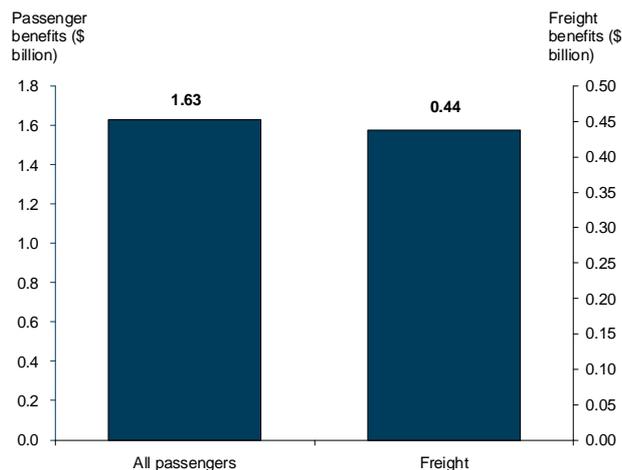
Connectivity benefits

India connectivity density index 2009: 0.10
Impact without Emirates on:
- GDP loss: US\$612m



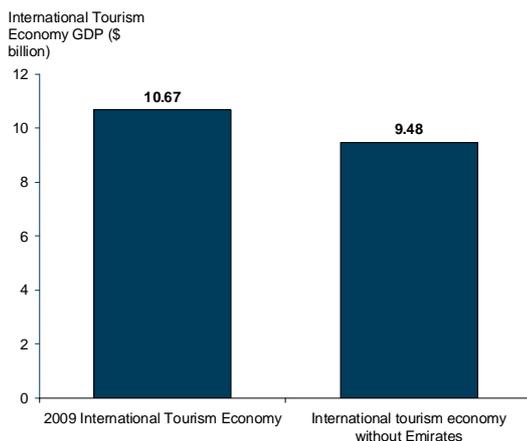
Consumer benefits

Monetary benefit to air travellers: US\$1.63bn
Monetary benefit to cargo shippers: US\$0.44bn



Tourism benefits

2009 International Tourism GDP (including indirect): US\$10.7 bn
Proportion of tourists arriving by air: 89%
Tourism GDP due to Emirates: US\$1.2 bn



MAURITIUS

Background

Population (2009): 1,288,000
GDP (2009): US\$16.32 billion

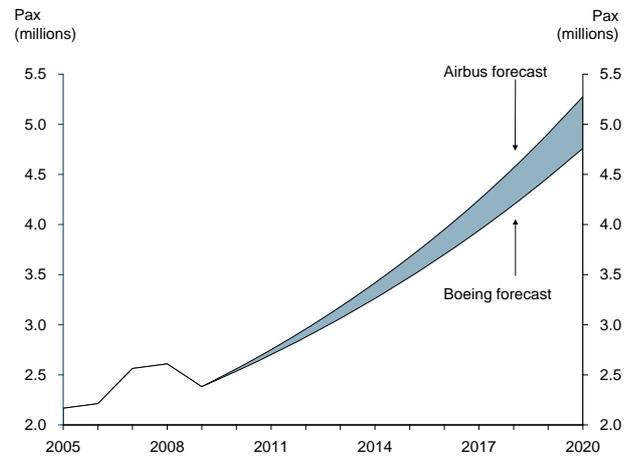
Aviation in 2009

Total international pax: 2,291,000

Forecast growth

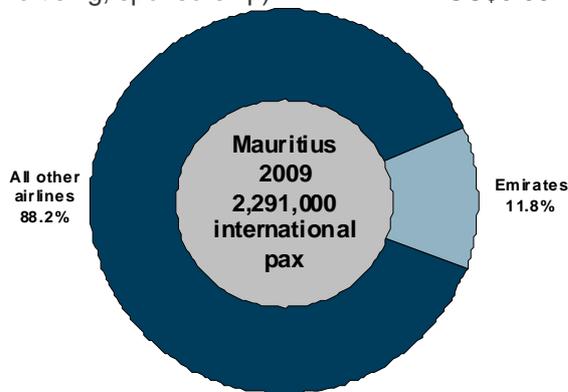
Airbus forecast: 7.5% per annum
Boeing Forecast: 6.5% per annum

Aviation growth forecast: Mauritius



Emirates in Mauritius

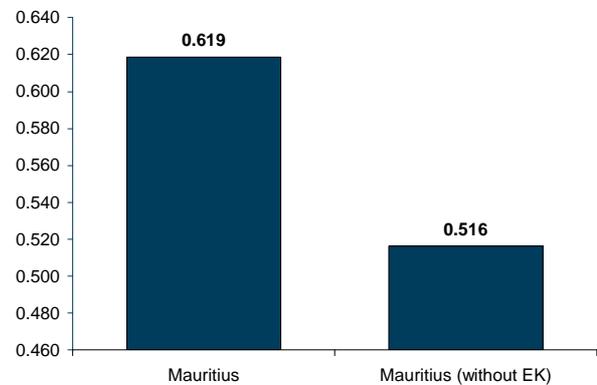
Year of first flight: 2002
Emirates pax to/from Mauritius in 2009: 269,538
Emirates share of international pax: 11.8%
Emirates freight to/from Mauritius 2009: 5,091 tns
Emirates share of freight: n/a
Airports served by Emirates: SRR
Emirates spending in Mauritius (advertising, sponsorship): US\$0.66m



Connectivity benefits

Mauritius connectivity density index 2009: 0.62
Impact without Emirates on:
- GDP loss: US\$30m

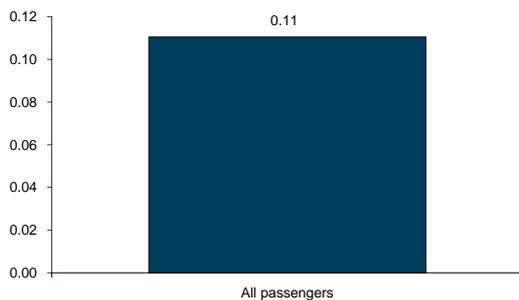
Connectivity per \$ billion GDP



Consumer benefits

Monetary benefit to air travellers: US\$0.11bn

Passenger benefits (\$ billion)

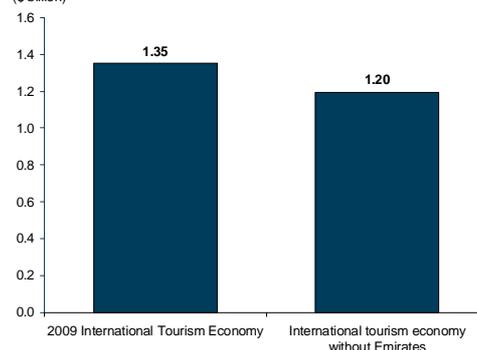


Tourism benefits

2009 International Tourism GDP (including indirect): US\$1.4 bn

Proportion of tourists arriving by air: 97%
Tourism GDP due to Emirates: US\$0.2 bn

International Tourism Economy GDP (\$ billion)



SOUTH AFRICA

Background

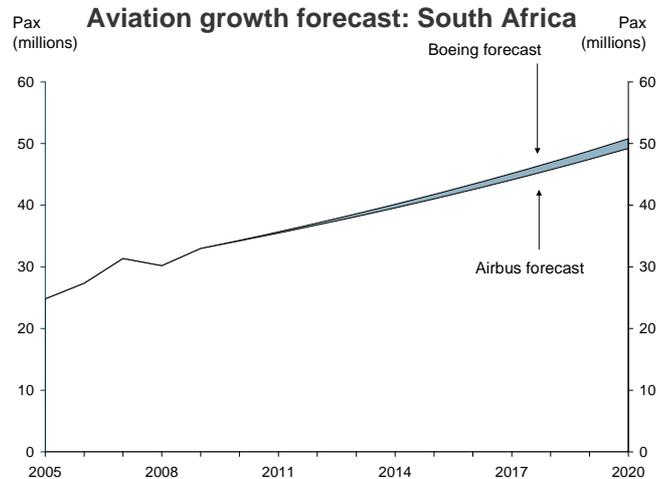
Population (2009): 49,464,000
GDP (2009): US\$504.5 billion

Aviation in 2009

Total international pax: 9,636,546
Total freight: 231,885 tonnes

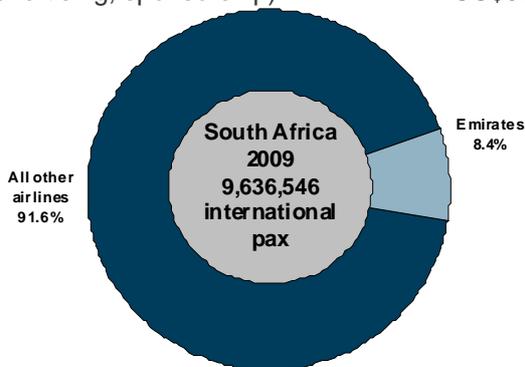
Forecast growth

Airbus forecast: 3.7% per annum
Boeing Forecast: 4.0% per annum



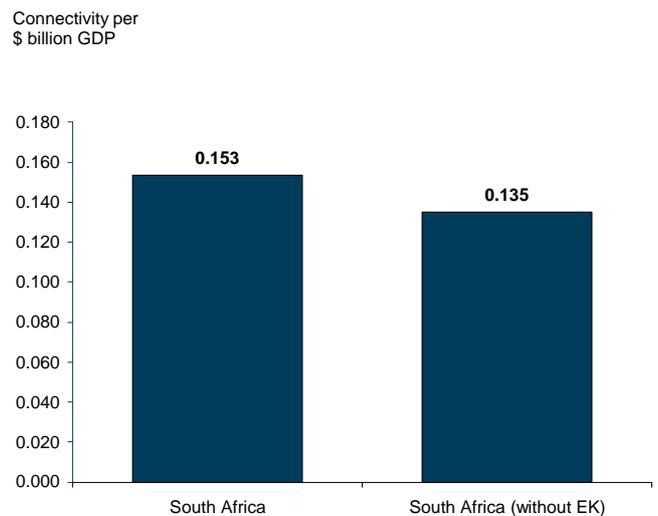
Emirates in South Africa

Year of first flight: 1995
Emirates pax to/from South Africa 2009: 807,799
Emirates share of international pax: 8.4%
Emirates freight to/from South Africa '09: 34,075 tns
Emirates share of freight: 14.7%
Airports served by Emirates: Johannesburg, Cape Town, Durban
Emirates spending in South Africa: (advertising, sponsorship): US\$8.4m



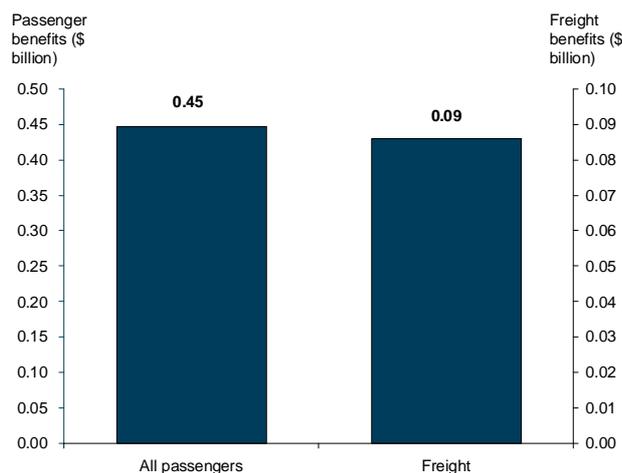
Connectivity benefits

South Africa connectivity density index 2009: 0.15
Impact without Emirates on:
- GDP loss: US\$101m



Consumer benefits

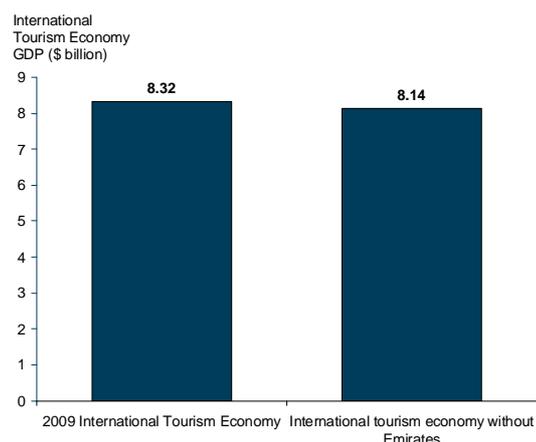
Monetary benefit to air travellers: US\$0.45bn
Monetary benefit to cargo shippers: US\$0.09bn



Tourism benefits

2009 International Tourism GDP (including indirect): US\$8.3 bn

Proportion of tourists arriving by air: 27%
Tourism GDP due to Emirates: US\$0.2 bn



UNITED KINGDOM

Background

Population (2009): 61,595,000
GDP (2009): US\$2.125 billion

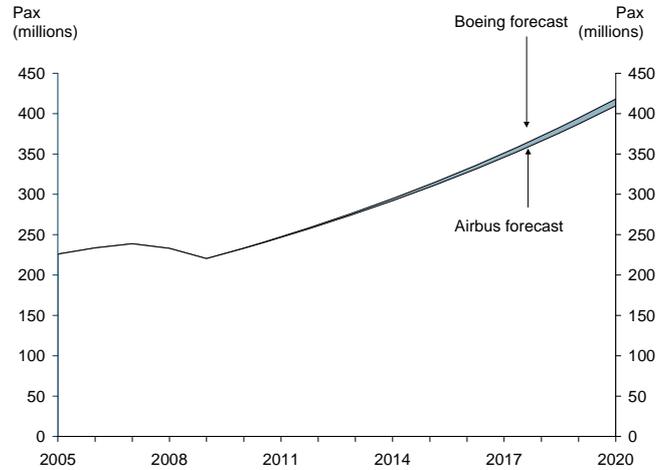
Aviation in 2009

Total international pax: 175,876,897
Total freight: 1,955,254 tonnes

Forecast growth

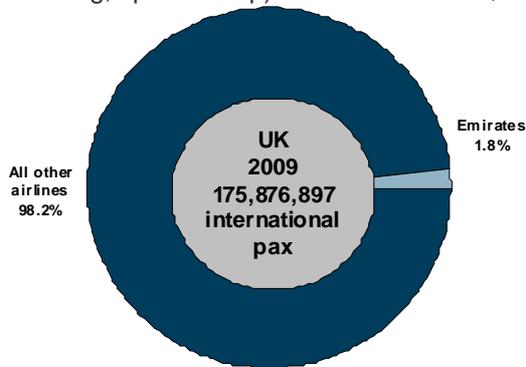
Airbus forecast: 5.8% per annum
Boeing Forecast: 6.0% per annum

Aviation growth forecast: UK



Emirates in UK

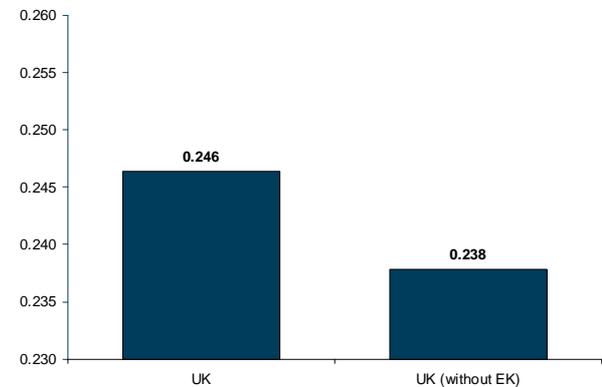
Year of first flight: 1987
Emirates pax to/from UK in 2009: 3,111,212
Emirates share of international pax: 1.8%
Emirates freight to/from UK in 2009: 100,525 tns
Emirates share of freight: 5.1%
Airports served by Emirates: Heathrow, Gatwick, Manchester, Newcastle, Glasgow, Birmingham
Emirates spending in UK (advertising, sponsorship): US\$42.5m



Connectivity benefits

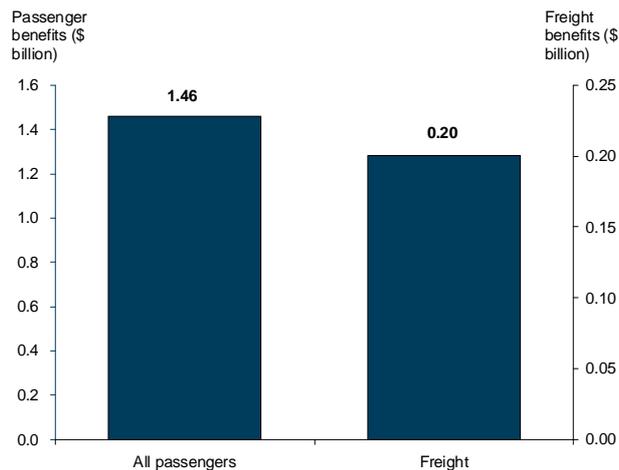
UK connectivity density index 2009: 0.25
Impact without Emirates on:
- GDP loss: US\$812m

Connectivity per \$ billion GDP



Consumer benefits

Monetary benefit to air travellers: US\$1.46bn
Monetary benefit to cargo shippers: US\$0.20bn

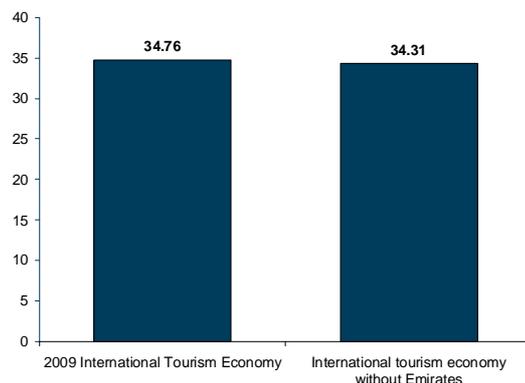


Tourism benefits

2009 International Tourism GDP (including indirect): US\$34.8bn

Proportion of tourists arriving by air: 74%
Tourism GDP due to Emirates: US\$0.45bn

International Tourism Economy GDP (\$ billion)



UNITED STATES

Background

Population (2009): 306,656,000
GDP (2009): US\$14,119 billion

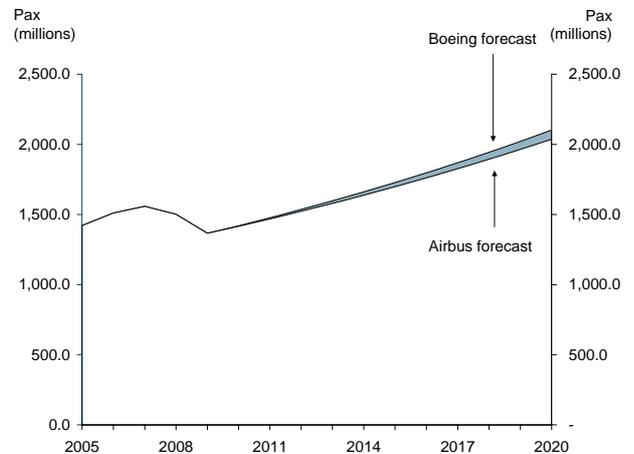
Aviation in 2009

Total international pax: 149,817,574
Total freight: 6,974,087 tonnes

Forecast growth

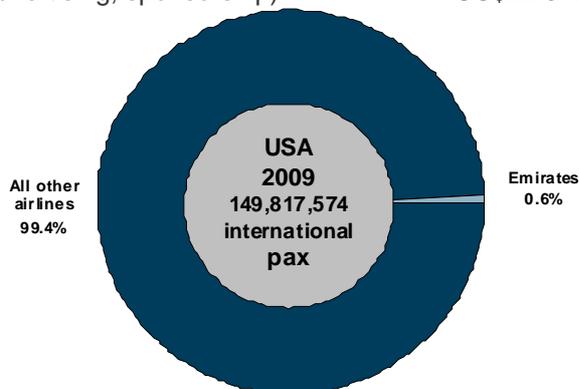
Airbus forecast: 3.7% per annum
Boeing Forecast: 4.0% per annum

Aviation growth forecast: USA



Emirates in USA

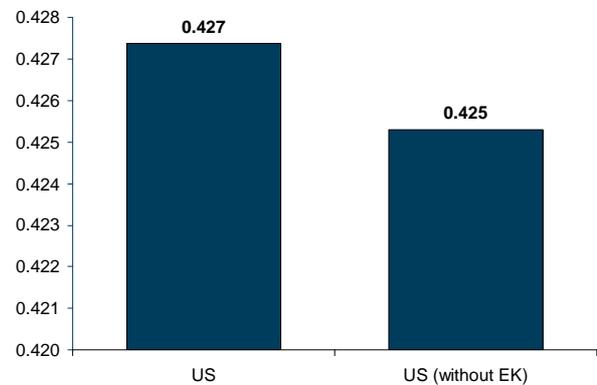
Year of first flight: 2004
Emirates pax to/from USA in 2009: 838,016
Emirates share of international pax: 0.6%
Emirates freight to/from USA in 2009: 28,694 tns
Emirates share of freight: 0.4%
Airports served by Emirates: New York (JFK), Los Angeles, Houston, San Francisco
Emirates spending in USA (advertising, sponsorship): US\$22.3m



Connectivity benefits

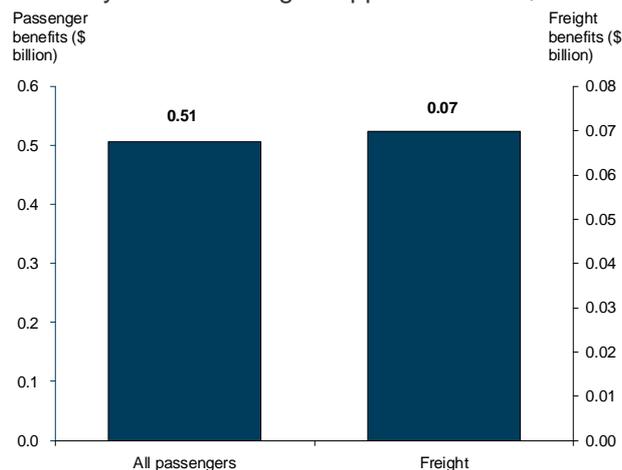
US connectivity density index 2009: 0.43
Impact without Emirates on:
- GDP loss: US\$758m

Connectivity per \$ billion GDP



Consumer benefits

Monetary benefit to air travellers: US\$0.51bn
Monetary benefit to cargo shippers: US\$0.07bn



Tourism benefits

2009 International Tourism GDP (including indirect): US\$136.4bn
Proportion of tourists arriving by air: 55%
Tourism GDP due to Emirates: US\$0.42 bn

Tourism Economy GDP (\$ billion)

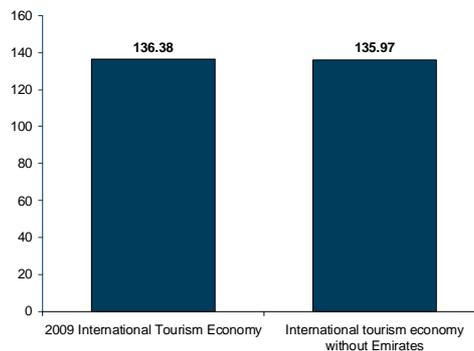


Table of Sources used in Section 3

| Data | Source | Notes |
|--|--|--|
| <i>Background</i> | | |
| Population | National Statistics Agencies / Haver Analytics | |
| GDP | IMF <i>World Economic Outlook</i> | Expressed in US\$ Purchasing Parity terms |
| Aircraft Movements | Airports Council International <i>Airport Traffic Report 2009</i> | |
| International Pax | Airports Council International <i>Airport Traffic Report 2009</i> | There may be some slight differences between market share data derived from ACI Airport Traffic Report compared to local market data sources - but the former was used for consistency among the ten country case studies. |
| Total Freight | Airports Council International <i>Airport Traffic Report 2009</i> | See above |
| Airport statistics | Airports Council International <i>Airport Traffic Report 2009</i> | See above |
| <i>Forecasts</i> | | |
| Airbus | Boeing <i>Current Market Outlook</i> (www.boeing.com/commercial/cmo/) | |
| Boeing | Airbus <i>Global Market Forecast 2010</i> (www.airbus.com/company/market/gmf2010/) | |
| <i>Emirates in ...</i> | | |
| Year of first flight | Emirates | |
| Emirates pax | Emirates | |
| Emirates freight | Emirates | |
| Emirates spending | Emirates | |
| <i>Connectivity benefits</i> | | |
| Connectivity density index | International Air Transport Association | |
| GDP loss | | Calculated using Oxford Economics' estimate of elasticity of GDP to aviation connectivity, See 'TFP growth and the transport sector: a dynamic industry panel analysis', 1999, by Simon Price. |
| <i>Consumer Benefits</i> | | |
| Customer benefits | | The benefit received by all international passengers. Calculated using demand elasticities reported in 'Estimating Air Travel Demand Elasticities', Intervistas Consulting, 2007. |
| <i>Tourism benefits</i> | | |
| Tourism GDP | Oxford Economics | |
| Proportion of tourists arriving by air | UN World Tourism Organisation | |

2 What factors account for the success of Dubai's aviation sector?

Key points

- The success of Dubai's aviation sector derives from a number of strengths. These strengths include:
- The Dubai Government demonstrates an awareness of the importance of aviation for enabling growth in key sectors of Dubai's economy. This is apparent in Dubai's strategic plan and also manifests itself in decision making that is consensus based, timely and effective.
- Dubai favours open competition among airlines. This openness is reflected in the large number of airlines that operate out of Dubai International (currently over 150); Dubai's liberal aviation policy that has pushed for greater freedoms for all airlines to enable them to operate without undue restrictions on their commercial decisions; and competitive airport charges.
- A consensus based approach to investment that has helped Dubai Airports and Emirates expand together, supporting each other's growth.
- A focus on growth and underserved markets that has enabled the airport to increase the number of passengers it handles from 12 million to 47 million over the past decade.

Introduction

Given the benefits that Dubai's aviation sector creates for Dubai, it is natural to ask what factors underlie this success. In this section we identify four key strengths which are the product of strategic decisions that the government of Dubai and the aviation sector have taken in the past. These strengths are:

- awareness of aviation's economic importance on the part of the government of Dubai;
- an aviation policy that favours open competition among airlines;
- a consensus based approach to investment; and
- a focus on growth and underserved markets.

We look at each of these strengths in turn.

The government's role in Dubai's economic development

The government has played a leading role in Dubai's economic development. This is recognised in Dubai's Strategic Plan to 2015, announced by HH Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai in February 2007. The Plan explains the principles guiding economic development initiatives and the key sectors where its initiatives will be focused. The plan identifies transport infrastructure as a priority area for public investment ("world-class infrastructure designed to suit the requirements of all users"), and its guiding principles for economic development: the adoption of free market economy principles, innovation in launching initiatives, speed and accuracy in project execution and unique relationship and partnership with the private sector.

The importance of the partnership between the government and the aviation sector was emphasised during interviews with key stakeholders in the aviation sector. They describe the relationship as a consensus-based partnership that allows important decisions to be made quickly and carried through effectively, enabling the industry to successfully adapt to the almost four-fold increase in the number of passengers travelling through Dubai over the past decade. Stakeholders attributed the success of the partnership to the government's awareness of the importance of aviation to Dubai's economy and the shared vision provided by the Strategic Plan. They also pointed to the small number of parties involved, which allows decisions to be reached quickly.

The Strategic Plan emphasises the importance of the free market. In the aviation sector this is reflected, for instance, in the decision to run Emirates as a standalone company that operates without financial assistance from the government (see page 53). Free markets depend on open competition. The commitment to openness is seen in the number of airlines operating out of Dubai International (currently over 150), its competitive landing charges (see page 41), its pursuit of open skies agreements (see page 35), and the government commitment to provide the necessary airport infrastructure to serve the interests of all airlines and passengers (see page 55).

Ownership of Dubai Airports and Emirates

The government ownership of key aviation organisations is shown in the attached organisational chart (Figure 2.1).

Dubai Airports manages and operates Dubai International (together with the recently opened Dubai World Central). Both airports are directly owned by the government of Dubai.

Several key organisations are owned indirectly by the government through the Investment Corporation of Dubai (ICD). The Emirates Group owns a number of aviation-related businesses such as Emirates (airline) and dnata, the ground handling company. The Group also owns a number of other smaller aviation-related businesses as well as interests in hotels, leisure and tourism.

The ICD also owns Dubai Duty Free which is housed at Dubai International but is run as a separate business to the airport.

Air regulation for Dubai is undertaken by Dubai's Civil Aviation Authority in association with the UAE's General Civil Aviation Authority.

Dubai Benefiting Others: Royal Brunei Airlines

Royal Brunei Airlines is Brunei's home carrier, wholly owned by the government of Brunei and based at Brunei International Airport. With a fleet size of 10 aircraft, Royal Brunei transports its passengers to 18 destinations around the world.

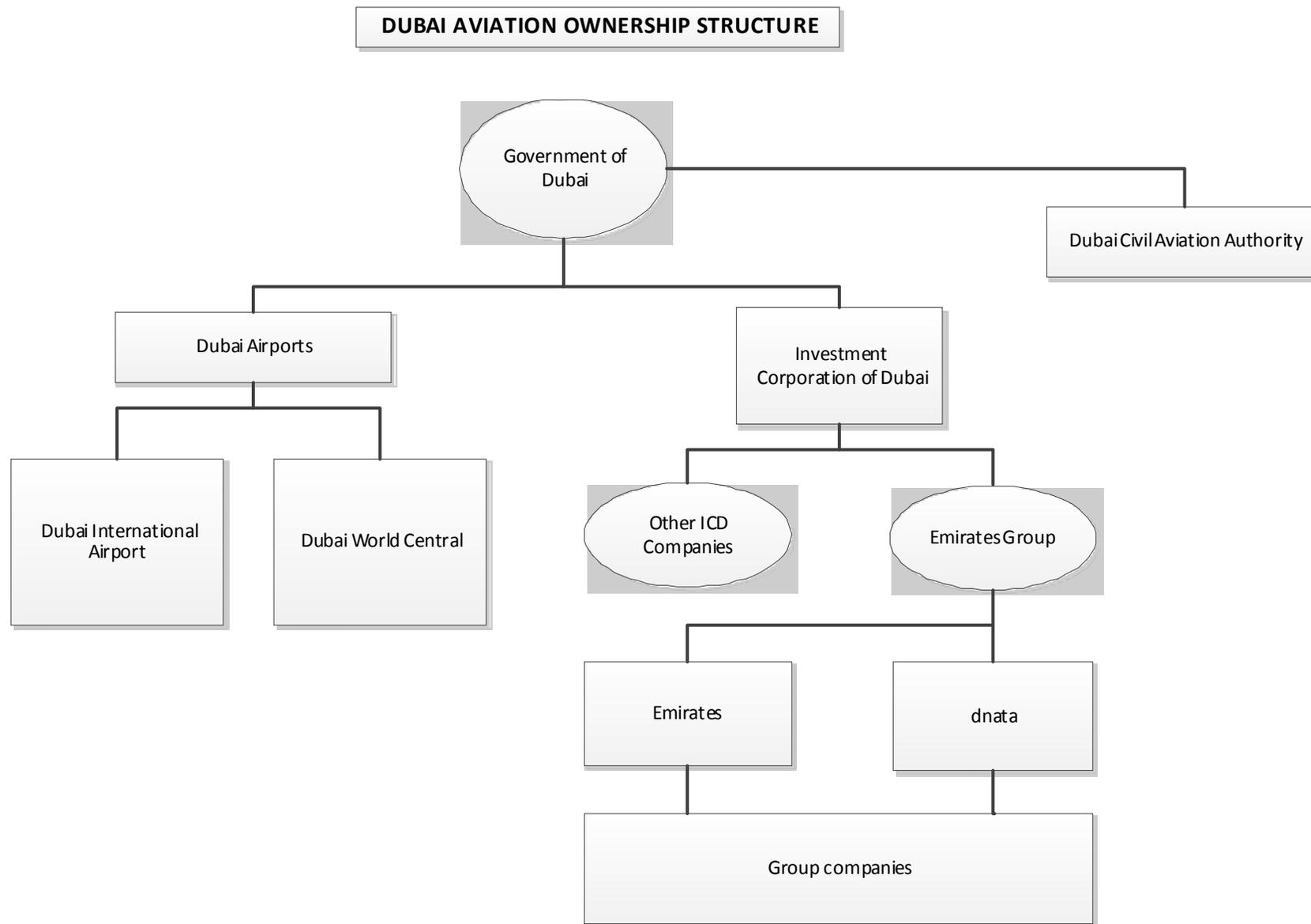
Dubai is a key network airport for Royal Brunei Airlines. In 2009, around 15% of Royal Brunei's passengers flew to Dubai, representing 12.8% of all international passengers who fly to and from Brunei.

Dubai also provides important onward connections for Royal Brunei. The London-Brunei connection is of particular importance to the airline and its passengers. Exercising their 5th freedom rights, Dubai provides Royal Brunei with an invaluable refuelling post to continue their journey on to their final destination.

These connections also benefit the economy, opening Brunei to visitors from around the world. When only considering the impact of foreign visitors, tourism accounts for approximately 2.4% of Brunei's GDP. We calculate that tourists travelling with Royal Brunei through Dubai contribute approximately US\$2.5million to the Brunei economy.

Another way to gauge Royal Brunei's importance to Brunei's economy is simply to compare its passenger traffic with Brunei's population. In 2009, the airline carried 1 million passengers (uplifted and discharged), over twice the number of Brunei's population of approximately 400,000.

Figure 2.1 : Dubai's aviation ownership structure



While owned by the government of Dubai through the ICD, Emirates itself publishes annual reports which include audited financial statements.⁵ The financial statements show that the company is neither supported through government subsidies nor receives capital injections from the government.⁶ As the company's sole shareholder, the ICD receives dividends from the company which it pays out of its operating profits. Since 2002, for instance, Emirates has paid dividends to the ICD every year. These dividend payments have totalled US\$1.6 billion, equivalent to an average payment of US\$176 million each year.

Openness

Dubai has a very liberal aviation policy.⁷ This liberal policy has two distinct but mutually supporting aspects.

Dubai favours open competition among airlines. There are currently over 150 airlines that operate out of Dubai International, benefiting from its infrastructure and competitive landing charges. Moreover, Emirates, while government owned, is operated as a fully commercial and profitable organisation. In many countries, however, competition among airlines is distorted through government regulations and taxation (whether intentionally or not).

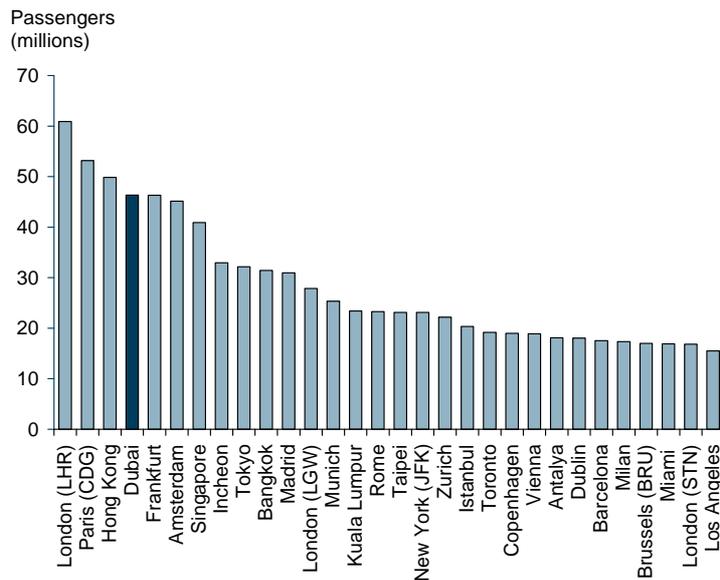
Second, Dubai's Civil Aviation Authority, working with its UAE equivalent (the General Civil Aviation Authority) has pushed for greater freedoms for airlines to enable them to operate without undue restrictions on their commercial decisions. The main obstacle to this is restrictive air access rights elsewhere and Dubai through its civil aviation authorities has sought to improve this situation through negotiation with other governments.

⁵ The financial statements are audited by PriceWaterhouseCoopers a leading international accountancy firm.

⁶ Emirates was launched in 1985. The government of Dubai provided US\$10 million, of seed capital together with two B727-200 aircraft and buildings that housed Emirates Training College. That year, the company leased two further aircraft from Pakistan International Airlines.

⁷ Dubai's approach to aviation sector – in particular its openness and its efficient operations – are sometimes referred to as its "Open Skies" policy.

Chart 2.1: The 30 largest international airports ^(a)

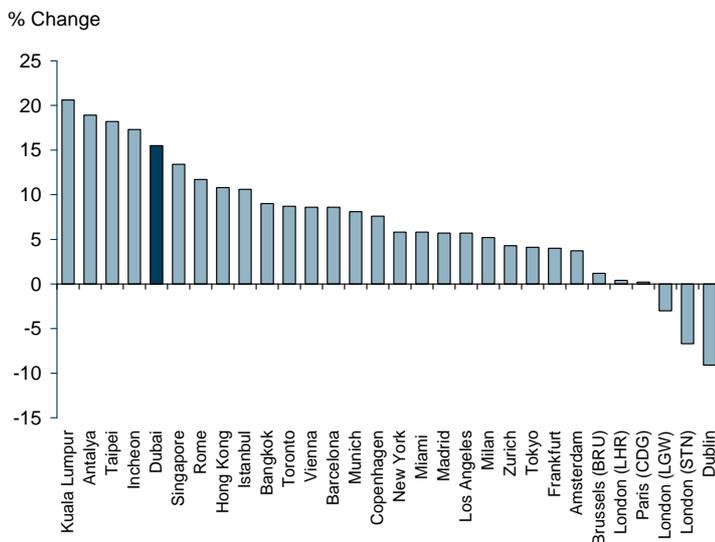


Source: ACI

(a) Airports ranked according to the number of international passengers handled in the 12 months ending December 2010.

Today Dubai International is one of the world's largest airports. Chart 2.1 shows the 30 largest airports by international passenger volume in 2010. Dubai is the 4th busiest airport in terms of international passenger traffic, behind London Heathrow, Charles De Gaulle (Paris), and Hong Kong.

Chart 2.2: Growth among the world's 30 largest international airports ^(a)



Source: ACI

(a) Percentage growth rate in international passengers in the 12 month ending December 2010

Although having become one of the world's largest airports, it continues to grow strongly. Chart 2.2 shows that in the 12 months to December 2010, Dubai airport is the fifth fastest growing airport, behind only Kuala Lumpur, Antalya, Taipei and Incheon.

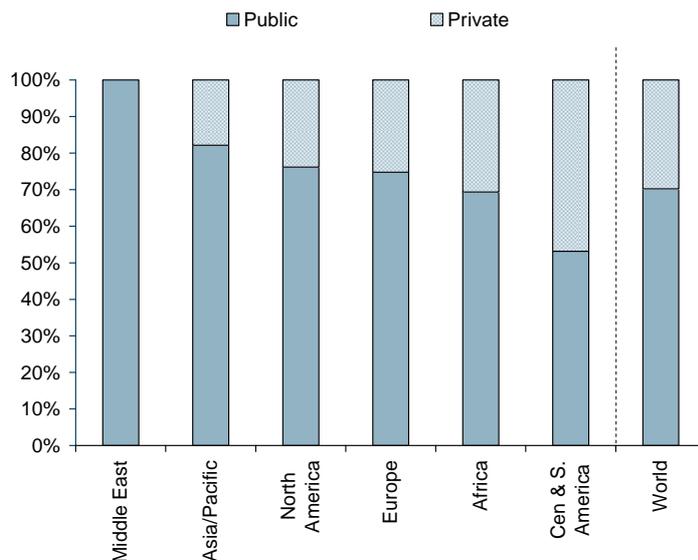
Airport ownership around the world

Across the world, it is very common for airports to be owned and run by publicly owned organisations. The extent of public ownership of the world's airlines is revealed in two recent reports.

ICAO Study

The first of these studies was carried out in 2007 by the International Civil Aviation Authority (ICAO). It covered almost 600 airports located across the world.⁸

Chart 2.3: Airport ownership in 2007



Source: ICAO

The report's findings are presented in Chart 2.3. According to the ICAO study, seven out of ten airports are publicly owned. The study found that a clear majority of airports are under public ownership for the majority of regions. Public ownership is most common in the Middle East, followed by Asia-Pacific, North America, Europe and Africa. Only in Central and South America was public ownership not dominant, where just over half of airports are publicly owned.

The study distinguished between direct public ownership – as is the case with Dubai – and indirect ownership. Indirect ownership is where the airport is operated by an organisation that has operational independence (autonomous), but which is ultimately owned by the government. The study found that around a half of airports in public ownership were operated by an autonomous organisation.

The ICAO study also looked at airport concessions, where a private sector airport operator is given the right to operate an airport for a given term, while ownership remains with either central or local government. Towards the end of the operation term, the concession is usually put to a competitive tender; and if the current operator wishes to retain its rights to operate the airport, it has to compete against

⁸ 'Ownership, Organization and Regulatory Practices of Airports and Air Navigation Services Providers, 2007', ICAO, (2008).

rival bidders. Over a quarter of airports were operated under this type of arrangement.

Less common are joint ventures between the public and private sectors and other initiatives towards partial privatisation. The exception is Europe where the ICAO found one in ten airports was partially privatised. This was examined further in a study of European airports conducted by the Airport Council International (ACI) which we turn to next.

ACI Study

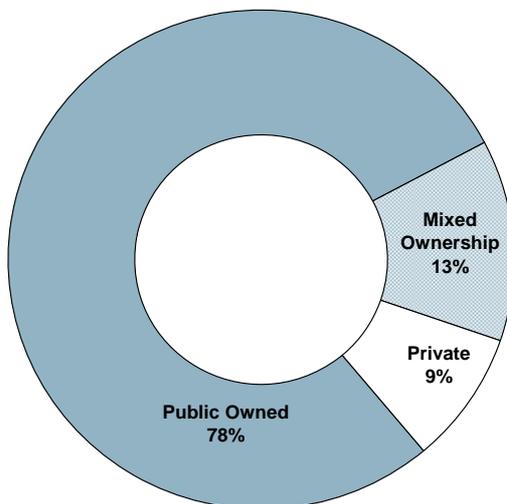
The ACI study, carried out in 2010, covered 404 airports across Europe.⁹

The study's findings are shown in Chart 2.4. Similar to the ICAO study, the ACI found that an overwhelming majority of airports are in public ownership. ACI's report found that almost eight out of ten airports were in full public ownership.

The remaining 13% of airports were in some form of mixed ownership. This group was almost equally split between those where the majority interest lay with public organisations and those ventures where private companies had the majority interest. A very small number of airports were run as joint ventures where public and private had equal stakes in the venture.

Less than one in ten airports was in full private ownership. With controlling interests (meaning greater or equal to 50% interest) taken into account, the private sector controls just over 15% of airports in Europe.

Chart 2.4: Airport ownership in Europe 2010



Source: ACI Europe

⁹ ACI Europe (2010) "The Ownership of Europe's Airports".

Dubai Benefiting Others: China Southern

China's largest airline, China Southern is expanding rapidly. In 2009, it carried approximately 66.3 million passengers – more than twice the number of passengers recorded just 5 years previously. This made it the 6th largest airline in the world, and the largest outside of the US, measured by the number of passengers carried.

Regardless of the metric used, the numbers are impressive. With a fleet size numbering more than 420 aircraft. A key destination within its network is Dubai, China Southern has significant point to point traffic with Dubai. In 2010, it carried approximately 200,000 passengers to and from Dubai, representing an increase of nearly 40% on the previous year.

Dubai provides China Southern with an invaluable staging post. With transit passengers accounting for 7% of their total traffic with Dubai, the airport allows China Southern to exercise their 5th freedom rights and extend their reach to important destinations such as Jeddah in Saudi Arabia.

Dubai is also important for China Southern's transfer passengers, who can switch to one of the over 150 airlines that currently operate from Dubai International. Popular onward connections for their passengers include Mehrabad, and London Heathrow.

The tourism sector in 2010 accounted for almost 1% of China's GDP. Over 13% of foreign tourists arrive by air. We estimate that tourists travelling with China Southern through Dubai contribute US\$12 million to Chinese GDP. However, with the international tourism market in China forecast to increase six-fold over the next 20 years¹⁰, the connectivity that Dubai offers China Southern is likely to play an important role in enabling this expansion in tourism to become reality.

¹⁰ Based on forecasts from the Oxford Economics Global Macroeconomic Model

Table 2.1: Airport Ownership

| Airport Ownership | | | |
|-------------------|-------------------|---|-----------|
| Airport | | Operator | Ownership |
| AMS | Amsterdam | Schipol Group | Private |
| BKK | Bangkok | Airports of Thailand | Public |
| BEI | Beijing | Civil Aviation Administration of China | Public |
| CDG | Charles De Gaulle | Aeroports de Paris | Private |
| FRA | Frankfurt | Fraport | Private |
| HKG | Hong Kong | Airport Authority Hong Kong | Public |
| ICN | Incheon | Incheon International Airport Corporation | Public |
| LHR | London Heathrow | BAA | Private |
| NRT | Narita, Tokyo | Narita International Airport Corporation | Private |
| PVG | Shanghai | Shanghai Airport Authority | Public |
| SIN | Singapore | Changi Airport Group | Public |
| AUH | Abu Dhabi | Abu Dhabi Airports Company | Public |
| IST | Ataturk, Istanbul | General Directorate of State Airports | Public |
| CAI | Cairo | Cairo Airport Company | Public |
| DOH | Doha | Qatar Civil Aviation Authority | Public |
| JED | Jeddah | General Authority of Civil Aviation | Public |

Source: Airport websites

Source: Airport websites

Table 2.1 lists 16 airports which are comparable to Dubai International either due to similarities in their operating as a large international airport, or because their proximity to Dubai means they have the potential to cater for similar passenger traffic. Of these 16, the only privately owned airports were four major European hub airports, as well as Tokyo's Narita Airport, one of Japan's large international airports. None of the airports situated in Asia or the Middle East was privately owned.

Charging at Dubai's airports

Chart 2.5 represents airport charges, expressed as US dollars per passenger carried, for an international flight by a typical long-distance passenger jet.¹¹ The chart covers 96 of the world's 100 largest airports measured by the number of passengers handled (both domestic and international).

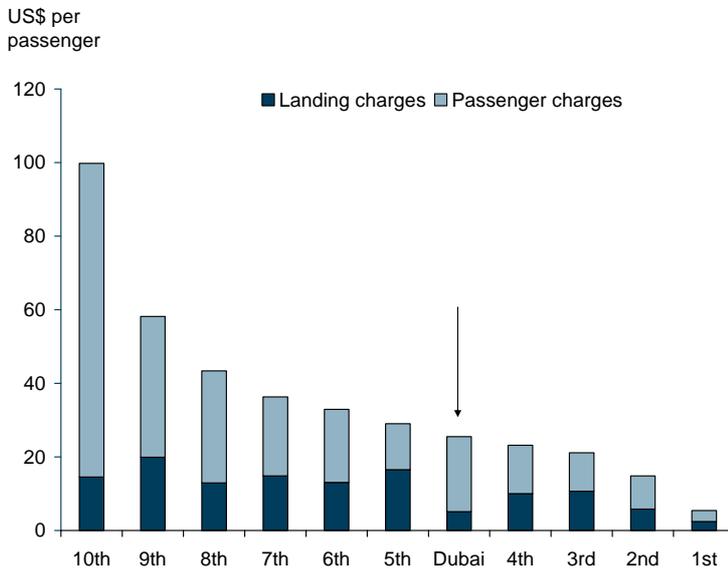
To compare Dubai International to so many other airports, we first ranked them according to their airport charge and then divided them into ten groups. The six least expensive airports form the 1st group. The remaining 90 airports are divided into groups of 10 in ascending order of the airport charges. Dubai is represented by its own column in Chart 2.5 to allow us to see its place in the distribution of airport charges.

In terms of its ranking, Dubai's lies between the 4th and 5th group; there is roughly an equal number of airports above it as there are below it in terms of their airport

¹¹ The charges are based on a Boeing 777-300ER with a passenger occupancy rate of 78% and a turnaround time at the airport of 90 minutes.

charges. Given its ranking, Dubai can be described as a typical or average airport with respect to its charges.

Chart 2.5: Airport charges at Dubai International and 96 of the world's largest airports, 2010^(a)



Source: Airport Charges.com

(a) The chart reports the average airport charge for ten groups of airports. The average charge for the ten most expensive airports is shown by the column labeled 10th (group); the column labeled 9th, shows the average charge for the next ten most expensive airports; and so on until, the last group (1st) contains the six least expensive airports. Dubai International is shown separately.

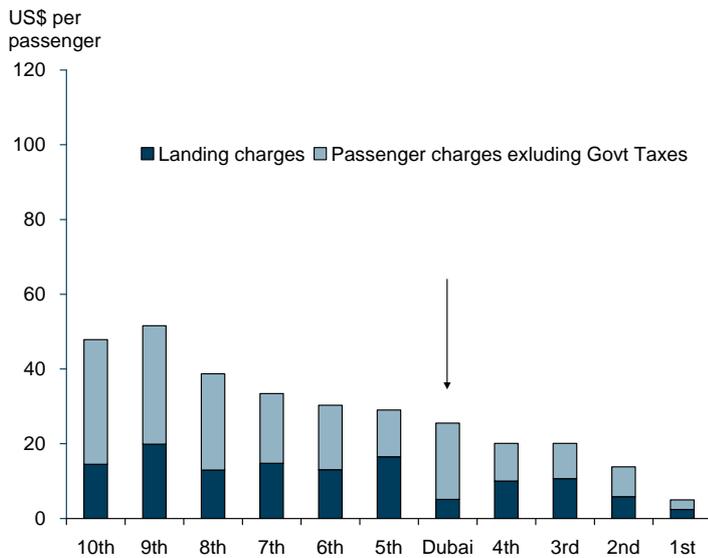
It is clear from this chart that the distribution of airport charges across the ten groups is highly skewed: the level of charges for the 8th, 9th and 10th groups – covering the 30 most expensive airports – is much higher than the level of charges for the remaining groups.

Chart 2.5 also illustrates the split between landing charges and passenger charges. The former covers charges for landing, air traffic control, and noise and emission charges; the latter covers security, infrastructure and passengers taxes.

When compared to the distribution for the total charge, it is a striking feature of this chart that landing charges (the dark blue component in each column) are much more evenly distributed across the ten groups. In fact, the average landing charge does not exceed US\$20 per passenger for any of the ten groups. In other words, the high charges levied by the most expensive airports are almost entirely accounted for by the passenger charges (including taxes).

Looking at passenger charges in more detail, Chart 2.6 shows the distribution of airport charges excluding government taxes. The airports are arranged in the same groups as shown in Chart 2.6, so that a comparison of the two charts shows how taxation distorts airports' relative competitiveness. Among the 10 most costly airports (10th group), taxes account for over half the total charge, and around 10% of the total charge for 20 airports in the 8th and 9th groups. With these taxes removed, the distribution of airport charges appears much more uniform than in Chart 2.5. For the airports in the 10th group, airport charges are significantly increased through taxation, undermining the competitiveness of these airports to the detriment of the aviation sector in their countries.

Chart 2.6: Airport charges, excluding government taxes 2010

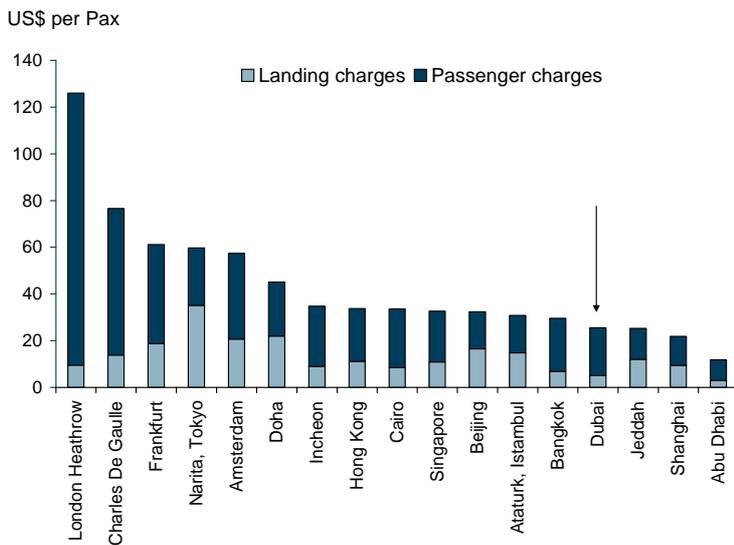


Source: Airport Charges.com

Among the remaining airports (7th through to the 1st group), relative charges appear much less distorted by taxation, with the ranking of airports in Chart 2.6 largely unaffected by having taxation removed. Likewise, Dubai's position, placed between the 4th and 5th groups also remains unchanged. So although heavy taxation is a serious issue for a sizable minority of airports, competition among the majority of international airports, including Dubai International, is conducted on a level playing field.

In Table 2.1, 16 airports are listed which are comparable to Dubai International because either they are large international hub airports or they are situated sufficiently nearby to be considered as peers. The charges at these 16 equivalent airports are compared with Dubai's in Chart 2.7. When contrasted, Dubai International is amongst the least expensive of these airports, with only Jeddah, Shanghai and Abu Dhabi having lower charges. However, the charges at most of these airports are very similar, with eleven airports having a total charge of less than US\$35 per passenger (recall that Dubai International's charge is US\$25 per passenger). Charges for the remaining six most expensive airports are generally much higher. The highest airport charge among the sample of 96 airports was at London Heathrow where airport charges were US\$126 per passenger.

Chart 2.7: Airport charges at Dubai International's peer group 2010^(a)

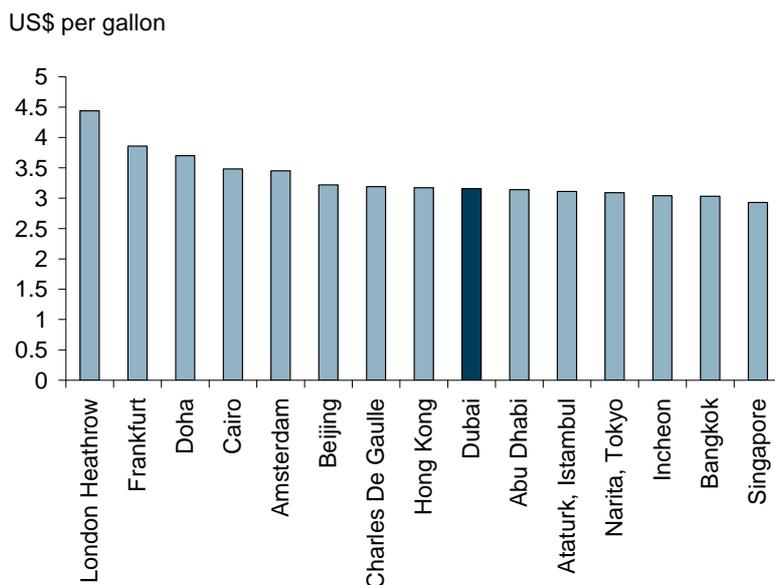


Source: Airport Charges.com
(a) The peer group comprises the same group of airports as that listed in Table 2.1.

Fuel Charges

Fuel charges at Dubai look unexceptional. Drawing on the same data set as above, Chart 2.8 compares fuel charges at Dubai International with 14 airports listed in Table 2.1. Dubai's fuel charge, at US\$3.16, lies towards the middle of the charges shown in Chart 2.8. Moreover, there is very little variation in fuel charges. For eleven of the 15 airports shown in Chart 2.8, fuel charges lie within the range of US\$3.0 to US\$3.5 per gallon.

Chart 2.8: Fuel prices at the largest 29 international airports



Source: Airport Charges.com

The picture is very similar if we to look at a broader sample of airports. Based on a sample of 65 airports covering all major regions bar North America (see below), 20 airports have lower fuel charges than Dubai's: 44 have higher fuel charges. As for

the variation of fuel charges, 62 of the 65 airports had a fuel charge within the range of US\$3.0 to US\$3.5 per gallon.

The data suggests that fuel charges generally do not vary much from one airport to the next. We did however encounter several problems with the fuel price data, which we think justifies caution in interpreting the data. We had to drop US airports from the comparison because the data was reported inclusive of charges/taxes that prevented them being compared with the other airports. The comparison is based on charges in mid-March. As we are interested in the variation across airports this is not a particular problem, but the reader should be aware that the level of fuel prices will vary over time. Despite these caveats, we feel that the data does indicate (1) that fuel charges are quite similar across many large airports and (2) and the fuel charges at Dubai are in this respect quite typical.

Emirates purchases fuel uplifted at Dubai International Airport from BP, Shell, Chevron, ENOC and Emojet – a joint venture between Emarat and Exxonmobil at commercial market rates.

Consensus based approach to investment

The government of Dubai owns the emirate's major airports and airlines. There is nothing unusual in this, as public ownership of airports is very common across the world, and many countries also either own or support their home airlines.

What is more unusual is the awareness by the government of how important its aviation sector is to the emirate's economic development. This awareness manifests itself in effective decision making that is results-focused. Another advantage flows from the ability of a small number of senior individuals in government and in the aviation sector to maintain close contact and reach decisions quickly.

Efficient operations

In this section, we examine Emirates operating performance by contrasting it to the revenue generated by other airlines, along with their costs and operating margins.¹²

Financial results for 2010/11

Emirates released its annual report for the financial year 2010/11 on 10 May. Although its release came too late for the data to be incorporated into our analysis, the information contained in the latest numbers is consistent with our findings (below). It was a difficult year for all airlines. A number of severe natural disasters disrupted global air transport services, political instability continued in many parts of the world and jet fuel prices rose sharply. Despite these problems, Emirates

¹² The airlines companies covered in this section and the airlines they operate are listed in Box 2.3 (page 59). The financial data reported in this section refer to company results unless otherwise stated. Many of the companies have business interests that extend beyond airline operations. For Lufthansa, the financial data refer to its Passenger Airline Group and Logistics businesses.

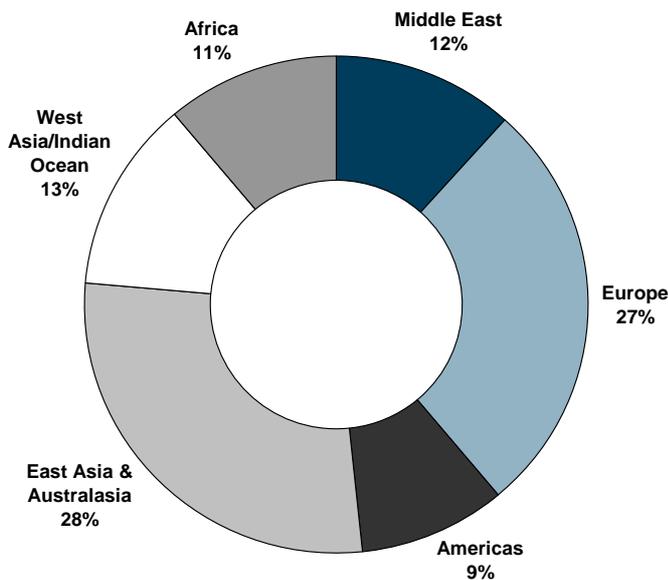
reported its highest profit in its 25 year history. Profitability was driven by strong revenue growth (25% higher on the year), reflecting strong growth in passenger numbers (revenue per passenger kilometre (RPKM) increased by 16.0% on the year), a 80% passenger seat factor, the highest in the airline's history, and a rebound in the Cargo business as world trade improved (tonnage increased 12% on the year). The Annual Report, marking the company's silver jubilee, is able to report that the airline has become the world's largest airline by scheduled international passenger-kilometres flown.

Comparison of airline revenues

In FY2009/10, Emirates generated US\$11.8 billion in revenue. Over three quarters of this revenue was earned through its passenger operations, with its cargo business accounting for most of the remainder.¹³

Over half of this revenue was earned through its Europe, East Asia and Australasia routes (see Chart 2.9); a quarter coming from South Asia and Africa markets; and a further tenth from the Americas. In total, these regions account for close to 90% of Emirates' total revenue.

Chart 2.9: Emirates' revenue by region, FY2009/10^(a)



Source: Emirates
(a) Financial year ending March 2010

To help us to evaluate Emirates' operating performance, we compare Emirates to a panel of 13 other airline companies. These companies are: Cathay Pacific, Singapore Airlines, Thai Airways, British Airways, American Airlines, United Airlines¹⁴, Lufthansa, Air France-KLM, Qantas, SriLankan Airlines, Malaysia

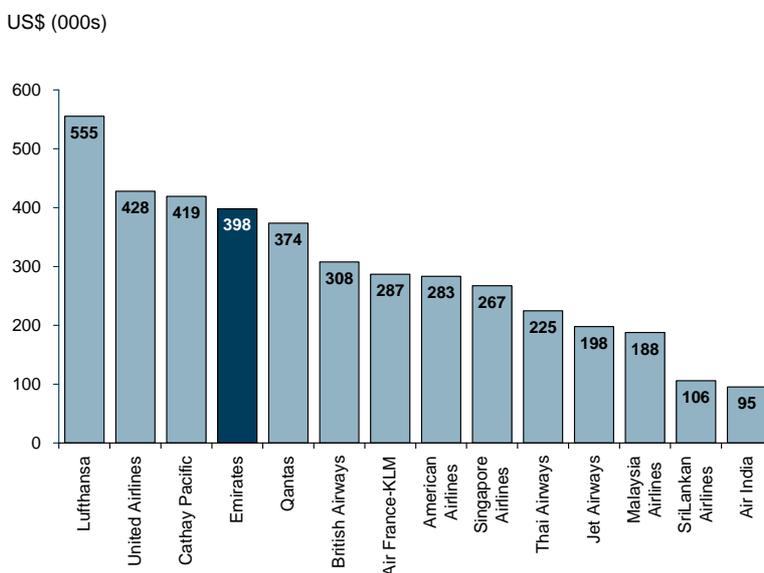
¹³ Emirate's air freight division is called Emirates SkyCargo.

¹⁴ Throughout this section data for United Airlines refers to financial year ending December 2009 and therefore does not include Continental Airlines.

Airlines, Air India, and Jet Airways. Many of these companies operate several airlines. Singapore Airlines, for instance, includes its namesake, together with SIA Cargo and SilkAir. The 13 companies in total operate 38 airlines. A list of the airlines is given in Box2.3 at the end of this Section.

Chart 2.10 shows the revenue earned per employee, for both Emirates together with the 13 other airline companies in our panel. In 2010, Emirates generated \$398,000 in revenue per employee, which is comparable to airlines such as Cathay Pacific, Qantas and United Airlines.¹⁵ Most of the Asian airlines – Jet Airways, Thai Airways, Malaysia Airlines and SriLankan Airlines and Air India – have much lower revenue per employee. Lufthansa stands out as earning high revenue per employee of US\$555,000, although it should be noted that this relates to their Passenger Airline Group and Logistics Divisions only. These differences will reflect a number of factors such as average air fares, passenger seat factors, the number of passengers for each member of cabin staff, and employee productivity.

Chart 2.10: Revenue per employee, financial year ending 2010^(a) ^(b) ^(c)



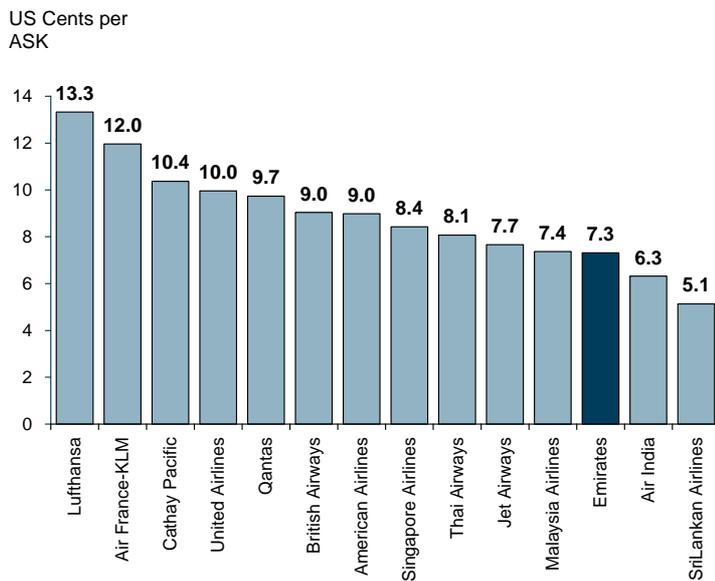
Source: Airlines' annual reports

- (a) Converted to US\$ using average exchange rate for the relevant financial year.
- (b) Malaysia Airlines refers to year ending December 2009 the most recent results available
- (c) Lufthansa and Emirates relate to their airline operations only

Another way to compare the performance of different airlines is to make allowance for differences in sizes of their fleets. With larger airlines able to generate more revenues in absolute terms, a better comparison is based on revenue generation per unit of 'fleet size'. An intuitive measure of fleet size is *available seat kilometres* (ASKM). ASKM takes account of differences in aircraft seating capacity as well as the distances flown. Comparing airlines on the basis of the revenues per ASKM (RASKM) provides a better gauge of their relative financial performance than comparing their headline results.

¹⁵ Throughout the remainder of this section, 2010 refers to each company's financial year ending in 2010. The figures reported related to the financial year 2010 for all but one airline, Malaysia Airlines, for which we use financial year 2009 data.

Chart 2.11: RASK, relative to Emirates, financial year ending 2010 ^{(a)(b)}



Source: Oxford Economics, Airline Annual Reports

(a) RASKM stands for revenue per available seat kilometre.

(b) Malaysia Airlines refers to year ending December 2009 the most recent results available.

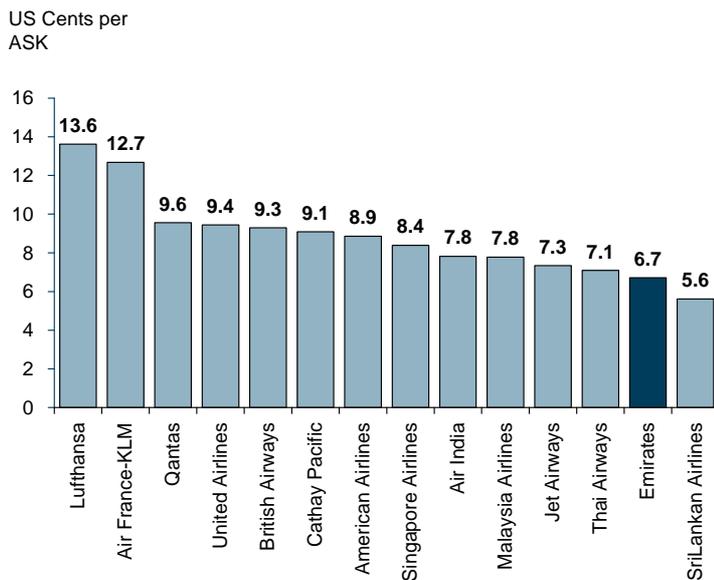
Revenue per ASKM is shown in Chart 2.11. Although better than two Asian airlines, if revenues were all that mattered, Emirates would not stand out as particularly special.

Comparison of airline costs

Chart 2.12 shows a comparison of total operating costs, where costs are expressed on a similar per ASKM basis. Emirates performs relatively well compared to the panel, with only SriLankan Airlines having a lower operating cost. Lufthansa and Air France-KLM stand out for having much higher operating costs than the other airlines.

We next explore these cost differences in more detail for four cost categories: labour, aircraft, fuel, and infrastructure and product delivery.

Chart 2.12: Operating costs per ASK, financial year ending 2010^(a)



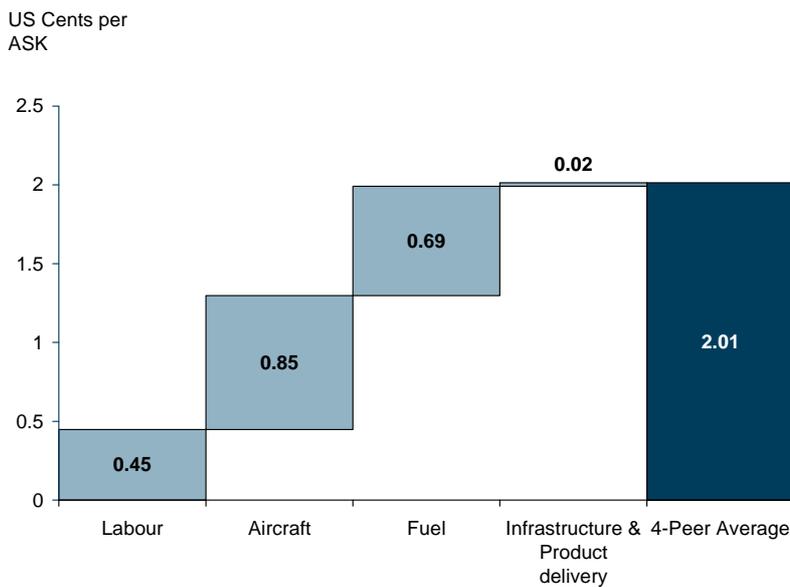
Source: Oxford Economics, Airline Annual Reports

(a) Malaysia Airlines refers to year ending December 2009 the most recent results available

In Chart 2.13, each category is represented by a column that shows the difference between Emirates' cost and the average cost for these four airlines. The chart shows that these four airlines had for these four cost categories an overall cost that was 2.01 US cents per ASKM above Emirates (right-hand column in Chart 2.13). This overall difference was mostly explained by higher aircraft costs (0.85 cents per ASKM), higher fuel costs (0.69 cents per ASKM), and higher labour costs (0.45 cents per ASKM). There were very slight differences in infrastructure and product delivery (0.02 cents per ASKM).

We look at labour, aircraft and fuel costs in turn.

Chart 2.13: Cost differentials ^(a)



Source: Oxford Economics, Airline Annual Reports

(a) The four airlines are Singapore Airlines, Cathay Pacific, Thai Airways, and Malaysia Airlines.

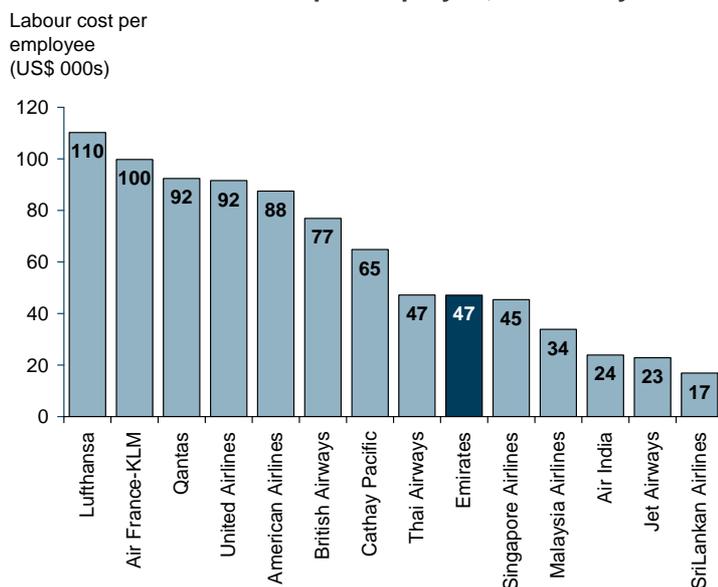
Labour costs

Labour costs vary considerably across airlines (Chart 2.14). This shows average labour cost per employee (expressed in US\$) for Emirates and the 13 other airlines.

The most striking feature of this chart is the disparity between the level of labour costs among the European, and North American airlines and the rest. Whereas labour costs averaged US\$ 94,575 per employee for the five airlines from those regions, labour costs averaged around half of this amount (US\$49,510) for the remaining eight airlines.¹⁶ Even Cathay Pacific which has a relatively high labour cost for an Asian airline has labour costs around a third lower than the average for the five European and North American carriers. It is clear that geography plays an important role in determining labour costs, reflecting local labour market conditions (the level of wages, unionisation etc) in airlines' home countries.

Emirates and Singapore Airlines have very similar labour costs at US\$47,000 and US\$45,000 respectively. These two airlines, which have much in common in terms of their history and business models (see Box 2.2), stand somewhat apart from the others. With comparatively small populations in their home countries, they must rely on recruiting staff from abroad: a relatively expensive strategy as foreign staff invariably must be offered attractive remuneration packages to induce them to relocate overseas.

Chart 2.14: Labour cost per employee, financial year ending 2010^(a)



Source: Oxford Economics, Airline Annual Reports
(a) Malaysia Airlines refers to year ending December 2009 the most recent results available

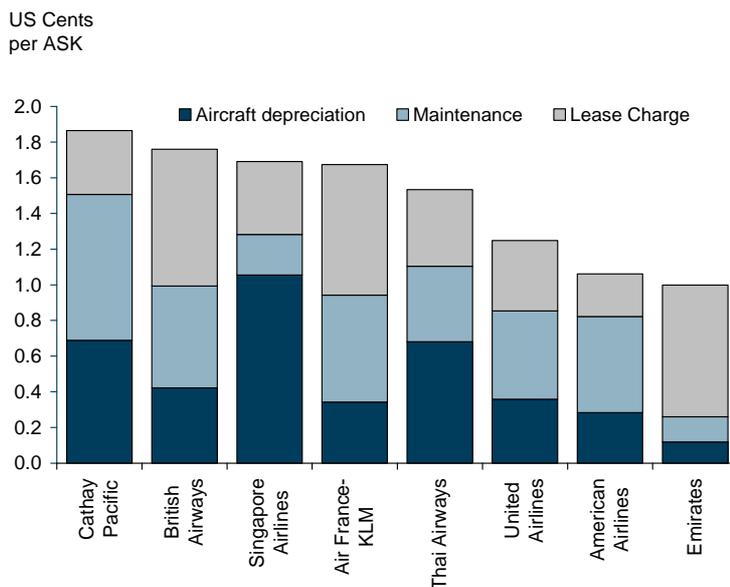
Aircraft costs

¹⁶ These are weighted average across the airlines using (employment as weights), to reflect differences in the size of the various airlines.

In Chart 2.13 the largest cost saving Emirates makes over its peers is in its aircraft costs. These costs include aircraft maintenance, aircraft depreciation, and leasing costs. Emirates aircraft costs are 0.85 cents lower per ASKM for Emirates compared with the average of the four airlines shown in that chart.

Chart 2.15 compares the aircraft costs in financial year ending 2010, drawing on a slightly smaller group of seven airlines. It shows that Emirates' lower aircraft cost is due to a lower depreciation charge and a lower maintenance cost. Partly offsetting these, Emirates has a higher leasing cost than many of its peers.

Chart 2.15: Aircraft costs, financial year ending 2010



Source: Airlines' Annual Reports, Oxford Economics

It is hard to interpret the differences in depreciation. It deserves to be included in the comparison as it is meant to reflect the cost of replacing aircraft as they retire from service. A valid cost, it is, nonetheless, difficult to compare the depreciation charge across airlines, because it reflects both an airline's investment policy (for instance, the average fleet age), and its financing policy, as depreciation is not charged on aircraft acquired through certain types of leases. Moreover, depreciation is not a cash expense but depends on an airline's accounting policies and the number of aircraft on-balance sheet. As these policies may differ from one airline to the next, this further hinders any comparison across firms. So although Chart 2.15 shows that depreciation varies considerably across airlines, it is hard to draw out whether this reflects differences in airlines' investment policies, their financing policies or merely reflects how they choose to account for depreciation in their accounts.

But one aspect of an airline's financing policy is more straightforward to pick out. It is clear from Chart 2.15 that Emirates incurs a relatively high leasing charge, around 55% higher than the average for the other airlines shown.

Chart 2.15¹⁷ compares the cost of aircraft leasing across airlines. Leases are a common way for airlines to acquire aircraft. Airlines use various types of leases and the numbers shown in Chart 2.15 reflect the cost from all types of leases. Depending on the type of lease, lessors can either be major financial institutions such as banks, or specialised aircraft leasing companies. Leases vary considerably in their terms, and airlines can pay more if they wish to return aircraft after a few years or wish to retain the flexibility to do so (operating leases typically provide these types of benefits over finance leases).

At 69 months, Emirates' has one of the youngest fleets of aircraft in the industry. In part, this will reflect the fleet's recent expansion, but among other benefits to operating leases, having a high proportion of the fleet financed through these types of leases (around 71%) should provide Emirates with more flexibility in managing its fleet age in the future. It pays for this privilege in a higher lease charge. This is one of the costs that Emirates accepts for being able to offer its passengers a new and fully modern fleet.

Maintenance costs

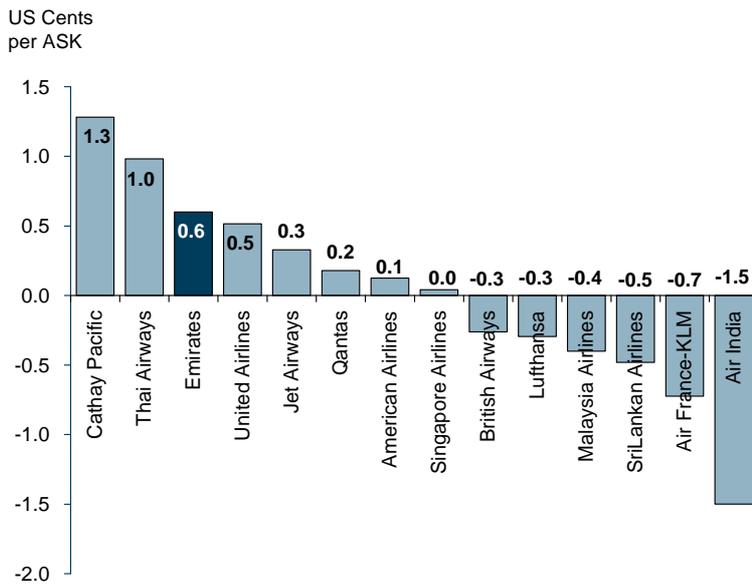
A relatively young fleet of aircraft requires less maintenance (Chart 2.15). A modern fleet also benefits from the latest advances in fuel economy. This is reflected in a relatively low fuel cost per ASKM (see Chart 2.13), but also has valuable environmental benefits as well.

Airline operating margins

We have seen airlines such as Lufthansa and Air France-KLM are successful at generating high revenues. They achieve this, however, through incurring high levels of cost compared to other airlines. Other airlines, exemplified by SriLankan Airlines and Malaysia Airlines contain costs but generate lower revenues than their peers.

¹⁷ United Airlines data excludes Continental Airlines

Chart 2.16: Revenue less operating cost, per ASKM, financial year ending 2010 ^(a)



Source: Oxford Economics, Airline Annual Reports

(a) Malaysia Airlines refers to year ending December 2009 - the most recent results available.

The relative success of airlines in generating revenues while containing costs is most apparent by looking at airlines' operating margins, the difference between revenues and operating costs, expressed on a per ASKM basis.

This comparison is given in Chart 2.16, which represents airline operating margin per ASKM relative to Emirates. The operating margin per ASKM is the difference between revenue per ASKM and operating cost per ASKM shown in Chart 2.11 and Chart 2.12 respectively. Emirates' operating margin is just over a half a cent per ASKM, which is the third largest positive margin of the airlines included in our comparison group, behind Thai Airways and Cathay Pacific. United Airlines, Jet Airways and Qantas both have slimmer margins, followed by American Airlines and Singapore Airlines which roughly break even. The remaining six airlines all operated with a negative margin in 2009/10.

Emirates apart, the airlines with the largest positive margins were from the Asia/Pacific region. All the airlines from Europe operated with a negative margin in 2009/10. Of course, this might reflect more buoyant demand in the Asian markets, however, as the chart shows three Asian airlines had a negative margin. So while many airlines are struggling to cope with difficult economic conditions, a number of airlines have found a way to buck the trend and have managed to make operating profits.

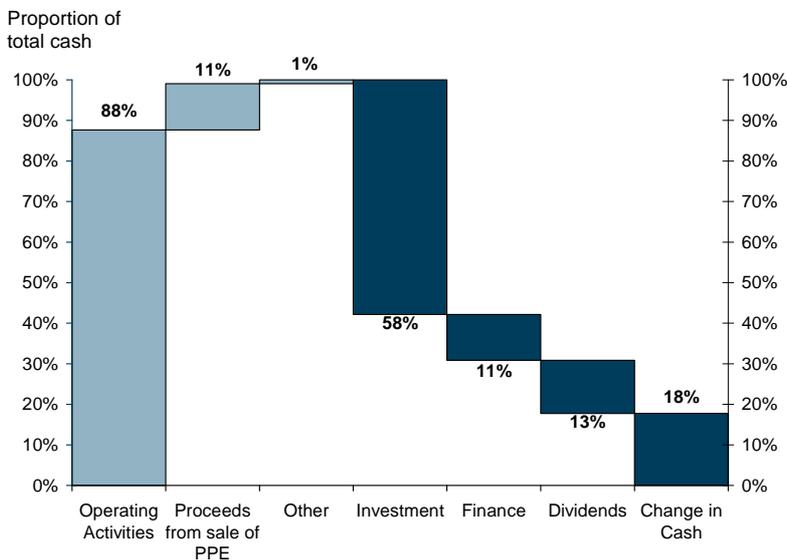
Having looked at airlines' revenue generation and their costs, it is interesting to note that the most successful airlines were neither the high revenue generators nor the most lean cost cutters. Of the airlines shown in Chart 2.16, the highest revenue generators are in fact Lufthansa and Air France-KLM (13.3 and 10.5 cents per ASKM), yet these two operated with negative margins. SriLankan Airlines, on the other hand, demonstrates that a very low cost per ASKM (Chart 2.12) does not guarantee profitability.

The airlines with positive margins instead have had to judiciously balance revenue generation and cost containment. Emirates, together with Thai Airways and Cathay Pacific, the airlines with the largest positive operating margins in our panel, appear to have all followed this route.¹⁸

Through its efficient operations Emirates has been able to fund its own expansion

So far we have looked at the factors underlying Emirates profitability and compared the airline's revenues and costs to some of its peers. We now turn to a related question. Has Emirates' profits been enough to fund its fleet expansion? Or has the airline resorted to other forms of financing to achieve its rapid growth? To answer these questions we next examine how Emirates has raised funds, and how it has used them over the past decade.

Chart 2.17: How Emirates has funded its fleet expansion, 2000-2010



Source: Emirates Annual Reports, Oxford Economics
PPE stands for Property, Plant and Equipment.

This is explored in Chart 2.17. The chart shows the sources and uses of funds deployed by the airline over the decade. It shows that through its efficient operations Emirates has been able to fund its own expansion, services its debt obligations and generate a cash surplus.

The columns shown in light blue show the various ways Emirates raised funds. By far the most important was from its operating activities. Emirates' operating profits

¹⁸ The operating margin for Lufthansa is calculated from information from the table on page 205 of its 2010 annual report. The margin is calculated from total revenue less operating expenses for Lufthansa's Passenger Airline Group and Logistics segments (a negative margin of €523 million). This compares to an operating profit of €1,240 million reported on the group's consolidated income statement. The difference reflects the performance of the group's other operating segments, other operating income and reconciling items reported in the table on page 67 of the annual report.

after allowance is made for non-cash expenses such as depreciation and the need to fund changes in working capital (such as inventory, and accounts receivable). Operating activities accounted for over 88% of the total funds raised, with asset sales (11%) accounting for most of the remainder.

The columns shown in dark blue depict the uses to which these funds were put. These funds must cover the firm's investment and pay its investors and creditors. Each of these absorbed 58%, 13% and 11% respectively of the funds that Emirates generated over the course of the decade. The remaining item, shown as the last column on the right in Chart 2.17, is the increase in the company's liquid reserves cash and other financial investments that can be converted into cash at short notice.

Dubai Benefiting Others: Korean Air

Korean Air is both the flag carrier and the largest airline of South Korea. Carrying over 20 million passengers to destinations in 39 countries worldwide, Korean Air was the 7th largest Asian airline by passenger numbers in 2009.

Dubai is a key international destination for Korean Air. In 2010, Korean Air carried over 70,000 passengers to and from Dubai, representing a substantial growth of over 50% on the 2009 figures. It serves as a valuable connection point for its passengers, who can switch to one of the over 150 airlines, principally Emirates, Gulf Air and Saudi Airlines, that operate from Dubai International.

The connectivity improvement these ties create is significant. Dubai acts as a substantial hub airport for passengers of Korean Air, with over 35% of their traffic connecting with other flights at the airport. Popular onward destinations include Mehrabad, Istanbul Ataturk and Bahrain airports. Korean Air has also extended its ties with Emirates by sharing a frequent flyer scheme called Skypass.

These connections also benefit South Korea's economy. The foreign tourism sector accounts for approximately 1.4% of South Korea's GDP, with around 85% of foreign tourists arriving by air. We estimate that tourists travelling with Korean Air through Dubai contribute US\$19 million to South Korean GDP.

A focus on growth and underserved markets

Over the decade, Emirates has expanded its fleet four-fold, from 32 to 142 passenger planes. Measured in terms of ASKM, the expansion has been even greater (seven-fold).

Table 2.2: Passenger numbers and capacity for Emirates and Dubai International, 2000 - 2010

| | | 2000 | 2005 | 2010 |
|----------------------------|-------------------------|--------|--------|---------|
| Emirates | Total Pax ('000) | 4,775 | 12,529 | 30,192 |
| | Capacity (ASKM million) | 22,426 | 68,930 | 161,756 |
| Dubai International | Total Pax ('000) | 12,321 | 24,782 | 47,200 |
| | Capacity (Pax '000) | 22,000 | 33,000 | 60,000 |

Source: Emirates Annual Reports

Table 2.2 shows the number of passengers carried by Emirates together with the fleet's ASKM. Passengers have more than doubled in the five years between 2000 and 2005, and more than doubled again in the five years between 2005 and 2010. Over these same periods, the fleet's ASKM trebled and then doubled again. This growth in ASKM reflects both the rapid build-up of its fleet and increasing route lengths as the airline has extended its route network. A notable feature of this expansion is how Emirates has targeted destinations and routes neglected by other airlines, allowing it to tap into pent-up demand.

As it has grown, so Emirates has accounted for a bigger share of Dubai International's passenger traffic. At the beginning of the decade, Emirates accounted for around one third of passengers handled at Dubai International; by the end of the decade that had increased to around two thirds.

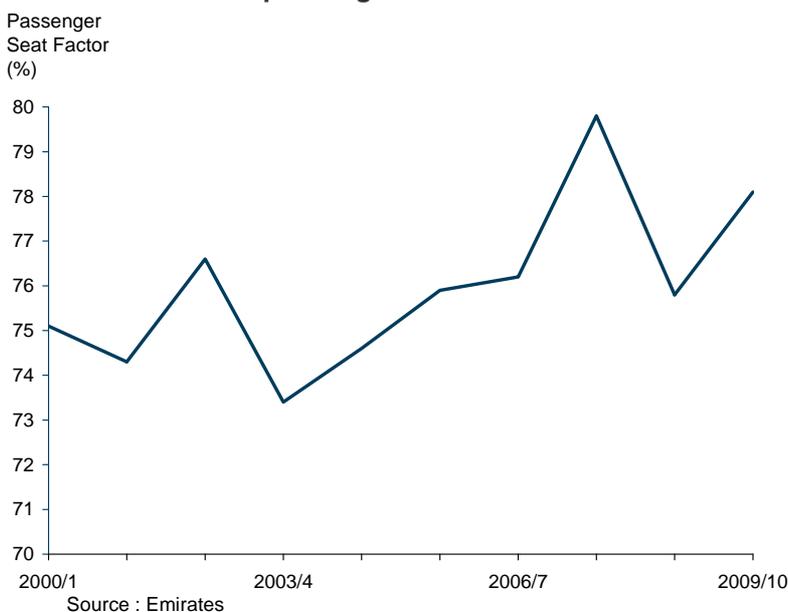
Dubai Airports has kept up with Emirates' rapid expansion by expanding its own capacity. In 2000, Dubai International could handle 22 million passengers per year. Through heavy investment in upgrading its facilities, the airport could handle 60 million passengers in 2010. Through this investment, Dubai Airports offers airlines and their passengers some of the best facilities in the industry. Added to this, Emirates has demonstrated that Dubai's strategic location within eight hours flight of most major destinations, and its attraction as a centre of tourism, trade and commerce, can be turned into a competitive advantage. These strengths have attracted other airlines, with over 150 airlines currently operating out of Dubai.

By targeting underserved routes, Emirates has kept its passenger seat factor high

Airlines' revenues depend on how successful they are in filling their planes with passengers. Other things equal, the higher the passenger seat factor the higher the RASKM. On the other hand, airline costs depend much less on the passenger seat factor: the cost of operating a plane varies little if fewer seats are filled. If RASKM are above costs per ASKM, which they are for Emirates, then a decrease in the passenger seat factor will compress any margin between the two, squeezing profits. The passenger seat factor is an important operating statistic for airlines.

Chart 2.18 shows the passenger seat factor that Emirates has achieved over the past decade. Although it has varied, it has averaged 76% through this period. An important factor underlying Emirates' profitability has been its achievement in keeping its passenger seat load factor consistently high over the years.

Chart 2.18: Emirates passenger seat factor



Source: Emirates Annual Reports

Box 2.1: Emirates financial performance – what other reports have said.

Three major banks, the Royal Bank of Scotland (RBS), UBS and Deutsche Bank (DB), have written detailed reports on Emirates in recent years. Their conclusions are summarised below.

*RBS*¹⁹

RBS examined whether the growth plans of Gulf carriers posed a serious threat to the survival of European network airlines. They concluded that the Gulf carriers growth was most likely to come from serving fast growing markets in Asia and Africa and that the major European airlines were not seriously threatened by their expansion.

In a subsequent report, RBS examined whether the growth in regions such as Asia and Africa would warrant Emirates plans to bring the total number of A380 super-jumbos in their fleet to 90, from the 15 currently in operation. Based on the forecasts published by Airbus and Boeing, they conclude that there is sufficient market growth to accommodate the planned expansion in Emirates fleet. This conclusion is in agreement with the results of the analysis presented in Section 3 of this report.

*UBS*²⁰

UBS compared Emirates operating costs with those of European and Asian airlines. Emirates costs were in line with the more efficient Asian carriers, and were much lower than the European airlines. This is consistent with the finding presented in Section 2 of this report.

UBS looked at whether Emirates was benefiting from financial assistance from government of Dubai. It found no evidence to support this. As explained in Section 2 of this report, we also found no evidence to support this either. Instead, Emirates' operating profits have been sufficient to fund its fleet expansion, with money left over to pay out dividends.

UBS concludes that Emirates' success is down to its young fleet and dynamic corporate culture, good management (and a government willing to support its aviation sector), and finally the location of its home hub, Dubai International, that has allowed it to establish itself in fast growing markets.

*Deutsche Bank (DB)*²¹

DB looked at the threat that Emirates poses to major European airlines. It reached a similar conclusion to RBS, namely that Emirates expansion was most likely to be

¹⁹ 'What would you do with 90 A380s?' The Royal Bank of Scotland, January 2011.

²⁰ 'What does Emirates mean for Europe', UBS, January 2005.

²¹ 'Global Airline Sector – Laying the foundation for Global M&A', Deutsche Bank, January 2011.

directed at its fastest growing markets. As these fast growing markets are mostly in Asia and Africa, Emirates did not present a serious threat to the European airlines.

Box 2.2: Dubai and Singapore

■ In 1937, the history of civil aviation in Dubai began when an air agreement was signed for a flying boat base for aircraft of Imperial Airways. In the 1940s flying boats were operated by British Overseas Airways Corporation (BOAC). When the airport opened in 1960, it was made of compacted sand. In 1965, the airport saw the opening of an asphalt runway, additions and improvements to major buildings on site, and the first few visits of large jets. The 1970s brought wide body aircraft and further airport development. These developments continued throughout the period, allowing for the eventual handling of Boeing 747 and Concorde aircraft. Dubai's second runway opened in 1984.

■ Over the course of the past decade, Dubai International has developed substantially. Terminal 2 opened in 1998, followed by Concourse 1 in 2000, and over the past decade has seen further improvements to its airport runway system and infrastructure. In 2008, Terminal 3 opened, with Concourse 3 expected to open towards the end of 2012. These developments will enable the airport to handle 75 million passengers a year, allowing further growth in passenger numbers from their current level of approaching 50 million.

The success story of aviation in Dubai bears a striking resemblance with that of Singapore's during its period of rapid growth that spanned the 1950s up until the late 1970s. Singapore Airlines started out as government-owned Malaysian Airways in 1947, before its renaming in 1972. The government of Singapore retains a majority interest through its investment in the company Tamasek Holdings.

Like Emirates, Singapore Airlines is allowed to operate without government interference in its commercial decisions. With this model, Singapore Airlines has grown to have a fleet of 108 aircraft that carries 16.5 million passengers per year.

Emirates has also adopted similar strategies, whereby each airplane can fly from its home hub nonstop to any major city in the world.

Singapore's Changi International Airport is publicly owned. In 2010, it handled 40 million passengers, somewhat less than 47 million handled at Dubai International.

Like Dubai today, Singapore developed into a major aviation hub despite having a relatively small domestic market (the populations of Dubai and Singapore are 2 and 5 million respectively). For both Singapore and Dubai, success in aviation has been built around its national airline. In the case of Singapore, the strategy was to exploit the synergy between growth in its national carrier and in its main hub airport. Importantly, this partnership between airport and airline helped each to commit to long-term investment projects.

For Dubai, Open Skies is at the heart of this kind of strategy, providing the connectivity needed to (1) drive its airports' growth, and (2) increase the potential market size needed for airlines to grow. But no airline can expect to capitalise on this if it is not a formidable competitor. Indeed, this possibly explains why two airlines are leaders in efficiency, competitiveness, and innovation.

Box 2.3: The airlines covered in this Section

| Airline Company | Airlines operated |
|--------------------|--|
| Emirates | Emirates |
| Cathay Pacific | Cathay Pacific; Dragonair; Hong Kong Air |
| Singapore Airlines | Singapore Airlines; SIA Cargo; SilkAir |
| Thai Airways | Thai Airways |
| British Airways | British Airways; OpenSkies SASU; BA Cityflieger |
| American Airlines | American Airlines; American Eagle |
| United Airlines | United Airlines |
| Lufthansa | Lufthansa Passenger Airlines; SWISS; British Midland; Austrian Airlines; Brussels Airlines; Germanwings; Sun Express |
| Air France-KLM | Air France; KLM; Martinair |
| Qantas | Qantas; Qantaslink; Jetstar; Qantas Freight |
| Srilankan Airlines | Srilankan Airways |
| Malaysia Airlines | Malaysia Airlines; FireFly Sdn. Bhd; MASwings; Malaysia Airlines Cargo |
| Air India | Air India; Air India Express; Air India Regional; Air India Cargo |
| Jet Airways | Jet Airways; Jet Lite |

3 The economic impact of Dubai's aviation sector in 2020

Key points

- Based on our view about the sector's underlying strengths, and forecasts for air passenger demand published by Airbus and Boeing, we conclude that Dubai's aviation sector will continue to play as important a role in Dubai's economy as it currently does.
- We calculate that in 2020 the sector will support 373,000 jobs in Dubai and contribute US\$45.4 billion to Dubai's GDP (at 2010 prices). To give a sense of the scale of these benefits, they are equivalent to 22% of total employment in 2020 and 32% of GDP in that year.
- Catalytic benefits play an even more prominent role than they do today. Whereas today catalytic benefits account for around a half of the total benefits (whether measured in terms of GDP or employment), we calculate that their contribution will increase to over 60% of the total benefits by 2020.

Investment in aviation is a long-term commitment. Whether developing the terminals and facilities at either of Dubai's two airports, or renewing and expanding Emirates' aircraft fleet, these investments impose substantial costs on the sector in the early years, whereas the potential benefits lie mostly in the future. Dubai's aviation sector continues to invest heavily in its infrastructure, its aircraft fleet and in its staff. So it is worthwhile to consider what future benefits Dubai may gain from its continuing commitment to aviation. To this end, this section looks ahead over the next decade to consider what the economic benefits might be in 2020.

Future growth in Emirates' air passenger traffic

Our analysis starts with a forecast for the growth in air passenger traffic over the next ten years. For this we use the forecasts published by Boeing and Airbus, the world's two largest airplane manufacturers.

To derive a forecast for the number of passengers that Emirates will carry in 2020, for each region we grow the current level of passengers by the average of the Boeing and Airbus forecasts. In doing this we are assuming that Emirates does not capture market share from other airlines, but that instead its passenger growth simply keeps pace with the growth in the overall market. Given Emirates success over the past decade, we view this assumption as conservative. On this basis Emirates passenger growth will average 6.6% a year over the next decade. This implies that by 2020, the number of passengers travelling with Emirates will have increased by around 86%, compared with their current level.

Emirates fleet expansion

Emirates currently has a large order book for new aircraft. It has published orders for 75 A380s, for 70 A350s and for 48 B777s. Some of these will be to replace their existing fleet of aircraft as these are withdrawn from service. To provide an illustration we estimate Emirates potential fleet in 2020, we assume that aircraft are retired after roughly 12 years, that the published new orders are delivered evenly

over the next decade, and that no aircraft remain on order at 2020. On this basis, we project that the Emirates fleet will grow to 249 by 2020. Its cargo fleet will similarly grow from 9 to 23 aircraft over the same period.

By taking account of the seating capacity on the different types of aircraft that Emirates has in its current fleet and on order, we estimate that the expansion of its passenger fleet will increase its seating capacity by just over 80% over the next decade.

A striking conclusion of this analysis is that Emirates current order book is only sufficient to allow the airline to increase its capacity in line with industry forecasts for overall market growth in the regions that its operations are concentrated on.

No forecast is certain, and any forecast over a decade must be subject to considerable uncertainty. However, there are a couple of reasons to think that Emirates may experience faster growth in demand than the Airbus and Boeing forecasts suggest. First these forecasts reflect a view about the industries overall growth over the next decade. Individual firms may experience quite different growth rates as they either gain or lose market share. Given Emirates strong financial performance over the past decade, it is quite likely that Emirates will achieve a higher rate of growth than the industry as a whole. Yet more uncertain is the future direction of regulation of international air transport services. If regulation continues to move towards greater liberalisation, then Dubai's policy of negotiating liberal air transport agreements is more likely to pay off to the benefit of Emirates and Dubai's aviation sector more generally.

Table 3.1: Future growth in air passenger traffic ^(a)

| | | 2000 | 2005 | 2010 | 2020 |
|----------------------------|-------------------------|--------|--------|---------|---------|
| Emirates | Total Pax ('000) | 4,775 | 12,529 | 30,192 | 56,105 |
| | Capacity (ASKM million) | 22,426 | 68,930 | 161,756 | 292,963 |
| Dubai International | Total Pax ('000) | 12,321 | 24,782 | 47,200 | 74,807 |
| | Capacity (Pax '000) | 22,000 | 33,000 | 60,000 | 90,000 |

Source: Various sources.

(a) Apart from the column for 2020, this table is the same as Table 1.2

Capacity at Dubai International

Emirates' growth might be constrained were capacity at Dubai's airports not to increase sufficiently to accommodate it.²² Table 3.1, shows how the numbers of passengers flying with Emirates has increased over the past decade together with our forecast for Emirates passenger numbers for 2020. Also shown in the table, is how the number of passengers handled by Dubai International has grown over the past ten years, and our projection for 2020. Alongside this is shown the evolution of the airport's passenger capacity. The 2020 projection is based on published figures for current plans to develop the airport.

²² Dubai Airports also operates the recently opened Dubai World Central (DWC) situated near Jebel Ali, around 40 kilometres from Dubai City. Although no passenger services currently operate from DWC, were Dubai airport to provide adequate capacity to absorb Emirates entire operation sometime in the future, Emirates might choose to use the other airport to accommodate its own growth.

Based on the numbers reported in Table 2.2, we see no reason why the growth in Emirates' passenger numbers will not be accommodated through Dubai Airports' current plans to further develop the airports.

Dubai Benefiting Others: Garuda Indonesia

In 2009, Garuda Indonesia carried approximately 11.2 million passengers to and from 31 domestic and 19 international destinations around the world. As the national carrier of Indonesia, Garuda has experienced rapid growth over the last 10 years, with passenger numbers doubling over this period, firmly cementing their place as the largest airline in Indonesia.

In June 2010 Garuda established new services to Dubai and Amsterdam Airports (exercising their 5th freedom rights to provide a one-stop European service via Dubai). In only the first 6 months of operation, over 70,000 people flew to and from Dubai, with 65% of these passengers continuing their journey with Garuda to Amsterdam. Following the success of this new route, Garuda plans to capitalise on the greater connectivity that Dubai affords the airline by offering other European routes to Frankfurt, Paris, London and Rome in the near future.

As well as an important transit destination for Garuda, the new services to Dubai offer Garuda's passengers a wealth of onward destinations to explore. With the majority of Garuda's services covering the Asia-Pacific region, Dubai provides a gateway at which its passengers can connect with one of over 150 airlines, to fly on to destinations across Africa, Europe and the Middle East.

The increased connectivity resulting from Garuda's services to and from Dubai also provides benefits to the Indonesian economy through tourism. In 2010, nearly 70% of foreign tourists arrived by air, contributing approximately US\$7.8 billion to GDP. We estimate that tourists travelling with Garuda through Dubai contributed US\$27.6 million to the Indonesian economy.

Catalytic benefits in 2020

It seems likely that over the next decade the two catalytic channels, tourism and connectivity, will play an increasingly important role in underpinning growth throughout Dubai's economy.

Supported through the continued investment in Dubai's aviation sector, we believe that the sectors that will benefit most from this are the hotel and catering sector and the distributive trades. Growth in these sectors over the course of the next decade will increase their combined share of GDP from 32% in 2009 to 40% in 2020, an increase of 8 percentage points. The overwhelming majority of overseas visitors will rely on air transport to reach Dubai, so that this expansion of the tourism-related activities will only be possible should Dubai Airports and Emirates expand their operations in line with their current published plans, as shown in Table 3.1.

Many other sectors of Dubai's economy will benefit from the continued investment in the aviation sector. The growth of tourism will ultimately provide support for the construction sector. Dubai is likely to continue to attract from abroad both investment and highly skilled workers to work in its business services and financial

sectors. Moreover, aviation provides a necessary part of the transport infrastructure that supports Dubai's role as a logistical hub that handles large volumes of foreign trade, much of it destined to be re-exported to elsewhere in the region and beyond. Our connectivity estimates are based on growth forecasts for passenger traffic published by Boeing and Airbus.

Our calculations assume that Dubai continues to grow strongly, albeit at a somewhat lower rate than that witnessed during the past decade.

Our projections are also consistent with the view that the future drivers of Dubai's growth will be mainly come through tourism related activities (hotels and catering, wholesale and retail sectors), and sectors that most benefit from connectivity (the production and service industries, including banking and finance).

Table 3.2: Aviation's contribution to Dubai's GDP and Employment

| | 2010 | 2020 |
|--|--------------------|--------------------|
| Panel A: Contribution to GDP (US\$ billion) | | |
| Total Contribution to GDP | 22.1 (28%) | 45.4 (32%) |
| <i>Comprised of:</i> | | |
| (1) Economic Footprint | 11.7 | 16.5 |
| <i>Comprised of :</i> | | |
| (1a) Direct | 6.2 | 10.5 |
| (1b) Indirect | 3.5 | 5.9 |
| (1c) Induced | 2.0 | .. |
| (2) Catalytic Benefit | 10.4 | 28.9 |
| <i>Comprised of:</i> | | |
| (2a) Tourism | 7.9 | 18.8 |
| (2b) Connectivity | 2.5 | 10.1 |
| Panel B: Contribution to employment (000's) | | |
| Total Employment Contribution | 259.0 (19%) | 372.9 (22%) |
| <i>Comprised of:</i> | | |
| (1) Economic Footprint | 125.1 | 145.7 |
| <i>Comprised of :</i> | | |
| (1a) Direct | 58.2 | 83.8 |
| (1b) Indirect | 43.0 | 61.9 |
| (1c) Induced | 23.9 | .. |
| (2) Catalytic Benefit | 133.9 | 227.2 |
| <i>Comprised of:</i> | | |
| Tourism | 133.9 | 227.2 |

Footnotes:

(a) In brackets are shown aviation's contributions as a proportion of Dubai's GDP and as a proportion of total employment in the Dubai economy.

(b) There is no induced benefit in 2020, this is indicated by ".." in the table.

Our estimates for the economic benefits in 2020 are reported in Table 3.2. The 2010 estimates are reported alongside for ease of comparison.

In 2020, Aviation's total contribution to GDP is US\$45.4 billion, 32% of projected GDP (28% in 2010).

Aviation's total economic footprint is projected to be US\$16.5 billion in 2020. This total is comprised of a direct benefit of US\$10.5 billion, and an indirect benefit of US\$5.9 billion. There is no induced benefit in 2020, as the benefit in 2010 comes from temporary adjustments in the wake of the global financial crisis that are unlikely to persist to 2020. Tourism and connectivity together come to US\$28.9 billion.

The total employment benefit is close to 372,900 jobs, 22% of Dubai's projected employment in 2020 (19% in 2010).

Compared to 2010, the catalytic benefits contribute a larger share of the total economic benefit. Whether measured in terms of GDP or employment, the catalytic benefits contribute around 60% of the total benefit, compared to around 50% in 2010.

Box 3.1 How connectivity contributes to Dubai's long-run growth

Connectivity reflects the range, frequency or service; the economic importance of destinations; and the number of onward connections available through each country's aviation network. Improvements in connectivity achieved in recent decades have brought benefits to users of air transport services by: reducing time spent in transit; increasing the frequency of service; allowing for shorter waiting times and better targeting of departure and arrival times; and improving the quality of service, such as reliability, punctuality and quality of the travel experience.

Improvements in connectivity enhance the economic performance of the wider economy through enhancing its overall level of productivity. This improvement in firm productivity outside the aviation sector comes through two main channels: first, through the effects on domestic firms of increased access to foreign markets, and increased foreign competition in the home market, and second, through the free movement of investment capital and workers between countries. Improved connectivity gives Dubai-based businesses greater access to foreign markets, which in turn encourages exports. Opening domestic markets to foreign competitors can also be an important driver behind reducing unit production costs, either by forcing domestic firms to adopt best international practices in production and management methods or by encouraging innovation.

A simple thought experiment considering the impact on trade from eliminating the air transport network suggests the economic benefit of connectivity is substantial. Moreover, the recent experience of businesses in Europe during the volcanic ash-induced airspace closures of 2010, as just-in-time supply chains failed, provides a more concrete illustration of how dependent modern economies are on their air transport infrastructures.

A number of recent studies have attempted to quantify the long-term impact on a country's GDP that results from an improvement in connectivity. Given that the supply-side benefits of connectivity come through promoting international trade and inward investment, any impact is likely to manifest itself gradually. As was discussed in the main text in relation to the IATA Connectivity Index (see page 15), it is sensible to scale connectivity measures by GDP. Based on academic research into the role of public transport investment in generating long-term economic

growth, work by Oxford Economics suggests that a 10% increase in connectivity, relative to GDP, will raise the level of productivity in the economy by a little under 1.1% over the long term. This estimate is used in this study to derive the connectivity benefits reported in Section 2 (benefits to Dubai) and Section 3 (benefits to onward markets).

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