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Transforming Intra-African Air Connectivity:

The Economic Benefits of Implementing the Yamoussoukro Decision

PREPARED FOR
IATA in partnership with AFCAC and AFRAA

PREPARED BY
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Executive Summary

Aviation has the potential to make an important contribution to economic growth and development within Africa. Air transport can open and connect markets, facilitating trade and enabling African firms to link into global supply chains. It plays an especially pivotal role in just-in-time global manufacturing production and in speeding fresh produce from agricultural communities in developing economies to markets in the industrialised world. Enhancing air connectivity can help raise productivity, by encouraging investment and innovation; improving business operations and efficiency. Air transport is indispensable for tourism, where convenient air service facilitates the arrival of larger numbers of tourists to a region or country

While many air markets between Africa and countries outside of Africa have been liberalised to a significant extent, most intra-African aviation markets remain largely closed, subject to restrictive bilateral agreements which limit the growth and development of air services. This has limited the potential for aviation to be an engine of growth and development

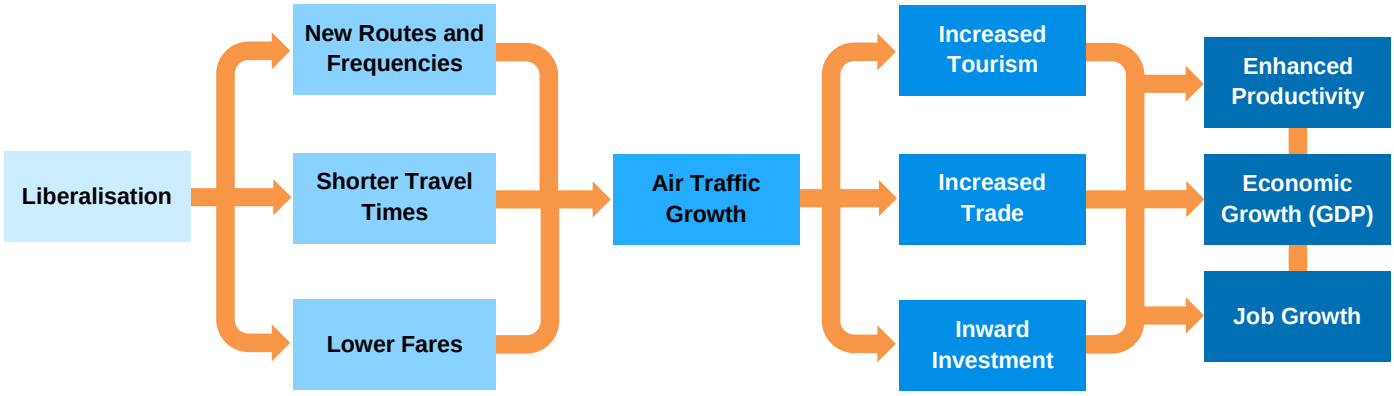
Recognising that this restrictive arrangement was limiting growth, many African nations adopted the Yamoussoukro Decision in 1999.[1] This agreement committed the 44 signatory countries to deregulating air services and to promoting regional air markets opening to transnational competition. However, the implementation of this agreement has been slow and limited, and thus the potential benefits of liberalising intra-African air markets remain largely unrealised.

IATA commissioned Inter*VISTAS* Consulting Ltd. (Inter*VISTAS*) to undertake a study to examine the impacts of liberalising intra-African air markets. The study involved modelling the transmission mechanisms by which liberalisation leads to greater air connectivity, resulting in increased traffic volumes and ultimately generating wider economic benefits.

Benefits of Liberalisation

Liberalisation can lead to increased air service levels and lower fares, which in turn stimulates additional traffic volumes, facilitates tourism, trade, investment and other sectors of the economy and brings about enhanced productivity, economic growth and increased employment, as illustrated below:

[1] The 1999 Decision followed up on the Yamoussoukro Declaration of 1988, in which many of the same countries agreed to principles of air services liberalisation.



There is considerable evidence that liberalisation of international air markets has provided substantial benefits for passengers and for the wider economy. For example, one study of the EU single aviation market found that liberalisation had greatly increased competition on many routes, had resulted in many more new routes operating, and had led to a 34% decline in discount fares in real terms.[2]

Furthermore, other studies have demonstrated a link between increased air traffic and growth in employment and Gross Domestic Product (GDP). For example, one study estimated that each 10% increase in international air services led to a 0.07% increase in GDP, which can translate into millions (or even billions) of dollars of incremental GDP.[3]

African Successes with Air Service Liberalisation

Where African nations have liberalised their air markets, either within Africa or with the rest of the world, there have been substantial positive benefits, for example (further details are provided in Chapter 3):

- The agreement of a more liberal air market between South Africa and Kenya in the early 2000s led to 69% rise in passenger traffic.
- Allowing the operation of a low cost carrier service between South Africa and Zambia (Johannesburg-Lusaka) resulted in a 38% reduction in discount fares and 38% increase in passenger traffic.
- Ethiopia's pursuit of more liberal bilaterals (on a reciprocal basis) has contributed to Ethiopian Airlines become one of the largest and most profitable airlines in Africa. Research has found that on intra-African routes with more liberal bilaterals, Ethiopians benefit from 10-21% lower fares and 35-38% higher frequencies (compared to restricted intra-Africa routes).

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[2] "European Experience of Air Transport Liberalisation", Joint Presentation by the European Union and the European Civil Aviation Conference to the 5th Worldwide Air Transport Conference (ICAO), 24-29th March 2003.

[3] Inter*VISTAS* Consulting Inc., "Measuring the Economic Rate of Return on Investment in Aviation", December 2006.

- The 2006 Morocco-EU open skies agreement led to 160% rise in traffic and the number of routes operating between points in the EU and points in Morocco increasing from 83 in 2005 to 309 in 2013.

Analysis of the Traffic Impacts of Intra-African Liberalisation

To understand the potential benefits of Intra-African liberalisation, analysis was conducted examining the impact of liberalising air markets between 12 countries within four sub-regions of Africa:

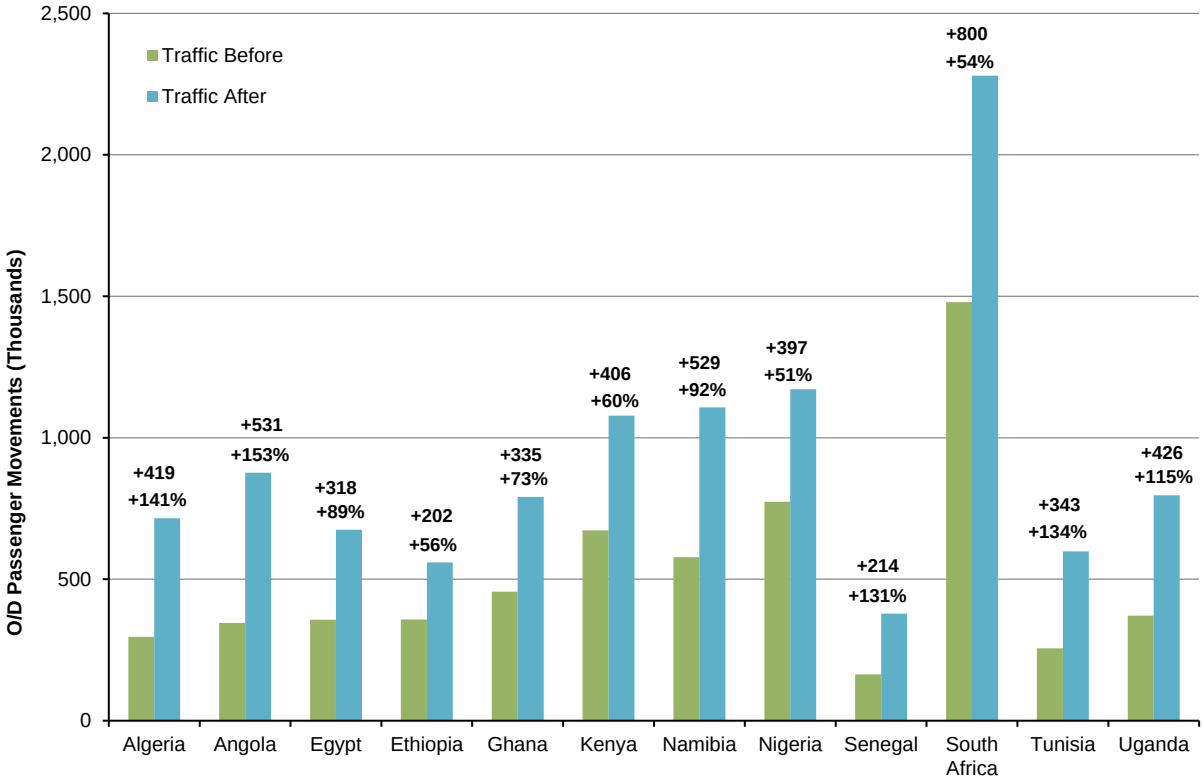
- **North**: Algeria, Egypt, Tunisia;
- **East**: Ethiopia, Kenya, Uganda;
- **South**: Angola, Namibia, South Africa;
- **West**: Ghana, Nigeria, Senegal

The impacts of liberalising the air market between these 12 countries were estimated using a gravity model developed by Inter*VISTAS* which forecasts traffic between any two countries (or groups of countries) based on the two countries' economic characteristics, trade levels, geographic relationship, and the characteristics of the air service bilateral between the two countries. By specifying changes to the terms of the bilateral, the model can be used to estimate the traffic impact resulting from liberalisation. From this, the model then estimates the resulting employment impacts and GDP impacts.

The increased passenger volumes resulting from liberalisation are summarised in **Figure ES-1**. The traffic impacts on the 12 countries range from increases of 51% (Nigeria) to increases of 141% (Algeria). In total, traffic flows between the 12 countries are projected to increase by 81%, from 6.1 million passenger movements currently (in 2013) to 11.0 million after liberalisation (an increase of 4.9 million passenger movements).[4] This represents several million passengers who can now travel by air, but who are currently unable to do so for reasons of cost, flight availability, or convenience.

[4] Passenger movements count each passenger twice – once as a departure and once as an arrival.

Figure ES-1: Passenger Traffic Impact of Liberalisation



Passenger Benefits of Liberalisation

Air service liberalisation is projected to bring about other substantial benefits for passengers:

- **Fare savings**: passengers travelling between these countries are expected to benefit from fare reductions of 25-35%, providing a saving of over US$0.5 billion per annum.
- **Greater connectivity**: Of the 66 country pairs between the 12 counties, 34 (52%) had some form of direct service in 2013. With liberalisation, it is forecast that an additional 17 country pairs will benefit from direct service, so that 75% of country pairs will have direct service.
- **Time savings:** new routes and greater frequencies will shorten the flying time between many cities. For example, in 2013 there was no direct service between Algeria and Nigeria. The most convenient routing available was via Morocco (Algiers-Casablanca-Lagos). The minimum journey time for this routing is 9 hours, but depending on connecting times could be as much as 17 hours. A direct service (which is forecast by the gravity model) would reduce the travel time between Algiers and Lagos to approximately 4.5 hours.
- **Greater convenience:** Of the 34 country pairs with direct service in 2013, only 21 had service operated at daily frequencies or better. Many had seasonal services or services operated at less than daily frequency. Such services offer passengers very limited choice in terms of their journey timings and prevent passengers obtaining an convenient

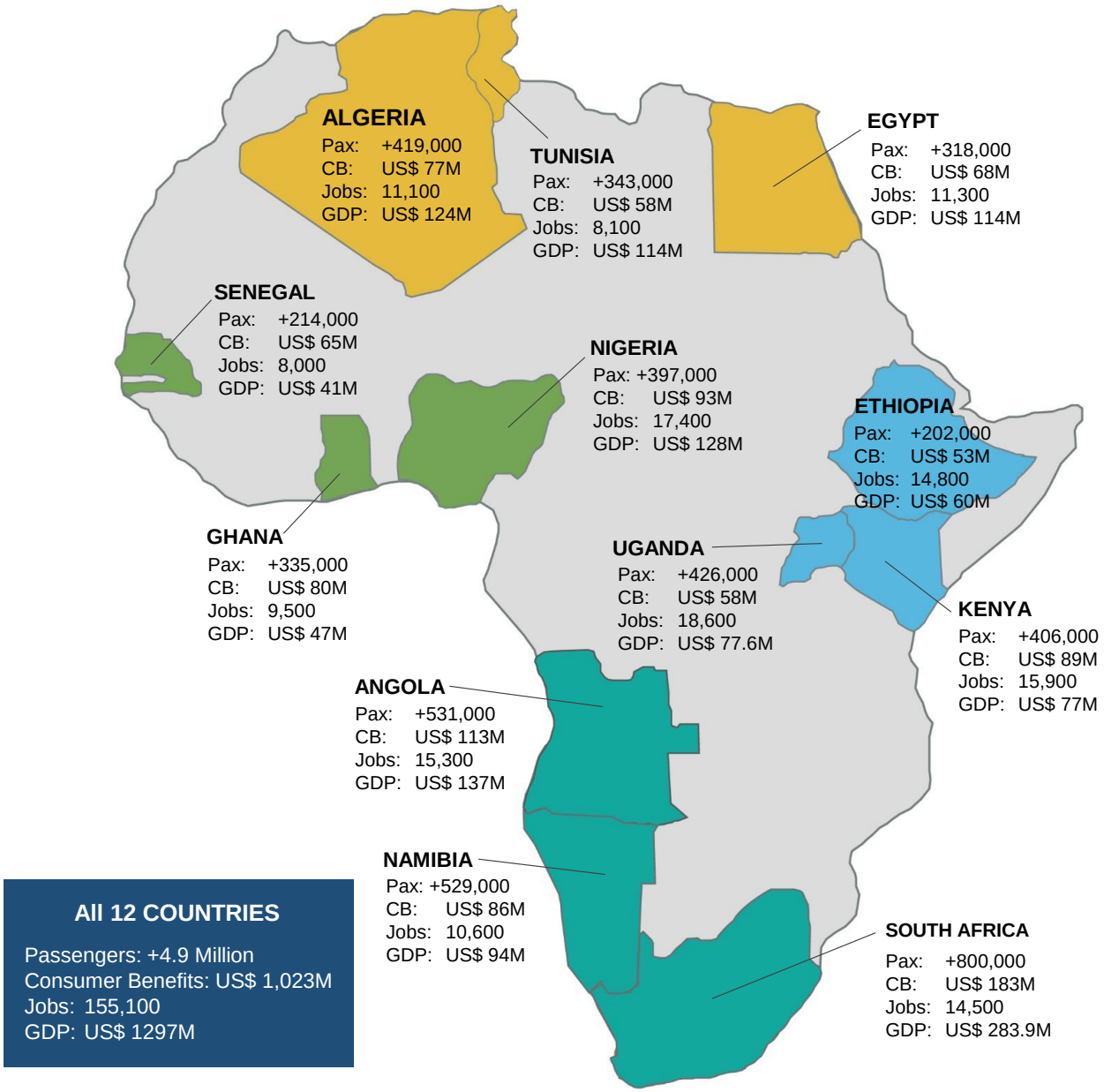
itinerary (e.g., conducting a trip over a single day, which is important to companies trying to minimise the time their staff are out of the office). With liberalisation, greater service frequencies can be supported, providing greater convenience and choice for consumers.

Benefits of Liberalisation to the Wider Economy

The impacts of liberalisation extend beyond the benefits to passengers and cargo shippers . The increased air service levels will stimulate employment in the aviation industry to handle passengers and their baggage and to operate, service, and maintain aircraft. Liberalisation is also expected to stimulate tourism between the countries, generating an estimated US$1.3 billion in additional tourism spending. Perhaps most significantly, the increase air service can facilitate many other sectors of the economy by supporting increased trade, attracting new businesses to the region, encouraging investment and enhancing productivity. Industries and activities that would otherwise not exist in a region can be attracted by improved air transport connectivity.

The increased aviation activity, tourism, trade, investment, productivity and other economic benefits will generate considerable employment and economic output (Gross Domestic Product) for the 12 countries. The estimated employment and GDP impacts of liberalisation are presented in **Figure ES-2**. Liberalisation between the 12 countries is estimated to generate 155,100 jobs in aviation, tourism, and the wider economy and to contribute US$1.3 billion to annual GDP (about 0.07% of the GDP of the 12 countries).

Figure ES-2: Summary of the Economic Impacts of Liberalisation



All financial figures are in 2013 prices.
CB = Consumer Benefits, measured in terms of consumer surplus.

Implications for Air Service and Opportunities for Carriers

Liberalisation will present air carriers with new route opportunities and the opportunity to grow their operations. **Chapter 8** provides analysis of the air service potential following liberalisation using a series of illustrative scenarios. In most cases, the number of frequencies operated between countries would be expected to more than double and, in a few cases, treble. Liberalisation would also lead to a number of new routes starting service.

There is always a great concern that liberalisation will harm the profitability and viability of existing carriers. Indeed, a common result is that liberalisation leads to loss of market share as new competitors enter the market. However, the stimulatory impact of liberalisation also means that the incumbent home carrier often still experiences a growth in traffic volumes despite this loss of market share. Liberalisation offers efficient, competitive carriers an opportunity to enhance profitability by expanding into new markets, accessing a wider pool of investment and through consolidation. The example of Ethiopian Airlines (Section 3.4) demonstrates that African carriers can thrive in a more liberalised environment. Whether the incumbent carriers prosper or suffer under liberalisation will depend in greater part on the quality of management of the carriers and how the carriers choose to respond to liberalisation.

Glossary of Terms and Abbreviations

Authorised points	The allowable routes that could be operated under an air service agreement. This could range from a general statement such as “any point in Country A to any point in Country B” to an exhaustively detailed specification of individual airports, and what points could or could not be combined on a particular flight and in what order.
Bermuda agreement	In 1946, the United States and the United Kingdom negotiated one of the first air service agreements under the Chicago Convention. The agreement, signed in Bermuda, included capacity and pricing controls. According to the standards of 2006, it is a restrictive structure. The so-called Bermuda I agreement has served as a prototype for many subsequent agreements. In 1977, the Bermuda II Agreement, again involving the United States and the United Kingdom, was similar to its predecessor in most respects, but included restrictions of multiple designation, and provisions for capacity and all-cargo services. Bermuda II has now been replaced by the U.S.-EU Open Skies Agreement which came into force in 2008.
Bilateral	*Bilateral* air service agreement, normally between two nation states. Also known as an air service agreement.
Cabotage (rights)	Cabotage is the transport of goods or passengers between two points in the same country (domestic transport). Specifically, the right of an air carrier from one country to operate domestic services within another country. Most countries do not permit cabotage by foreign airlines.
Catalytic impacts	Catalytic impacts capture the impact a particular economic activity has in facilitating growth and productivity in the general economy. The continued existence of the activity (in this case aviation) can cause long term changes in the society’s expectations. Businesses and people observe the activity, assume its continued existence, and modify their behaviour accordingly. They then pursue new interests which would not be possible in the absence of this activity. For example, the presence of an airport with commercial air services may make the community more attractive as a location for a branch plant. Potential exporters could be offered low air freight rates to overseas destinations, which would make them newly competitive. Neither the new businesses nor the exporters need have any apparent relationship to commercial aviation, except as customers.
Chicago Convention	The Convention on International Civil Aviation (or Chicago Convention) was signed on December 7, 1944 by 52 nations at the International Civil Aviation Conference held in Chicago, USA. The Chicago Convention led to the creation of the International Civil Aviation Organization (ICAO), a United Nations agency coordinating and regulating international air travel. It also established a set of international rules regarding use of airspace, aircraft registration, safety, and the framework for bilateral air service agreements governing air travel between nations.
Code-sharing	An agreement whereby airlines permit the use of their flight code in the flight schedule of other airlines, providing they have the underlying traffic rights. This allows two or more airlines to market their joint services as a single entity and each airline can sell tickets on its code-share partner’s, either as a stand-alone flight or

	as a connecting service. For example, one airline may operate route A-B while another operates B-C. Under a code-share, both airlines can sell through-tickets for travel between A and C. In addition, code-shares can allow Airline X to sell tickets on Airline Y flights even where they have no overlapping services — the ticket will be branded as a service by Airline X even though the flight is in fact operated by Airline Y.
Consumer surplus	Consumer surplus is the amount that consumers benefit by being able to purchase a product or service (in this case flight services) for a price that is less than they would be willing to pay.
Designation	The number and name of airlines nominated by each country in an air service agreement to operate air services between the two countries.
Direct impacts	*Direct Impacts* arise immediately from the conduct of those entities performing the activity in question. For an airport, the "direct impacts" would include the activities of airlines, the airport itself, forwarders, ground handling agents, and other firms whose principal business involves commercial aviation.
E/D Passengers	Enplaned/deplaned passengers. A measure of passenger volume that counts each passenger who enplanes or deplanes an aircraft.
EU	European Union, an economic and political union of 27 member states, located in Europe. It was established by the Treaty of Maastricht in November 1993, replacing the previous European Economic Community which dates back to 1957.
Fare elasticity	Consumers' sensitivity to fare price changes for a particular good or service.
Freedoms of the air	See Appendix A.
GDP	Gross Domestic Product, a measure of the total national output of an economy.
IATA	International Air Transport Association, an international industry organisation representing the majority of the global airline industry.
Indirect impacts	*Indirect Impacts* involve the supply chain of the businesses or entities conducting the primary activity (i.e., those included in the direct impact). The airlines at an airport purchase fuel which has been refined at a plant and transported to the airport by pipe or truck. Catering companies at the airport buy food from wholesalers. The items purchased can be used for many purposes besides commercial aviation, and would usually occur off site. The materials support the primary aviation activity, although they could be used for many purposes.
Low Cost Carrier (LCC)	Also known as a no-frills or budget carrier, these are airlines that typically offer low fares for an air service with lower levels of service than traditional network or legacy carriers. Although there is considerable variation in the business models, low cost carriers typically operate a single aircraft type (to reduce training and maintenance costs), do not offer first or business class travel, do not provide in-flight services such as meals and entertainment (or offer them at additional charge), and emphasise point-to-point travel offering limited connecting options. Examples include Southwest Airlines in the U.S., EasyJet and Ryanair in Europe, Air Asia based in Malaysia, Jambo Jet and FastJet in Africa, Gol in South America, and Virgin Blue in Australia.

MALIAT	Multilateral Agreement on the Liberalisation of International Air Transportation, originally signed by New Zealand, Brunei Darussalam, Chile, Singapore, and the United States. Mongolia is now a signatory to this agreement for cargo services only.
Member State	A sovereign nation state of the European Union (EU). There are currently 27 member states of the EU: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.
MOU	Memorandum of Understanding: In the absence of a formal Air Service Agreement, two countries may conclude an MOU granting air traffic rights between the two countries. In addition, MOUs may be used to make modifications to an existing Air Service Agreement. Such changes could include allowing additional capacity, resolving an ongoing dispute, clarifying any ambiguities or definitions, or clarifying items that had been left "to be agreed" in the original negotiations. A total renegotiation of the agreement could be procedurally difficult for either party, or both nations might be satisfied with the overall framework. Under such circumstances, the countries would agree to retain the original agreement but amend it as necessary. The results of the negotiations would be summarised in a Memorandum of Understanding, Record of Consultations, Exchange of Notes, or similar mechanisms. Although the parties agree to retain the original agreement, the negotiations can be very complicated and important.
O/D Traffic	Origin/Destination traffic: In aviation this refers to the traffic between two cities or countries where the origin is the starting point of the air journey and the destination is the final destination of the air traveller. As such, it does not include connecting traffic at the origin or destination. For example, O/D traffic between the UK and Singapore would capture the total traffic that started in the UK and ended in Singapore (and vice versa in the other direction). It would not include passengers starting in the UK and connecting in Singapore enroute to other destinations (e.g., Australia).
Open Skies	An "Open Skies" air service agreement creates a very liberal market between the two signatory nations. It allows any number of airlines from either nation unlimited rights to fly between any city-pair involving the two countries, without significant restrictions on capacity, frequency, or price. It generally also includes the right to operate fifth and sixth freedom services.
Pax	A short word for passengers.

Contents

1 Introduction

While many air markets between Africa and countries outside of Africa have been liberalised to a significant extent, most intra-African aviation markets remain largely closed, subject to restrictive bilateral agreements which limit the growth and development of air services. This has limited the potential for aviation to contribute to economic growth and development within Africa.

Recognising that this restrictive arrangement was limiting growth, many African nations adopted the Yamoussoukro Decision in 1999 (named after the Ivorian city in which it was agreed). This agreement committed the 44 signatory countries to deregulating air services and to promoting regional air markets opening to transnational competition. However, the implementation of this agreement has been slow and incomplete, as noted by Charles Schlumberger, Lead Air Transport Specialist at the World Bank, and author of *Open Skies for Africa*:

> *"A historic opportunity is being missed. Ten countries have not signed on to or completed proper ratification of this decision, and many others that are signatories have not implemented it. Meantime, most countries in Africa that have abandoned their ailing carriers and opened up to foreign operators now have air services, both passenger and freight, that are more efficient, safer, and with more competitive prices."*[5]

IATA commissioned Inter*VISTAS* Consulting Ltd. (Inter*VISTAS*) to undertake a study to examine the impacts of liberalising intra-African air markets. The study involved modelling the transmission mechanisms by which liberalisation leads to greater air connectivity, resulting in increased traffic volumes and ultimately generating wider economic benefits. In particular, the study examined the following impacts of liberalisation:

- Direct user impacts — passenger traffic volumes, fare levels, consumer surplus, connectivity and time savings.
- Wide Economic Benefits — employment, tourism, trade and Gross Domestic Product.
- Air services — implications for the air services operating across Africa.

The analysis examined the impact of liberalising air markets between 12 countries within four sub-regions of Africa (as shown in **Figure 1-1** overleaf):

- **North**: Algeria, Egypt, Tunisia;
- **East**: Ethiopia, Kenya, Uganda;
- **South**: Angola, Namibia, South Africa;
- **West**: Ghana, Nigeria, Senegal

[5] World Bank, "Open Skies for Africa: Implementing the Yamoussoukro Decision", 2010, http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTTRANSPORT/EXTAIRTRANSPORT/0,,contentMDK:22709045~pagePK:210058~piPK:210062~theSitePK:515181,00.html.

Figure 1-1: The 12 African Countries Covered in the Study

1.1 Report Structure

This report documents the analysis undertaken to examine the impact of liberalisation on the 12 countries. The report is structured as follows:

- **Chapter 2** provides a general discussion on the structure and history of international air service agreements.
- **Chapter 3** summarises previous evidence on the impacts of liberalising international air markets, both on the aviation sector and the wider economy.
- **Chapter 4** gives an overview of the air markets in the 12 African nations and the air services currently operating.
- **Chapter 5** discusses the principles and application of the Yamoussoukro Decision.
- **Chapter 6** provides the analysis of the impacts of liberalisation on users — air passenger volumes, fares, connectivity and time savings. The analysis is based around a gravity model developed by Inter*VISTAS* which forecasts traffic between two countries based on the countries' economic characteristics, trade levels, geographic relationship, and the characteristics of the air service agreement.
- **Chapter 7** examines the impact of liberalisation on the wider economy, including employment, tourism, trade, and Gross Domestic Product.
- **Chapter 8** considers the implication of liberalisation on intra-African air services.
- **Chapter 9** provides the results of sensitivity tests analysis of the impact of sub-regional liberalisation.

Additional details on the analysis and modelling are provided in the appendices.

2 Air Service Agreements and Air Service Liberalisation

Starting in the late 1970s, and accelerating in the 1980s and 1990s, many governments have moved to deregulate various aspects of aviation. This has included the privatisation of airlines and airports, deregulation of domestic markets, and the liberalisation of bilateral agreements controlling international air services between countries. This chapter discusses the liberalisation of international air services and its impacts on the aviation market and the wider economy.

2.1 Traditional Bilaterals

In most parts of the world, international air services between countries operate under the terms of a bilateral *air service agreement* (bilateral) negotiated between the two countries. These agreements are generally of treaty status and are enforceable in international law (although some operate under, or are modified by, a less formal Memorandum of Understanding arrangement). The framework for these bilateral air service agreements was established towards the end of World War II in 1944, when 52 countries came together at the International Civil Aviation Conference held in Chicago, USA, which established the *Chicago Convention*.[6]

The Chicago Convention stipulated that two nations seeking to be linked by commercial air services would negotiate the terms through concluding a bilateral air service agreement also known as a "bilateral". This would specify the conditions under which the proposed services would operate in terms of the privileges granted by either signatory country to the airline, or airlines, of the other country. The agreement would cover such items as:

- **Traffic Rights**. Also known as *Freedoms of the Air*, these are a standard set of nine distinct air rights over which the two countries will negotiate. For example, the first freedom of the air is the right to overfly the territory of a country without landing there, the second freedom is the right to stop in a country to refuel (or other technical reasons), the third freedom is the right to carry passengers (or cargo) from one's own country to the other country, and the fourth freedom is the right to carry passengers (or cargo) from the other country to one's own. A summary of the freedoms of the air are provided in the box below. Virtually all bilaterals will allow freedoms one to four.[7] However, bilaterals differ in their treatment of fifth freedom rights — the ability of a carrier from Country A to carry traffic from Country B to a third country as an extension of a service between Countries A and B. Some bilaterals do not permit this type of traffic while others do, or some variant of it.

[6] The Chicago Convention framework clearly distinguishes between international and domestic services. Domestic services are considered strictly a matter for the respective national government.

[7] For many countries, the first two freedoms (known as technical freedoms) are enshrined in a multilateral agreement known as the International Air Services Transit Agreement signed at the Chicago Conference.

Freedoms of the Air

When countries negotiate air service bilaterals, they grant traffic rights to airlines that are referred to as "freedoms of the air." These rights are:

First Freedom. The right to fly over another nation's territory without landing.

Second Freedom. The right to land in a foreign country for non-traffic reasons, such as maintenance or refuelling, without picking up or setting down revenue traffic.

Third Freedom. The right to carry people (or cargo) from the airline's own country to the other country.

Fourth Freedom. The right to carry people (or cargo) from the other country to the airline's own country.

Fifth Freedom. The right to carry traffic between two foreign countries with services starting or ending in the airline's own country (also known as beyond rights).

Sixth Freedom. The right to carry traffic between two countries via the airline's own country.

Seventh Freedom. The right to carry traffic between two foreign countries on a service that does not involve the airline's own country.

Eighth Freedom. The right to carry traffic between two points within a foreign country (i.e., domestic traffic) as an extension of a service starting or ending in the airline's own country (also known as tag-on or fill-up *cabotage*).

Ninth Freedom. The right to carry traffic between two points within a foreign country with no requirement to start or end the service in the airline's own country (also known as pure or standalone *cabotage*).

Further details on the freedoms of the air can be found in **Appendix A**.

- **Authorised Points**. The allowable routes that could be operated. This could range from a general statement such as "any point in Country A to any point in Country B" to an exhaustively detailed specification of individual airports, and what points could or could not be combined on a particular flight and in what order.
- **Capacity**. The number of flights or seats that could be operated between the two countries.
- **Pricing**. The method for setting fares on the route. The agreement would specify the conditions necessary for a fare proposed by the airline of one country to become operative. Some agreements require airlines to submit ticket prices to aeronautical authorities for approval while others allow the airlines to set prices without restriction.
- **Designation**. The number of airlines the bilateral partners can nominate to operate services and the ownership criteria airlines must meet to be designated under the bilateral agreement (e.g., the airlines designated by Country A must be majority owned by residents of Country A).

- Other clauses related to operative agreements (e.g., code-sharing) and various "doing business" issues such as repatriation of currencies, the ability to select handling agents at foreign airports, and the use of computer reservations systems.

Historically, many of the bilaterals have been fairly restrictive. One of the earliest agreements was the "Bermuda I" agreement between the United States and the United Kingdom signed in 1946. This bilateral specified limits on pricing, capacity, designated airlines, and routes operated. This restrictive agreement has acted as a template for a great number of subsequent bilaterals between various countries.[8] As a result, the development of international air service has been as much a function of government policy as it has been a function of commercial considerations.

In addition to the bilateral agreements, most countries have also placed foreign *ownership and control* restrictions on the airlines (although in many cases airlines were, and sometimes still are, government owned). In part, this was to ensure that the airline complied with the national ownership requirements in the bilateral — in order for an airline to be designated by a country in the bilateral, it typically needed to be majority owned and controlled by citizens of that country. However, these ownership restrictions were also justified for various strategic, safety, and defence reasons, e.g., governments wanted the ability to control the airlines in times of national emergency.

Typically, the ownership restrictions specify the maximum percentage of airline shares (stocks) that can be owned by foreign nationals. For example, the United States requires that foreign ownership of domestic and international U.S. airlines be restricted to no more than 25% of voting shares (stocks).[9] Other countries set the ownership limit at 20% (e.g., Brazil), 33% (e.g., Japan and Taiwan), 35% (e.g., China), 40% (e.g., India), 49% (e.g., Peru, Kenya, Australia, and New Zealand for international carriers), or 50% (e.g., South Korea).

[8] Bermuda I was replaced by a slightly less restrictive Bermuda II agreement in 1977. Bermuda II has now been replaced by the U.S.-EU Open Skies Agreement which came into force in 2008.

[9] It is possible for foreign investors to hold up to 49% equity stake in a U.S. airline provided it can be proven that the airline is under the control of U.S. citizens and the CEO is a U.S. citizen, based on criteria set out by the U.S. Department of Transport.

2.2 The Move Towards Open Skies

The international framework of the Chicago Convention has proven to be durable and fairly flexible, allowing a wide range of market regimes, from highly restrictive agreements with rigidly defined descriptions of allowable city-pairs, capacity, and pricing to more liberal agreements that allow free entry of airlines of either signatory nation to any route, unrestricted capacity, and full pricing freedom.

Nevertheless, a number of shortcomings have been identified with this form of regulation:

- The regulation is slow moving and unresponsive — under restrictive bilaterals, changes in capacity, number of airlines, pricing, etc. would require negotiation by diplomats, creating delays of several years in some cases before the changes can take place.
- The bilateral negotiations are often narrowly focussed on the benefits to the airlines. The benefits to passengers, shippers, tourism, and the wider economy are given less weight, often because they are more difficult to quantify.
- The industry has undergone considerable transformation which is not always reflected in the bilaterals. Technological improvements have allowed a greater range of services at much lower cost and many countries have privatised previously state-owned air carriers.

Recognising these shortcomings and the potential economic benefits of a more liberal aviation sector, many governments have moved to deregulate various aspects of aviation. This has included the privatisation of airlines and airports, deregulation of domestic markets, and liberalisation of international bilaterals.

One of the earliest instances of liberalisation was the deregulation of the U.S. domestic air market in 1978. Prior to deregulation, the pricing, routes, and capacity operated on air services within the U.S. was tightly controlled by government. Deregulation removed all of these controls and allowed market forces to determine service and price levels. There has also been a trend towards the liberalisation of international bilateral agreements. Since 1992, the U.S. has pursued “open skies” bilaterals with other countries.[10] The term “open skies” is somewhat loosely defined within the industry, but the U.S. government defines it as allowing the carriers of the two nations to operate any route between the two countries without restrictions on capacity, frequency, or price and to have the right to operate fifth and sixth freedom services.[11] It also allows cooperative marketing arrangements such as code-sharing and liberal all-cargo operations (e.g., seventh freedom operations). The U.S. definition of “open skies” does not include seventh freedom passenger services, cabotage, or liberalisation of ownership and control restrictions, although other definitions of “open skies” do (e.g., the European Union considers cabotage to be part of open skies). To date, the U.S. has signed 113 open skies agreements.[12]

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[10] In fact, the U.S. had started pursuing more liberal bilaterals since the late 1970s, but the policy was only formalized as “open skies” in the 1990s.

[11] Some controls on pricing remain through a double disapproval mechanism, i.e., if both governments concur to disallow the fare.

[12] Source: U.S. State Department, http://www.state.gov/e/eb/rls/othr/ata/114805.htm, accessed 8th May 2014.

Other countries, such as New Zealand, Chile, and Morocco, have also pursued similar "open skies" arrangements. For example, in 1996 Australia and New Zealand signed a Single Aviation Market agreement which now allows carriers from the two countries to operate without restriction between the two countries (the Trans-Tasman market) and also allows fifth freedom and cabotage rights.

A number of multilateral agreements have also developed, most notably the European Union (EU) single aviation market. Between 1987 and 1993, the EU introduced three packages of reforms that almost fully deregulated the EU air market. Carriers from within the EU are now free to operate any route within the EU without restriction on price or capacity, including cabotage (i.e., domestic air travel within a member state), which has been permitted since 1997. In addition, all restrictions on airline ownership have been removed for EU citizens (e.g., an air carrier operating from Italy can be 100% owned by investors from the UK; however, investment by non-EU citizens is restricted to 49%). The EU is also negotiating open skies bilateral agreements as a block with other countries, for example the EU-U.S. Open Skies Agreement in 2008. Another less extensive example of a multilateral agreement is the *Multilateral Agreement on the Liberalisation of International Air Transportation* (MALIAT) originally signed by New Zealand, Brunei Darussalam, Chile, Singapore, and the United States.[13] The MALIAT signatories have granted each other unlimited traffic rights between each other under third, fourth, fifth, and sixth freedoms as well as unlimited seventh freedom traffic rights for cargo-only flights. National majority ownership is not a requirement for being designated between MALIAT countries, only a principal place of business is required. New Zealand, Chile, Singapore, and Brunei have gone even further and granted each other seventh and eighth freedom rights for passenger flights.

Another multilateral agreement is the Yamoussoukro Decision of November 1999, which agreed liberalisation of intra-African air markets. The Yamoussoukro Decision commits its 44 signatory countries to deregulate air services and promote transnational competition in regional air markets. It promotes the removal of all restrictions on access, capacity, frequency, and tariffs and the exercise of first, second, third, fourth and fifth freedom rights. The principles and application of the Yamoussoukro Decision are described in more detail in **Chapter 5**.

In the area of ownership and control, there has been some liberalisation but considerable restrictions still apply in most cases. Chile is one of the few examples of countries that do not place any restrictions on the foreign ownership and control of its domestic and international airlines. However, the airlines are required to have their principal place of business in Chile (i.e., the airline must be primarily based in Chile). In part, this is to ensure that the airline can reasonably be designated as a Chilean carrier under the terms of Chile's international bilateral. However, most countries apply some limit on ownership that typically ranges from 20% to 50% of voting shares (stocks). Some countries apply different restrictions on domestic and international carriers. For example, both Australia and New Zealand allow

[13] The Cook Islands, Samoa, and Tonga have joined MALIAT since its original signing. Mongolia joined in 2008 for cargo traffic only. Peru was also a signatory but has since withdrawn.

100% foreign ownership of domestic carriers but only 49% ownership of international carriers.

Despite the trend towards liberalisation, there remain considerable government restrictions on airline operations and ownership. Many bilaterals still follow the constrictive Bermuda model established over 50 years ago and most governments still apply restrictions on the ownership and control of airlines. The next chapter describes the benefits that have arisen from liberalisation and are likely to arise with further liberalisation.

3 Impacts of Air Service Liberalisation

In many ways, the liberalisation of the aviation industry can be seen as part of a fairly global trend of market deregulation and privatisation which has also been applied to the telecommunications, utilities, railway, and other industries. It is generally accepted that this deregulation has been on the whole beneficial to these industries and, more importantly, to the consumers they serve. Indeed, empirical research has found that in many industries deregulation/privatisation has often led to lower prices for consumers, higher service quality, and improved access to services (greater take-up by consumers, in part due to lower prices and increased levels of investment).

However, it is worth noting that many of the remaining restrictions placed on the operation of international air service and the ownership and control of airlines are fairly unique to the industry. Today, there are very few industries subject to such a large degree of government control. Major industries such as pharmaceuticals, energy, and even parts of the defence industry have been allowed to merge across borders and have no restriction on their foreign ownership.

3.1 Benefits to Passengers

Liberalisation of air service bilaterals has generally fostered greater competition, resulting in lower fares for travellers, greater numbers of people travelling, greater choice of airlines and routes, and improved service levels (higher frequencies, etc.).

A 2003 study by the European Union found that the liberalisation of the EU air market (the single aviation market) had resulted in the following (EU, 2003):[14]

- **Changes to industry structure**. The total number of scheduled airlines increased 6% between 1992 and 2000, increasing from 124 to 131 airlines. However, this understates the degree of change in the industry. The EU reports that just over half the airlines present at the start of 1993 were still operating by the end of 2000. Between 1992 and 2000, 144 new airlines entered the market, of which 64 were still operating in 2000.
- **Increased routes and connectivity**. There was a strong rise in the number of city-pairs served and in overall capacity provided in the EU market. The total number of intra-EU city-pairs increased 74%, while the number of domestic city-pairs increased 12% between 1992 and 2000. Both the number of flights and seats operated increased by an even greater amount, indicating that overall capacity has increased substantially.
- **Increased route competition**. Between 1992 (the year before the EU air market was fully liberalised) and 2000, the number of intra-EU routes served by more than two carriers increased by 256% while the number of domestic (within member state) routes with more than one carrier had increased by 88%.

[14] "European Experience of Air Transport Liberalisation", Joint Presentation by the European Union and the European Civil Aviation Conference to the 5th Worldwide Air Transport Conference (ICAO), 24-29th March 2003.

- **Reduced fares**. In real terms (i.e., after adjusting for inflation), discount economy fares, which represent the vast majority of tickets purchased, declined 34% between 1992 and 2000. Over the same period, full economy fares declined 5% in real terms.

Similarly, a 2006 study by Inter*VISTAS*-ga[2] also found a substantial stimulation of traffic resulting from the liberalisation of the EU air market.[15] It found that, as a result of liberalisation, the rate of traffic growth doubled from an average of 4.8% per annum in 1990-1994 to 9.0% per annum in 1998-2002.

The stimulatory effect on traffic of liberalising individual bilaterals is illustrated in **Figure 3-1**. The table provides a comparison of traffic levels in the year immediately preceding inauguration of the new bilateral to volumes in the first full calendar year after inauguration. These examples result from changes in bilateral air service agreements or from specific government decisions to relax the restrictive provisions of current agreements. The table shows that just one year after liberalisation, traffic increased by as much as 174%. This may understate the stimulus impacts as traffic can take several years to fully mature.

Figure 3-1: Air Service Agreement Liberalisation and Traffic Growth

City-Pair	Service	Liberalisation Event	Increase
Vancouver-Phoenix	America West 1995	1995 Canada-U.S. Bilateral	146.4%
Toronto-Minneapolis	Air Canada 1995, Northwest	1995 Canada-U.S. Bilateral	55.3%
Toronto-New Orleans	Air Canada 1998	1995 Canada-U.S. Bilateral	41.2%
Ottawa-Chicago	Air Canada/ American 1995	1995 Canada-U.S. Bilateral	109.7%
Montreal-Atlanta	Delta 1995	1995 Canada-U.S. Bilateral	55.5%
Atlanta-San Jose CR	Delta 1998	1997 U.S.-Costa Rica	118.5%
Chicago-Hong Kong	United 1996	U.S.-Hong Kong Bilateral	21.1%
Chicago-London	United 1995	U.S.-U.K Mini Deal, 1995	42.1%
Chicago-Sao Paulo	United 1997	U.S.-Brazil, 1996	80.4%
Houston-Sao Paulo	Continental 1999	U.S.-Brazil, 1997	120.5%
Atlanta-Guadalajara	Delta 1999	U.S.-Mexico, 1991	169.5%
Detroit-Beijing	Northwest 1996	U.S.-China, 1995	174.3%
Houston-Tokyo	Continental 1998	1998 U.S.-Japan	116.6%
Atlanta-Rome	Delta 1999	1998 U.S.-Italy	110.8%
Dallas/Fort Worth-Zurich	American 2000	1995 Open Skies	115.3%

Source: Inter*VISTAS*-ga[2], "The Economic Impact of Air Service Liberalisation", June 2006.

[15] Inter*VISTAS*-ga[2], "The Economic Impact of Air Service Liberalisation", June 2006.

Gonenc and Nicoletti (2001) conducted a study of 27 OECD countries with the aim of analysing the relationships among liberalisation, ownership rules, competition, efficiencies and air fares.[16] The study found that air fares tend to be lower in markets where regulatory impediments to competition are lowered, or in other words, where markets are liberalised. Both business and economy fares tend to decline in liberalised markets, or more competitive markets, where concentration is reduced.

A study by the World Trade Organization (WTO) also examined the impact of liberalisation on passenger traffic volumes using a gravity-type model calibrated on air passenger flows between 184 countries.[17] The analysis found that complete or near-complete liberalisation resulted in traffic increases of 30% on average, although some impacts were as high as 86% on some country-pairs.

3.2 Impacts of Liberalisation on the Wider Economy

The impacts of liberalisation extend beyond those to passengers. The increase in air services and traffic volumes stimulated by liberalisation has been found to increase employment and benefit the wider economy. This arises in a number of ways:

- **Aviation Sector**: additional economic activity in the aviation sector is generated by the servicing, management, and maintenance of the additional air services. This includes activities at airlines, airports, air navigation, and other businesses that support the aviation sector. The impact can "spin-off" into the wider economy (called indirect or multiplier impacts) — e.g., food wholesalers that supply food for catering on flights, trucking companies that move goods to and from the airport, refineries processing oil for jet fuel, etc.
- **Tourism Sector**: air service facilitates the arrival of larger numbers of tourists to a region or country. This includes business as well as leisure tourists. The spending of these tourists can support a wide range of tourism related businesses: hotels, restaurants, tour companies, theatres, car rentals, etc. Of course, air service also facilitates outbound tourism, which can be viewed as reducing the amount of money spent in an economy. However, even outbound tourism involves spending in the home economy on travel agents, taxis, etc. In any case, it is not necessarily the case that money spent by tourists flying abroad would be spent on tourism at home if there were no air service.
- **Impacts on Trade, Investment and Productivity**: also known as *Catalytic Impacts* or *Wider Economic Benefits*. These impacts relate to the way in which aviation facilitates the business of other sectors of the economy. Air transportation facilitates employment and economic development in the national and regional economy through increased trade, attracting new businesses to the region, and encouraging investment. Industries and activities that would otherwise not exist in a region can be attracted by improved air

[16] Gonenc, R. and Nicoletti, G., "Regulation, Market Structure and Performance In Air Passenger Transportation", OECD Economic Studies No. 32, 2001/I, 2001.

[17] Piermartini, R. and Rousová, L. (World Trade Organization), "Liberalisation of Air Transport Services and Passenger Traffic", Staff Working Paper, December 2008.

transport connectivity. In particular, these impacts can act through a number of mechanisms:

- Trade effects — air transport liberalisation opens new markets to many businesses as a result of new destinations, better flight connections, and higher frequencies offered. This leads to a broader demand for existing products. Although air cargo accounts for 0.5% of the volume of global trade shipments, it accounts for over 35% by value, meaning that air cargo is high value, often times perishable or time-sensitive.[18] Air transport connects businesses to a wide range of global markets, providing a significantly larger customer base for their products than would be accessible otherwise. It is particularly important for high-tech and knowledge-based sectors and suppliers of time-sensitive goods.
- Investment effects — a key factor many companies take into account when taking decisions about location of office, manufacturing, or warehouses is proximity of an international airport.
- Productivity effects — air transportation offers access to new markets, which in turn enables businesses to achieve greater economies of scale; inward investment can enhance the productivity of the labour force (e.g., state-of-the-art manufacturing facilities); air access also enables companies to attract and retain high quality employees. All of these factors contribute to enhanced productivity, which in turn increases the national income.

To illustrate, consider a country like Singapore. Adjusted for cost of living (purchasing power parity), the World Bank ranks Singapore fourth in the world in terms of per capita GDP while the IMF ranks it third.[19]

However, Singapore does not have large amounts of natural resources or a particularly large population base to rely upon. Its economic success is underpinned by the fact that it is an accessible and open country in which to do business. Trade is particularly important to the Singapore economy: the value of goods trade processed in Singapore in 2012 was over three times its annual GDP.[20] By comparison, the same ratio for the United States was 0.25.[21]

A large number of factors have contributed to Singapore's success as a trading centre and business hub: business regulations, government policy, taxation, the education and skillset of the local population, geographic location, historical legacy, etc. Nevertheless, the quality and range of air services available at the country's main airport, Changi Airport, is a contributing factor. Singapore's position as a global trading and business hub would not be possible without the high degree of air connectivity provided by the airport. The air service at the airport transports high-value domestic exports around the world and enables employees

[18] Source: Air Transport Action Group: http://www.atag.org/.

[19] Source: World Development Indicators, World Bank, 2013; World Economic Outlook Database, IMF, 2013.

[20] Source: Singapore Department of Statistics, External Trade Yearbook.

[21] Source: World Bank.

of multinational businesses to travel to clients, regional offices, and global headquarters. Many of the businesses with regional headquarters in Singapore would not be located there without the mobility that the country's air services provide.

3.2.1 Aviation Employment

A 2004 study by the UK CAA examined the impact of liberalisation of the EU market on employment in the aviation sector.[22] It found that between 1991 and 2001 (i.e., before and after liberalisation) employment in the aviation sector had increased by 38% in the UK. The study found similar results across Western Europe with employment increasing by 6-84%, except in a few countries where the national carrier had collapsed or been restructured as a result of government policy (e.g., Switzerland, Belgium, Greece).

A study conducted by NERA Economic Consulting in 2008 on behalf of IATA examined the impact of liberalisation on aviation employment in the U.S. and Europe.[23] The study found evidence that employment in the U.S. aviation industry increased substantially following the liberalisation of its domestic market in 1978. Employment rose by 22% between 1975 and 1985 (prior to 1975, aviation employment had been declining), and then rose by a further 51% between 1985 and 1993. In Europe, employment in the 15 EU member states that liberalised in the 1990s grew by 6% between 1997 and 2007, despite a significant traffic downturn in 2001 (due to recessionary effects and the impact of the 9/11 terrorist attack).

3.2.2 Trade, Investment and Business Location Decisions

A significant body of research has developed examining the impact of air transport on aspects of trade, investment, and location decisions; it is summarised below:

- A study commissioned by IATA surveyed 625 businesses in five countries (China, Chile, United States, Czech Republic, and France), and found that 25% of their sales were dependent on good air transport links.[24] This percentage rose to 40% for High Tech companies. In regards to access to effective air transport links, 63% of firms stated that it was vital or very important to investment decisions, while a further 24% said it was somewhat important. On average, 18% of firms reported that the lack of good air transport links had affected their past investment decisions, while 30% of Chinese firms reported that they had changed investment decisions because of constraints on air services.
- Research by the World Trade Organization (WTO) examined the role that quality of infrastructure has on a country's trade performance, estimating a gravity model that incorporates bilateral tariffs and a number of indicators for the quality of infrastructure.

[22] UK CAA, "The Effect of Liberalisation of Employment", 16 March 2004.

[23] NERA Economic Consulting, "The Impact of International Air Transport Liberalisation on Employment", October 2008.

[24] "Airline Network Benefits", IATA Economic Briefing No. 3, 2006.

The research found that country-pairs with good airport infrastructure trade more than twice as much, everything else being equal.[25]

- A study by York Aviation investigating the factors affecting individual company location decisions in Europe found that proximity to a major airport was the fourth most important factor when deciding the country of location of the European Headquarters of companies, and was the most important factor when deciding the region of location within the country.[26]
- An academic research paper published in 2008 analysed the relationship between international air service and the location of large firms' headquarters across major European urban areas.[27] The research found that the supply of non-stop intercontinental flights was a significant factor in determining headquarter locations (along with other economic, business, labour, and tax factors). Empirical research indicated that a 10% increase in supply of intercontinental air service was associated with a 4% increase in the number of large firm headquarters located in the corresponding urban area.
- A study commissioned by EUROCONTROL examined the catalytic effects of air transportation in Europe. The study examined the contribution of air transportation to tourism, trade, location/investment decisions, and productivity. [28] The study estimated the net contribution of air transportation to trade (i.e., export minus imports) to be €55.7 billion in 2003 across the 25 current EU members. The study analysed the relationship between air transportation and business investment, and found that a 10% increase in air transportation usage will tend to increase business investment by 1.6% in the long run (the impact takes approximately five years to fully manifest). The study authors estimate that between 1994 and 2003, air transportation increased business investment by 5.8% in the 25 EU member countries, worth €66 billion.

[25] Nordas, H. K. and Piermartini, R., "Infrastructure and Trade", WTO Staff Working Paper ERSD 2004-04.

[26] York Aviation, "The Social and Economic Impacts of Airports in Europe", January 2004.

[27] Bel, G. and Fageda, X. (2008), "Getting There Fast: Globalization, Intercontinental Flights and Location of Headquarters", Journal of Economic Geography, Vol. 8, No. 4.

[28] Cooper, A. and Smith, P. (2005), "The Economic Catalytic Effects of Air Transport in Europe," Commissioned by EUROCONTROL. EUROCONTROL is a civil and military organisation established in 1963 to facilitate a safe, seamless pan-European Air Traffic Management (ATM) system.

3.2.3 Overall Contribution to Economic Growth

A number of studies have empirically investigated the link between air service and economic growth, summarised below.

- A study by Irwin and Kasarda (1991) examined the relationship between the structure of airline networks and employment growth at 104 metropolitan areas in the United States.[29] Using data for a 30-year period, the researchers conducted statistical analysis which found that expansion of the airline network serving a region had a significant positive impact on employment in that region, particularly in service sector employment.[30]
- A study by Button and Taylor (2000) examined the link between international air service and economic development. [31] Using data for 41 metropolitan areas in the U.S., the authors statistically analysed the link between "high-tech" employment and the number of direct routes to Europe offered by airports in the region. The analysis found that there was a strong and significant relationship between employment and air services to Europe, such that increasing the number of European routes served from three to four generated approximately 2,900 "high-tech" jobs.
- In a similar study, Brueckner (2002) also looked at the impact of air service on employment in the U.S.[32] The analysis found that a 10% increase in passenger enplanements in a metropolitan area leads to an approximate one percent increase in employment in service-related industries. Frequent service to a variety of destinations, reflected in the high levels of passenger enplanements, was found to both attract new firms to the metro area and stimulate employment at established enterprises. However, the analysis found that there was no impact on manufacturing and other goods-related employment, suggesting that air travel is less important to these industries than it is to service-related industries.
- Cooper and Smith (2005) examined the contribution of air transportation to tourism, trade, location/investment decisions, and productivity.[33] The study estimated that the net contribution of air transportation to trade (i.e., exports minus imports) was €55.7 billion in 2003 across the 25 current EU members, or approximately 0.6% of GDP.
- A 2006 study by Inter*VISTAS* Consulting Inc. found that a 10% increase in a nation's air connectivity (a measure of international air service) increased GDP by 0.07%.[34]

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[29] Irwin, M. and Kasarda, J., "Air Passenger Linkages and Employment Growth in U.S. Metropolitan Areas", *American Sociological Review*, Vol. 56, No. 4, August 1991.

[30] The analysis was conducted using non-recursive models which confirmed that increases in the airline network were a cause rather than a consequence of this employment growth.

[31] Button, K. and Taylor, S., "International air transportation and economic development", *Journal of Air Transport Management*, Vol. 6, Issue 4, October 2000.

[32] Brueckner, J. (2002), "Airline Traffic and Urban Economic Development".

[33] Cooper, A. and Smith, P., "The Economic Catalytic Effects of Air Transport in Europe," EUROCONTROL, 2005.

[34] Inter*VISTAS* Consulting Inc., "Measuring the Economic Rate of Return on Investment in Aviation", December 2006.

- Ishutkina and Hansman (2009) analysed the interaction between air transportation and economic activity on a worldwide basis.[35] The study uses a feedback model, literature reviews, aggregate data, and case study analyses. The authors concluded that a feedback relationship between air transport and economic activity exists. Air transportation provides employment and supports economic activities which are dependent on the availability of air transportation services. In turn, economic activity drives the demand for air transportation services. Specifically, aggregate and individual country-level data were analysed in terms of the relationship between air transportation passengers and GDP. A data analysis of 139 countries over a time period of 30 years (1975 and 2005) showed that in the majority of the countries with positive growth rates, significant changes were observed. On the air transportation supply side, changes in the regulatory framework and infrastructure capability, and on the air transportation demand side, changes such as economic liberalisation reforms and supporting infrastructure investment led to positive growth rates.

3.3 Case Studies of Air Service Liberalisation

This section provides brief case studies where countries have liberalised their air services and examines the resulting impacts.

Malaysia-Thailand
The original agreement between Malaysia and Thailand was signed in 1969. This Bermuda I agreement allowed named points, carrier designations, frequencies, and capacity to be added into the market based on government consultations. Following Memoranda of Understanding (MOUs) between Malaysia and Thailand have allowed services and frequencies to increase, thus driving an increase in overall traffic.

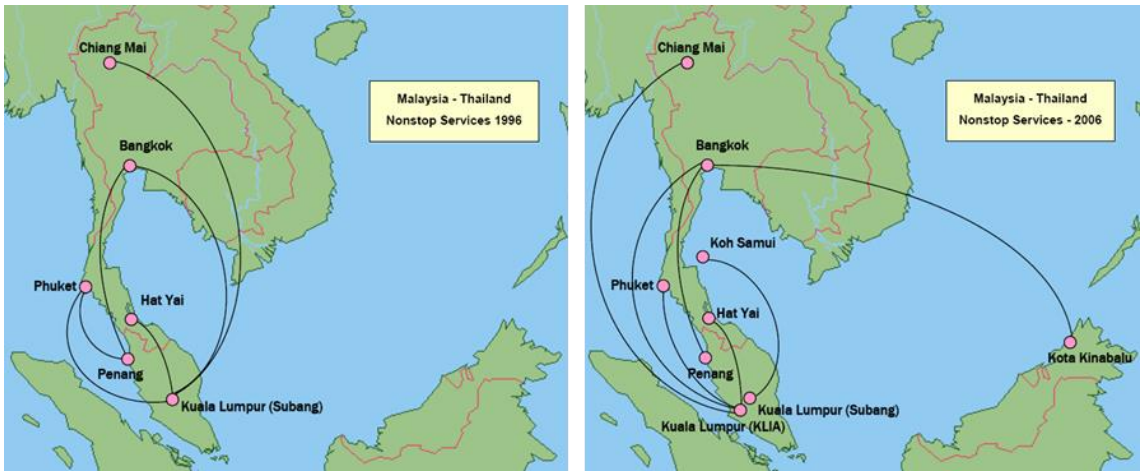
Many attributes of a liberalised market can be found within the terms of the current agreement between the countries. They include no restrictions on points served, multiple designations, code-sharing rights, and open frequencies. Fifth freedom, intermediate or beyond, and seventh freedom cargo operations are included in the agreement. As in most other bilateral agreements, cabotage is not included.

In 2004, AirAsia, a Malaysian low-cost carrier, entered the Malaysia-Thailand market triggering a sharp seat capacity increase in the market. AirAsia targeted third and fourth freedom markets, i.e., traffic between the two countries. The bilateral agreement between Malaysia and Thailand permitted AirAsia to expand in the market with new designations and frequencies. **Figure 3-2** shows non-stop air services between Malaysia and Thailand in 1996 compared to 2006. Non-stop routes have increased mainly due to new low-cost carrier services provided by AirAsia. As AirAsia grew domestically, it also developed an international network to destinations such as Kuala Lumpur-Bangkok/Phuket and Bangkok-

[35] Ishutkina M.A. and Hasnman R.J. (2009), “Analysis of the interaction between air transportation and economic activity: a worldwide perspective”, PhD thesis, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology.

Penang. While these routes were already served in 1996, the total capacity has grown due to AirAsia's low fare strategy.

Figure 3-2: Malaysia-Thailand Non-stop Services 1996 vs. 2006



Source: Inter*VISTAS* study: "The Economic Impact of Air Service Liberalisation", 2006 based on OAG data.

In 2005, 1.3 million passengers travelled between Thailand and Malaysia. Of this total, over 370,000 can be attributed to the combination of the liberalised regime and the entry of the new low-cost carrier. The direct and indirect effects of liberalisation have caused a market expansion of over 37%. The economic and tourism impacts of Thailand and Malaysia are near identical. It is estimated that each nation obtained more than 4,300 full-time equivalent positions and a stimulus of over $114 million to their respective GDPs.[36]

Jamaica-U.S. Liberal Air Service Agreement

The U.S. is the only country with which Jamaica has concluded a truly liberalised agreement. Jamaica depends highly on tourism and the U.S. is a major tourist market for Jamaica. Thus, the tourism market is central to Jamaican aviation policy.

In 1979 a liberal air service agreement was reached between the U.S. and Jamaican governments. In 2002, a full open skies agreement was signed, although it was a small advance from the already liberal agreement in place. It did allow Jamaican carriers to serve any point in the U.S., fully liberalised air cargo, and allowed for code-sharing arrangements.

During the period from 1979 to 2002, the U.S.-Jamaican market increased significantly from 450,000 to 1.2 million passenger arrivals, averaging 12% per annum growth. At the same time, Air Jamaica has maintained its competitiveness. Air Jamaica has increased the number of points served from four gateway points in 1979 to 12 gateways points across the United States by 2002.

Jamaica's experience with code-sharing is limited to only one arrangement between Air Jamaica and Delta Airlines. This code-sharing agreement has proved to be a positive

[36] Inter*VISTAS*-ga[2], "The Economic Impact of Air Service Liberalisation", June 2006.

experience as Jamaica was able to expand its market to points which it would not otherwise have been able to access.[37]

Air Jamaica has been beset by other financial and management problems, however. Caribbean Airlines acquired the airline's fleet and route rights on 1 May 2010 and has opened a new hub at Kingston's Norman Manley International Airport.

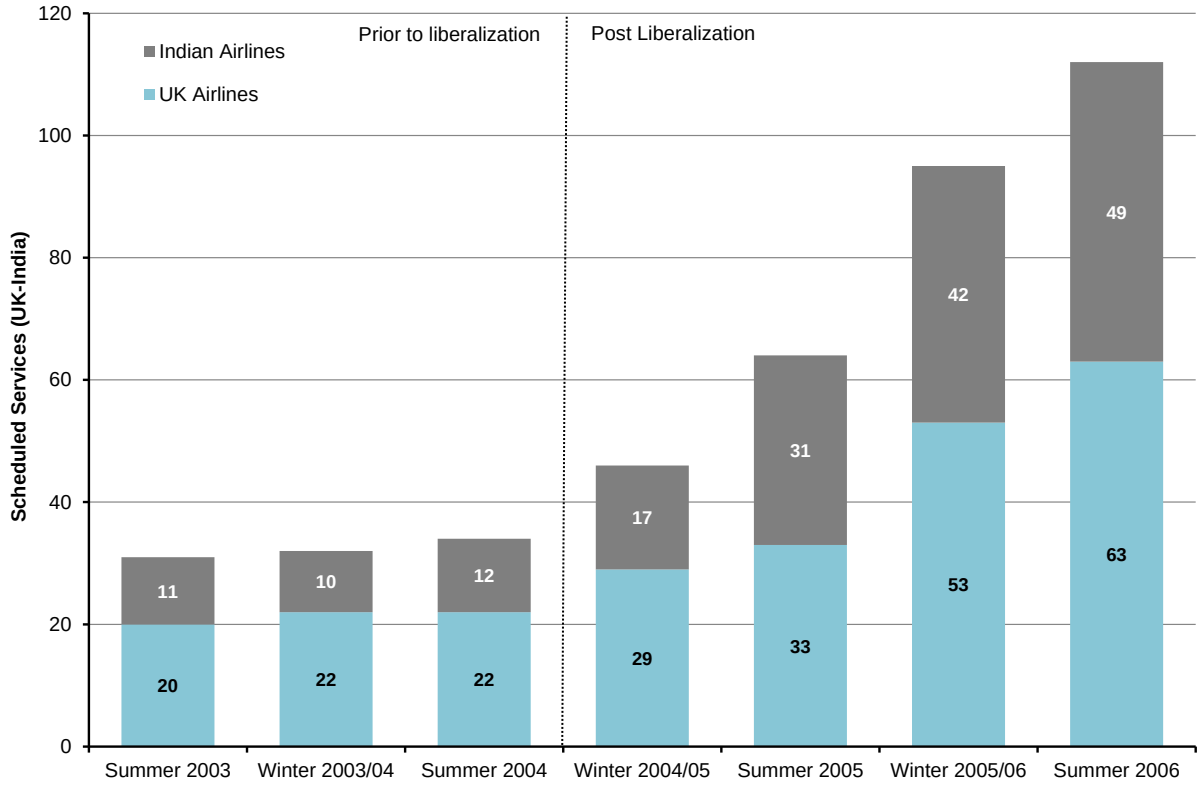
India-UK Bilateral

The UK Civil Aviation Authority (CAA) examined the impact of the liberalisation of the UK-India bilateral which took place in 2004.[38] The study found that two years after liberalisation, the number of direct services between the UK and India had increased from 34 (22 services operated by UK airlines and 12 by Indian airlines) to 112 services (63 services operated by UK airlines and 49 by Indian airlines) per week (an increase of 229%) as can be seen in **Figure 3-3Error! Reference source not found.**. While most of these new services were operated between the two countries' main airports (Heathrow in the UK and Delhi and Mumbai in India), services connecting secondary points in the UK and India also arose. In addition, the number of carriers operating between the two countries increased from three to five (BMI and Jet Airways entered the market). This increased competition resulted in average fares declining by 17% for leisure passengers and by 8% for business passengers. The lower fares and increased service caused passenger traffic between the two countries to increase by 108%.

[37] "Jamaica's Experience with air transport liberalisation", Regulatory Policy Seminar on Liberalisation Policy and Implementation, in Port of Spain, Trinidad and Tobago, 27-29 April 2004.

[38] UK CAA, "UK-India Air Services: A Case Study in Liberalisation", 22 November 2006.

Figure 3-3: Number of Scheduled Services between UK and India (2003-2006)



Source: UK CAA, "UK-India Air Services: A Case Study in Liberalisation", 22 November 2006 based on OAG data.

Liberalisation in Chile

Chile has pursued an aggressive policy of air service liberalisation since 1978. Chile has a broad policy of allowing free entry into its domestic and international air markets with little restriction on pricing and operations (subject to safety regulations), provided it generally receives reciprocity from the other country and there are no conflicts with bilaterals related to a third country.[39] As a result, Chile has signed a relatively large number of open skies agreements, such as those with the U.S., UK, Uruguay, Paraguay, Singapore, Panama, New Zealand, Jamaica, and the Dominican Republic. In other cases, while an open skies agreement has not been achieved, a more liberal bilateral has still been signed (e.g., Brazil, Argentina, Spain).

A 2008 study analysed the impact of the Chilean air liberalisation policy, especially the traffic growth, traffic concentration, and economic benefits of five Chilean aviation markets that were liberalised.[40] The study examined the impact on traffic and economic growth as a result of liberal or open skies agreements with the U.S., Spain, Brazil, and Argentina. The study found that, in general, with each liberalised agreement, passenger traffic flows grew steeper

[39] "The Policy of Open Skies in Chile", December 29th, 2003, ICAO Document.

[40] Villena, M.J., Harrison, R, and Villena, M.G., "Impacto Economico de la Politica de Acuerdos de Cielos Abiertos en Chile", Revista de Analisis Economico, Vol. 23, No. 1, pp.107-149, June 2008.

and generally exceeded previous projections of traffic growth. Using econometric analysis, the study's authors estimated that liberalisation of the agreements with these four countries had resulted in an additional US$489.4 in Gross Domestic Product (GDP).

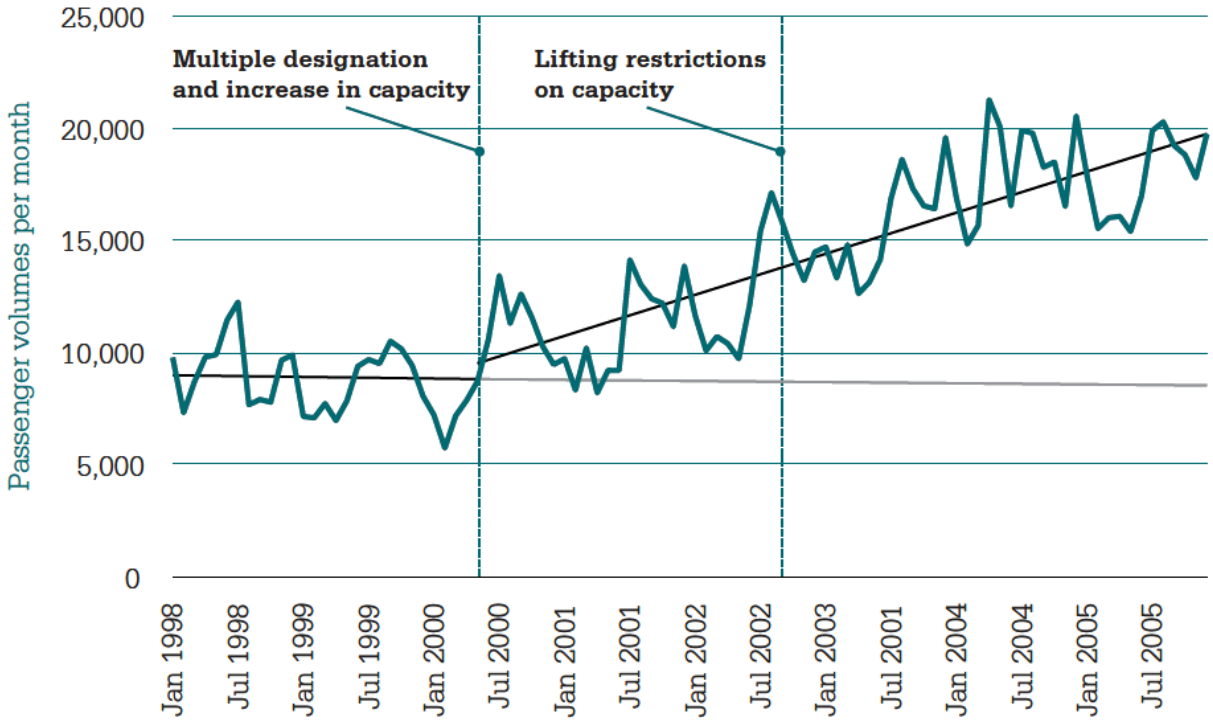
3.4 Liberalisation in Africa

The international evidence above illustrates the positive impacts resulting from air service liberalisation. This section reviews the experiences of liberalisation in Africa.

South Africa-Kenya

In 2000, South Africa and Kenya agreed to a more liberal air service agreement bilateral between the two countries. The liberalisation consisted of multiple designations (allowing a number of airlines to operate between the countries) and increasing the number of daily flights from 4 to 14. [41] In 2003, the agreement was further liberalised, removing all restrictions on capacity. After liberalisation, passenger volumes on the main route between the two countries, Johannesburg-Nairobi, increased by 69% as shown in **Figure 3-4**. While some growth can be attributed to accelerated economic growth in both countries, and increased trade between them, it is clear that liberalisation contributed to a significant increase in passenger volumes over the period.

Figure 3-4: Passenger Volumes on the Johannesburg-Nairobi Route, 1998-2005.



Source: Reproduced from *Clear Skies Over Southern Africa, The Importance of Air Transport Liberalisation for Shared Economic Growth*, ComMark Trust, October 2006.

[41] "Clear Skies Over Southern Africa, The Importance of Air Transport Liberalisation for Shared Economic Growth", ComMark Trust, October 2006.

South Africa-Zambia (Johannesburg-Lusaka Route)

The Johannesburg-Lusaka route demonstrates the impact that low cost carriers (LCCs) can have on market dynamics. In 2006, the South African LCC, Kulula started operating the Johannesburg-Lusaka route under an operating agreement with Zambian Airways. Prior to Kulula's entry, the route was only served by South African Airways (Zambian Airways had stopped flying the route).

Following the entry of Kulula, there was a dramatic impact on traffic and fares, as shown in **Figure 3-5**. Three months after Kulula's entry, traffic volumes on the route had increased 38%, top-end fares (business and full economy) had declined 33% and bottom-end fares (discount economy) had declined 38%, on average.[42] It is estimated that the traffic increase translates into 6,300 additional tourists to Zambia, spending an addition US$ 8.9 million.[43]

In this case, the market was not liberalised by government policy, but rather by Kulula using Zambian Airways' assigned capacity. Nevertheless, it illustrates the potential impacts that can arise if policy restrictions on intra-African routes are removed.

Ethiopia

Ethiopia has had a long standing policy of obtaining liberal air service rights on a reciprocal basis with other countries both within and outside of Africa. Ethiopia has signed bilateral air service agreements with over 90 countries, some of which have been open skies agreements (such as the agreement with the U.S. signed in 2005). Without these wide-ranging and liberal agreements, it is unlikely that the country's national carrier, Ethiopian Airlines, could have achieved its status as the largest carrier by revenues and profit in Africa (and one of the fastest growing) in 2013.[44]

However, there remains a large number of its bilaterals with African nations that are fairly restrictive. A 2010 World Bank report found that of the 46 bilaterals signed with other African states, 19 could be considered to be in accordance with the Yamoussoukro Decision (i.e., open skies).[45] Where Ethiopia has been able to obtain liberal bilaterals, there have been demonstrable benefits for passengers. Abate (2013) examined the impact of bilateral restrictions on fares and frequency on 20 routes between Addis Ababa, Ethiopia and destinations in Africa using traffic data from 2000 to 2005.[46] The bilaterals on these routes varied in terms of their restrictions on capacity, frequency, and pricing. The analysis found that routes operating under liberal bilaterals had 10-21% lower fares and 35-38% higher frequency levels than restrictive bilaterals, all else being equal.

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[42] "Clear Skies Over Southern Africa, The Importance of Air Transport Liberalisation for Shared Economic Growth", ComMark Trust, October 2006.

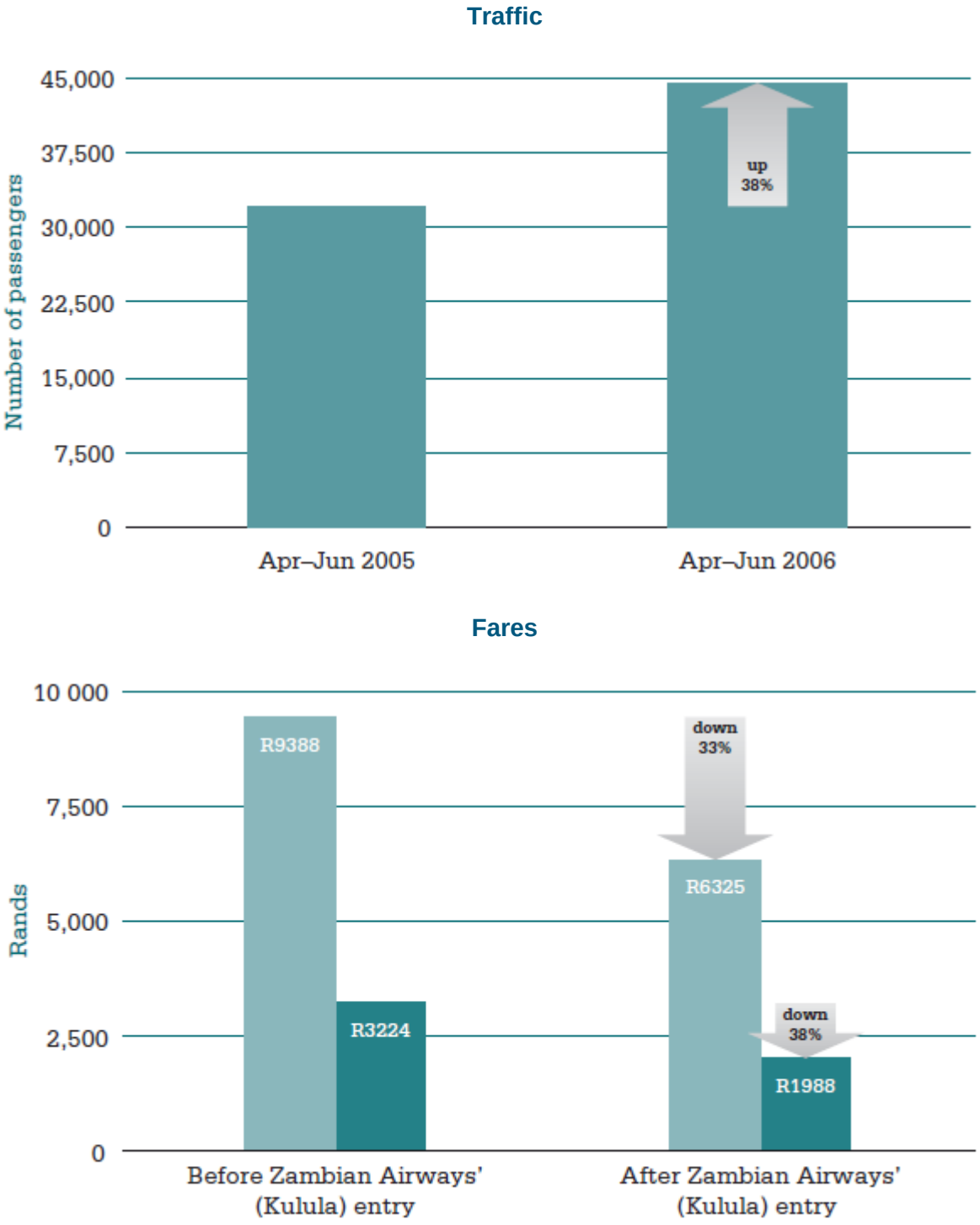
[43] Ibid.

[44] IATA, World Air Transport Statistics (WATS), 58th edition, 2014.

[45] World Bank, "Open Skies for Africa: Implementing the Yamoussoukro Decision", 2010.

[46] Megersa A. Abate, "Economic Effects of Air Transport Liberalisation in Africa", Swedish National Road and Transport Research Institute, October 2013.

Figure 3-5: Impact on Traffic and Fares on the Johannesburg-Lusaka Route

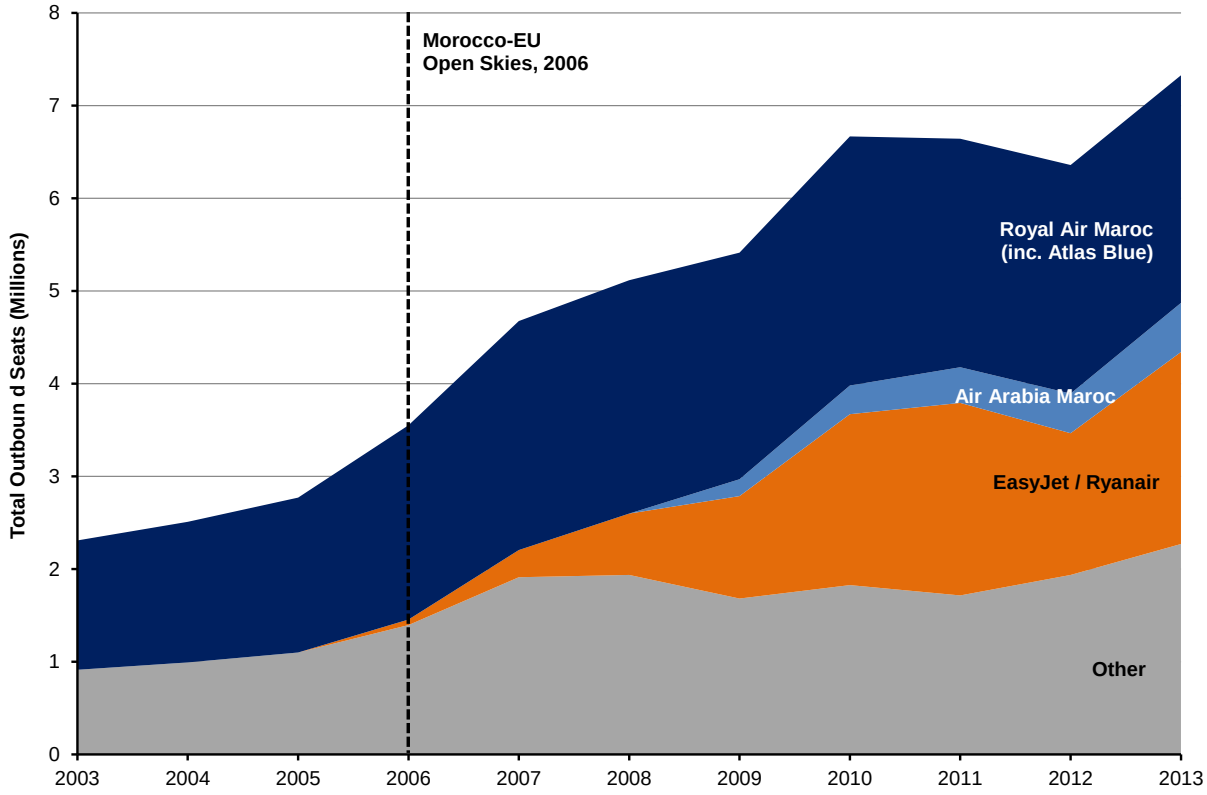


Source: Reproduced from *Clear Skies Over Southern Africa, The Importance of Air Transport Liberalisation for Shared Economic Growth*, ComMark Trust, October 2006.

Morocco-EU Open Skies

In 2006, an open skies agreement between Morocco and the EU and came into force. The agreement allows EU carriers to serve any point in Morocco without restriction on price or capacity while allowing Moroccan carriers the same freedom to operate to any point in the EU, and will allow fifth freedom rights for carriers from both sides. The impact on seat capacity between Morocco and the EU is illustrated in **Figure 3-6**.[47]

Figure 3-6: Impact of the Morocco-EU Opens Skies Agreement on Air Capacity Between Morocco and the EU Destinations



Source: Diio Airline Schedule Data (2003-2013).

The total number of seats operated between increased by 160% between 2005 and 2013 and the number of routes operated between points in the EU and points in Morocco rose from 83 in 2005 to 309 in 2013 (some seasonal).[48] The increase in traffic and routes was largely the result of the entry of low cost carriers. Europe's two largest LCCs entered the market in 2006 and, in 2009, a Moroccan LCC, Air Arabia Maroc, was set up as a joint venture between various Moroccan investors and Air Arabia. European and Moroccan LCCs accounted for 41% of seat capacity in 2013, compared with 0% in 2005.

[47] Royal Air Maroc set up Atlas Blue as an LCC subsidiary in 2004. The airline was rolled back into Royal Air Maroc in 2009.

[48] Source: Diio Airline Schedule Data (2003-2013).

While the market share of the main home carrier, Royal Air Maroc, has declined from 60% in 2005 to 40% in 2013, thanks to market growth its total seats operated has increased 47%.[49] Approximately 19% of the traffic growth occurred at Morocco's largest airport – Casablanca – while 36% of the growth occurred at the country's second largest airport in Marrakesh. The remaining 45% of growth occurred at regional airports, with Agadir, Fez, Nador Tangier all experiencing substantial growth.

Nigeria

In the late 1990s, Nigeria started to reform its aviation industry, with the complete deregulation of its domestic market and privatisation of airline and handling companies. In 2001, Nigeria implemented a new civil aviation policy promoting liberalisation and, in particular, the principles of the Yamoussoukro Decision. International bilaterals with some countries were reviewed and partially liberalised, including those with African nations, and in 2002, Nigeria signed an open skies agreement with the U.S.

Ismaila et al (2014) estimated a gravity model to examine the impact of this liberalisation process on traffic volumes to and from Nigeria.[50] The analysis used data on traffic between Nigeria and 112 countries in 2009 and 2010, and controlled for other factor that may have influenced traffic levels (economic growth, bilateral trade, distance between the countries, etc.). The analysis found that traffic volumes were significantly higher on routes with more liberal bilaterals, all else being equal, and that the traffic increased with the degree of liberalisation. Using the model parameters, it was estimated that liberalising Nigeria's remaining restrictive bilaterals could increase traffic on those routes by 33-66% (depending on the degree of liberalisation). If restrictions on airline ownership were also removed, traffic volumes could increase by as much as 117% (compared to a restrictive bilateral and ownership regime).

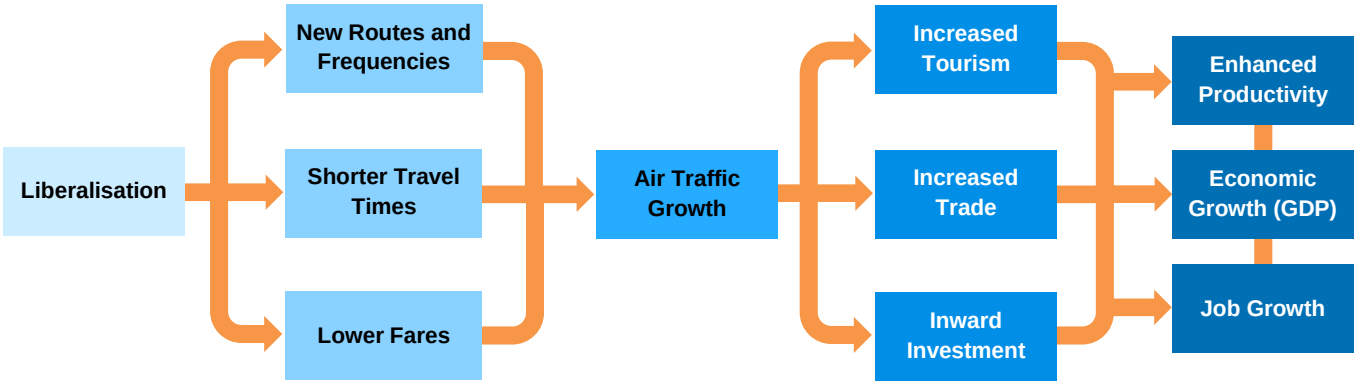
[49] Ibid.

[50] Ismaila, D. A., Warnock-Smith, D. and Hubbard, N., "The impact of Air Service Agreement liberalisation: The case of Nigeria", Journal of Air Transport Management, Vol. 37 (2014), pp. 69-75.

3.5 Summary

A body of research has developed over the last 15 years or so which has examined and quantified the impact of air service liberalisation and the contribution of air transport to trade, investment, and economic growth. Through the use of different empirical methods and data sets, this research has consistently found a significant and positive relationship between liberalisation, aviation and economic growth.

Liberalisation can lead to increased air service levels and lower fares, which in turn stimulates additional traffic volumes, facilitates tourism, trade, investment and other sectors of the economy and brings about enhanced productivity, economic growth and increased employment, as illustrated below:

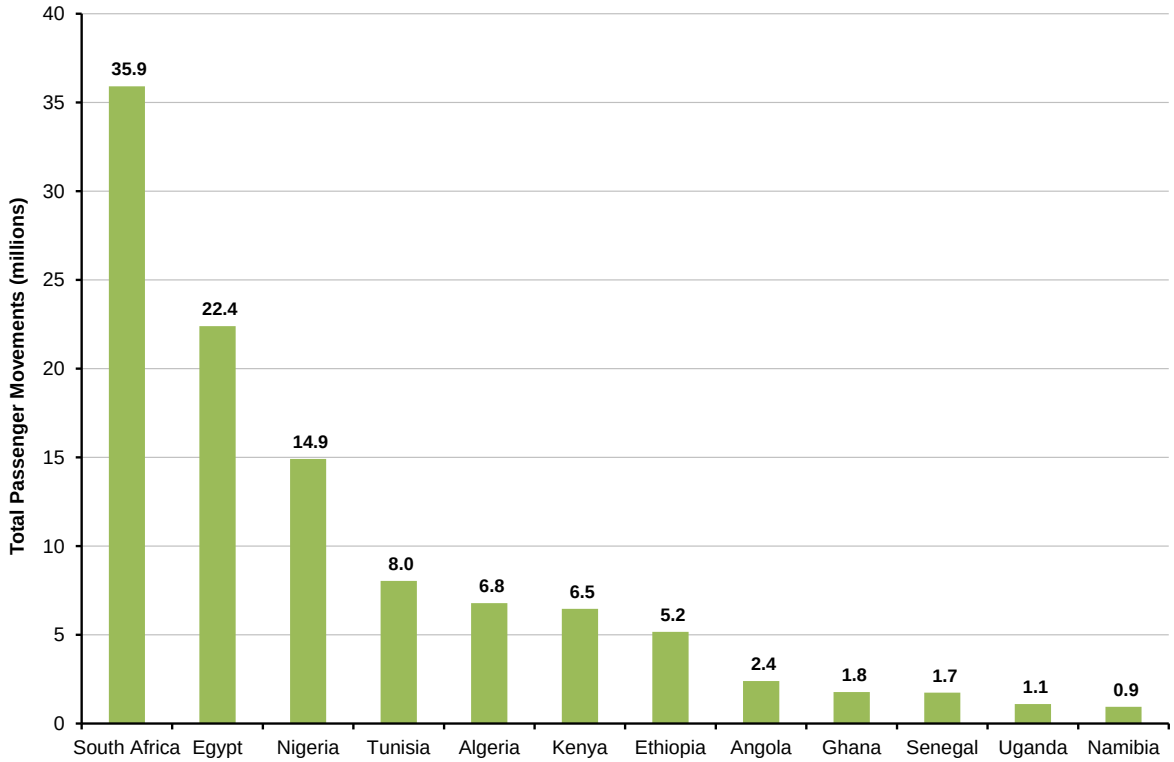


4 The African Air Market

4.1 Overview of the 12 Air Markets

The following section provides an overview of air passenger movements, major carriers and airports for the 12 African countries of focus. All air passenger traffic statistics are drawn from the "2011 World Airport Traffic Report" by Airports Council International, unless otherwise specified. **Figure 4-1** summarises air passenger movements by country.

Figure 4-1: Air Passenger Movements by Country, 2011



Source: "2011 World Airport Traffic Report", Airports Council International, 2012.

4.1.1 Northern Africa

- **Algeria** contains 36 airports, a third of which are international. In 2011, 6.8 million passengers passed through the country's airports – 4.3 million international passengers and 2.5 million domestic passengers. Algeria's busiest airports include Algiers (4.8 million total passengers), Oran Es Senia (1.1 million total passengers), and Oued Irara (0.44 million total passengers). Algiers International is the main hub for Algeria's national carrier Air Algerie and Tassili Airlines. Air Algerie is the national airline of Algeria, operating scheduled international services to 39 destinations in 28 countries in Europe, North America, Africa, Asia, and the Middle East, as well as domestic services to 32 airports. As of December 2013, Air Algerie is wholly owned by the government of Algeria.

- Approximately 22.4 million passengers flowed through **Egypt's** airports in 2011 – 18.6 million international passengers and 3.8 million domestic passengers. The three largest airports in Egypt are Cairo International (12.8 million total passengers), Sharm El Sheikh (5.5 million total passengers), and Borg El Arab (1.0 million total passengers). Collectively, these airports account for over 85% of the country's passenger traffic. Egypt's predominant carrier is EgyptAir, a member of Star Alliance. The airline's main hub is Cairo International Airport and it operates scheduled passenger and freight services to more than 75 destinations in the Middle East, Europe, Africa, Asia, and the Americas.
- **Tunisia** has nine international airports, seven of which are managed by the country's civil agency, the Office for Civil Aviation and Airports. A total of 8.0 million passengers transited through these airports in 2011 – 7.5 million international passengers and 0.5 million domestic passengers. The largest airport is the capital's Tunis-Carthage International (3.9 million total passengers). The airport has an annual passenger capacity of 5.0 million, 80% of which is made up of scheduled international flights. The next largest airport, Djerba-Zarzis International (1.7 million), has an annual capacity of 4.0 million passengers, and 75% of its traffic consists of international charter flights. The country's smaller airports are at Sfax, Tabarka-November 7, Nefta, Gafsa-Ksar, and Gabes-Matmata. However, capacity at the smaller airports is significantly underused. The country's flag carrier airline is Tunisiair, which operates scheduled international services to European, African and Middle Eastern destinations out of its main hub at Tunis-Carthage International. Other major carriers include Nouvelair and Karthago.[51]

4.1.2 Eastern Africa

- The vast majority of **Ethiopia's** air passenger traffic flows through Addis Ababa Bole International. In 2011, nearly 5.2 million total passengers passed through the airport – 4.6 million international passengers and 0.5 million domestic passengers. Approximately three quarters of international traffic at the airport is intra-African. It is the main hub of Ethiopian Airlines, the flag carrier that serves destinations in Ethiopia and throughout the African continent, as well as non-stop service to Asia, Europe and North America.
- Entebbe International is the principal international airport of **Uganda** and is operated by the Civil Aviation Authority of Uganda. The airport served nearly 1.1 million passengers in 2011, almost all of which were international passengers. Air Uganda is largely recognized as the national carrier, following the collapse of Uganda Airlines in May 2001. Air Uganda uses a fleet of three aircraft to operate scheduled flights from Entebbe to various countries in Eastern and Central Africa.
- Jomo Kenyatta International in Nairobi is **Kenya's** foremost international airport, serving nearly 80% of the country's air passenger traffic. In 2011, the airport served a total of 5.0 million passengers – 3.8 million international passengers and 1.2 million domestic passengers. It has scheduled flights to destinations in over 50 countries and is the main hub for Kenya Airways and Fly540. Kenya Airways is the country's largest domestic

[51] "The Report: Tunisia 2011", Oxford Business Group, 2012.

airline and was the first African flag carrier to successfully privatize its operations. Launched in 2006, Fly540 is a low-cost carrier that operates domestic and international passenger and freight services. Moi International Airport in Mombassa is Kenya's second largest airport, serving over 1.3 million passengers in 2011 – 0.5 million international passengers and 0.8 million domestic passengers. In addition to handling direct flights to Europe, the airports offer connections to several regional destinations. Both Jomo Kenyatta International and Moi International are operated by the Kenya Airports Authority.

4.1.3 Western Africa

- Kotoka International is **Ghana's** largest and most important airport by a significant margin. In recent years, the airport achieved a substantial increase in passenger traffic from 1.4 million in 2010 to 1.8 million in 2011 - 1.6 million international passengers and 0.2 million domestic passengers. Other commercial airports are located at Tamale, Kumasi and Sunyani. Eagle Atlantic Airlines is the first wholly Ghana- owned flag carrier after the demise of Ghana Airways and Ghana International Airlines.[52] The air carrier focuses on providing low cost airline service to West African countries through its main hub at Kotoka International.
- Sedar Senghor International is **Senegal's** primary airport, serving over 1.7 million passengers in 2011 – the vast majority of which were international passengers. Blaise Diagne International is currently under construction to serve as a new airport for Dakar, as Sedar Senghor International is becoming too small for future operations. The airport is expected to be operational by the end of 2014. Senegal Airlines is the country's predominant carrier, operating a scheduled domestic network and regional flights to neighboring countries. The airline was launched after Air Senegal International ceased its operations in 2009, and made its first flights on January 25, 2011.
- Over 14.9 million passengers transited through **Nigeria's** airports in 2011 – 11.3 million international passengers and 3.6 million domestic. The airports in Lagos (6.7 million passengers), Abuja (4.2 million passengers), and Port Harcourt (1.3 million passengers) accounted for over 80% of the country's air traffic flows. Murtala Muhammed International in Lagos is Nigeria's predominant international airport and is operated by the Federal Airports Authority of Nigeria. It serves as a hub for domestic carriers Aero and Arik Air. Nnamdi Azikiwe International in Abuja also serves as a hub for Arik Air, as well as IRS Airlines. Air Nigeria was also a notable domestic player until the company announced the closure of its worldwide operations in September 2012, due, in-part, to non-compliance with tax obligations.[53]

[52] "The Report: Ghana 2011", Oxford Business Group, 2012.

[53] "The Report: Nigeria 2011", Oxford Business Group, 2012.

4.1.4 Southern Africa

- **South Africa** is host to several of the busiest airports on the continent. Around 90% of the 35.9 million passengers – 10.5 million international passengers and 20.4 million domestic passengers - that transited through airports in South Africa in 2011 went through the Johannesburg (18.9 million), Cape Town (8.4 million), or Durban (5.0 million) airports. O.R. Tambo International, near Johannesburg, serves as the primary airport for domestic and international travel to/from Africa and is Africa's busiest airport with a capacity to handle up to 28 million passengers annually. The airport is the hub of South Africa's largest international and domestic carrier, South Africa Airways, as well as a number of local airlines, including Airlink, South African Express, and Kulula.[54]
- Approximately 0.94 million passengers transited through airports in **Namibia** in 2011 – 0.78 million international passengers and 0.16 million domestic passengers. Hosea Kutako International, located in the capital city of Windhoek, accounted for nearly 80% of the country's air passenger traffic. Most of the services at this airport are to points in Africa, particularly South Africa. Few domestic flights pass through the Hosea Kutako International, as those are predominantly handled at the smaller Windhoek Eros Airport. Air Namibia is the country's national airline, headquartered in Windhoek. It operates scheduled domestic, regional, and international passenger and cargo services, having its international hub at Hosea Kutako International and a domestic hub at Windhoek Eros Airport. As of December 2013, the carrier is wholly owned by the Namibian government.
- Quatro de Fevereiro International is the main international airport of **Angola** and is located in the capital city of Luanda. The airport served over 2.4 million passengers in 2009, a 9.4% increase over the previous year.[55] Quatro de Fevereiro International is the main hub for TAAG Angola Airlines, the country's flag carrier. The airline operates domestic services within Angola, as well as medium-haul services in Africa and long-haul services to Brazil, Cuba, China and Portugal. In the near future, Quatro de Fevereiro International will be replaced by the new Angola International Airport. Construction work has already been started but was discontinued due to financial disagreements between the Angolan government and the Chinese property developer. The new airport is designed for around 13 million passengers per year.[56]

[54] "The Report: South Africa 2011", Oxford Business Group, 2012.

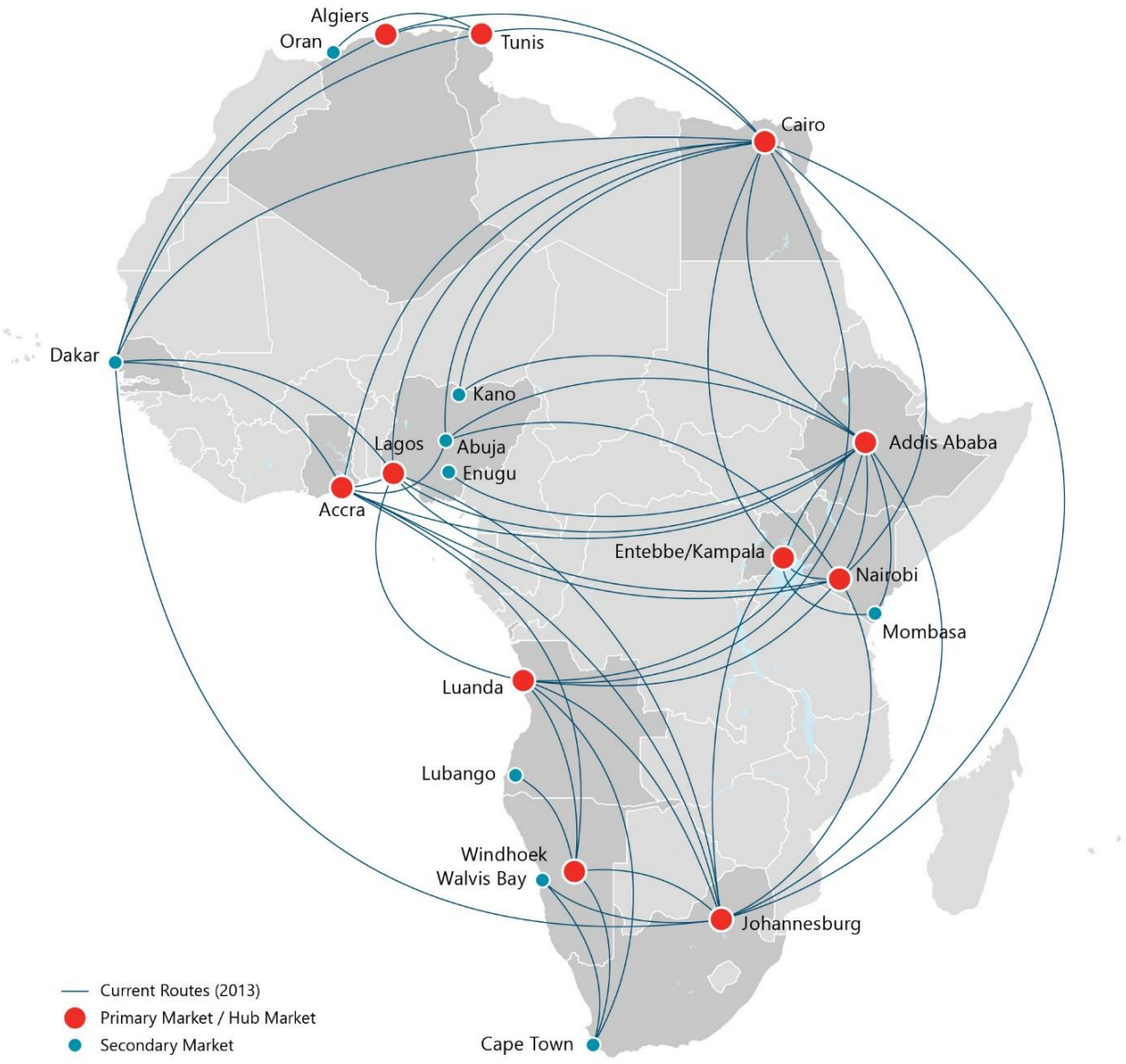
[55] "2009 World Airport Traffic Report", Airports Council International, 2010.

[56] "Interview with Pimentel Araujo about the Angola air traffic", aeroscope.com, August 2012.

4.2 Air Services Between the 12 Countries

Figure 4-2 shows the services operating between the 12 countries in 2013. Of the 66 country pairs between the 12 counties, 34 (52%) had some form of direct service. In total, there was an average of 134 daily flights across 94 city pairs.

Figure 4-2: Services Operating Between the 12 Countries (2013)



Source: Diio Airline Schedule Data (2013).

5 The Principles and Application of the Yamoussoukro Decision

5.1 History and Principles of the Yamoussoukro Decision

Transportation is taking an increasingly prominent role in the African economy, particularly as trade expands beyond the local level. However, many parts of the region have deficient infrastructure that constrains opportunities for economic development. Poor roads have led to high transportation costs due to increased fuel consumption, higher maintenance costs, and the reduced life of trucks in general.

Africa's population size — over 1 billion people — combined with its large landmass presents a favourable environment for the air transport industry. The fact that almost a third of African countries — 16 out of 54 — are landlocked and that over-land infrastructure is under-developed makes air transport all the more important. In 2010, the aviation industry in Africa supported about 7 million jobs, including 257,000 direct jobs, which were worth about US$67.8 billion of the continent's GDP.[57] Air transport plays a critical role in facilitating health care access, humanitarian assistance, the movement of products to global markets, tourism, and the creation of businesses.

Although Africa is home to 12% of the world's people, it accounts for less than 3% of the global air service market.[58] The expansion and improvement of air transport on the continent has been hampered by a restrictive and protectionist intra-African regulatory regime. After independence, most African states established their own flag carriers, which primarily focused on route development to European capitals rather than strengthening intra-African or domestic networks. This led to the cross-subsidization of unprofitable domestic and regional routes supported by profits from intercontinental routes protected by monopoly-oriented agreements. As a result, domestic, regional, and trans-continental air service markets remained underserved, inefficient, and uncompetitive.

Africa's air transport sector has suffered from more than just high prices and unprofitable routes — safety and reliability are also significant issues for operators. Africa's aircraft hull-loss accident rate is more than six times higher than those of Asia and Latin America, and more than 12 times higher than those of Europe and North America.[59]

In 1999, the *Yamoussoukro Decision* (the Decision) was adopted out of recognition that the strict regulatory protection that sustains national carriers has detrimental effects on air safety records, while inflating air fares and dampening air traffic growth. It followed up on the Yamoussoukro Declaration of 1988, in which many of the same countries agreed to principles of air services liberalisation. The Decision commits its 44 signatory countries to

[57] "Africa's Aviation Industry", African Development Bank, 2012.

[58] Kuuchi, R., "An Assessment of African Open Skies", African Airlines Association, 2013.

[59] "Aviation Safety Report", International Air Transport Association, 2012.

deregulate air services and promote transnational competition in regional air markets. It was viewed as a means to develop air services in Africa and stimulate the flow of private capital in the industry. Specifically, the Decision calls for:

- Full liberalisation of intra-African air transport services in terms of access, capacity, frequency, and tariffs;
- Free exercise of first, second, third, fourth, and fifth freedom rights of passenger and freight air services by eligible airlines;
- Fair competition on a non-discriminatory basis;
- Compliance with international safety standards.[60]

Recognising that Africa is a fragmented continent with assorted economic and political organisations, the Yamoussoukro Decision encourages sub-regional and regional organisations to pursue policy implementation. As a result, much of the progress towards liberalisation has been facilitated by regional economic communities (RECs). An outline of regional implementation can be found below:

- **North Africa.** The Arab states of North Africa have yet to liberalise air services among themselves, even though certain instruments, such as the Arab League Open-Skies Agreement, exist. Morocco, the only North African country that is not a signatory party, has been the most proactive with respect to liberalising and expanding its air services — it has signed an open skies agreement with the EU and has acquired controlling stakes in two African air carriers.
- **West Africa**. The predominant organisation, the Economic Community of West African States (ECOWAS), has failed to take meaningful progress towards liberalising air services. However, the smaller REC, the West African Economic and Monetary Union (WAEMU), has gone beyond the provisions of the Decision and agreed to an EU model that includes cabotage rights. Finally, the Banjul Accord Group (BAG) has agreed to a multilateral air service agreement that creates a liberalised regime in line with the provisions of the Decision.
- **Central Africa**. The Economic and Monetary Community of Central Africa (CEMAC) has implemented all the necessary legislative and regulatory elements to comply with the provisions of the Decision.
- **South and East Africa**. The Eastern Africa Community (EAC) has elected to revise bilaterals to align with the principles of the Decision. However, while implementation remains pending, tangible progress has been made in other relevant matters, such as the establishment of joint air safety and security agencies. Conversely, the Southern African Development Community (SADC) has failed to make any substantial advancement. The main obstacle towards progress appears to be the dominant position

[60] "Aviation Safety Report", International Air Transport Association, 2012.

of South Africa and the fear that its national carrier, South African Airways, would quickly marginalize weaker competition in a liberalised market.[61]

5.2 Progress to Date

According to Article '7', provisions of the Decision take precedence over all the previous bilaterals signed between African countries. However, to date the practice has been for individual countries to negotiate bilaterally based on these provisions — this affords each country control over the pace and extent of openness.[62] While some states have relaxed bilaterals to allow more flights and frequencies, full liberalisation is far from achieved. Several issues have prevented the full potential of the Decision from being realized:

- **Protectionist policies have obstructed liberalisation**. The desire by each country to have a national airline and the absence of a mechanism to form and jointly own airlines on the continent is a major impediment to liberalisation. A number of countries continue to restrict market access under the pretext that their national airline is not ready to compete in a liberalised market. Other countries insist that non-local airlines pay royalties for the privilege of using additional frequencies beyond what is allowed under the BASA.

- **Discriminatory practices have hampered the pace of liberalisation**. While some states in Africa have refused to open their skies to each other, they have opened up to carriers from other continents. This is particularly apparent in West Africa, where non-African airlines tend to be given more third/fourth and sometimes fifth freedom traffic rights while African carriers are denied. With limited market access, it is very difficult for carriers in the region to grow and compete effectively, even if they have the resources to expand their network. As a result, it is often more convenient and faster to fly from a city in West Africa via London, Paris, Amsterdam, or Dubai and back to a neighbouring city in West Africa than to travel direct.

- **Severe restrictions have been imposed by regulators outside the continent**. The EU, in particular, has been accused of non-transparency for the manner in which it applies its airline safety bans. Several airlines with strong safety records are prevented from flying to the EU due to lack of confidence in the safety oversight provided by African regulatory authorities. These restrictions have detrimental effects on the growth of the air transport sector. Notably, non-African carriers currently transport about 80% of intercontinental traffic to/from Africa, highlighting the need to level the playing field.

- **The efficient utilization of infrastructure has been hindered by non-physical barriers**. These non-physical bottlenecks to traffic flow range from severe shortages of foreign exchange to burdensome documentation procedures. Visa requirements tend to be unnecessarily onerous, expensive, and take a long time to process. Similarly, several

[61] Shlumberger, C., "Open Skies for Africa 2010", World Bank, 2010.

[62] Abeyratne, R., "The Implications of the Yamoussoukro Decision on African Aviation", Air and Space Law, Issue 6, pg. 280-293, 2003.

countries do not exchange embassies, thus requiring one to travel to another country to get a visa. For example, in South Africa, some African nationals are required to have transit visas even if they are merely transiting through the airport. Meanwhile, many European and American citizens do not require visas to enter South Africa. [63]

Although policy implementation remains incomplete or stagnant in many regions of Africa, there is evidence to suggest that progress has been made at the operational level. Some of the most significant impacts of the Yamoussoukro Decision include:

- The strengthening of a few stronger African carriers, such as Ethiopian and Kenya Airways, that were able to capitalize on their comparative advantages;
- The consolidation of networks through the elimination of a number of low-density routes and growth of routes to and from the main hubs;
- The development of fifth freedom traffic, especially in regions and country-pairs that lacked strong local carriers;[64]
- The development of sixth freedom traffic fostered by the liberalisation of third and fourth freedom capacities within Africa, and in some cases with the intercontinental counterpart countries.[65]

[63] Kuuchi, R., "An Assessment of African Open Skies", African Airlines Association, 2013.

[64] Often offered by carriers at marginal cost, resulting in competitive pressure on regional fares.

[65] Shlumberger, C., "Open Skies for Africa 2010", World Bank, 2010.

6 Analysis of the Impacts of Intra-African Liberalisation on Direct Users

This chapter summarises analysis of the traffic and passenger impacts resulting from liberalising the air service bilaterals between 12 countries:

- **North**: Algeria, Egypt, Tunisia
- **East**: Ethiopia, Kenya, Uganda
- **South**: Angola, Namibia, South Africa
- **West**: Ghana, Nigeria, Senegal

These impacts were estimated based on a gravity model of air traffic movements described in the sections below.

6.1 Defining the Scenario

The analysis assumes that all 12 countries sign “open skies” bilateral agreements with each other, which are in accordance with the principles of the Yamoussoukro decision (a total of 66 bilaterals covering all country-pairs). The bilaterals allow any airline from either country to operate any route between the two countries without restriction on capacity, frequency, or price and with the ability to operate fifth freedom services and enter into co-operative arrangements. The analysis assumes there are no other possible constraints on air service development such as onerous visa requirements or infrastructure limitations (e.g., lack of airport or air navigation capacity).

The estimated traffic impacts are of origin/destination (O/D) traffic between the country pairs. As such, it does not include connecting traffic at the origin or destination. For example, O/D traffic between Nigeria and South Africa is the total passenger traffic that started in Nigeria and ended in South Africa (and vice versa in the other direction). It would not include passengers starting in Nigeria and connecting in South Africa enroute to other destinations (e.g., Mauritius). The implications of liberalisation for connecting traffic flows are discussed in **Chapter 8**.

Additional modelling was conducted to examine the impacts of liberalisation between countries within the same part of Africa (e.g., the impact of liberalisation just between the North countries — Algeria, Egypt, and Tunisia). The impact of this sub-regional liberalisation is provided in **Chapter 9**.

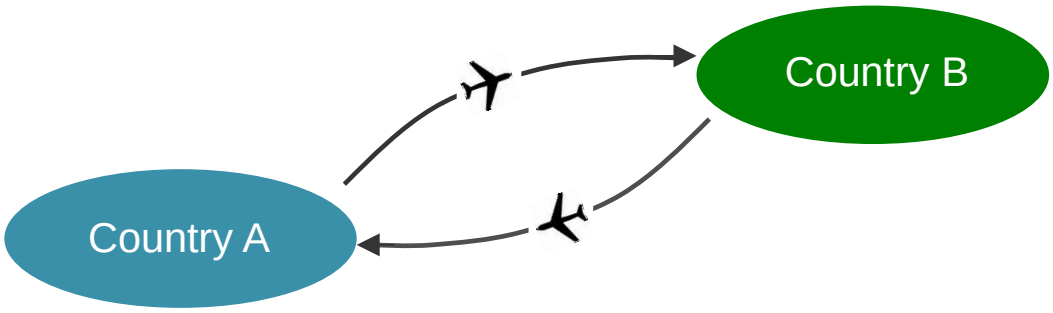
6.1.1 A Necessary but Not Sufficient Condition

The impacts presented are the long-term impacts manifesting 2-3 years after liberalisation is enacted. However, it should be kept in mind that liberalisation is a necessary, but not always sufficient condition for the realisation of full benefits. Other issues are also critical, such as aviation infrastructure, taxation levels, visa requirements, doing business issues, etc.

The estimated impacts are those arising purely from liberalisation and are in isolation to other factors that may impact traffic volumes, such as general economic growth, government policy or infrastructure development.[66] It is possible that with other complimentary policies or initiatives, the benefits set out in this report could be even higher.

6.2 Modelling the Impact of Liberalisation

The impacts of liberalisation of bilaterals between the 12 countries were estimated using a gravity model which forecasts traffic between any two countries based on the economic characteristics of the two countries, trade levels between the two countries, their geographic relationship, and the characteristics of the bilateral between the two countries as illustrated below:



$$Traffic_{AB} = F(GDP_A, GDP_B, Trade_{AB}, Intervening_{AB}, BilateralFactors(0,1)_{AB})$$

Where:

$Traffic_{AB}$ is the total two-way Origin/Destination (O/D) passenger traffic between the two countries.

GDP_A and GDP_B is the Gross Domestic Product of the two countries, capturing their economic size (i.e., there is likely to be higher air traffic volumes between larger countries economically, all else being equal).

$Trade_{AB}$ is an estimate of the total amount of trade between the two countries (i.e., the higher the amount of trade between countries, the higher the potential air traffic volumes, all else being equal).

$Intervening_{AB}$ captures the intervening opportunities for closer travel between the two countries. Traffic between two countries was found to be less if there were opportunities for travel to closer countries. The intervening variable is calculated as an index of the sum of GDPs of every country that is 10% or less distant than the distance between the two countries. In other words, air traffic volumes are

[66] The impacts are provided relative to current (2013) traffic levels. The projections were generated under the assumption of *ceteris paribus.* In other words, the only difference between current traffic levels and the travel levels projected by the model is the impact of liberalisation. GDP, trade and other factors are kept constant.

likely to be higher from nearby countries than from more distant ones, all else being equal.

BilateralFactors(0,1)$_{AB}$ are dummy variables capturing the presence or absence of a specific restriction on the bilateral. For example, if the bilateral allows flights only to named points then the dummy variable takes the value 1, else if carriers are unrestricted in the airports/cities they can fly to, the dummy variable takes the value 0. The dummy variables also have "modifiers" to reflect the circumstances of the individual bilateral. For example, the *named points* dummy is multiplied by a variable derived from the product of the geographic area of the two countries. This captures the fact that liberalising this condition will have a smaller impact on geographically small island nations with only one major airport than on large countries with multiple airports.

The original gravity model was developed as part of a previous study by the Inter*VISTAS* group.[67] Its parameters were estimated using traffic, economic, and bilateral data from over 800 country-pairs with varying degrees of liberalisation. It has since been updated and modified in subsequent studies. Further details on the model can be found in **Appendix B**.

The impacts of liberalisation were estimated by specifying changes to the terms of the bilateral, e.g., the BilateralFactors(0,1) dummies were switched from one (1) to zero (0), where relevant, on each bilateral agreement. The gravity model then calculated the growth in international traffic stimulated by this change. In estimating the traffic, the model takes account of the fact that liberalisation is a necessary but not a sufficient condition for traffic growth. No new services will result if there is no underlying demand to support them. The model therefore examines the air services already operating between each country pair (the model contains up-to-date airline schedule data on services between the countries). If any such flights already operate, it is assumed that capacity can expand to accommodate demand. If no such flights exist, the model algorithm determines the aircraft most appropriate for a route of that length. If the traffic available is insufficient to support a reasonable level of service, the model assumes that no direct service will arise. The model then examines the bilateral agreement to ascertain if fifth freedom rights are available. If so, it then allocates the traffic to an appropriate indirect service, reducing the estimated traffic due to the undesirability of the indirect service. If no fifth freedom rights are available, then the model assumes that there will be no increase in traffic level despite the liberalisation of the bilateral.

To undertake the analysis in this report, the model was fully updated using 2013 traffic and economic data (the most recent available on a global basis).[68]

[67] The results of that study can be found in the report, "The Economic Impact of Air Service Liberalisation", Inter*VISTAS*-ga^2, June 2006.

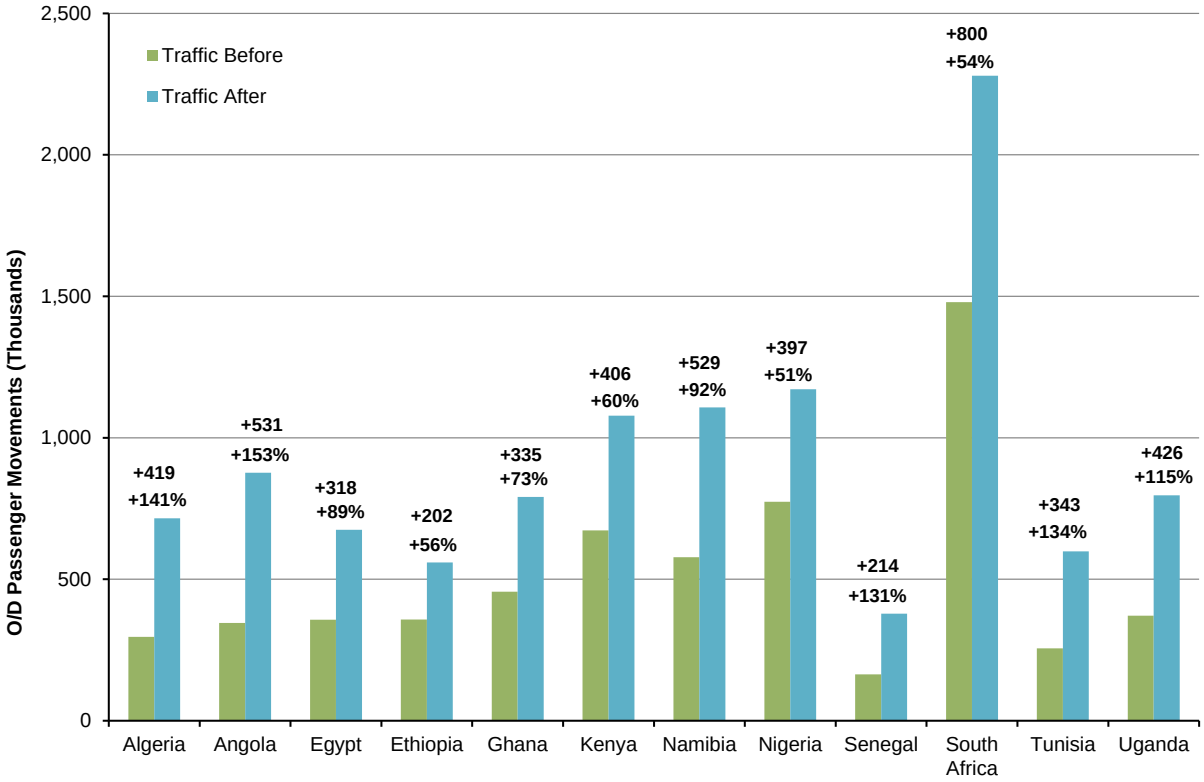
[68] The economic data was sourced from the World Bank's World Development Indicators. The traffic and fare data was sourced from IATA's PaxIS data product.

6.3 Passenger Traffic Volumes

Based on the gravity model described above, the projected increase in O/D passenger traffic to and from each country resulting from liberalisation is summarised in **Figures 6-1** and **6-2**. This represents the long-term traffic impact manifesting 2-3 years after liberalisation is enacted. Liberalisation of the bilaterals between the 12 countries is projected to increase traffic flows between these countries by 81%, from 6.1 million passenger movements currently (in 2013) to 11.0 million after liberalisation (an increase of 4.9 million passenger movements).[69] This represents several million passengers who can now travel by air, but who are currently unable to do so for reasons of cost, flight availability, or convenience.

The increases to/from individual countries are a function of their existing air market, economic conditions, and the current status of its bilaterals. Angola, Algeria, Tunisia, Senegal, and Uganda are all projected to see traffic more than double on routes to the other 11 countries, with traffic increases of 153%, 141%, 134%, 131% and 115% respectively. South Africa is projected to have the largest absolute increase in passenger movements (800,000 movements per annum) due to the large size of its air market. This represents a 52% increase in traffic to/from the 11 other countries.

Figure 6-1: Passenger Traffic Impact of Liberalisation



[69] Passenger movements count each passenger twice – once as a departure and once as an arrival.

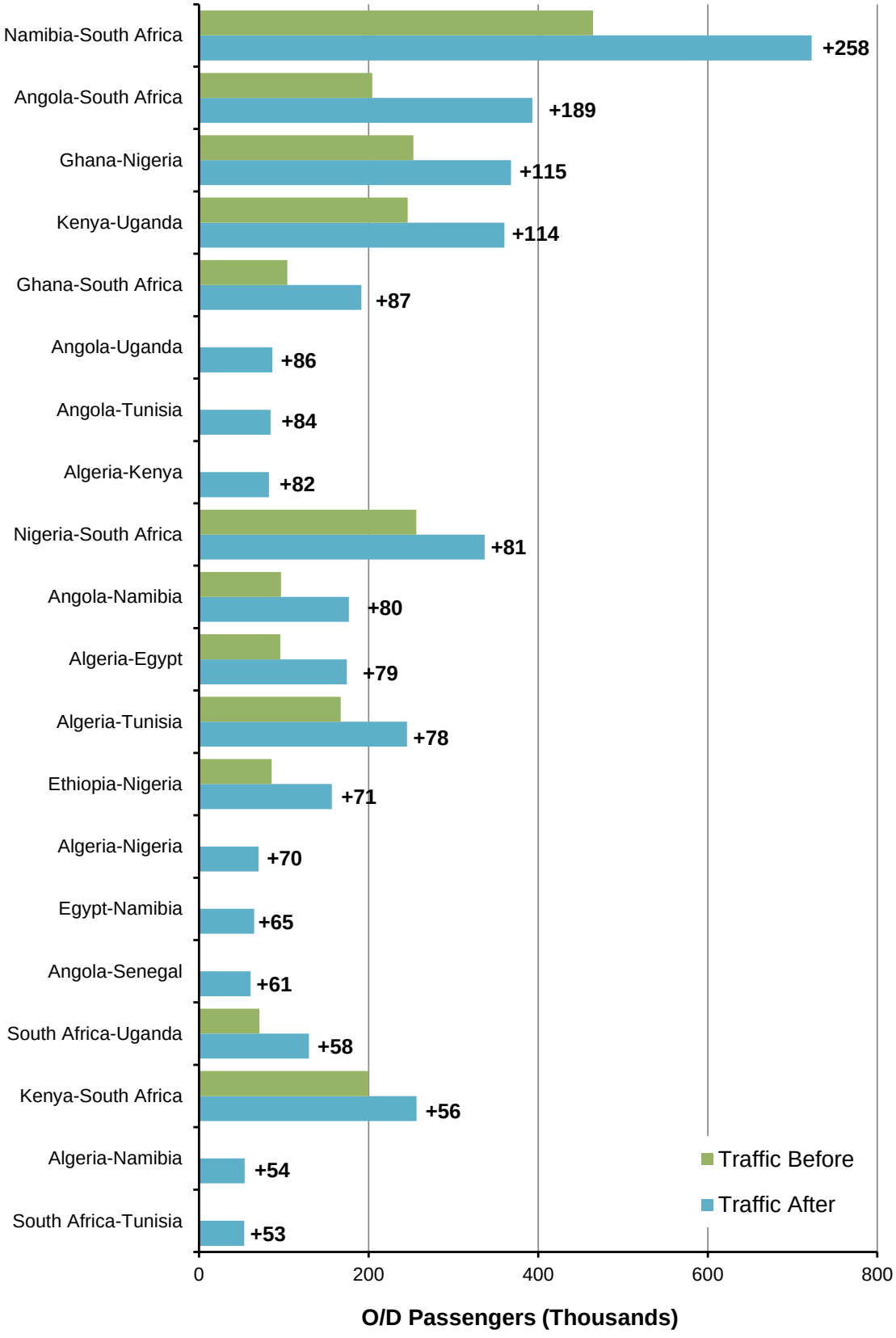
Figure 6-2: Passenger Movements Before and After Liberalisation

Country	Traffic Before	Traffic After	Increase	% Increase
Algeria	296,200	715,300	+419,100	+141%
Angola	345,900	876,600	+530,700	+153%
Egypt	357,100	674,700	+317,600	+89%
Ethiopia	357,500	559,300	+201,800	+56%
Ghana	456,200	790,900	+334,700	+73%
Kenya	672,700	1,078,300	+405,600	+60%
Namibia	577,800	1,107,200	+529,400	+92%
Nigeria	774,000	1,171,400	+397,400	+51%
Senegal	164,000	378,300	+214,300	+131%
South Africa	1,479,100	2,279,400	+800,300	+54%
Tunisia	255,700	598,500	+342,800	+134%
Uganda	371,100	796,900	+425,800	+115%
Total	**6,107,300**	**11,026,800**	**+4,919,500**	**+81%**

Figure 6-3 shows the top 20 country-pairs in terms of absolute traffic growth (these routes account for 75% of total forecast traffic increase). The largest growth is forecast for South Africa-Namibia which is forecast to increase by 258,000 passengers, an increase of 55% of current levels (465,000 in 2013 — the largest existing country pair in the study). The top five country pairs (Namibia-South Africa, Angola-South Africa, Ghana-Nigeria, Kenya-Uganda, Ghana-South Africa) all had direct service between them in 2013, but with liberalisation are projected to see increased air service, stimulating traffic growth of between 45% and 92%.

The next three largest increases are on country pairs without direct service (Angola-Uganda, Angola-Tunisia, Algeria-Kenya). In these cases, the existing level of traffic is very low (around 1,000 O/D passengers on each country-pair in 2013). It is projected that liberalisation will allow direct service to start, stimulating considerable O/D demand of between 82,000 and 86,000 passengers per annum.

Figure 6-3: Top 20 Growth Country Pairs Following Liberalisation



6.4 Pricing

The research summarised in Section 3.1 found that air service liberalisation often leads to fare reductions as new carriers enter the market and airlines achieve greater efficiencies. Estimates of the fare reductions have been produced on the basis that some of the traffic stimulation forecast in the previous section is due to fare reductions.

In estimating the fare reduction it was assumed that on country pairs which already had direct service prior to liberalisation, a half of the traffic stimulation was attributable to the fare reductions, while on country pairs that did not previously have direct service, a third of the traffic increase was attributable to fare reductions (the remaining stimulation effect was attributable to improved service levels — direct service, increased frequency, etc.).

As such, the fare reduction was calculated as follows:

Country Pairs Already With Direct Service

$\%\ \text{Fare Reduction}_{AB} = 1/2 \times \%\ \text{Traffic Increase}_{AB} / \text{Fare Elasticity}_{AB}$

Country Pairs With No Prior Direct Service

$\%\ \text{Fare Reduction}_{AB} = 1/3 \times \%\ \text{Traffic Increase}_{AB} / \text{Fare Elasticity}_{AB}$

The fare elasticities were taken from a previous IATA study which provides fare elasticities for different geographic markets.[70] The most applicable elasticity was selected for each country pair. Typically, the elasticities ranged from -0.8 to -1.5.

The estimated impact on passenger fares is summarised in **Figure 6-4**. It shows that passengers from these countries are expected to benefit from fare reductions of 25-35%. It is possible to estimate the combined fare saving by multiplying the fare reduction by the average fare and the total number of passengers in 2013. Total savings range from US$14.5 million for passengers from Tunisia to US$139.3 million for South African passengers. In total, the liberalisation of the bilaterals between these 12 countries is estimated to save existing passengers a total of over US$0.5 billion per annum.

[70] Inter*VISTAS* Consulting Inc., “Estimating Air Travel Elasticities”, A report for IATA, December 2007.

Figure 6-4: Estimated Fare Impact of Liberalisation

Country	% Reduction in Average Fares	Total Savings for Existing Users (US$ Million)	Increase in Consumer Surplus (US$ Million)
Algeria	-31%	18.2	76.6
Angola	-33%	43.9	113.3
Egypt	-32%	38.4	68.4
Ethiopia	-28%	38.2	52.6
Ghana	-29%	46.0	80.1
Kenya	-25%	49.1	89.3
Namibia	-25%	28.1	85.9
Nigeria	-27%	71.4	93.4
Senegal	-35%	32.1	65.0
South Africa	-28%	139.3	183.1
Tunisia	-29%	14.5	57.5
Uganda	-29%	21.2	58.2
Total	**-**	**540.4**	**1,023.4**

All financial figures are in 2013 prices.

Liberalisation also results in additional passengers travelling who previously were unable to do so, due in part to the lower cost of travel. The benefit to these additional passengers is captured in a concept known as consumer surplus. Consumer surplus is a term in economics that refers to the amount that consumers benefit by being able to purchase a product for a price that is less than they would be willing to pay. Consumer surplus is a concept frequently used in economic welfare analysis. The concept is described in more detail in **Appendix C**.

The consumer surplus estimates in **Figure 6-4** suggest that the gain in consumer surplus could range from US$52.6 million in Ethiopia to US$183.1 million in South Africa. The gain in consumer surplus totals over US$1 billion per annum across the 12 countries.

6.5 Connectivity and Time Savings Benefits for Passengers

The potential passenger benefits of liberalisation come not just from fare reductions. The research and case studies in Chapter 3 demonstrate that liberalisation can also result in additional frequencies on existing routes and the development of new routes. This can result in time savings for passengers (fast direct services rather than time-consuming connecting itineraries) and greater convenience (a greater choice of departure times).

6.5.1 Greater Connectivity

Of the 66 country pairs between the 12 counties, 34 (52%) had some form of direct service. The gravity model forecasts that with liberalisation an additional 17 country pairs will benefit from direct service, so that 75% of country pairs will have direct service.

The timing and convenience of services is also important. Of the 34 country pairs with direct service in 2013, only 21 had service operated at daily frequencies or better. Many had seasonal services or services operated at less than daily frequency. Such services offer passengers very limited choice in terms of their journey timings and prevent passengers obtaining an convenient itinerary (e.g., conducting a trip over a single day, which is important to companies trying to minimise the time their staff are out of the office). With liberalisation, greater service frequencies can be supported, providing greater convenience and choice for consumers.

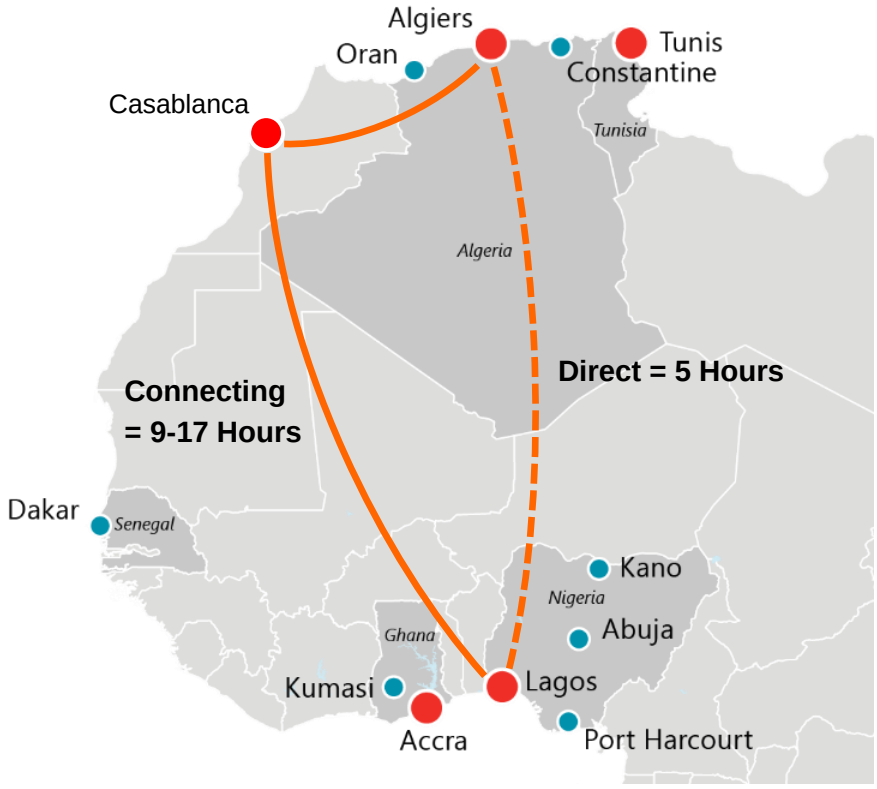
Increased service levels will not just benefit the O/D demand between the country pairs. It will also make connections to points outside of Africa more convenient and attractive. For example, business or leisure travellers from Europe, Asia, and elsewhere wanting to visit multiple points in Africa will have a greater choice of intra-African services and more convenient itineraries, further stimulating demand. The wide air service implications of liberalisation are further discussed in **Chapter 8**.

6.5.2 Time Savings for Passengers

This improved connectivity can offer considerable time savings and convenience for passengers. For example, in 2013 there was no direct service between Algeria and Nigeria. The most convenient routing available was via Morocco (Algiers-Casablanca-Lagos), as illustrated in **Figure 6-5**. The minimum journey time for this routing is 9 hours, but depending on connecting times could be as much as 17 hours (no more than two daily frequencies were operated between Casablanca and either Algiers or Lagos). A direct service (which is forecast by the gravity model) would reduce the travel time between Algiers and Lagos to approximately 4.5 hours.

For smaller cities and secondary airports, the potential time savings are even greater. For example, to fly from Oran (Algeria) to Kano (Nigeria) would currently involve a 14-23 hour two-stop itinerary. With an Algiers-Lagos service in place, the connecting itinerary could be reduced to around 8-10 hours. If a direct service between Oran and Kano could be sustained, the flying time would be reduced to approximately 4 hours.

Figure 6-5: Flying Algiers to Lagos



Chapter 8 provides illustrative scenarios of the potential impact of liberalisation on air services between African nations. In many cases, liberalisation is projected to result in the development of new routes, greatly improving travel times for some passengers. The projected time savings calculated in these scenarios are summarised in **Figure 6-6**. In many of these cases, the travel time is more than halved, making business and leisure travel between the two cities much more convenient and productive.

Figure 6-6: Illustrative Time Savings from the Scenarios in Chapter 8

Route	Travel Time Before Liberalisation	Travel Time After Liberalisation	Time Saving
Port Elizabeth (South Africa) - Windhoek (Namibia)	5-6 Hours (1-Stop)	2.5 Hours (Direct)	2.5-3.5 Hours
Port Harcourt (Nigeria) - Accra (Ghana)	5 Hours (1-Stop)	1.5 Hours (Direct)	3.5 Hours
Addis Ababa (Ethiopia) - Port Harcourt (Nigeria)	9-10 Hours (1-Stop)	5 Hours (Direct)	4-5 Hours
Cairo (Egypt) - Port Harcourt (Nigeria)	9-12 Hours (1-Stop)	5.5 Hours (Direct)	3.5-6.5 Hours
Dakar (Senegal) - Abuja (Nigeria)	6-7 Hours (1-Stop)	4 Hours (Direct)	2-3 Hours
Luanda (Angola) - Durban (South Africa)	6-7 Hours (1-Stop)	3.5-4.0 Hours (Direct)	2.5-3.5 Hours

7 Benefits of Intra-African Liberalisation to the Wider Economy

In addition to the direct benefits to users, the increase in air service and traffic is forecast to stimulate employment and economic growth in a number of ways:

- **Aviation Sector**: additional economic activity in the aviation sector is generated by the servicing, management, and maintenance of the additional air services.
- **Tourism Sector**: air service facilitates the arrival of larger numbers of tourists to a country; this includes business as well as leisure tourists. The spending of these tourists can support a wide range of tourism related businesses: hotels, restaurants, theatres, car rentals, etc.
- **Impacts on Trade, Investment and Productivity**: includes the role of air transportation in facilitating in the general economy by increased trade, business activity, and greater productivity.

The following sections describe the potential economic impacts for the 12 countries as a result of air service liberalisation.

7.1 Employment Impacts Related to the Aviation Sector

Increases in air traffic will require additional resources to handle the additional passengers and aircraft. This is comprised of two elements:

- **Direct Employment**
  Employment in the aviation sector related to the servicing, management, and maintenance of additional air services. This includes activities by the airlines, airport operator, air traffic control, ground handlers, airport security, immigration and customs, aircraft maintenance, etc.
- **Indirect Employment**
  This additional aviation activity has “spin-off” impacts for downstream industries that supply and support the aviation activities. For example, these could include: wholesalers providing food for inflight catering, refineries processing oil for jet fuel, companies providing accounting and legal services to airlines, travel agents booking flights, etc. These indirect impacts generate additional employment in a range of industries.

The parameters and methodology used to estimate the employment impacts in the aviation sector are described in **Appendix B**. The resulting estimates are provided in **Figure 6-1**. Liberalisation is projected to generate an additional 14,600 (direct) jobs in the aviation sector across the 12 countries. The projected employment gains in each country range from 900 in Ethiopia to 2,200 in South Africa. Including the indirect jobs, the total estimated employment impact reaches 23,400 jobs across the 12 countries, ranging from 1,500 jobs in Ethiopia to 5,400 in South Africa. As with the traffic figures, these are the long-term projections some 2-3 years after liberalisation.

Figure 7-1: Additional Employment Generated in and by the Aviation Sector

Country	Direct Employment (Jobs)	Indirect Employment (Jobs)	Total Employment (Jobs)
Algeria	1,200	2,200	3,400
Angola	1,500	2,700	4,200
Egypt	900	1,600	2,500
Ethiopia	600	900	1,500
Ghana	1,000	1,500	2,500
Kenya	1,200	1,800	3,000
Namibia	1,500	2,300	3,800
Nigeria	1,700	2,500	4,200
Senegal	600	1,000	1,600
South Africa	2,200	3,200	5,400
Tunisia	1,000	1,800	2,800
Uganda	1,200	1,900	3,100
Total	**14,600**	**23,400**	**38,000**

7.2 Impact on Tourism

The World Travel & Tourism Council (WTTC) estimates that international visitors to Africa spent a total of US$48 billion in 2013.[71] The tourism sector in Africa is estimated to directly contribute US$72 billion to the continent's GDP (3.6% of total GDP) and support 8.2 million jobs.[72] The WTTC estimates that international tourism spending within the 12 countries being studied was US$28.9 billion in 2013 (South Africa accounted for US$10.1 billion and Egypt for US$6.7 billion). The World Bank notes that tourism has the potential to stimulate development in a wide range of economic sectors:

> *During the construction phase of tourist accommodation and services, tourism creates jobs in that sector. If the country is sufficiently developed, the investment can generate demand locally for furniture and furnishings, and even for capital equipment. Tourism also generates a demand for transport, telecommunications and financial services. Through consumption of local products in tourist accommodation, restaurants and food markets, and through the additional expenditures outside the accommodation, tourists stimulate demand for agriculture, fisheries, food processing,*

[71] World Travel & Tourism Council, "Travel and Tourism Economic Impact 2014 – Africa", 2014, http://www.wttc.org/site_media/uploads/downloads/africa2014.pdf

[72] Ibid. Includes impact of domestic and international tourism.

> *and light manufacturing products, such as the garment industry, as well as for handicrafts and the goods and services of the informal sector. Estimates of such expenditures vary according to the local circumstances but can range from half to nearly double expenditures in tourist accommodation. Similarly, tourism can act as a catalyst for the development of small businesses in related production and service sectors. Notably, tourism can provide an economic base for a region whose only development options are its cultural and natural resources, whether coastal, mountain, or wildlife or a combination of these.*[73]

The tourism sector is a major beneficiary of increased air services. Air service facilitates the arrival of tourists (both business and leisure) to a country or region. The spending of these tourists can support a wide range of tourism related businesses: hotels, restaurants, tour guides, theatres, car rentals, etc. In addition, the tourism industry generates significant indirect impacts on businesses that supply and support tourism. For example, food wholesalers for hotels and restaurants, taxi firms, hotel laundering services, delivery trucks, etc.[74]

The forecast number of tourists to each of the 12 countries (from the 11 other countries) stimulated by liberalisation is provided in **Figure 7-2**, along with the incremental tourism spend and the direct and indirect employment generated by this increased tourism. Liberalisation is projected to stimulate an additional 1.23 million tourism visits among the 12 countries, spending a total of US$1.3 billion, an increase of 4.4% on total international tourism spend in 2013.

This tourism spending is projected to create 40,000 new direct jobs in the tourism sector and a further 35,100 jobs in connected industries. A total of 75,100 jobs are forecast to be generated across the 12 countries by the additional tourism visits and spending stimulated by liberalisation. The employment impacts in the individual countries range from 3,200 jobs in Tunisia to 9,600 in Uganda.

[73] World Bank, "Tourism in Africa: Harnessing Tourism for Growth and Improved Livelihoods", 2013, http://www.worldbank.org/content/dam/Worldbank/document/Africa/Report/africa-tourism-report-2013-overview.pdf

[74] By this definition, air transport could be considered part of the indirect industries benefiting from tourism. The multipliers used in this analysis exclude air transport as part of the indirect impact of tourism, to avoid double counting.

Figure 7-2: Additional Tourism Stimulated by Liberalisation

Country	Additional Tourist Visits	Incremental Tourism Spend (US$ Million)	Employment (Jobs)		
			Direct	Indirect	Total
Algeria	110,000	135.0	2,700	2,300	5,000
Angola	122,000	152.5	3,400	3,000	6,400
Egypt	76,000	82.5	2,900	2,500	5,400
Ethiopia	51,000	92.5	4,700	4,100	8,800
Ghana	78,000	56.6	2,300	2,000	4,300
Kenya	99,000	132.2	4,600	4,000	8,600
Namibia	127,000	109.0	2,400	2,100	4,500
Nigeria	97,000	138.1	4,700	4,200	8,900
Senegal	55,000	37.4	1,900	1,700	3,600
South Africa	205,000	209.5	3,600	3,200	6,800
Tunisia	94,000	65.3	1,700	1,500	3,200
Uganda	116,000	74.3	5,100	4,500	9,600
Total	**1,230,000**	**1,285.0**	**40,000**	**35,100**	**75,100**

All financial figures are in 2013 prices.

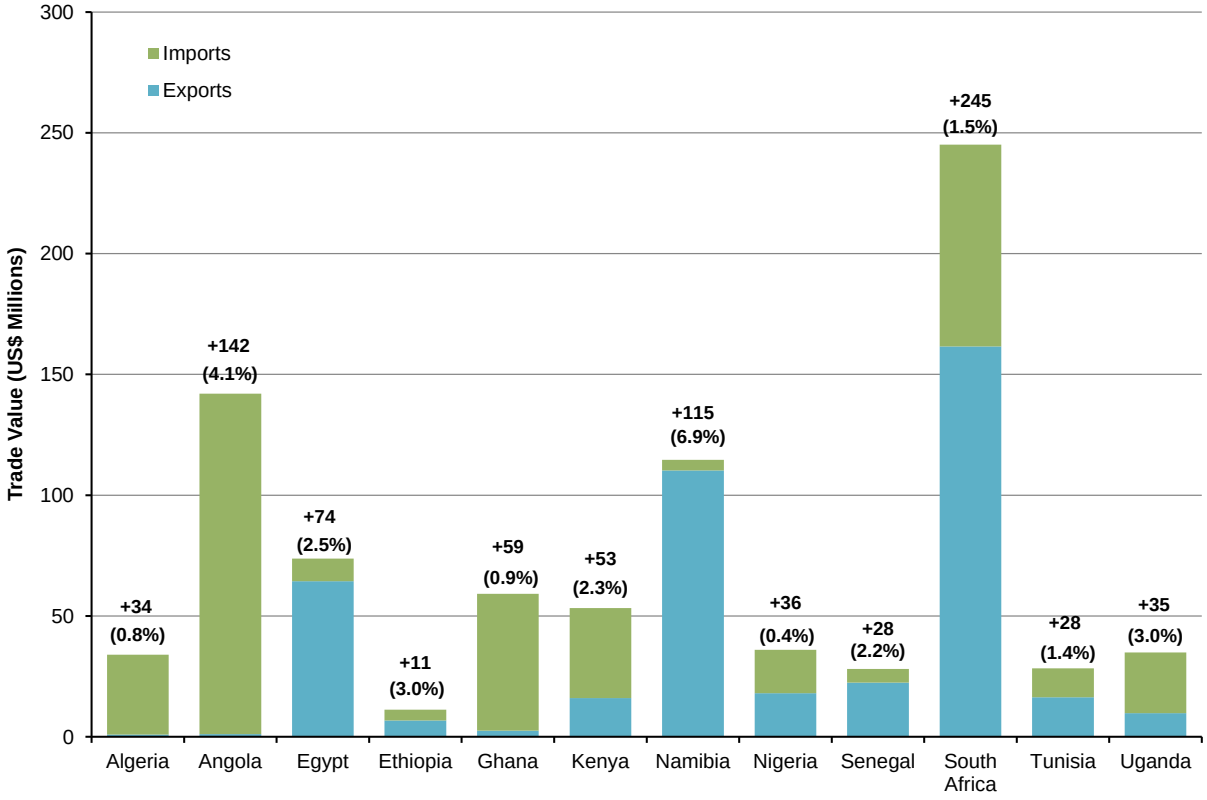
7.3 Impact on Trade

Air transport liberalisation opens new markets to many businesses as a result of new destinations, better flight connections, and higher frequencies offered. This leads to a broader demand for existing products. The increase in trade *in goods* among the 12 countries resulting from liberalisation was estimated based on the existing trade flows and the projected increase in air traffic. The methodology is summarised in **Appendix D**.

The estimated increase in trade flows is provided in **Figure 7-3**. It shows the increase in imports and exports for each of the 12 countries, and the percentage increase relative to total trade among the 12 countries. The total value of goods trade stimulated by liberalisation is estimated to be US$ 430 million.[75] In absolute terms, South Africa is forecast to experience the largest increase in trade — US$245 million in two-way trade. In percentage terms, Namibia has the largest projected increase at 6.9%.

[75] This total controls for double-counting of the country totals – one country's exports is another country's imports.

Figure 7-3: Estimated Increase in Trade Resulting from Liberalisation



All financial figures are in 2013 prices.

The percentage growth in trade is partially a function of each country's current trade volumes. For example, Nigeria is projected to have a 0.4% increase in trade because it has the largest trade base due to its oil exports. The balance between exports and imports for each country is a result of the type of goods each country exports and imports. For example, Angola is projected to have very low growth in exports because very little of the goods it produces can be shipped by air. This may change in the future as the economy develops and air services develop, and therefore these estimates should be considered conservative.

7.4 Trade, Investment and Productivity Benefits

As discussed in Section 3.2, air transportation has been linked to economic and productivity growth. Air transportation facilitates employment and economic development in the national and regional economy through increased trade, attracting new businesses to the region, and encouraging investment. These effects can include some or all of the following:

- Trade effects — as estimated in the previous section, liberalisation could stimulate an incremental US$ 430 million in two-way trade.
- Investment effects — a key factor many companies take into account when taking decisions about location of office, manufacturing, or warehouses is proximity of an international airport.

- Productivity effects — air transportation offers access to new markets, which in turn enables businesses to achieve greater economies of scale. Air access also enables companies to attract and retain high quality employees.

All of these effects have the potential to stimulate economic growth and generate employment opportunities. The employment and GDP impacts resulting from increased trade, investment and productivity were estimated using parameters calibrated from international data from previous examples of expanded air service. Details of the methodology and parameters are provided in **Appendix B**.

The estimated impacts, in terms of employment and GDP, are provided in **Figure 7-4**. The trade, investment and productivity facilitated by air transport following liberalisation are projected to result in an additional 42,000 jobs across the 12 countries and US$342.5 million in GDP. The employment impacts in each country range from 2,100 jobs in Tunisia to 4,700 jobs in Angola.

Figure 7-4: Trade, Investment and Productivity Impacts Stimulated by Liberalisation

Country	Employment (Jobs)	Incremental GDP (US$ Million)
Algeria	2,700	20.0
Angola	4,700	42.0
Egypt	3,400	33.8
Ethiopia	4,500	25.7
Ghana	2,700	13.8
Kenya	4,300	18.7
Namibia	2,300	14.1
Nigeria	4,300	50.6
Senegal	2,800	13.4
South Africa	2,300	55.4
Tunisia	2,100	31.4
Uganda	5,900	23.5
Total	**42,000**	**342.5**

All financial figures are in 2013 prices.

7.5 Total Impacts

Figures 7-5 and **7-6** show the total employment and GDP impacts of liberalisation combining the impacts in the aviation sector, tourism, and the impact on trade, investment and productivity.[76] Across the 12 countries, liberalisation is projected to generate 155,100 jobs and nearly US$1.3 billion in GDP (0.07% of the total GDP of the countries). The largest employment is in Uganda (18,600 jobs), followed by Nigeria, Kenya, Angola, and Ethiopia. In absolute terms, South Africa is projected to have the large GDP increase (US$283.9 million) but in percentage terms the largest impact is in Namibia (0.56% of GDP), followed by Uganda, Senegal, Angola, and Tunisia.

Figure 7-5: Total Economic Impact Stimulated by Liberalisation

Country	Employment (Jobs)	Incremental GDP (US$ Million)*
Algeria	11,100	123.6 (0.04%)
Angola	15,300	137.1 (0.11%)
Egypt	11,300	114.2 (0.02%)
Ethiopia	14,800	59.8 (0.06%)
Ghana	9,500	46.8 (0.09%)
Kenya	15,900	76.9 (0.10%)
Namibia	10,600	94.2 (0.56%)
Nigeria	17,400	128.2 (0.03%)
Senegal	8,000	40.5 (0.15%)
South Africa	14,500	283.9 (0.05%)
Tunisia	8,100	113.7 (0.11%)
Uganda	18,600	77.6 (0.16%)
Total	**155,100**	**1,296.5 (0.07%)**

* Figure in parenthesis is the GDP impact as a percentage of national GDP.
All financial figures are in 2013 prices.

[76] The figures include both the direct and indirect impacts of aviation and tourism.

Figure 7-6: Map of Total Economic Impact Stimulated by Liberalisation

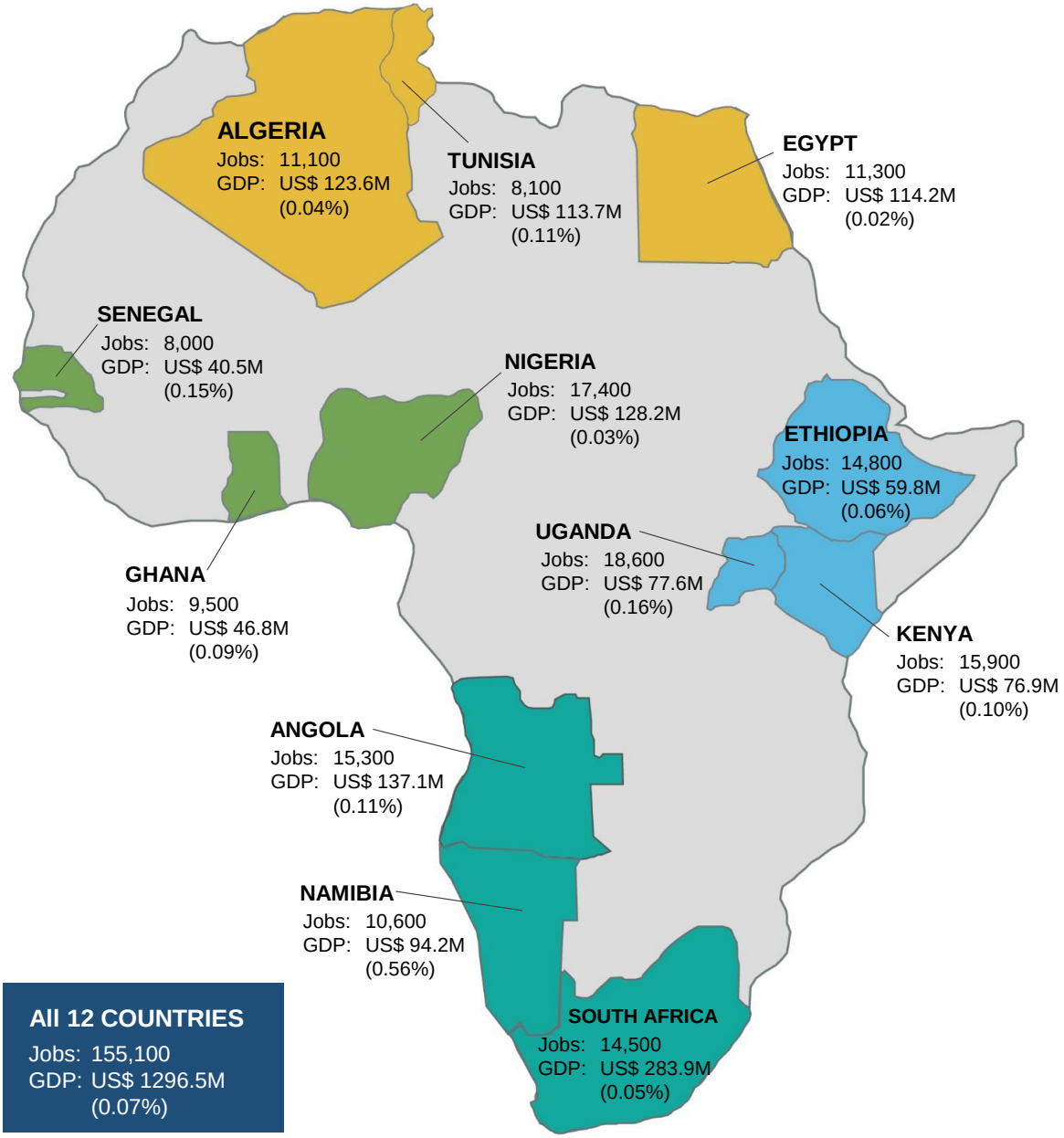


Figure in parenthesis is the GDP impact as a percentage of national GDP.
All financial figures are in 2013 prices.

8 Implications for Air Services in Africa

8.1 Airline Business Models and Partnerships

Intra-African airline service growth has been stifled due, in part, to the lack of a large scale liberalisation policy between African nations. As a result, international airline service between countries in Africa has not been as frequent or as strong as economic growth might suggest. As a result, there is a limited amount of non-stop service available between many countries. Service within Africa is generally offered by large network airlines which have business models that rely on connectivity through a specific hub (e.g., Addis Ababa, Johannesburg, Nairobi). These same large network carriers that provide most of the intra-African services are members of global marketing alliances and strategic partnerships.[77]

In addition to the global trend of alliances, there is a significant amount of growth occurring globally through low cost carriers, which generate high rates of traffic stimulation in the local markets. In more liberal air markets, low cost carriers (LCCs) have grown rapidly, operating in parallel to network carriers. For example, EasyJet or Ryanair grew rapidly in Europe following the creation of a single aviation market in the 1990s.

Low cost carriers have begun to develop in Africa. However, particularly in the context of the 12 markets in this study, the network carrier model remains prominent. Ten out of the 12 countries identified in the study are bases to network carriers with airport hubs that provide domestic and international access. Of these ten countries, four are bases to major carriers aligned to a global marketing alliance (Star, SkyTeam, oneworld) that provide connectivity outside of Africa as well as a sizeable amount of regional service. The other six countries are home to mid-sized network carriers all of which provide point-to-point service, and limited long-haul service outside of Africa. Two of these countries, Ghana, and Senegal, do not currently have major flag carriers and largely rely on foreign carrier access for service.

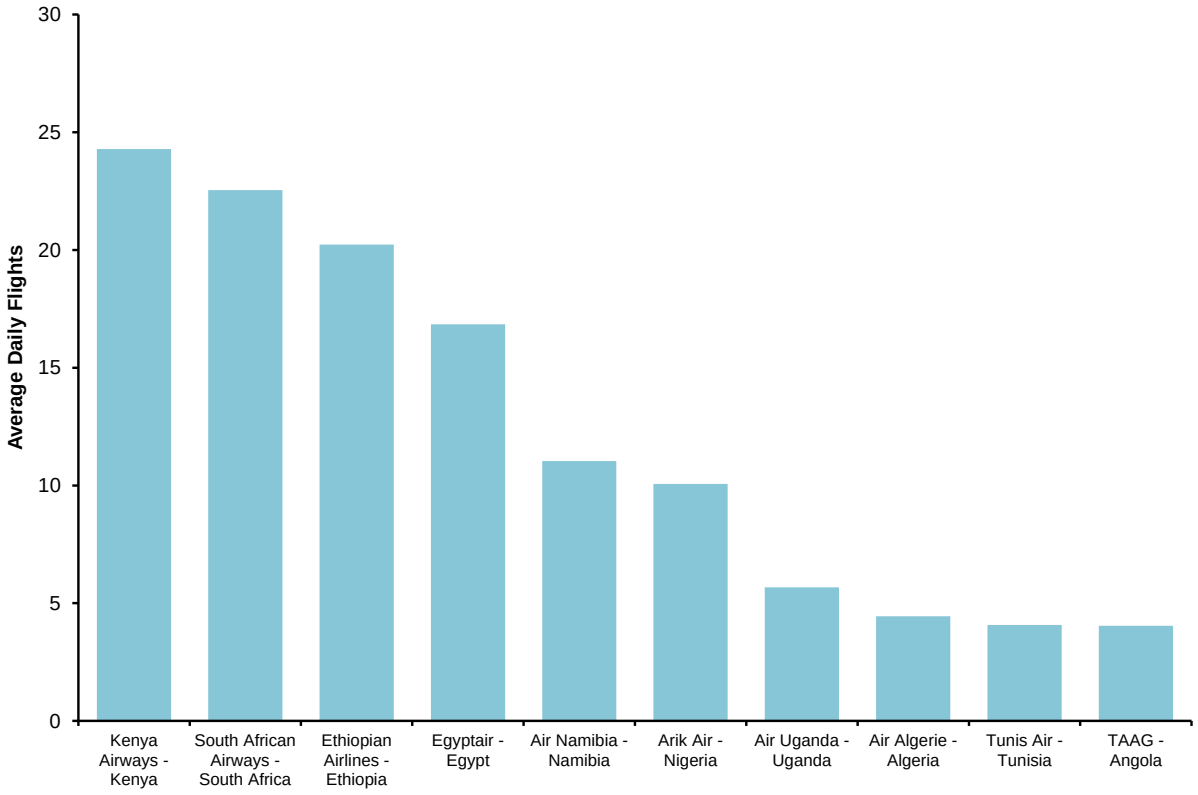
Figure 8-1 shows the major carriers based in the 12 countries while **Figure 8-2** shows the African carriers with the greatest number of operations on routes between the 12 countries.

[77] Airline alliances are agreements between a group of airlines to co-ordinate on a range of marketing and operational activities. Airline alliances are generally under-pinned by code-sharing agreements where two or more carriers sell seats on each other's aircraft. One of the benefits of these alliances is that it allows airlines to greatly expand the scope of routes it can offer (by offering routes operated by partner airlines) and enables it to enjoy economies of scale and scope that it could never achieve on its own.

Figure 8-1: Major Carriers Based in the 12 Countries

Country	Network Carrier	Low Cost Carriers
Algeria	Air Algerie	
Angola	TAAG Angola	Fly540(FastJet)
Egypt	Egyptair	
Ethiopia	Ethiopian	
Ghana	*No major carrier*	Fly540(FastJet)
Kenya	Kenya Airways	JamboJet, Fly540(FastJet)
Namibia	Air Namibia	
Nigeria	Arik Air	
Senegal	*No major carrier*	
South Africa	South African Airways	Mango, Kulula, FastJet
Tunisia	Tunis Air	
Uganda	Air Uganda (regional)	

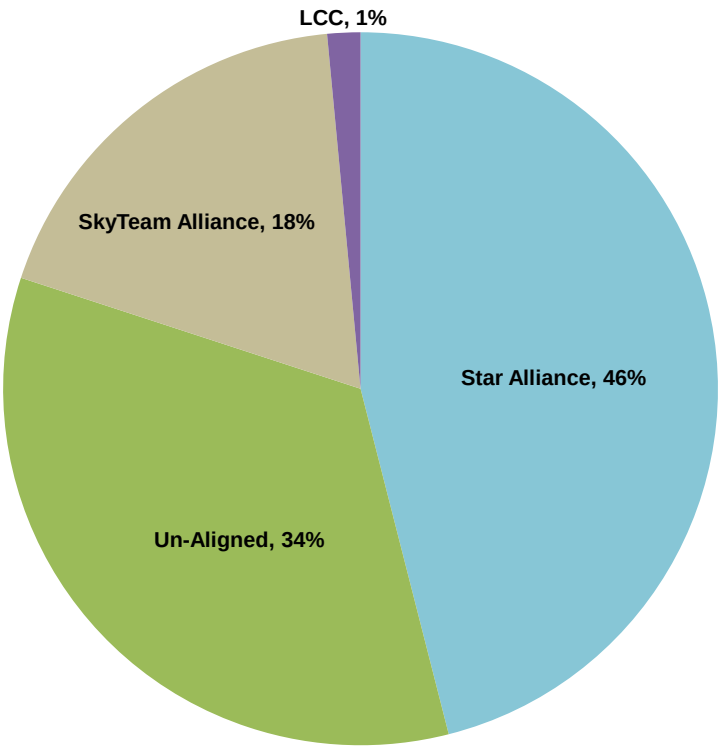
Figure 8-2: Top 10 Africa Carriers Operating Between the 12 Countries (2013)



Source: Diio Airline Schedule Data (2013).

Airline alliances play a significant role in global access into Africa's primary and secondary markets. The networks of these major carriers have facilitated growth for intra-Africa routes by virtue of providing connectivity over a third country hub, such as offering service between Egypt and South Africa with a connection in Kenya. As shown below in **Figure 7-3**, alliances play a significant role in international services accounting for 64% of the international departure share between the twelve countries. Star Alliance, with South African, Ethiopian and Egyptair as members, accounts for 46% of the total. Kenya Airways is the lone SkyTeam member airline in Africa. All other carriers operating internationally between the 12 countries are not currently aligned with a major alliance.

Figure 8-3: Seat Share of Traffic by Alliance on Routes Between the 12 Countries (2013)



Source: Diio Airline Schedule Data (2013).

Only one LCC currently operates between the 12 countries analysed, this being Johannesburg - Windhoek. Most countries in the study have not seen significant LCC growth with the exception of South Africa and, to some extent, Kenya. South Africa has two low cost carriers operating extensive domestic networks. International low cost carrier growth has so far been very limited from South Africa. In addition to alliances, new strategic partnerships with carriers such as Etihad Airways or Qatar Airways have also increased connectivity into the region and, in some cases, have even funded new ventures by taking equity partnerships. Should liberalisation occur within Africa, potential to increase foreign investment into African-based airlines which could further grow traffic in the region.

Should liberalisation occur, the LCC business model may play a role in stimulating the overall market and increase the likelihood of point-to-point access between more primary and secondary markets within Africa. It is extremely difficult for LCCs to flourish in a restricted market. Because of this, LCC growth in Africa has been predominantly in large domestic markets such as South Africa and Kenya. LCCs have also developed in the form of subsidiaries of large African network carriers. For example, South Africa has experienced strong growth from LCC operations through South African Airways' subsidiary Mango. The carrier operates domestic services only, but has announced intentions to begin international operations in the near future. New LCC's are also developing, an example of which is Tanzanian-based LCC, FastJet. The carrier is backed by EasyJet founder Stelios Haji-Ioannou and currently operates domestic markets within Tanzania. To help facilitate expansion, the carrier recently invested in Fly540, a regional carrier with operating certificates in a handful of African countries. The long term aim of the carrier is to grow into a pan-African carrier offering low cost service between countries. A carrier like FastJet would benefit greatly from a reduction in bilateral roadblocks in terms of designations, pricing provisions, allowable gateways, etc. as this could prevent them from stimulating traffic growth. FastJet currently holds the rights to operate in a handful of countries. However, the carrier is currently facing regulatory issues that are preventing them from operating in nations like Angola, Kenya and Ghana. The carrier has recently begun operations in South Africa.

8.2 Connecting Traffic

While the growth of LCCs will help increase point-to-point traffic, and provide much needed stimulation in the region, liberalisation will also assist in increasing connectivity as a result of additional access between country pairs. Many network carriers' business models rely on the ability to connect passengers at a hub and provide feed and access to onward third countries. This is particularly important to carriers that participate in global alliances. With additional access outside of bilateral restrictions, these carriers can increase their partnerships to include joint ventures, cross border investment and more liberal commercial agreements (code sharing, etc.).

Connectivity is an important aspect of air access into Africa. As highlighted above, of the top 10 airlines within these countries, the four largest carriers operate with connecting hub structures from their respective bases. As their base countries become more liberalised, larger carriers may grow toward increased network connectivity. This action could lead to growth into an alliance or development of other strategic partnerships to provide additional access into third countries.

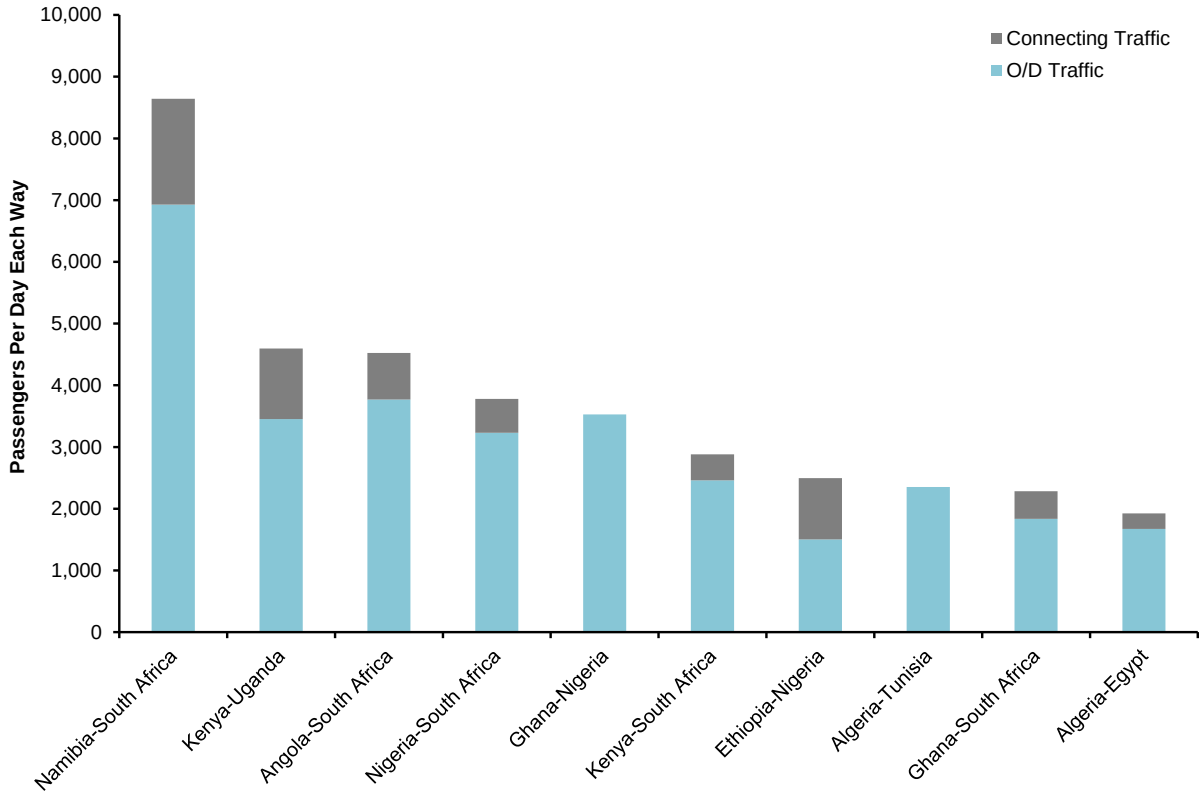
The liberalisation gravity model described in Chapter 5 forecasts the impact on origin/destination (O/D) traffic and does not model connecting traffic flows. Should air service between countries with hubs be liberalised, it is expected that additional passengers will flow beyond a country (or both countries) onto third countries. An example of this would be a passenger flying from Namibia to South Africa and on to Hong Kong.

Analysis was conducted to account for these connecting passengers. **Figure 8-4** shows the contribution of connecting traffic to the top 10 country pairs following liberalisation. An example of the power of connectivity can be witnessed in the Kenya-Uganda market. Kenya Airways is a hub carrier connecting passengers on the Nairobi end with nearly 33% of passengers currently connecting to markets beyond Kenya into Asia, Europe and the Middle East.

For example, in 2013, there were approximately 2,361 O/D passengers per week each way on the Kenya-Uganda market. The liberalisation model forecasts that the Kenya-Uganda O/D market will increase to 3,453 passengers per week each way following liberalisation. After layering in 33% connectivity based on current traffic flows, the market will reach a total size of 4,596 passengers per week each way.

As this example illustrates, air service liberalisation has the potential to increase connecting flows at African hub airports, strengthening the business models of African air carriers. It should be noted these connectivity benefits are not included in the analysis of liberalisation impacts in Chapter 6 and 7, and therefore the estimates provided should be considered conservative.

Figure 8-4: Contribution of Connecting Traffic to the Top 10 Country Pairs Post-Liberalisation



Source: Inter*VISTAS* analysis of IATA PaxIS data and Diio Traffic Data.

8.3 Illustrative Scenarios of Air Service Development

To illustrate the potential impact of liberalisation on air services, scenario analysis was conducted on a select number of country pairs. The scenarios considered the changes to air services (additional frequencies, new services) that might occur following liberalisation. The scenarios were based on the results from the liberalisation gravity model augmented by analysis of existing traffic flows between the countries, the potential for development of connecting traffic, the type of carriers operating in the region and experiences of liberalisation from elsewhere in the world. Eight major country pairs were analysed covering all 12 countries:

- Namibia – South Africa
- Kenya - Uganda
- Ghana - Nigeria
- Ethiopia – Nigeria
- Algeria - Tunisia
- Egypt - Nigeria
- Nigeria - Senegal
- Angola – South Africa

The scenarios are data-led assessments of the type of service developments that may arise following liberalisation, based in part on experiences elsewhere. However, every market is unique, and other political, industry or economic factors may affect the outcome. Thus the scenarios are designed to illustrate the potential air service developments, but it cannot be guaranteed that services will develop in this way. As with the previous analysis, it should be kept in mind that liberalisation is a necessary, but not always sufficient condition for the development of these new services. Other issues are also critical, such as aviation infrastructure, taxation levels, visa requirements, doing business issues, etc.

8.3.1 Namibia – South Africa

The Namibia – South Africa market, where O/D traffic has grown at a rate of 5% per year since 2005, is the largest country pair analysed. Currently (as of 2013), there four routes operating between the countries: Johannesburg to Windhoek and Walvis Bay and Cape Town to the same points. Services are operated by both Air Namibia and South African Airways on all route pairs, with additional services provided by low cost carrier Kulula between Johannesburg and Windhoek.

Air service liberalisation is forecast to increase passenger traffic between the two countries by 55% or 2,472 passengers per week each way. Historically, in addition to the O/D traffic, the services between these countries carried a further 25% connecting traffic (connecting in South Africa). Including this connecting proportion, and assuming a constant load factor, the number of seats operating between the two countries is forecast to increase from 8,419 to 13,088 per week each way. Based on the average aircraft size operated, the weekly

frequency between the two countries is projected to increase from 75 weekly frequencies in each direction to 117.

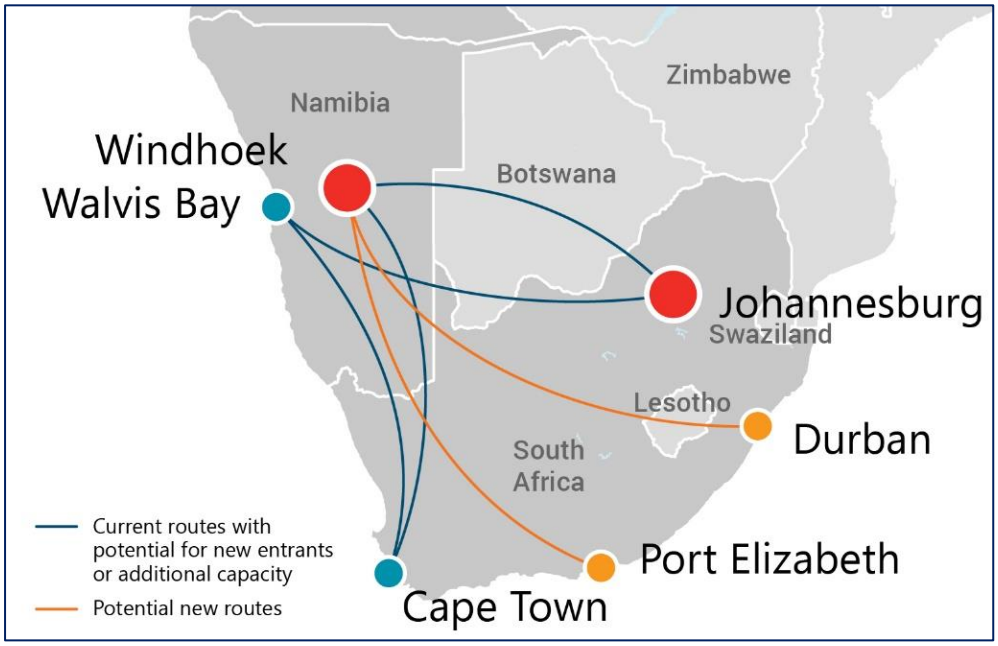
These additional frequencies may be operated on existing routes or could be the result of new routes starting such as Durban - Windhoek. Based on the historical traffic flows and market growth, **Figures 8-5** and **8-6** provide a scenario of air service development between the two countries following liberalisation. As noted previously, this is an illustrative scenario of the air service development that could occur following liberalisation. It is based on analysis of the current markets, the forecast from the gravity model and previous experience.

Figure 8-5: Scenario for Air Service Development on Namibia – South Africa Following Liberalisation.

	Weekly Freq Each Way		Comments
	Before	After	
South Africa - Namibia	**75**	**117**	
Specific Routes:			
Johannesburg - Windhoek	47	61	Additional frequencies could be operated by existing carriers (South African Airways, Air Namibia, Kulula) or by new entrant.
Johannesburg - Walvis Bay	7	14	Additional frequencies could be operated by existing carriers (South African Airways) or by new entrant.
Cape Town - Windhoek	16	23	Additional frequencies could be operated by existing carriers (South African Airways, Air Namibia) or by new entrant.
Cape Town - Walvis Bay	6	10	Additional frequencies could be operated by existing carriers (South African Airways) or by new entrant.
Durbin - Windhoek	None	6	Largest O/D market without direct service. Could be operated by a network carrier or LCC.
Port Elizabeth - Windhoek	None	3	Next largest O/D market without direct service. Low frequency level may suit an LCC.
Total	**75**	**117**	

These new services offer considerable time savings for passengers. For example, currently someone travelling from Port Elizabeth to Windhoek would take at least 5-6 hours using a connecting service. A direct service, as projected above, would reduce the flying time to 2.5 hours.

Figure 8-6: Map of Possible Air Service Development on Namibia – South Africa Following Liberalisation



8.3.2 Kenya - Uganda

The Kenya – Uganda market is well established and has grown at a rate of 2% per year between 2005 and 2013. Three carriers, African Express Airways, Air Uganda and Kenya Airways, currently operate between the countries. All three carriers operate from Entebbe/Kampala to both Nairobi and Mombasa in Kenya.

Air service liberalisation is forecast to increase passenger traffic between the two countries by 46% or 1,093 passengers per week each way. Assuming 33% connecting traffic (based on existing proportions connecting in Kenya), and assuming a constant load factor, the number of seats operating between the two countries is forecast to increase from 6,453 to 8,829 per week each way. Based on the average aircraft size operated, the weekly frequency between the two countries is projected to increase from 85 weekly frequencies in each direction to 136.

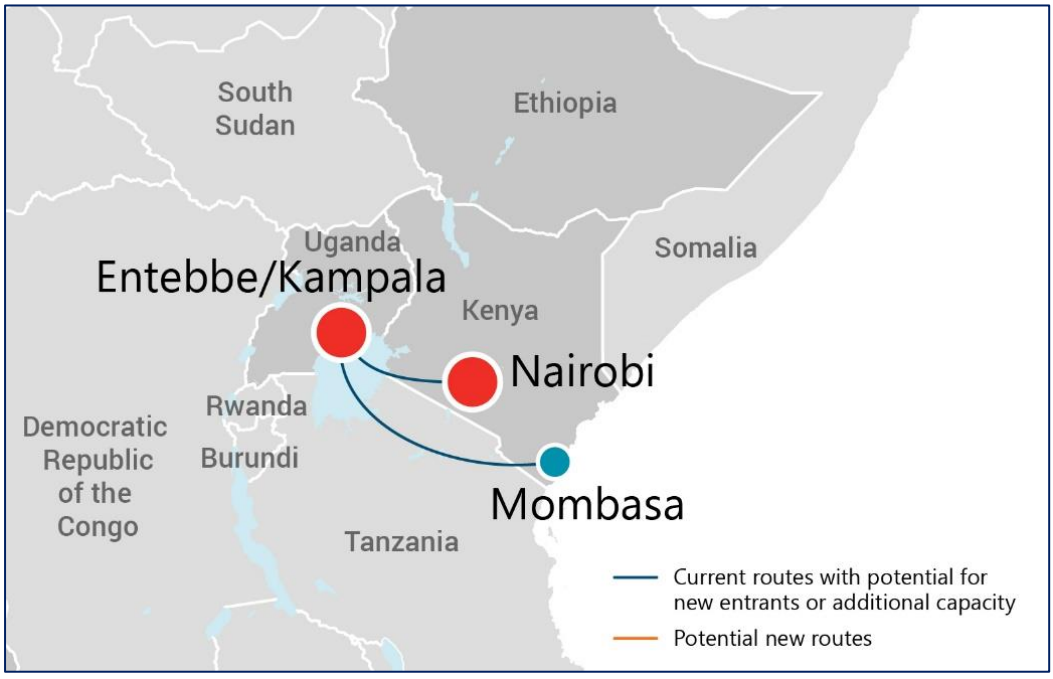
Market growth is likely to be limited to the currently served cities, in least in the short to medium term, due to the population concentration in these cities. However, should a low cost carrier become more prevalent in Kenya this could change, so that secondary points in Kenya are served. **Figures 8-7** and **8-8** provide a scenario of air service development between the two countries following liberalisation. Other scenarios may also be possible.

Under this scenario, passengers travelling Entebbe/Kampala – Mombasa have much more convenient frequencies available. Where prior to liberalisation, the service operated 3x weekly, after liberation the service could increase to as much as 3x daily. This may allow same-day return travel and far greater choice of departure and arrival times.

Figure 8-7: Scenario for Air Service Development on Kenya - Uganda Following Liberalisation.

	Weekly Freq Each Way		Comments
	Before	After	
Kenya - Uganda	85	136	
Specific Routes:			
Entebbe/Kampala - Nairobi	82	115	Additional frequencies could be operated by existing carriers (Kenya Airways, Air Uganda, African Express Airways) or by new entrant.
Entebbe/Kampala - Mombasa	3	21	Additional frequencies could be operated by existing carriers (Air Uganda) or by new entrant.
Total	**85**	**136**	

Figure 8-8: Map of Possible Air Service Development on Kenya - Uganda Following Liberalisation



8.3.3 Ghana - Nigeria

Though the Ghana-Nigeria market has been largely flat in terms of O/D growth since 2005, the market is fairly large and has the potential for growth as a result of liberalisation. While Ghana does not currently have a large home carrier, Arik Air of Nigeria has been expanding its scope of services from Accra. Arik Air, Aero Contractors, and Africa World Airlines offer the majority of service between the two countries. Service operates from both Lagos and Abuja in Nigeria to Accra, Ghana.

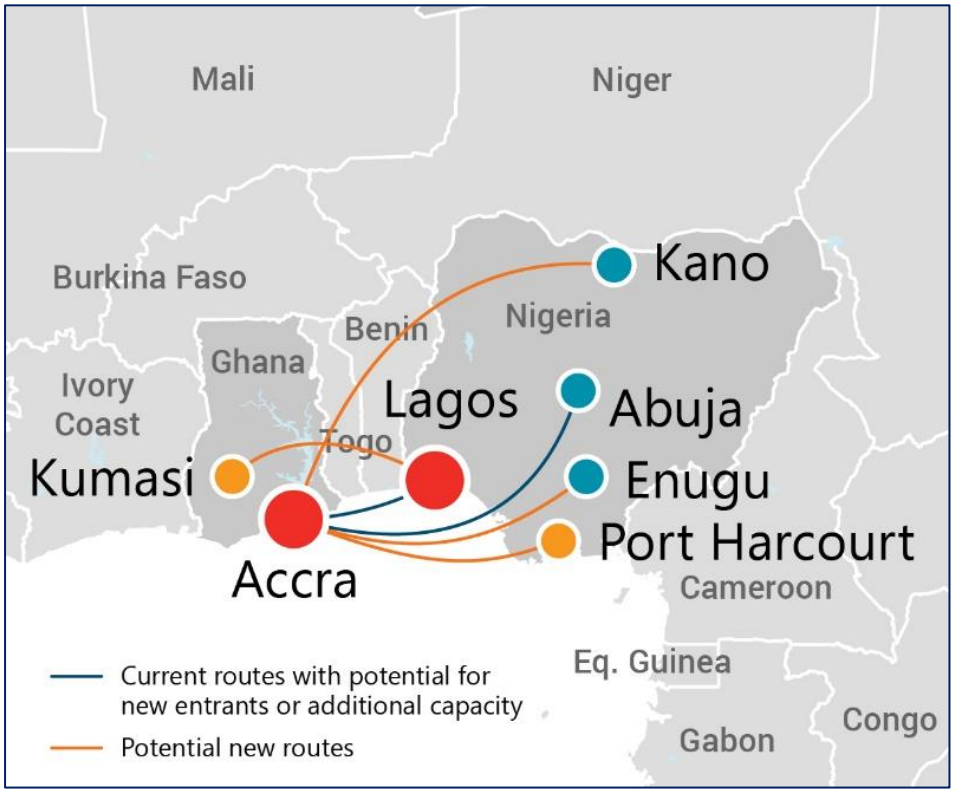
Air service liberalisation is forecast to increase passenger traffic between the two countries by 45% or 1,103 passengers per week each way. Assuming a constant load factor, the number of seats operating between the two countries is forecast to increase from 4,041 to 5,880 per week each way. Based on the average aircraft size operated, the weekly frequency between the two countries is projected to increase from 40 weekly frequencies in each direction to 77.

These additional frequencies may be operated on existing routes or could be the result of new routes starting such as Kumasi - Lagos. Should a low cost carrier grow in West Africa this may add additional routes. Based on the historical traffic flows and market growth, **Figure 8-9** and **8-10** provide a scenario of air service development between the two countries following liberalisation.

Figure 8-9: Scenario for Air Service Development on Ghana - Nigeria Following Liberalisation

	Weekly Freq Each Way		Comments
	Before	After	
Ghana - Nigeria	40	77	
Specific Routes:			
Accra – Lagos	34	48	Additional frequencies could be operated by existing carriers (Arik Air, Aero Contractors, and Africa World Airlines) or by new entrant.
Accra - Abuja	7	14	Additional frequencies could be operated by existing carriers (Arik Air) or by new entrant.
Accra – Port Harcourt	None	7	Largest O/D market without direct service. May suit a network or low cost carrier.
Accra – Kano	None	4	Next largest O/D market without direct service. Low frequency level may suit a network or low cost carrier.
Kumasi - Lagos	None	4	Next largest O/D market without direct service. Low frequency level may suit a network or low cost carrier.
Total	**40**	**77**	

Figure 8-10: Map of Possible Air Service Development on Ghana - Nigeria Following Liberalisation



Again, the development of new and expanded services brings greater convenience and improved travel times for passengers. For example, flying between Accra and Port Harcourt, a distance of 791kms, currently takes a minimum of 5 hours on a connecting itinerary. A potential new direct service would reduce the flying time to under 1.5 hours.

8.3.4 Ethiopia - Nigeria

The Ethiopia-Nigeria country pair has recorded average growth of 13% per annum in market size between 2005 and 2013. Both countries are home to hub carriers: Ethiopian Airlines based in Addis Ababa and Arik Air based in Lagos. Ethiopian is currently the only airline operating between the countries, offering service to four markets in Nigeria, Lagos, Abuja, Enugu and Kano. With Addis Ababa's status as the capital and hub for a large carrier, it is expected this country pair will likely to continue growing, as connectivity and local demand grow. Potentially, Arik Air could begin serving the market offering new service from Lagos to Addis Ababa and follow-up with additional service from secondary points like Abuja, especially with Addis Ababa-Abuja growing at 45% per year since 2005. Network carriers will likely use bilateral liberalisation to increase capacity or frequencies as they develop their hub, and perhaps open new service to Port Harcourt.

Air service liberalisation is forecast to increase passenger traffic between the two countries by 83% or 682 passengers per week each way. Historically, in addition to the O/D traffic, the services between these countries carried a further 66% connecting traffic (connecting in

Ethiopia). Including this connecting proportion, assuming a constant load factor, the number of seats operating between the two countries is forecast to increase from 3,122 to 5,518 per week each way. Based on the average aircraft size operated, the weekly frequency between the two countries is projected to increase from 17 weekly frequencies in each direction to 46.

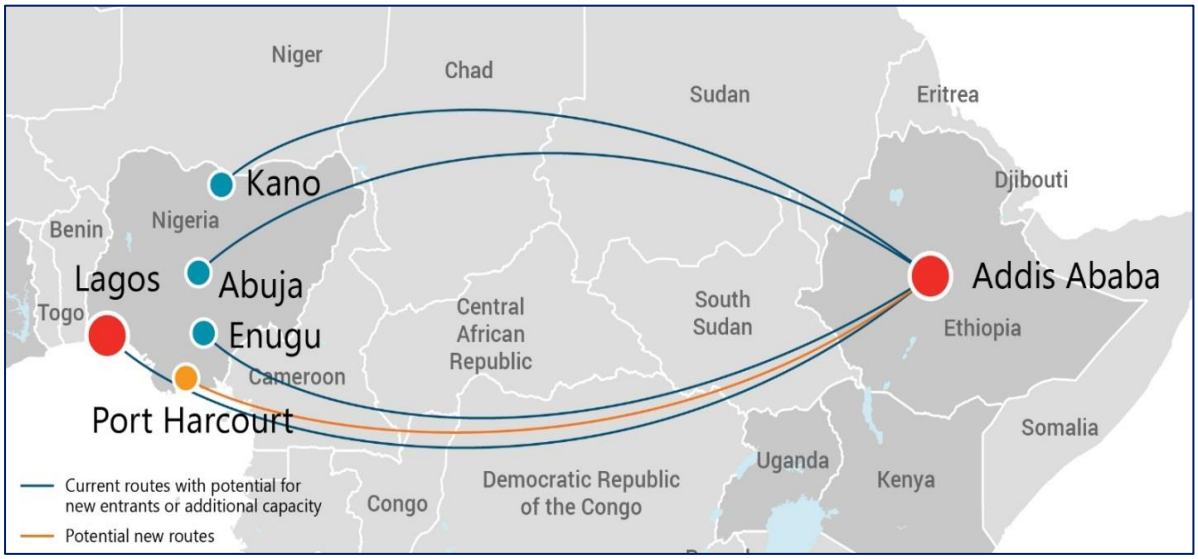
These additional frequencies may be operated on existing routes or could be the result of new routes starting such as Addis Ababa – Port Harcourt. Based on the historical traffic flows and market growth, **Figures 8-11** and **8-12** provide a scenario of air service development between the two countries following liberalisation.

Figure 8-11: Scenario for Air Service Development on Ethiopia - Nigeria Following Liberalisation

	Weekly Freq Each Way		Comments
	Before	After	
Ethiopia - Nigeria	17	46	
Specific Routes:			
Addis Ababa – Lagos	7	14	Additional frequencies could be operated by existing carrier (Ethiopian Airlines) or by new entrant.
Addis – Ababa – Abuja	7	14	Additional frequencies could be operated by existing carrier (Ethiopian Airlines) or by new entrant.
Addis Ababa - Enugu	2	7	Additional frequencies could be operated by existing carrier (Ethiopian Airlines) or by new entrant.
Addis Ababa – Kano	1	7	Additional frequencies could be operated by existing carrier (Ethiopian Airlines) or by new entrant.
Addis Ababa - Port Harcourt	None	4	Next largest O/D market without direct service. Low frequency level may suit a network or low cost carrier.
Total	**17**	**46**	

Under this scenario, there are considerable benefits to passengers. Services that are currently once daily are projected to increase to twice daily and routes operating at less than daily increase to daily. In addition, the projected new service between Addis Ababa and Port Harcourt would reduce the travel time on this route from 9-10 hours on a 1-stop connect to 5 hours on a direct service.

Figure 8-12: Map of Possible Air Service Development on Ethiopia - Nigeria Following Liberalisation



8.3.5 Algeria - Tunisia

The Algeria-Tunisia market has witnessed strong growth at a rate of 7% per year since 2005. Each country in the market is home to a carrier in Air Algerie of Algeria and Tunis Air of Tunisia. Both Air Algerie and Tunis Air operate on the Algiers –Tunis sector, with the latter also operating to Tunis from Oran, the second largest market in Algeria. While both O/D markets have recorded positive year over year growth, Oran has recorded a dramatic growth of over 200% per year since 2005 growing to nearly 23 passengers per day each way. Market increases will likely come in the form of frequency or capacity increases on both Algiers-Tunis and Oran-Tunis as other O/D markets in this country pair are very small with these passengers having the flexibility to connect in either Algiers.

Air service liberalisation is forecast to increase passenger traffic between the two countries by 47% or 751 passengers per week each way. Assuming a constant load factor, the number of seats operating between the two countries is forecast to increase from 5,019 to 7,183 per week each way. Based on the average aircraft size operated, the weekly frequency between the two countries is projected to increase from 15 weekly frequencies in each direction to 30.

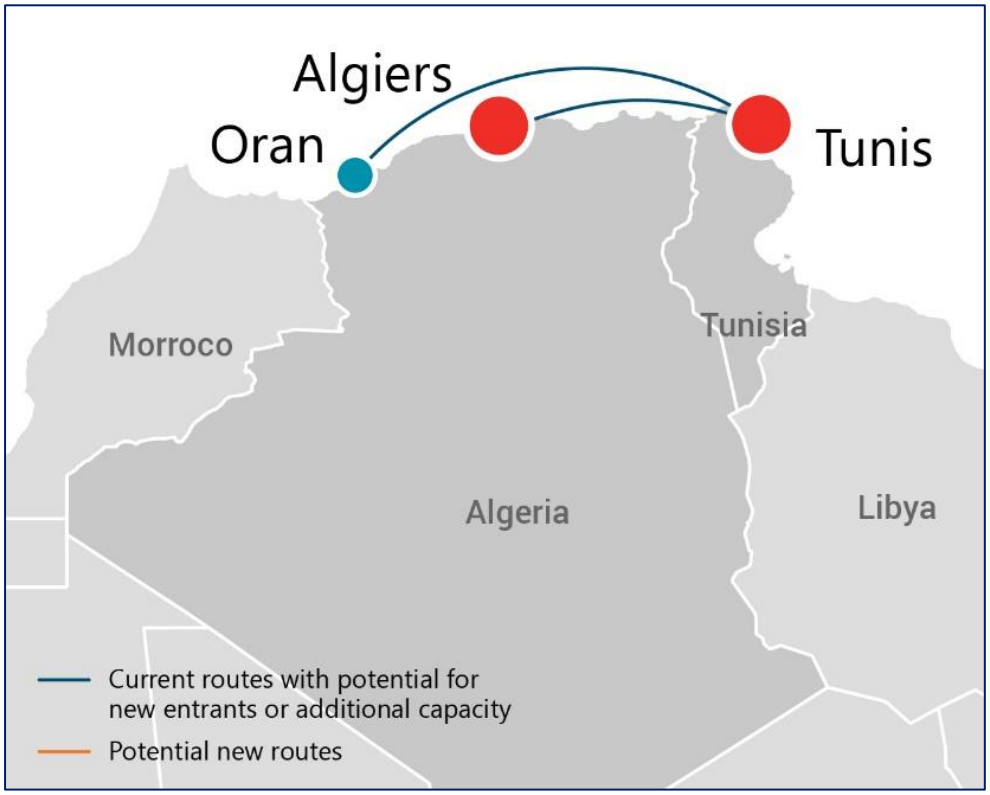
These additional frequencies may be operated on existing routes or could be the result of new routes. Based on the historical traffic flows and market growth, **Figures 8-13** and **8-14** provide a scenario of air service development between the two countries following liberalisation.

While no new routes are projected in this scenario (at least in the short to medium term), the increased frequencies on existing routes offer much more convenient itineraries for passengers.

Figure 8-13: Scenario for Air Service Development on Algeria - Tunisia Following Liberalisation

	Weekly Freq Each Way		Comments
	Before	After	
Algeria - Tunisia	15	30	
Specific Routes:			
Algiers – Tunis	14	23	Additional frequencies could be operated by existing carrier (Air Algerie, Tunis Air) or by new entrant.
Oran - Tunis	1	7	Additional frequencies could be operated by existing carrier (Air Algerie) or by new entrant.
Total	**15**	**30**	

Figure 8-14: Map of Possible Air Service Development on Algeria - Tunisia Following Liberalisation



8.3.6 Egypt - Nigeria

The Egypt – Nigeria market has recorded a year over year growth rate of 13% since 2005. The growth has largely come from Egyptair which operates from its Cairo hub to three markets in Nigeria; Abuja, Kano and Lagos. The carrier is the only operator between the two countries. Abuja-Cairo is the largest of the three markets at approximately 31 passengers per day each way. With such a small market size, it's clear that services on the country pair are largely driven by connectivity beyond Egypt. Liberalisation in the market would allow additional capacity in these three market pairs as well as open up additional markets in Nigeria for expansion such as Port Harcourt. A Nigerian carrier may opt to begin a new less than daily service between Abuja or Lagos and Cairo as they consider intra-African expansion.

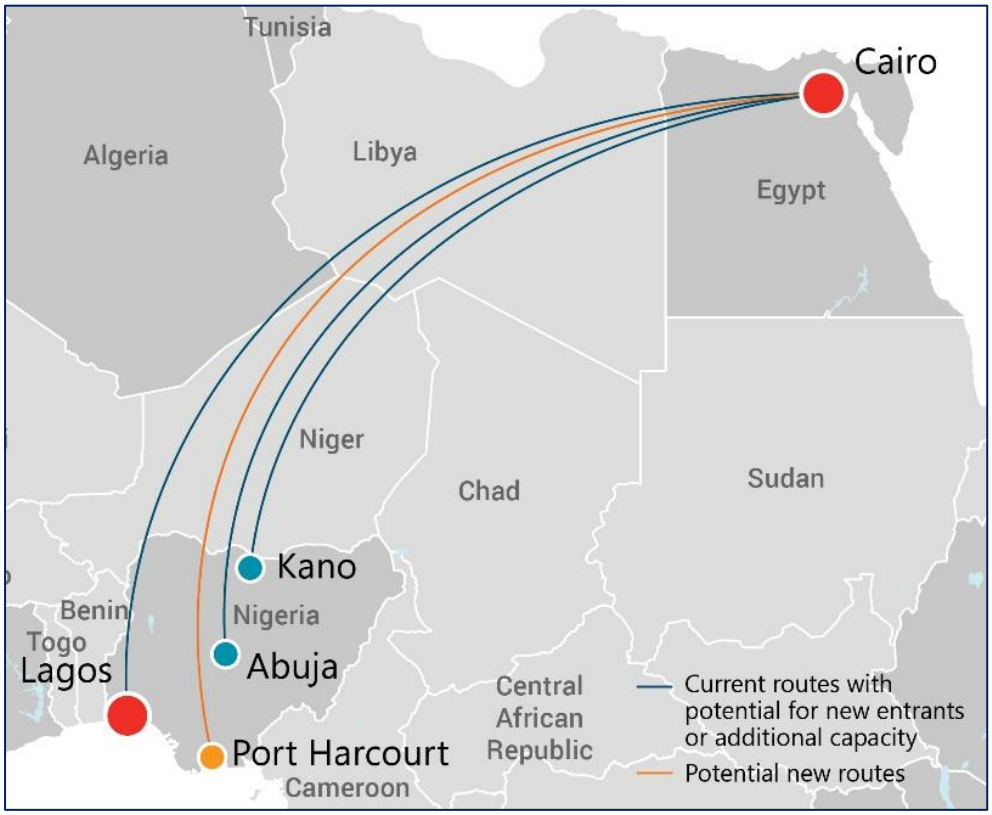
Air service liberalisation is forecast to increase passenger traffic between the two countries by 53% or 339 passengers per week each way. Historically, in addition to the O/D traffic, the services between these countries carried a further 57% connecting traffic (connecting in Egypt). Including this connecting proportion, assuming a constant load factor, the number of seats operating between the two countries is forecast to increase from 1,785 to 2,609 per week each way. Based on the average aircraft size operated, the weekly frequency between the two countries is projected to increase from 17 weekly frequencies in each direction to 34.

These additional frequencies may be operated on existing routes or could be the result of new routes. Based on the historical traffic flows and market growth, **Figures 8-15** and **8-16** provide a scenario of air service development between the two countries following liberalisation.

Figure 8-15: Scenario for Air Service Development on Egypt - Nigeria Following Liberalisation

	Weekly Freq Each Way		Comments
	Before	After	
Egypt - Nigeria	17	34	
Specific Routes:			
Cairo – Abuja	7	10	Additional frequencies could be operated by existing carrier (Egyptair) or by new entrant.
Cairo – Kano	5	7	Additional frequencies could be operated by existing carrier (Egyptair) or by new entrant.
Cairo – Lagos	5	14	Additional frequencies could be operated by existing carrier (Egyptair) or by new entrant.
Cairo – Port Harcourt	None	3	Next largest O/D market without direct service. Low frequency level may suit a network or low cost carrier.
Total	**17**	**34**	

Figure 8-16: Map of Possible Air Service Development on Egypt - Nigeria Following Liberalisation



In this scenario, liberalisation results in the frequency on a number of existing routes increasing to daily or better, enhancing connectivity and convenience for passengers. A potential new service between Cairo and Port Harcourt would reduce travel times from 9-12 hours to approximately 5.5 hours.

8.3.7 Nigeria - Senegal

The Nigeria-Senegal market has grown by 43% per year to nearly 50 passengers per day each way. The market is largely centred around the Lagos – Dakar market which is operated less than daily by Arik Air. The market will see capacity or frequency upgauges as a result of the liberalised bilateral. The country pair may also benefit from new less than daily service between Abuja and Dakar longer term, as the market has witness strong growth to nearly 70 passengers per week each way.

Air service liberalisation is forecast to increase passenger traffic between the two countries by 81% or 398 passengers per week each way. Assuming a constant load factor, the number of seats operating between the two countries is forecast to increase from 669 to 1,043 per week each way. Based on the average aircraft size operated, the weekly frequency between the two countries is projected to increase from 4 weekly frequencies in each direction to 9.

These additional frequencies may be operated on existing routes or could be the result of new routes. This country pair may grow more than forecast if a new low cost carrier was to develop in Western Africa. Based on the historical traffic flows and market growth, **Figures 8-17** and **8-18** provide a scenario of air service development between the two countries following liberalisation.

Figure 8-17: Scenario for Air Service Development on Nigeria - Senegal Following Liberalisation

	Weekly Freq Each Way		Comments
	Before	After	
Nigeria - Senegal	4	9	
Specific Routes:			
Lagos – Dakar	4	7	Additional frequencies could be operated by existing carrier (Arik Air) or by new entrant.
Abuja - Dakar	None	2	Next largest O/D market without direct service. Low frequency level may suit a network or low cost carrier.
Total	**4**	**9**	

Figure 8-18: Map of Possible Air Service Development on Nigeria - Senegal Following Liberalisation

The level of air service between Senegal and Nigeria has been relatively low, with only 4 flights per week operating in 2013 on average. Air service liberalisation between the two countries is projected to increase the number of frequencies to 9 flights per week, a more than doubling of capacity, and providing a great choice of travel options for passengers. The potential new service between Dakar and Abuja would reduce travel times from a minimum of 6-7 hours to 4 hours.

8.3.8 Angola – South Africa

Angola – South Africa is among the largest country pairs analysed in the study, and has grown by 7% year over year between 2005 and 2013. The countries are connected through service by both South African Airways and TAAG Angola. Both carriers offer service between Johannesburg and Luanda while TAAG also operates service between Luanda and Cape Town. While both markets have seen positive growth rates since 2005, the Cape Town – Luanda market has witnessed a sizeable increase of 54% per year since 2005 (from a low base) and recorded nearly 51 passengers per day each way in 2013. Should liberalisation occur, new point-to-point service may increase in this market as a result. Network carriers in both countries may also look to add new service from their bases to secondary markets like Lubango and Cabinda in Luanda and Cape Town and Durban in South Africa. This service may also come from South African low cost carriers as they expand internationally.

Air service liberalisation is forecast to increase passenger traffic between the two countries by 92% or 1,810 passengers per week each way. Historically, in addition to the O/D traffic, the services between these countries carried a further 20% connecting traffic (connecting in South Africa). Assuming a constant load factor, the number of seats operating between the two countries is forecast to increase from 4,701 to 7,527 per week each way. Based on the average aircraft size operated, the weekly frequency between the two countries is projected to increase from 14 weekly frequencies in each direction to 41.

These additional frequencies may be operated on existing routes or could be the result of new routes such as Durban – Luanda. Based on the historical traffic flows and market growth, **Figures 8-19** and **8-20** provide a scenario of air service development between the two countries following liberalisation.

In this scenario, air service liberalisation is projected to result in almost threefold the number of frequencies between the two countries than currently operate. Existing routes are projected to see significant frequency increases and up to four new routes are projected to start operations, all of which benefits passengers. For example, the journey between Luanda and Durban is projected to decline from 6-7 hours to around 3.5-4.0 hours.

Figure 8-19: Scenario for Air Service Development on Angola – South Africa Following Liberalisation

	Weekly Freq Each Way		Comments
	Before	After	
Angola – South Africa	14	41	
Specific Routes:			
Luanda – Johannesburg	11	14	Additional frequencies could be operated by existing carrier (South African Airways, TAAG Angola) or by new entrant.
Luanda – Cape Town	3	7	Additional frequencies could be operated by existing carrier (TAAG Angola) or by new entrant.
Luanda – Durban	None	7	Next largest O/D market without direct service. Low frequency level may suit a network or low cost carrier.
Lubango - Johannesburg	None	5	Next largest O/D market without direct service. Low frequency level may suit a network or low cost carrier.
Lubango – Cape Town	None	4	Next largest O/D market without direct service. Low frequency level may suit a network or low cost carrier.
Cabinda - Johannesburg	None	4	Next largest O/D market without direct service. Low frequency level may suit a network or low cost carrier.
Total	**14**	**41**	

Figure 8-20: Map of Possible Air Service Development on Angola – South Africa Following Liberalisation

8.3.9 Summary

These scenarios illustrate the increased frequencies and direct routes that could result from liberalisation. In addition, as described in Chapter 3, there is the potential for increased competition on these routes, lowering fares and increasing choice for passengers.

There is always a great concern that liberalisation will harm the profitability and viability of existing carriers. Indeed, a common result is that liberalisation leads to loss of market share as new competitors enter the market. However, the stimulatory impact of liberalisation also means that the incumbent home carrier often still experiences a growth in traffic volumes despite this loss of market share. Liberalisation offers efficient, competitive carriers an opportunity to enhance profitability by expanding into new markets, accessing a wider pool of investment and through consolidation. Ultimately, liberalisation, per se, does not set off an inevitable chain of events. The example of Ethiopian Airlines (Section 3.4) demonstrates that African carriers can thrive in a more liberalised environment. Whether the incumbent carriers prosper or suffer under liberalisation will depend in greater part on the quality of management of the carriers and how the carriers choose to respond to liberalisation.

9 Additional Analysis – The Impact of Sub-Regional Liberalisation

The analysis in the previous chapters documents the projected impact of liberalisation between all 12 of the selected countries in Africa. Sensitivity analysis was conducted to examine the impact from liberalising only the bilaterals between the three countries in each sub-region of Africa:

- **North**: Algeria, Egypt, Tunisia;
- **East**: Ethiopia, Kenya, Uganda;
- **South**: Angola, Namibia, South Africa
- **West**: Ghana, Nigeria, Senegal

For example, the impact of liberalising the bilaterals between Algeria, Egypt and Tunisia, while leaving the bilaterals with the other nine countries unchanged.

The results of this analysis are provided in **Figures 9-1** to **9-4**. The tables show the impact in terms of passenger traffic volumes, total employment and total GDP (aviation-related, tourism, and trade, investment and productivity impacts combined, including multiplier impacts). Also shown is the impact of sub-regional liberalisation as a percentage of the impacts from liberalising all 12 countries. It is notable that most countries benefit from liberalising with closer countries than more distant ones. If impacts from liberalisation were generated evenly across all the countries, we would expect the percentage to be around 18% (two divided by eleven). However, with the exception of Senegal, the impacts of liberalising with countries in the same sub-regional represent considerable more of the total impact than 18%, with some as high as 50-60%. This reflects the fact that most countries tend have more two-way traffic, trade, tourism, and business with neighbouring countries than those further away.

Figure 9-1: Impact of Liberalisation Between the North Countries

Country	Passenger Traffic Increase	Total Employment Impact (Jobs)	Total GDP Impact (US$ Million)
Algeria	+156,800 (+53%)	4,200	46.4
Egypt	+130,000 (+36%)	4,700	47.0
Tunisia	+129,900 (+51%)	3,000	41.3
% of 12 Country Liberalisation			
Algeria	37%	38%	38%
Egypt	41%	42%	41%
Tunisia	38%	37%	36%

Figure 9-2: Impact of Liberalisation Between the East Countries

Country	Traffic Increase	Total Employment Impact (Jobs)	Total GDP Impact (US$ Million)
Ethiopia	+49,800 (+14%)	3,500	14.5
Kenya	+155,100 (+23%)	6,300	29.7
Uganda	+122,500 (+33%)	5,700	23.6
% of 12 Country Liberalisation			
Ethiopia	25%	24%	24%
Kenya	38%	40%	39%
Uganda	29%	31%	30%

Figure 9-3: Impact of Liberalisation Between the South Countries

Country	Traffic Increase	Total Employment Impact (Jobs)	Total GDP Impact (US$ Million)
Angola	+268,600 (+78%)	7,900	70.9
Namibia	+337,600 (+58%)	6,900	60.8
South Africa	+446,500 (+30%)	8,100	159.1
% of 12 Country Liberalisation			
Angola	51%	52%	52%
Namibia	64%	65%	65%
South Africa	56%	56%	55%

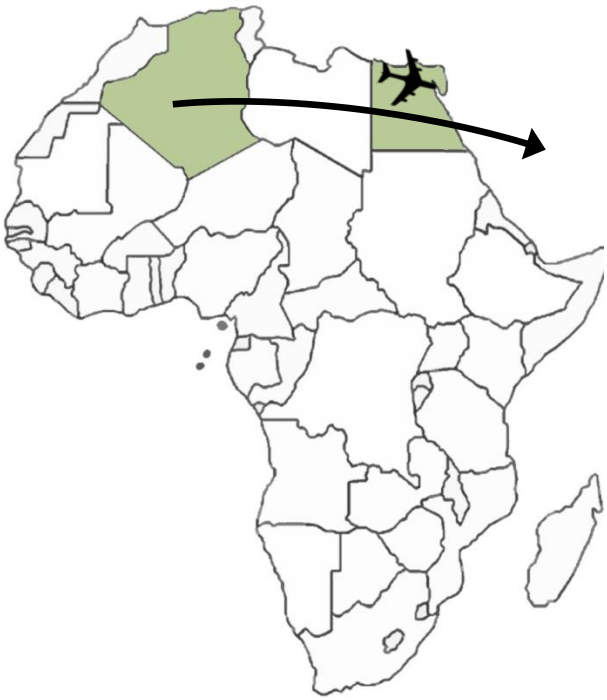
Figure 9-4: Impact of Liberalisation Between the West Countries

Country	Traffic Increase	Total Employment Impact (Jobs)	Total GDP Impact (US$ Million)
Ghana	+120,500 (+26%)	3,500	17.2
Nigeria	+143,200 (+36%)	5,000	31.0
Senegal	+33,600 (+51%)	1,300	6.3
% of 12 Country Liberalisation			
Ghana	36%	37%	37%
Nigeria	36%	29%	24%
Senegal	16%	16%	16%

Appendix A: Freedoms of the Air

The freedoms of the air were first established at the Chicago Conference in 1944 in order to provide a standardised basis for negotiation of bilateral air service agreements. In 1944 only the first five freedoms were identified, however, since that time another four definitions have been added. The nine freedoms of the air are:

First Freedom

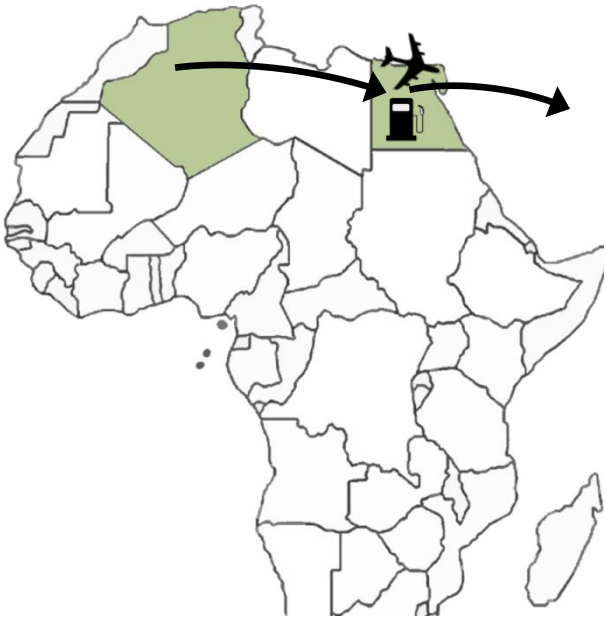


The right to fly and carry traffic over the territory of another country without landing. For example, the right of an Algerian air carrier to transit Egyptian airspace enroute to another country (or as part of a domestic flight).

For many countries, this freedom (and the second freedom right) is enshrined in a multilateral agreement known as the International Air Services Transit Agreement (IASTA) signed at the Chicago Conference. However, a number of countries are not party to this agreement, including Russia, Canada, and Brazil, and have chosen to negotiate these rights as part of the individual bilaterals.

Although these rights are fairly universal, airlines are generally required to give prior notice before entering a nation's airspace and are often charged a fee to cover air navigation costs.

Second Freedom



The right to land in another country for technical reasons such as refuelling or maintenance without boarding or deplaning passengers or cargo. For example, right of an Algerian carrier to refuel in Egypt as part of an onward journey.

The long range of modern aircraft means that this freedom is rarely used for passenger carriers. Historically under this right, locations such as Anchorage, Shannon, and Gander became key refuelling points for early long-haul aircraft.

As with the first freedom, many countries provide this right under IASTA. The first two freedoms are known as technical freedoms.

Third Freedom

The right of an air carrier from a country to carry passengers or cargo from that country to another country.

For example, the right of an Algerian carrier to transport passengers from Algeria to Egypt.

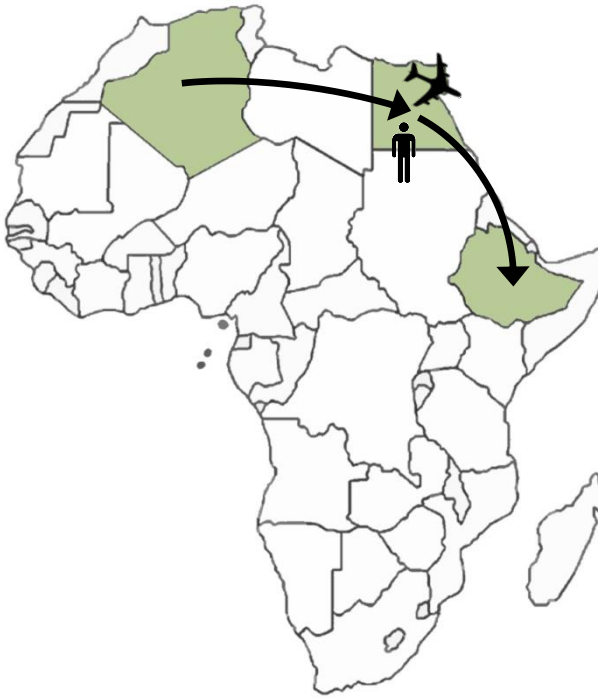
Fourth Freedom

The right of an airline from one country to land in a different country and board passengers travelling to the airline's own country.

For example, the right of an Algerian carrier to transport passengers from Egypt to Algeria.

Third and fourth freedoms are granted in virtually all air service agreements and almost always together.

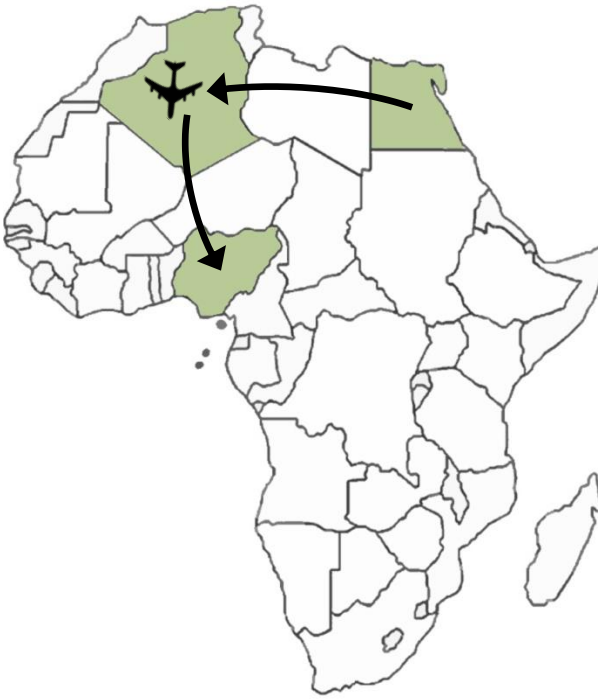
Fifth Freedom



This freedom is also sometimes referred to as "beyond rights". It is the right of an airline from one country to land in a second country, to then pick up passengers and fly on to a third country where the passengers then deplane. For example, an Algerian carrier flies from Algeria to Egypt, boards passengers at an Egyptian airport and flies those passengers to Ethiopia.

Whereas third and fourth freedoms are standard in nearly all bilaterals, the granting of fifth freedoms varies from bilateral to bilateral.

Sixth Freedom



The right to carry traffic from one country through the home country to a third country. For example, an Algerian carrier transporting passengers from Egypt to Nigeria via Algeria.

Sixth freedom clauses rarely appear in the bilateral agreements (it is essentially an airline using the third and fourth freedom rights of two separate agreements). However, in the past, some governments have attempted to restrict this traffic. For example, the UK government tried to restrict UK-Australia traffic via Malaysia by requiring a stopover of several days in Kuala Lumpur (or other connecting points). It also required Malaysia Airlines to pay $50 to British Airways for each sixth freedom passenger carried.[78] Nowadays, governments rarely place restrictions on sixth freedom traffic.

[78] Rigas Doganis, "Flying Off Course: The Economics of International Airlines", Third Edition, 2002, Routledge.

Seventh Freedom

The right to carry traffic from one country to another state without going through the home country. For example, the right of an Algerian carrier to transport passengers from Egypt to Nigeria as a stand-alone flight.

One example of Seventh Freedom is the UK-Singapore bilateral signed in 2007 which allows Singapore air carriers to operate services from London and British carriers to operate services from Singapore. The granting of seventh freedom rights is fairly common for all-cargo flights.

Eighth Freedom

The right to carry traffic between two points within a foreign country (i.e., domestic traffic) as an extension of a service starting or ending in the airline's own country (also known as tag-on or fill-up *cabotage*). For example, the right of an Algerian carrier to transport passengers from Cairo to Luxor as part of service that originated in Algeria.

One example of Eighth Freedom is the Australia-New Zealand single aviation market which allows a carrier from each country to operate tag-on domestic services in the other country. Another is part of the MALIAT between New Zealand, Chile, Singapore, and Brunei (although not the U.S., the other signatory).

Ninth Freedom

The right to carry traffic between two points within a foreign country with no requirement to start or end the service in the airline's own country (also known as pure *cabotage*). For example, an Algerian carrier operating a service between Cairo to Luxor as a stand-alone service.

A significant example of Ninth Freedoms is the EU single aviation market which allows EU carriers to operate domestic services within any of the EU member states.

Appendix B: Detailed Description of the Gravity Model

Introduction

The impacts of liberalisation were estimated using a gravity model that forecasts traffic between any two countries (or groups of countries), and which was developed and calibrated as part of a previous study by the Inter*VISTAS* group.[79]

This appendix provides an overview of the econometric analysis undertaken to estimate the key model parameters and provides a description of the workings of the model.

Estimating the Model Parameters

The model expresses the air traffic between any particular country pair as depending on a vector of geographical, socioeconomic, and regulatory variables. The model considers each country pair as an independent entity; its traffic will not be affected by changes in other country pairs. Furthermore, events in other economic sectors, such as new consumption opportunities that may compete with air travel, will not affect traffic in any manner.

Each data point consists of one country pair. The dependent variable consists of the yearly two-way origin-destination traffic between the country pair. The model views passenger traffic as a function of several socioeconomic and geographic variables, and the chosen attributes of the relevant bilateral air service agreement.

The model was estimated using cross-sectional data on over 800 country pairs. The cross-sectional analysis assumes that a particular relationship between traffic, the extent of liberalisation, and socioeconomic conditions applies to every market. Each country pair will display unique traffic volumes, socioeconomic variables, airline industry conditions, and degrees of liberalisation in the air service agreements. Through correcting for variations in economic activity and other extraneous factors, this approach seeks to explain variations in the passenger traffic between different country pairs to variations in their bilateral agreements. In theory, this method should isolate the separate impacts of route definitions, single/multiple designations, pricing controls, the presence or absence of fifth freedom permissions, and other attributes of air service agreements. Through using a very large sample involving all regions of the world, nations in all stages of development, and countries with a wide range of approaches to international aviation, the process should, in theory, yield a robust estimate of the impacts for any arbitrary country pair.

The specification of the gravity model was as follows:

$$Traffic_{AB} = F(GDP_{AB}, ServiceTrade_{AB}, Intervening_{AB}, BilateralFactors(0,1)_{AB})$$

[79] The results of that study can be found in the report, "The Economic Impact of Air Service Liberalisation", Inter*VISTAS*-ga^2, June 2006.

Note that this specification was chosen after a large number of alternative specifications were attempted, many with variables that were later rejected. Each of the selected variables are discussed in detail below:

Gross Domestic Product (GDP_{AB})
GDP_{AB} is the product of the GDP of the two countries. Gross Domestic Product (GDP), calculated from the Purchasing Power Parity method, measures the total magnitude of economic activity in any nation. The specification assumes that changes in the GDP of each country in the country pair will have identical influences in the level of traffic. The GDP term proved the most important exogenous variable in terms of significance and explanatory power. The data on GDP was sourced from the World Bank World Development Indicators.

$ServiceTrade_{AB}$
Unlike goods, services are consumed at the same time and place as they are produced; they cannot usually be stored in inventory. Service activities include insurance, financial assistance, medical services, management, consulting, etc. Since they usually require a close interaction between the seller and the consumer, the sale of services is an important determinant of the demand for travel. It was not possible to obtain data on services trade data for each potential country pair. The model, therefore, uses a gravity-type relationship between each nation's services trade with all countries to define a country pair propensity. The "Service Flows" term for the country A-B was expressed as:

Exports of Services by Country A x Imports of Services by Country B
+
Exports of Services by Country B x Imports of Services by Country A

Again, the data was sourced from the World Bank.

$Intervening_{AB}$
The traffic between any country pair is anticipated to be less if passengers could choose from other, closer destinations. For example, Australian residents will view New Zealand as easier and cheaper to reach than the United Kingdom. This proximity will correspond to a lower demand among Australians for air travel on the Australia-United Kingdom route. Similarly, individuals and businesses of the United Kingdom may view Canada as a partial substitute for Australia. This would reduce the volume of Australia-destined traffic originating in the United Kingdom.

The passenger model uses an "Intervening Opportunity" quantity as a determinant of country pair traffic. For each country in a country pair, the model calculates the sum of the GDPs of every country that is 10 percent or less distant than the other nation in the country pair. The resulting sum measures the size of closer opportunities. The product of the Intervening Opportunity term for both nations in a country pair proved to be a useful predictor of country pair traffic and displayed the expected negative sign.

Variables Pertaining to the Bilateral Agreements – $BilateralFactors(0,1)_{AB}$
$BilateralFactors(0,1)_{AB}$ are dummy variables capturing the presence or absence of a specific restriction on the bilateral. For example, if the bilateral allows flights only to named points,

then the dummy variable takes the value 1, else if carriers are unrestricted in the airports/cities they can fly to, the dummy variable takes the value 0. The dummy variables also have "modifiers" to reflect the circumstances of the individual bilateral. For example, the *named points* dummy is multiplied by a variable derived from the product of the geographic area of the two countries. This captures the fact that liberalising this term will have minimal impact on geographically small island nations with only one major airport (e.g., the bilateral for Singapore-Mauritius) than on large countries with multiple airports (e.g., the bilateral for Australia-U.S.). Each of the dummy variables are described below:

- **Permitted Number of Airline Designations**. Bilateral agreements usually specify the number of airlines permitted to fly any route between the two countries. A "0" denotes a dual or multiple designation; a "1" otherwise. This digit is then multiplied by the distance between the two countries. A country pair can only benefit from a multiple designation if one or both countries have more than one airline fit, willing, and able to operate the route. Furthermore, each such country must be willing to allow its own airlines to compete.
    - An airline seeking to operate long distance services must usually use wide body aircraft. It will require a network of feeder services using smaller aircraft. In contrast, many short-haul services use much smaller aircraft, and can serve strictly point-to-point markets. The airline operating long-haul services requires very substantial physical and financial resources. Comparatively few countries have more than one airline operating long distance services. Many are more conservative in allowing competition between their airlines on intercontinental routes, compared to shorter and highly fragmented regional markets. A single-designation rule would therefore be more onerous to short distance services than to longer flights.
- **Capacity Controls**. Many experts consider capacity controls as particularly inimical to market growth, and a key trait of a restrictive agreement. Sometimes the limits are written directly in the agreements. Lengthy negotiations are often necessary to increase the limits. In other instances, such as "Bermuda" agreements, the capacities are subject to a regular process of consultation. In either case, the airlines flying between the two nations have many opportunities to curb capacity growth and maintain high fares.
    - Two variables were employed to model the impact of capacity controls. The first variable was a "1" if capacity was fully predetermined by the agreement (which corresponds to the most inflexible form of capacity clause), and zero otherwise. A second 1-0 dummy applied if a Bermuda-type clause was in force. Both dummy variables were multiplied by GDP, reflecting a hypothesis that capacity controls become proportionately more detrimental to competition as the size of the market grows.
- **Pricing**. This variable is assigned a "0" if the bilateral allows free pricing without significant government control. It was assigned the value "0.5" if the bilateral included a double-disapproval (a more permissive form of pricing enforcement). A "1" indicates another regime, such as country-of-origin or single disapproval pricing. The resultant quantity was then modified by the product of the per capita GDPs of both countries. This reflected the belief that countries with a large per capita GDP would be most likely to

generate large volumes of leisure travellers. They would be especially affected by any price rigidities. Furthermore, airlines are most likely to offer incentive fares on routes with considerable leisure traffic. A restrictive pricing regime, which limits their flexibility, would be a proportionately large obstacle to growth in affluent country pairs.

- **Fifth Freedom Rights**. A "1" indicates the absence of any fifth freedom rights in the bilateral. A "0" depicts an agreement with such provisions. The data did not permit a more precise delineation of fifth freedom rights, such as between "intermediate" and "beyond" rights.
    - Fifth freedom rights can be most valuable for long-haul services, for which intermediate stops may be technically necessary. An ability to "top off" a long distance flight with incremental short-haul revenue, or serve a minor centre as part of a longer flight to a more significant destination may be necessary for a profitable route. These factors suggest that a fifth freedom provision may be more important to nation-pairs that are relatively distant. Furthermore, other significant markets should occur either in close proximity to the great circle flight path between the two nations (for intermediate fifths) or reasonably close to either nation. The 0-1 variable is therefore multiplied by the product of the *intervening destinations* variable (described earlier) to measure the significance of fifth freedom services for each country pair observation.
- **Named Points**. Some bilateral agreements limit services to a very few rigidly defined destinations; others, following a more liberal approach, allow services to any operationally feasible combination. In many situations, bilateral agreements will stipulate a fixed number of "roving points," for which each nation can choose the precise destinations at a later date. A very flexible definition of permissible routes is most conducive to competition when it involves nations with large areas and many potential destinations. This variable was assigned a value of zero for country pairs with broad route definitions. Those observations with specific point restrictions were assigned a value equal to the product of variables representing the area of the country.

The preliminary estimation process used an ordinary least squares algorithm on a double-log specification. This reflects the assumption that many of the processes being modelled are multiplicative. For example, a restrictive bilateral would cause a greater absolute loss of traffic in a large market than in a small one. As is common with many cross-sectional models, the preliminary specification showed problems with heteroscedasticity, as determined by a significant Goldfeldt Quandt statistic. A general least squares procedure, using the GDP variable as a weighting factor, produced the estimates shown in the table on the following page.

The regression provided a reasonable "fit" (Adjusted R-Squared of 0.67) and the signs are consistent with expectations. The coefficient on the bilateral related variables are all negative, providing evidence that the artificial constraints posed by bilateral air service agreements constrain the growth of traffic. Furthermore, these obstacles operate not only between well-studied country pairs such as between the United States and the United Kingdom, but also in a huge variety of markets, involving countries of all sizes, stages of economic development, and political systems in every part of the world.

These results therefore support the hypothesis that restrictive bilateral agreements constrain traffic development. They lead to the rejection of the null hypothesis — that restrictive bilateral agreements have little impact on traffic.

Variable	Coefficient	Standard Error	T Statistic	95% Confidence Interval	
				Lower	Upper
Intercept	-0.42345	0.277463	-1.52	-0.9673	0.1204
Economic Variables:					
GDP_{AB}	0.24054	0.040627	5.92	0.1609	0.3202
$ServiceTrade_{AB}$	0.14279	0.033162	4.30	0.0778	0.2078
$Intervening_{AB}$	-0.05739	0.005125	-11.20	-0.0674	-0.0473
$BilateralFactors(0,1)_{AB}$:					
Single Designation	-0.02101	0.00732	-2.87	-0.0354	-0.0067
Predetermined Capacity	-0.03687	0.01016	-3.63	-0.0568	-0.0170
Bermuda Capacity	-0.02578	0.00941	-2.74	-0.0442	-0.0073
Single Disapproval Pricing	-0.03629	0.01077	-3.37	-0.0574	-0.0152
Fifth Freedoms	-0.00036	0.00012	-1.64	-0.0006	-0.0001
Authorised Points	-0.05866	0.01868	-3.14	-0.0953	-0.0220
Statistical Fit:					
R-Squared	0.6796				
R-Squared Adjusted	0.6714				
F-Statistic	72.9612				
Observations	812				

Using the Model to Estimate the Traffic Impacts of Liberalisation

The impacts of liberalisation were estimated by specifying changes to the terms of the bilateral, e.g., the BilateralFactors dummies were switched from 1 to zero, where relevant, on each bilateral agreement. The gravity model then calculated the growth in international traffic stimulated by this change.

To avoid “extreme” results whereby unrealistic increases in traffic were forecast, the model “tests” in stimulus predicted by the removal of each restriction. Should the predicted stimulus exceed a particular critical value, the stimulus is reduced to that particular value. Furthermore, a “grand limit” capped the total growth resulting from a full liberalisation.

The limits were estimated by taking a sample of 600 country pairs in various stages of liberalisation. Each attribute of the relevant bilateral agreements was examined in turn and subject to a step-by-step liberalisation. The model calculated the conditional expectations of traffic resulting from each perturbation of the bilateral for each observation, generating a

series of calculated stimuli. For each attribute in the bilateral, a maximum limit on the traffic gain from an incremental liberalisation was calculated using Chebyshev's Inequality.[80] The process yielded, for each attribute and for a total liberalisation, a level of stimulation that would be exceeded by only 10 percent of the observations. To eliminate the risks of over-estimating the stimulus from liberalisation, the model superimposed the limits shown in the table below on any extrapolation produced by the gravity model:

Liberalisation Measure	**Maximum Permissible Traffic Growth**
Single to Multiple Designation	50.7%
Predetermined Capacity to Open Capacity	25.0%
Bermuda Capacity Control to Open Capacity	17.8%
Single Refusal to Double Refusal Pricing	14.1%
Including Fifth Freedom Rights	8.8%
Named Point Route Annexes to Open Routes	97.3%
Fully Restrictive to Fully Liberal ("grand limit")	166.4%

In estimating the traffic, the model takes account of the fact that liberalisation is a necessary but not a sufficient condition for traffic growth. No new services will result if there is no underlying demand to support them. The model therefore examines the air services already operating between each country pair (the model contains up-to-date summary information on services between the 12 countries from airline schedule data). If any such flights already operate, it is assumed that capacity can expand to accommodate demand. If no such flights exist, the model algorithm determines the aircraft most appropriate for a route of that length. If the traffic available is insufficient to support a reasonable level of service, the model assumes that no direct service will arise. The model then examines the bilateral agreement to ascertain if fifth freedom rights are available. If so, it then allocates the traffic to an appropriate indirect service, reducing the estimated traffic due to the undesirability of the indirect service.

[80] Chebyshev's Inequality describes very broad characteristics that govern any statistical population. It is "distribution free" in that it does not require any prior knowledge of the population, except that it have a mean and variance.

Economic Impact Parameters

This section describes the development of the economic parameters (employment, GDP, etc.) that are used in the model to estimate the economic impact of liberalisation. The parameters used a combination of generalized findings and localized data.

Aviation. The economic impact of aviation can be different in different types of economies and in different regions. Accordingly, for this model, economic impact multipliers were developed for each of the 12 countries. The aviation sector ratios and economic impact multipliers were estimated based on a number of industry statistical publications and reports and government data, including:

- The Air Transport Action Group – Aviation Benefits Beyond Borders (2012/13).
- Economic Benefits from Air Transport series of reports published by IATA.[81] The reports cover Kenya, Nigeria and South Africa.
- Employment and GDP data from the statistical agencies of each country.
- Additional employment and GDP data from the World Bank World Development Indicators.[82]
- Employment data by economic sector from the International Labour Organization.[83]

Tourism. Tourism related expenditures, employment, GDP, and multipliers were based primarily on the following data:

- World Travel & Tourism Council (WTTC), Travel and Tourism Economic Impact 2014 (2013 data). [84]
- Employment and GDP data from the statistical agencies of each country.
- U.N. World Tourism Organization (UN-WTO), Compendium of Tourism Statistics, 2014 (2012 data).[85]

In order to determine the economic impact of international tourists arriving at individual countries by air transportation, various tourism ratios were developed including:

- **Average expenditure per international tourist visit** — international tourist expenditure data was sourced from WTTC. The expenditure data was based on all international visitors but excluding domestic tourism.
- **Employment per $1 million of tourist expenditure** — total tourism related employment was generally sourced from the WTTC and national tourism satellite accounts published

[81] http://www.benefitsofaviation.aero/Pages/download.aspx

[82] http://data.worldbank.org/data-catalog/world-development-indicators

[83] http://www.ilo.org/global/statistics-and-databases/lang--en/index.htm

[84] World Travel & Tourism Council, "Travel and Tourism Economic Impact 2014 – Africa", 2014, http://www.wttc.org/site_media/uploads/downloads/africa2014.pdf

[85] http://statistics.unwto.org/content/compendium-tourism-statistics

by individual countries. Because the employment figures were only available at the industry level and not attributable to domestic versus international sectors, the employment ratios are based on combined domestic and international data. The tourism data has been adjusted to remove the air transport related employment in order to avoid double counting the employment impacts already included in the air transport economic impact above.

Catalytic Impacts. The approach taken to estimate the catalytic impacts resulting from liberalisation was to use generalised parameters drawn from statistical analysis of historical data. This analysis seeks to determine the contribution of air transport to economic growth by examining the relationship between these factors over time or compared between different countries (or both). The analysis attempts to control for other factors that also contribute to economic growth (education spending, government policies, investment, research and development spending, etc.), in order to isolate the impact of air transport.

The connectivity parameter was taken from a study undertaken by Inter*VISTAS* on behalf of IATA.[86] This study was previously referenced in Section 3.2. It was selected because it is one of few studies that is based on global data (including data on African nations) — most studies have used U.S. data. It also provides a parameter that specifically addresses productivity, rather than other aspects of aviation economic impacts such as airport activity or tourism, which have already been estimated.

The parameter from that study found that a 1% increase in a nation's air connectivity increased the nation's productivity (measured in terms of GDP per hour or GDP per worker) in each year by 0.0068%. The measure of connectivity used for this parameter was a connectivity index developed by IATA. The index measures the number and size (in terms of passenger air traffic) of destinations served, as well as the frequency of service to each destination and the number of onward connections available from those destinations.[87]

While the outcome from the parameter is expressed in terms of GDP per hour or worker, it captures the aggregate net effect of a range of catalytic impacts, including trade, investment, business location, etc., which manifest themselves as greater GDP per worker.[88] For example, greater trade allows businesses to benefit from economies of scale as they sell to a larger market. Investment decisions (expanding operations, developing new operations, introducing new technologies) will also have the effect of improving the value-added produced by each worker.

The forecasts of increased passenger traffic were used as a proxy for connectivity. This assumption is likely a conservative one as, historically, the connectivity index has grown at a

[86] Inter*VISTAS* Consulting Inc., "Measuring the Economic Rate of Return on Investment in Aviation", December 2006.

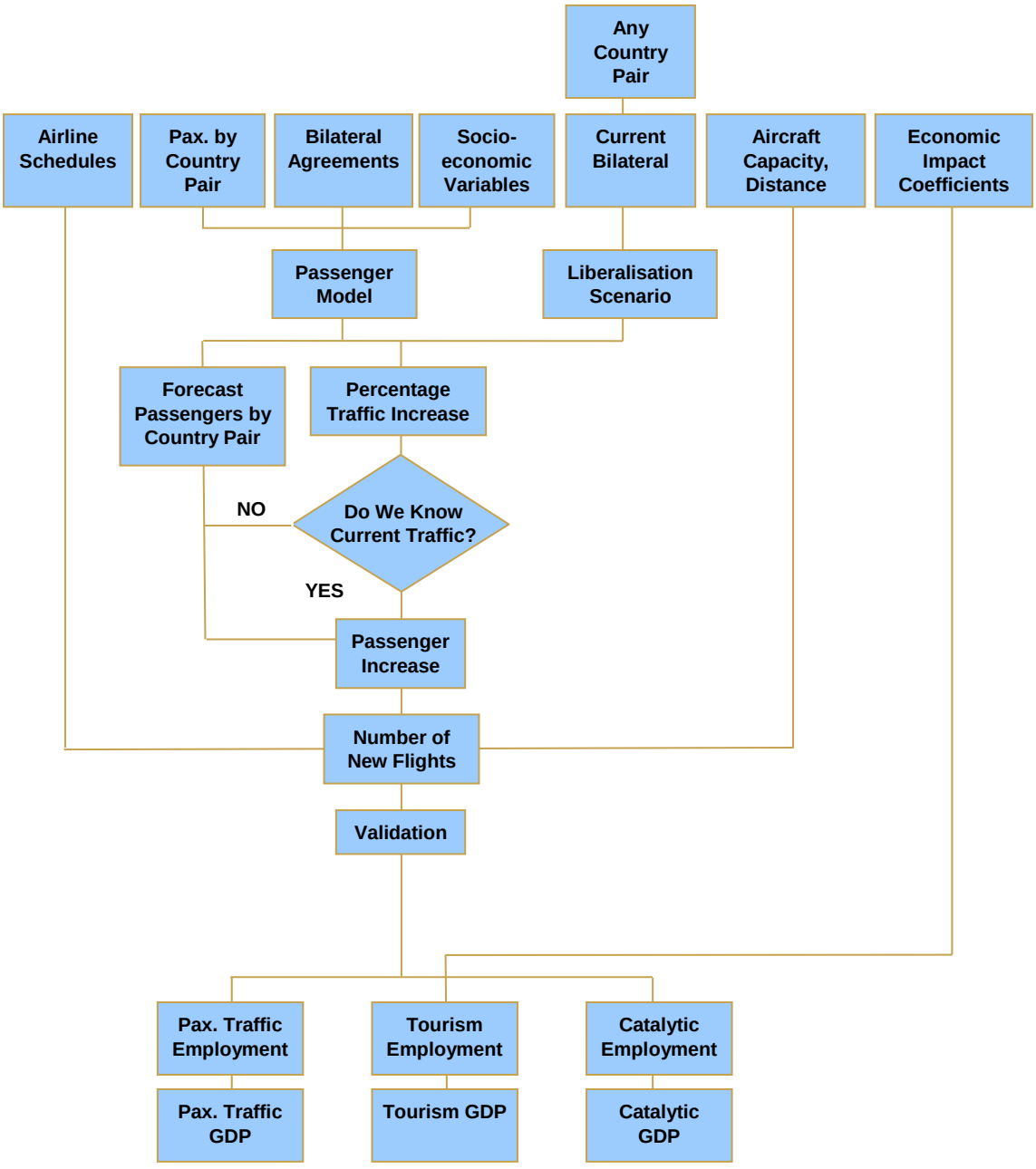
[87] For further details on the connectivity index, see: http://www.iata.org/whatwedo/Documents/economics/aviation_economic_benefits.pdf

[88] The original analysis that produced the connectivity parameter did not include any variables related to trade or business location, therefore air connectivity contribution to these effects is captured by the coefficient on GDP per hour.

slightly faster rate than passenger traffic. The connectivity parameter was applied to the percentage growth in traffic to estimate the total impact on GDP. The GDP attributable to the catalytic impacts of liberalisation stimulates spending by businesses and individuals in the economy and so can be translated into employment impacts. These were estimated based on the average GDP per worker in each of the 12 countries.

Model Summary

The passenger traffic and economic impact modules are components of a larger and integrated framework within the model. The diagram below shows a simplified schematic of the adopted approach showing the interactions between each part and how they together form a model of liberalisation.


Any Country Pair
Airline Schedules
Pax. by Country Pair
Bilateral Agreements
Socio-economic Variables
Current Bilateral
Aircraft Capacity, Distance
Economic Impact Coefficients
Passenger Model
Liberalisation Scenario
Forecast Passengers by Country Pair
Percentage Traffic Increase
NO
Do We Know Current Traffic?
YES
Passenger Increase
Number of New Flights
Validation
Pax. Traffic Employment
Tourism Employment
Catalytic Employment
Pax. Traffic GDP
Tourism GDP
Catalytic GDP

Appendix C: Consumer Surplus

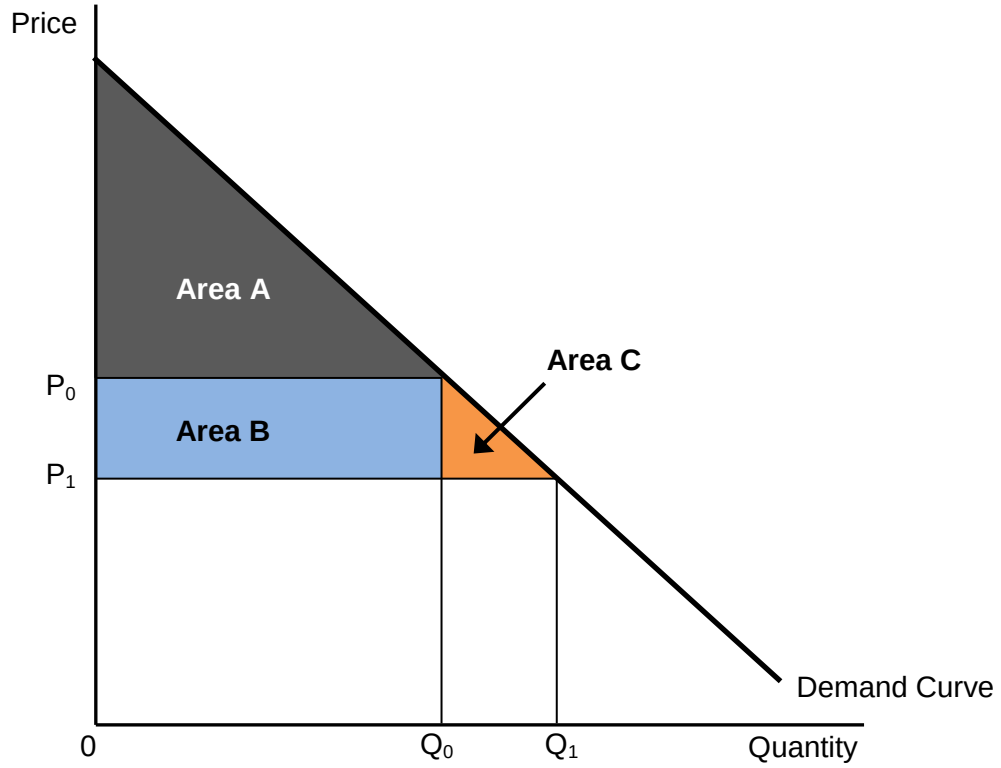
Consumer surplus is a term in economics that refers to the amount that consumers benefit by being able to purchase a product for a price that is less than they would be willing to pay. Consumer surplus is a concept frequently used in economic welfare analysis.

The concept is illustrated in **Figure C-1** which shows a standard demand curve representing the relationship between price and quantity demand — as price declines the amount demanded increases.

At the initial price P_0, the consumer surplus is represented by Area A. Consumers to the left of Q_0 were willing to a pay a price higher than P_0; summing the difference between each consumer's willingness to pay and P_0 produces a consumer surplus equal to area A.

If the price is reduced to P_1 (e.g., in the air market, fares are reduced), then the consumer surplus is increased by an amount equal to Area B and Area C. It is this gain in consumer surplus (Area B + Area C) that is provided in this report. As suggested by the diagram, this gain in consumer surplus is comprised of two elements:

Figure C-1: Consumer Surplus



- Area B: the fare savings for existing passengers, calculated in this analysis as: average fare saving x number of existing passengers. This element represents a transfer of producer surplus to consumer surplus.[89]
- Area C: this is a net gain in welfare resulting from additional passengers being able to access air services due to the lower fare. In this analysis, this element of consumer surplus is estimated as: ½ x average fare saving x number of new passengers.

It should be noted that the calculation of consumer surplus benefits is based purely on the fare reductions. However, consumers will also benefit in other ways: more direct services, greater frequencies, and more choice of airlines. These benefits are difficult to monetarise and have not been included. As a result, the consumer benefits may be understated.

[89] Producer surplus is amount producers benefit by selling at a price higher than they would be willing to sell for.

Appendix D: Estimating Trade Impacts

The increase in trade *in goods* between the 12 countries resulting from liberalisation was estimated as follows:

- The current level of trade between the 12 countries was determined. Data on the total value of goods traded between the 12 countries was obtained from the UN COMTRADE database, which provides international merchandise trade statistics for 140 countries from 1962 to the present.[90] The database also contains data on bilateral trade broken down by commodity.[91]
- Not all goods are likely to be transported by air. For example, commodities such as oil and minerals are likely to be trucked or moved by ship. Commodity groups that could be transported by air were identified and tabulated. These commodities were:
    - Fish, crustaceans, molluscs & other aquatic invertebrate
    - Dairy products, eggs, honey, edible animal products
    - Live trees, plants, bulbs, roots, cut flowers, etc.
    - Edible vegetables and certain roots and tubers
    - Edible fruit, nuts, peel of citrus fruit, melons
    - Pharmaceutical products
    - Photographic or cinematographic goods
    - Electrical, electronic equipment
    - Optical, photo, technical, medical, etc. apparatus
    - Musical instruments, parts and accessories
    - Works of art, collectors pieces and antiques
- It was assumed that half of these commodity flows were actually shipped by air (the rest were shipped by other modes).
- The increase in trade was estimated based on the traffic growth forecast from liberalisation. This involved estimating the bellyhold capacity of the additional passenger air services stimulated by liberalisation.[92]
- It is assumed that air carriers will price this bellyhold capacity to achieve a 60% average load factor.

[90] The database is available here: http://comtrade.un.org/.

[91] The most recent data is for 2012. The trade values were converted to 2013 prices by adjusting for inflation.

[92] Based on the type of aircraft likely to be operated between the countries, given the distance between them. The capacity calculation allowed for passenger's luggage requirements.

This provided an estimate of the percentage cargo capacity growth that would result from liberalisation, which was applied to the COMTRADE trade figures to estimate trade growth.

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