



AGENDA FOR
FREEDOM

The Impact of International Air Service Liberalisation on Mauritius

Prepared by InterVISTAS-EU Consulting Inc.
July 2009



LIBERALISATION REPORT



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strategic
transportation
& tourism
solutions

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Executive Summary

At the invitation of IATA, representatives of 14 nation states and the EU met at the *Agenda for Freedom Summit* in Istanbul on the 25th and 26th of October 2008 to discuss the further liberalisation of the aviation industry. The participants agreed that further liberalisation of the international aviation market was generally desirable, bringing benefits to the aviation industry, to consumers and to the wider economy. In doing so, the participants were also mindful of issues around international relations, sovereignty, infrastructure capacity, developing nations, fairness and labour interests.

None of these issues were considered insurmountable and to explore the effects of further liberalisation the participants asked IATA to undertake studies on 12 countries to examine the impact of air service agreement (ASA) liberalisation on traffic levels, employment, economic growth, tourism, passengers and national airlines.

IATA commissioned Inter *VISTAS*-EU Consulting Inc. (Inter *VISTAS*) to undertake the 12 country studies. The aim of the studies was to investigate two forms of liberalisation: market access (i.e., liberalising ASA arrangements) and foreign ownership and control.¹ This report documents the analysis undertaken to examine the impact of liberalisation on **Mauritius**.²

History of Air Service Agreements and Ownership and Control Restrictions

Since World War II, international air services between countries have operated under the terms of bilateral *air service agreements* (ASAs) negotiated between the two countries. Typically, these ASAs specified which airlines could operate between the two countries, the routes carriers could operate (e.g., which airports they could fly to), whether carriers could offer beyond services (fifth freedom rights), limits on the frequency and capacity (seats) that the carriers could operate, and often placed controls over airline pricing. 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 ASAs, most countries have also placed foreign *ownership and control* restrictions on the airlines. In part, this was to ensure that the airline complied with the national ownership requirements in the ASA - in order for an airline to be designated by a country in the ASA, 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 is restricted to no more than 25% of voting shares (stocks).

In the last two decades there has been a trend towards the liberalisation of the international air market as governments recognised the benefits of allowing market forces to determine the

¹ The focus of this study is on air passenger services; it does not consider the impact of liberalising air cargo services.

² The 12 countries covered in this study are: Australia, Brazil, Chile, India, Mauritius, Morocco, Peru, Singapore, Turkey, United Arab Emirates, Uruguay, Vietnam.

development of air services. For example, since 1992 the U.S. has pursued “open skies” bilaterals with other countries where carriers of the two nations can operate any route between the two countries without significant restrictions on capacity, frequency or price, and have the right to operate fifth and sixth freedom services. It also allows cooperative marketing arrangements such as code-sharing and liberal all-cargo operations. To date, the U.S. has signed over 90 open skies agreements.

Arguably the most prominent and comprehensive example of liberalisation has been 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 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 with 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 has unique political and legal characteristics which have allowed it to develop and implement powerful free trade policies which may not be easily replicated elsewhere.

Evidence on the Impact of Liberalisation

As documented in this report, there is considerable evidence that liberalisation of international markets has provided substantial benefits for air passengers and the wider economy. One study of the EU single aviation market found that it 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.³ Another study found that liberalisation of the EU market had doubled the rate of growth in air traffic in the EU.⁴ Furthermore, other studies have demonstrated a link between increased air traffic and growth in employment and Gross Domestic Product (GDP). For example, a recent 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.⁵ Liberalising airline ownership and control has also been found to provide benefits for passengers and the economy, by providing airlines with access to new and cheaper sources of capital, allowing airlines to draw from a greater pool of management talent, and enabling efficiencies through consolidation and mergers.⁶

In summary, liberalisation leads to increased air service levels and lower fares, which in turn stimulates additional traffic volumes and can bring about increased economic growth and employment, as illustrated below:



³ “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.

⁴ InterVISTAS-ga², “The Economic Impact of Air Service Liberalisation”, June 2006.

⁵ InterVISTAS Consulting Inc., “Measuring the Economic Rate of Return on Investment in Aviation”, December 2006.

⁶ See, for example, Piermartini, R. and Rousova, L. (World Trade Organization), “Liberalisation of Air Transport Services and Passenger Traffic”, Staff Working Paper, December 2008.

International Air Service Agreements in Mauritius

Most of the air service agreements to which Mauritius is a signatory are restrictive in nature, with limits on capacity, designated airports, approved airlines and pricing. Of the 26 major Mauritian ASAs reviewed in this study, none can be qualified as open skies. It should be noted that governments typically require reciprocity when negotiating the terms of an ASA. Therefore, it is possible that restrictions within an ASA are not due to the policies of the Mauritian government but due to the policies of the opposite country. In Mauritius, foreign ownership of national carriers is restricted to 40%.

Impact of International Air Service Liberalisation on Mauritius

Despite the trend towards liberalisation, there remain considerable government restrictions on airline operations and ownership. Many ASAs still follow the constrictive model established over 50 years ago and most governments still apply restrictions on the ownership and control of airlines. To address the impact of further liberalisation, analysis was undertaken to estimate the traffic and economic impacts resulting from the further liberalisation of the Mauritius international air market. The analysis considered market access and ownership and control liberalisation separately and in combination.

The impacts of further liberalisation of the Mauritian international air market 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 ASA between the two countries. By specifying changes to the terms of the ASA, the model can be used to estimate the traffic impact resulting from ASA liberalisation. The model can also estimate the resulting employment impacts and GDP impacts.

The results of this analysis are presented in **Figure ES-1**. Liberalisation of market access (ASAs) is forecast to increase international traffic to/from Mauritius by 979,000 passengers, an increase of 40% from 2007 levels. Ownership and control liberalisation is projected to increase international traffic by 624,000 passengers, an increase of 25%. Liberalising market access and ownership and control in combination is expected to stimulate an additional 1.6 million international passengers, an increase of 65%.

Liberalisation would also provide considerable benefits for passengers. Average fares are forecast to decline by 31% with market access liberalisation, by 21% with ownership and control liberalisation and by 51% when both forms of liberalisation are undertaken. These fare reductions provide increases in consumer surplus of between MUR 1.8 Billion and MUR 4.4 Billion.⁷

The increase in air service and passenger traffic is forecast to generate employment 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.

⁷ 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.

- **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, theatres, car rentals, etc.
- **Catalytic Impacts:** includes the role of air transportation in facilitating growth and productivity in the general economy by increased trade, business activity and greater personal productivity.

In total, liberalisation of market access is forecast to generate 10,400 full-time equivalent (FTE) jobs, while ownership and control liberalisation is expected to generate a total of 7,100 FTE jobs. The two forms of liberalisation in combination are forecast to generate 17,500 FTE jobs in total. In addition to employment, liberalisation is also forecast generate incremental GDP of between MUR 0.8 Billion and MUR 2.1 Billion.

Figure ES-1: Summary of the Impacts of Liberalisation on Mauritius

	Market Access Liberalisation	Ownership and Control Liberalisation	Combined Liberalisation
Increase in International Traffic (Passengers and % increase)	979,000 +40%	624,000 +25%	1,604,000 +65%
Reduction in Average Fare	31%	21%	51%
Increase in Consumer Surplus (Mauritian Rupees, MUR)	2,538 Million	1,827 Million	4,364 Million
Employment (FTEs)			
Aviation Sector (including indirect impacts)	1,900	1,300	3,200
Tourism (including indirect impacts)	6,500	4,400	10,900
Catalytic Impacts	2,000	1,400	3,400
Total Employment Impact	10,400	7,100	17,500
Gross Domestic Product (Mauritian Rupees, MUR)	1,260 Million	839 Million	2,099 Million
Impact on Home Carriers	Liberalisation may lead to a loss of market share by the home carriers; however, this may be offset by high traffic growth as liberalisation stimulates the market. While increased competition has the potential to weaken the viability and profitability of home carriers in some instances, liberalisation also offers the means to protect profitability by expanding into new markets, accessing a wider pool of investment and through consolidation.		

FTE: Full-Time Equivalent Job.

All financial figures are in 2008 prices.

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Glossary of Terms and Abbreviations

ASA	Air Service Agreement normally between two nation states, also known as a bilateral air service agreement or bilateral.
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	<i>Bilateral</i> air service agreement, also known as an air service agreement or ASA (see above).
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) could 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 partners 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	<i>Direct Impacts</i> 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.
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.
FTE	Full-Time Equivalent Job, a standardised measure of employment where 1 FTE is equal to one person working a full-time job.
GDP	Gross Domestic Product, a measure of the total national income and output of an economy.
Indirect impacts	<i>Indirect Impacts</i> 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 may purchase goods or services, such as stationery and office supplies, from a local business. 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, Gol in South America and Virgin Blue in Australia.

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 summarized 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.
MUR	Mauritian Rupees
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.

1. Introduction

At the invitation of IATA, representatives of 14 nation states and the EU met at the *Agenda for Freedom Summit* in Istanbul on the 25th and 26th of October 2008 to discuss the further liberalisation of the aviation industry. The participants agreed that further liberalisation of the international aviation market was generally desirable, bringing benefits to the aviation industry, to consumers and to the wider economy. In doing so, the participants were also mindful of the following issues:

- The need to maintain leverage to address “doing business” issues.
- The need to avoid overwhelming available infrastructure with increased traffic.
- The special needs of developing nations, and those in transition, to fully open markets.
- The need for a level playing field.
- The dependency of remote island States on air transportation.
- The impact on labour interests.
- Issues of national pride and sovereignty.

None of these issues were considered insurmountable and to explore the effects of further liberalisation the participants asked IATA to develop studies on 12 countries to examine the impact of Air Service Agreement (ASA) liberalisation on the aviation industry, air passengers, and the wider economy, in each country.

IATA commissioned InterVISTAS-EU Consulting Inc. (InterVISTAS) to undertake the 12 country studies. The aim of the studies was to investigate two forms of liberalisation: market access (i.e., liberalising ASA arrangements) and foreign ownership and control. The 12 studies examined the following impacts of liberalisation on each of the countries:

- Impact on traffic volumes.
- Impact on passengers (consumer benefits).
- Impact on jobs in the air transport industry and the wider economy.
- Impact on tourism.
- Impact on Gross Domestic Product (GDP).
- Impact on national airlines.

The focus of this study is on air *passenger* services; it does not consider the impact of liberalising air cargo services.

1.1 Report Structure

This report documents the analysis undertaken to examine the impact of liberalisation on **Mauritius**.⁸ The report is structured as follows:

⁸ The 12 countries covered in this study are: Australia, Brazil, Chile, India, Mauritius, Morocco, Peru, Singapore, Turkey, United Arab Emirates, Uruguay, Vietnam.

- **Chapter 2** provides a general discussion on structure and history of international air service agreements and the previous evidence on the impacts of liberalising international air policy.
- **Chapter 3** gives an overview of the Mauritius aviation market and the current state of its air service agreements and foreign ownership and control restrictions.
- **Chapter 4** provides the analysis of the impacts of liberalisation on Mauritius. 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. The model was calibrated on data from over 800 country pairs and, as a result, contains specific parameters for different regions of the world.

Additional details on air service agreements and the structure of the gravity model are provided in the appendices.

2. Overview of Air Service Agreements and Air Service Liberalisation

2.1 History and Characteristics of Air Service Agreements

In most parts of the world, international air services between countries operate under the terms of a bilateral *air service agreement* (ASA) 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*.⁹

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" or ASA. 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 and in more detail in **Appendix A**. Virtually all the bilateral ASAs will allow freedoms one to four.¹⁰ However, ASAs 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 ASAs do not permit this type of traffic while others do, or some variant of it.
- **Authorized 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.

⁹ The Chicago Convention framework clearly distinguishes between international and domestic services. Domestic services are considered strictly a matter for the respective national government.

¹⁰ 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.

- **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.

Freedoms of the Air

When countries negotiate air services agreements, 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.

Historically, many of the ASAs 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 ASA specified limits on pricing, capacity, designated airlines and routes operated. This restrictive agreement has acted as a template for a great number of subsequent ASAs between various countries.¹¹ 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.

¹¹ 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.

In addition to the bilateral ASAs, 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 ASA - in order for an airline to be designated by a country in the ASA, 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 is restricted to no more than 25% of voting shares (stocks).¹² 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).

2.2 The Trend Toward Liberalisation

The international ASA 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 great 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 ASAs.

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

¹² 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.

towards the liberalisation of international ASAs. Since 1992, the U.S. has pursued “open skies” bilaterals with other countries.¹³ The term “open skies” is somewhat loosely defined 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.¹⁴ 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 over 90 open skies agreements. 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) between Brunei, Chile, New Zealand, Singapore and the United States. 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.

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

¹³ In fact, the U.S. had started pursuing more liberal ASAs since the late 1970s, but the policy was only formalised as “open skies” in the 1990s.

¹⁴ Some controls on pricing remain through a double disapproval mechanism, i.e., if both governments concur to disallow the fare.

Despite the trend towards liberalisation, there remain considerable government restrictions on airline operations and ownership. Many ASAs 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 section describes the benefits that have arisen from liberalisation and are likely to arise with further liberalisation.

2.3 Impact of Liberalisation

It is worth noting that the restrictions placed on the operation of international air service and the ownership and control of airlines are unique to the aviation sector. 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. It is generally accepted that these lack of restrictions have been beneficial to these industries and, more importantly, to the consumers they serve. Don Carty, the ex-CEO of American Airlines observed:

"The current rules of the game in our business hurt – not just the airlines – but our customers too. In other industries, globalisation is fuelling mergers and acquisitions and other sorts of business combinations. And since there are no flag chemical companies or flag shoe companies, these combinations are able to progress so long as they will create efficiencies in areas like R&D, the elimination of duplicative staff, economies of scale and so on – the benefits of which accrue to the customer."

Speech by Don Carty, ex-CEO of American Airlines, to the AAAE Conference, Texas, May 2002

2.3.1 Liberalisation of Air Service Agreements

As the examples below illustrate, liberalisation of ASAs have 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:¹⁵

- **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%.
- **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.
- **Increased routes and capacity.** 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.

¹⁵ "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.

A 2006 study by Inter *VISTAS*-ga² also found a substantial stimulation of traffic resulting from the liberalisation of the EU air market.¹⁶ 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 ASAs is illustrated in **Figure 2-1**. The table provides a comparison of traffic levels in the year immediately preceding inauguration of the new ASA 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 2-1: 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: "The Economic Impact of Air Service Liberalisation", Inter *VISTAS*-ga², June 2006.

The UK Civil Aviation Authority (CAA) examined the impact of the liberalisation of the UK-India ASA which took place in 2004.¹⁷ The study found that two years after liberalisation, the number of direct services between the UK and India had increased from 34 to 112 services per week (an increase of 229%). 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

¹⁶ Inter *VISTAS*-ga², "The Economic Impact of Air Service Liberalisation", June 2006.

¹⁷ UK CAA, "UK-India Air Services: A Case Study in Liberalisation", 22 November 2006.

operating between the two countries increased from three to five. 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%.

2.3.2 Ownership and Control Liberalisation

The removal of restrictions on ownership and control is anticipated to have a number of impacts on the airline industry:

- Airlines will obtain access to a wider pool of capital rather than being largely restricted to their home markets.¹⁸ In many cases this will lower the cost of capital due to the increased supply available, particularly in countries with less developed capital markets. In addition, struggling or start-up airlines with weak credit ratings can obtain access to capital that would otherwise be unavailable. Airlines may also benefit from the expertise of the investor as many investors will likely have a specialised interest in the sector (e.g., other airlines).
- In many countries the ownership and control restrictions also limit foreign representation on the airline board and in airline management (e.g., the U.S. requires the CEO to be a U.S. citizen in some cases). With liberalisation, airlines would be free to seek the best expertise available from around the globe.
- The lifting of ownership and control restrictions would lead the way to cross-border integration and merger of airlines (mergers would still be subject to scrutiny by competition authorities). This would enable airlines to exploit cost efficiencies and network synergies with considerable benefits for consumers. Studies in other industries show mergers provide efficiency gains of 1.5-2.7%.¹⁹

A 2002 study on the potential economic impact of an U.S.-EU open aviation area estimated that removal of ownership and control restrictions had the potential to produce cost savings of 4.2% in U.S. and EU air carriers, leading to lower fares for consumers and stimulating additional demand.²⁰ A recent study by the World Trade Organization (WTO) also examined the impact of ownership and control restrictions on international air traffic, and estimated that the removal of such restrictions could stimulate a 34-39% increase in traffic, depending on the degree of control already in place and the measurement methodology used.²¹

The issue of ownership and control is closely linked to air service agreements due to the nationality requirements for the designated airlines. This further restricts the ability of airlines to merge across borders. Consider the case of Air France/KLM which merged in 2004. As both airlines were within the EU, they were free to merge subject to the approvals of the EU and national competition authorities. However, in order to comply with the nationality requirements in the French and Dutch bilaterals, the merged airline had to develop a complex "two headed" structure to maintain French and Dutch control for the relevant ASAs. When eventually the EU

¹⁸ As Cosmas, Belobab and Swelbar (2008) note, while ownership laws restrict equity, the same applies to the debt markets as well. Debtors often seek a level of control in their investments which may not be permitted under current ownership and control laws.

¹⁹ UK CAA, "Ownership and Control Liberalisation: A Discussion Paper", October 2006.

²⁰ The Brattle Group, "The Economic Impact of an EU-US Open Aviation Area", Prepared for the European Commission, December 2002.

²¹ Piermartini, R. and Rousová, L. (World Trade Organization), "Liberalisation of Air Transport Services and Passenger Traffic", Staff Working Paper, December 2008.

is able to replace all member state bilaterals with a single EU-wide bilateral, then the complex structure of Air France/KLM may no longer be required (it is possible the structure will be maintained for other reasons).²² One way around this issue is to replace the ownership and control requirements in the ASA with principal place of business requirements as has been done by Chile.

2.3.3 Impact 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, 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.
- **Catalytic Impacts:** this includes the role of air transportation in facilitating growth and productivity in the general economy by increased trade, business activity and greater personal productivity.

A 2004 study by the UK CAA examined the impact of liberalisation of the EU market on employment in the aviation sector.²³ 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).

More broadly, a number of studies have examined the link between air service levels and general employment or economic growth (the “catalytic impacts”):

²² The EU is addressing this issue in two ways. In the short-term, it is negotiating “horizontal agreements” which amend the airline designation clause in the existing ASAs between member states and third countries to allow all qualifying EU carriers to be designated, as well as other adjustments to bring the ASA into compliance with EU law. Longer term, the EU is seeking to negotiate a single EU-wide (open skies) ASA to replace those of the member states. The most significant example of this to date is the EU-U.S. Open Skies agreement in 2008.

²³ UK CAA, “The Effect of Liberalisation of Employment”, 16 March 2004.

- 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.²⁴ 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.²⁵
- A study by Button and Taylor (2000) examined the link between international air service and economic development.²⁶ 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.²⁷ The analysis found that a 10 percent increase in passenger enplanements in a metropolitan area leads to an approximately 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.²⁸ The study estimated that the net contribution of air transportation to trade (i.e., export 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%.²⁹

The research summarised in this section provides evidence of the way in which liberalisation leads to increased air service levels and lower fares, which in turn stimulates additional traffic volumes, and can bring about increased economic growth and employment, as illustrated below:



²⁴ Irwin, M. and Kasarda, J. (1991), “Air Passenger Linkages and Employment Growth in U.S. Metropolitan Areas”, *American Sociological Review*, Vol. 56, No. 4, August 1991.

²⁵ 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.

²⁶ Button, K. and Taylor, S. (2000), “International air transportation and economic development”, *Journal of Air Transport Management*, Vol. 6, Issue 4, October 2000.

²⁷ Brueckner, J. (2002), “Airline Traffic and Urban Economic Development”.

²⁸ Cooper, A. and Smith, P. (2005), “The Economic Catalytic Effects of Air Transport in Europe,” EUROCONTROL.

²⁹ Inter VISTAS Consulting Inc., “Measuring the Economic Rate of Return on Investment in Aviation”, December 2006.

3. The Mauritian Aviation Market

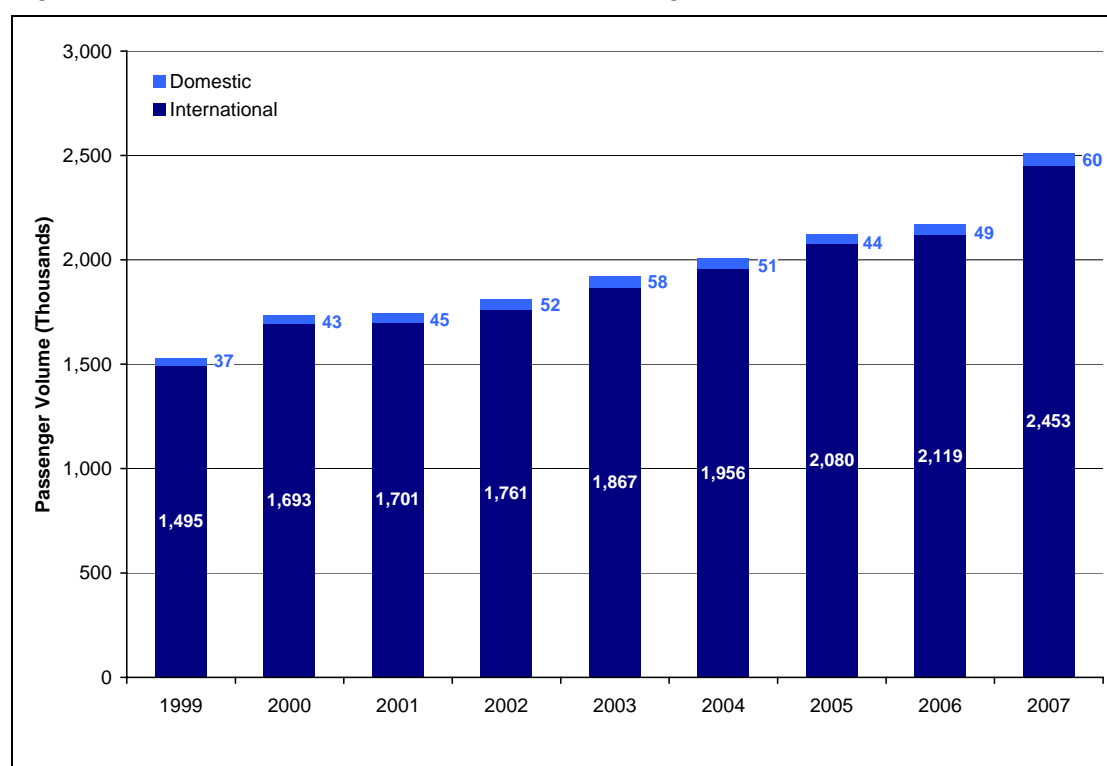
3.1 Overview of the Market in Mauritius

Passenger Traffic

Sir Seewoosagar Ramgoolam International Airport is the primary commercial airport serving Mauritius handling all international air traffic and half of all domestic traffic. The airport is located approximately 43 kilometres southeast of Port Louis, the capital of Mauritius.

In 2007, total annual air passenger traffic in Mauritius reached over 2.5 million, of which over 2.4 million (98%) was international traffic (see **Figure 3-1**). Over the last eight years, international passenger traffic has grown by an average of 6.4% per annum. International traffic in 2007 grew by 16% relative to 2006.

Figure 3-1: Domestic, International and Total Passenger Volumes (1999-2007)



Source: Airports of Mauritius Company Ltd.

Major Airlines

Air Mauritius is the national airline of Mauritius, accounting for 76% of domestic capacity and 53% of international capacity in 2007, as shown in **Figure 3-2**.³⁰ The major foreign air carriers serving Mauritius in 2007 were Air Austral based in Reunion, Air France, Emirates, South African Airways and British Airways.

Figure 3-2: Seat Capacity Market Share of Major Airlines in Mauritius (2007)

Airline	Seat Capacity Market Share	
	Domestic	International
Air Mauritius	76%	53%
Catovair	24%	-
Air Austral	-	10%
Air France	-	8%
Emirates	-	7%
South African Airways	-	4%
British Airways	-	4%
Other Airlines	-	14%
Total	100%	100%

Source: OAG Max Airline Schedule data, 2007.

Origin/Destination Markets

Figure 3-3 presents the major international origin/destination (O/D) markets for Mauritius. Reunion in the Indian Ocean is the largest O/D market, totalling 481,000 passengers in 2007 and making up 20% of all international traffic. The second largest market is France (434,000 passengers) and the United Kingdom is the third largest market (310,000 passengers). Other major markets include South Africa, Germany, Italy, Madagascar, United Arab Emirates, Switzerland and the Seychelles.

³⁰ The domestic traffic is largely on one route between Sir Seewoosagur Ramgoolam International and the island of Rodrigues.

Figure 3-3: Top 10 Origin/Destination Markets for Mauritius (2007)

Country	Passengers (Thousands)	% of Total Passengers
Reunion	481	20%
France	434	18%
United Kingdom	310	13%
South Africa	301	12%
Germany	175	7%
Italy	125	5%
Madagascar	86	4%
United Arab Emirates	75	3%
Switzerland	55	2%
Seychelles	54	2%
Other / Connecting	357	15%
Total	2,453	100%

Source: IATA PaxIS Passenger Traffic Data.

Note: Traffic figures are based on the final origin or destination of the air passenger, not their immediate connecting point. Figures may not sum up to the totals due to rounding.

3.2 International Air Service Agreements in Mauritius

Most of the air service agreements to which Mauritius is a signatory are restrictive in nature, with limits on capacity, designated airports, approved airlines and pricing. This is illustrated in **Figure 3-4** which summarises the key characteristics of the air service agreements governing the top 20 international O/D markets to/from Mauritius (77% of all international traffic to/from Mauritius). Of these top 20 markets, 18 have ASAs which restrict the airports airlines can fly to (named points) and all have ASAs placing some kind of restriction on capacity (predetermined capacity). In addition, all of the ASAs place restrictions on pricing (single disapproval) and half designate only one airline from each country to operate service between the two countries. Furthermore, 12 of the 20 ASAs do not permit fifth freedom operations. It should be noted that governments typically require reciprocity when negotiating the terms of an ASA. Therefore, it is possible that restrictions within an ASA are not due to the policies of the Mauritian government but due to the policies of the opposite country.

In Mauritius, foreign ownership of carriers is restricted to 40%. For instance, both Air France and Air India have minority stakes in Air Mauritius.

Figure 3-4: Key Characteristics of the Air Service Agreements on the Top 20 Origin and Destination Markets in Mauritius

Country	Authorized Points	Capacity	Pricing	Airline Designation	Fifth Freedoms
1. France	Named	Predetermination	Single Disapproval	Multiple	Yes
2. United Kingdom	Any	Predetermination	Single Disapproval	Multiple	No
3. South Africa	Named	Predetermination	Single Disapproval	Multiple	No
4. Germany	Any	Predetermination	Single Disapproval	Multiple	Yes
5. India	Named	Predetermination	Single Disapproval	Single	Yes
6. Italy	Named	Predetermination	Single Disapproval	Multiple	No
7. Madagascar	Named	Predetermination	Single Disapproval	Multiple	No
8. UAE	Named	Predetermination	Single Disapproval	Single	No
9. Australia	Named	Predetermination	Single Disapproval	Single	Yes
10. Switzerland	Named	Predetermination	Single Disapproval	Single	Yes
11. Seychelles	Named	Predetermination	Single Disapproval	Single	No
12. Hong Kong SAR	Named	Predetermination	Single Disapproval	Multiple	No
13. Singapore	Named	Predetermination	Single Disapproval	Single	Yes
14. Spain	Named	Predetermination	Single Disapproval	Multiple	No
15. Belgium	Named	Predetermination	Single Disapproval	Single	Yes
16. Austria	Named	Predetermination	Single Disapproval	Multiple	No
17. Malaysia	Named	Predetermination	Single Disapproval	Multiple	No
18. Kenya	Named	Predetermination	Single Disapproval	Single	Yes
19. Netherlands	Named	Predetermination	Single Disapproval	Single	Yes
20. China	Named	Predetermination	Single Disapproval	Single	No

Source: ICAO World Air Services Agreement Database, World Trade Organization QUASAR Database and InterVISTAS's own research.

Notes:

Authorised points – *Named* indicates that the ASA restricts airlines to operating to/from specific airports, while *Any* indicates that the airlines can fly to any point within each country.

Capacity - *Predetermination* means that prior government agreement on capacity is required before service begins (most restrictive); *Bermuda* sets principles that the airline should respect in relation to capacity and allows government to intervene only *a posteriori* (less restrictive than predetermination); *free determination* means no government restrictions on capacity apply (least restrictive).

Pricing – *single disapproval* means that either government can disapprove an air tariff published for air service between the two countries (most restrictive); *double disapproval* means that both governments must agree to disapprove an air tariff (less restrictive); *free pricing* means that there is no restrictions on pricing.

Airline Designation – the number of airlines designated by each country to operate service between the two countries. *Single* indicates that only one airline from each country is authorised to operate service between the two countries).

Fifth Freedoms – indicates whether fifth freedom service are permitted (i.e., service to a third country as part of an air service between the two countries). In many cases, ASAs permitting fifth freedom services will restrict those services only to specified routes.

4. Estimated Impacts of International Air Service Liberalisation on Mauritius

4.1 Introduction

This chapter provides a summary of the estimated traffic and economic impacts resulting from the further liberalisation of the Mauritian international air market. These impacts were estimated using a gravity model described in Section 4.2 below. Two forms of liberalisation were considered in this analysis:

1. **Market Access Liberalisation.** This refers to liberalisation in terms of the bilateral air service agreements relating to airline designation, capacity restrictions, pricing restrictions, authorized points, fifth freedom rights and co-operative arrangements. The analysis considers the impact if all restrictions on these terms were removed from all of Mauritius's major ASAs (e.g., all Mauritian airlines, and those of the other country, were free 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 code share arrangements).
2. **Ownership and Control Liberalisation.** This refers to liberalisation of the ownership and control restrictions placed on the country's airlines operating international services. The analysis considers the impact if these restrictions were removed (e.g., no restrictions on foreign ownership). As this form of liberalisation is considered separately to market access liberalisation, it is assumed that a principal place of business requirement replaces the national ownership requirements within the ASAs.

In addition, the two forms of liberalisation are also considered in combination. It should be noted that governments typically require reciprocity when negotiating the terms of an ASA. Therefore, it is possible that restrictions within an ASA are not due to the policies of the Mauritius government but due to the policies of the opposite country. In this analysis it is assumed that reciprocity is reached in the liberalisation of these agreements.

4.2 Modelling the Impact of Liberalisation

The impacts of further liberalisation of the Mauritius international air market were estimated using a gravity model which forecasts traffic between any two countries (or groups of countries) based on the economic characteristics of the two countries, trade levels between the two countries, their geographic relationship and the characteristics of the ASA between the two countries as follows:

$$\text{Traffic}_{AB} = F(\text{GDP}_{AB}, \text{ServiceTrade}_{AB}, \text{Intervening}_{AB}, \text{ASAFactors}(0,1)_{AB})$$

Where,

Traffic_{AB} is the total Origin/Destination (O/D) passenger traffic between countries A and B in both directions.

GDP_{AB} is the product of the GDP of the two countries, capturing their economic size.

$ServiceTrade_{AB}$ is the total amount of trade in service (i.e., not goods) between the two countries in U.S. dollars.

$Intervening_{AB}$ captures the intervening opportunities for closer travel than between 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 countries A and B.

$ASAFactors(0,1)_{AB}$ are dummy variables capturing the presence or absence of a specific restrictions on the ASA. For example, if ASA allows flights only to named points then the dummy variable takes the value 1 or 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 ASA. 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 ASA for Singapore-Mauritius) than on large countries with multiple airports (e.g., the ASA for Australia-U.S.).

The gravity model was developed and calibrated as part of a previous study by the InterVISTAS group.³¹ Its parameters were estimated using traffic, economic and ASA data from over 800 country pairs with varying degrees of liberalisation. 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 ASA, e.g., the $ASAFactors(0,1)$ dummies were switched from 1 to zero, where relevant, on each ASA 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 information on services to/from Mauritius from OAG 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. 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 ASA.

Having estimated the incremental traffic stimulated by liberalisation, the model then calculates the employment and Gross Domestic Product (GDP) generated by this traffic. The model contains economic multipliers to estimate the employment and GDP stimulated by increased air

³¹ The results of that study can be found in the report, "The Economic Impact of Air Service Liberalisation", InterVISTAS-ga², June 2006.

service at both ends of each country-pair. These multipliers capture the employment and GDP generated by unit increases in traffic based on data collected from around the world and are broken down into different types of impacts (aviation industry, tourism, catalytic). The model contains 14 sets of multipliers reflecting differing levels of stimulation that occur in different types of countries. For example, increased air service can have a larger employment impact in developing countries than in developed countries due to the greater use of technology in developed countries. Further details on the economic multipliers are provided in **Appendix B**.

To undertake the analysis in this report, the model was fully updated using 2007 traffic and economic data (the most recent available on a global basis).³² In addition, information was collected on 26 ASAs between Mauritius and other countries, which represents all the ASAs that Mauritius is currently a signatory.

Comment on Modelling Ownership and Control Liberalisation

As noted in Section 2.3.2, liberalisation of ownership and control has provided airlines with access to new and cheaper sources of capital, allowed them to draw from a greater pool of management talent, and enabled airlines to achieve greater efficiencies through consolidation and mergers. In turn, this form of liberalisation has been shown to reduce fares for consumers and stimulate increased traffic levels. The original gravity model developed in 2006 did not contain any parameters relating to ownership and control. Therefore, an additional parameter was developed which could address the impact of this form of liberalisation using results obtained by other researchers. After conducting an extensive literature review, two items of research were found to provide information in this area:³³

- The Brattle group report estimated that liberalisation of ownership and control in the EU-U.S. market could stimulate traffic by 5-11%.³⁴ This estimate is based on a specific market which has already seen significant liberalisation, especially on the EU side. Furthermore, the estimate is based on airline cost analysis to determine potential cost savings which then get passed onto passengers in fare savings.
- Research by the WTO indicates that full liberalisation of ownership and control could stimulate 34-39% growth in traffic.³⁵ The findings were based on the estimation of a gravity model similar to that described above, which included dummy variables related to ownership and control. The authors also conducted cluster analysis (grouping ASAs based on their degree of liberalisation), which also provided a means to determine the impact of ownership and control restrictions.

Based on the available research, it was decided to incorporate a parameter which allowed for a maximum traffic impact from ownership and control liberalisation of 34% (the lower end of the research from the WTO). However, the impact was scaled by the degree of ownership restriction already in place. For example, liberalising ownership when the original limit was 49% foreign ownership would have a smaller impact than if the original limit was 25%, which itself had a smaller impact than if the original limit was 0%.

³² 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.

³³ In general, there is very little empirical research on this form of liberalisation.

³⁴ The Brattle Group, "The Economic Impact of an EU-US Open Aviation Area", Prepared for the European Commission, December 2002.

³⁵ Piermartini, R. and Rousova, L. (World Trade Organization), *Liberalisation of Air Transport Services and Passenger Traffic*, Staff Working Paper, December 2008.

In the case of Mauritius, foreign ownership is limited to 40%. The analysis of ownership and control liberalisation is based on a scenario where the Mauritius government removes this limit entirely (100% foreign ownership is permitted).

4.3 Forecast Impact of Liberalisation

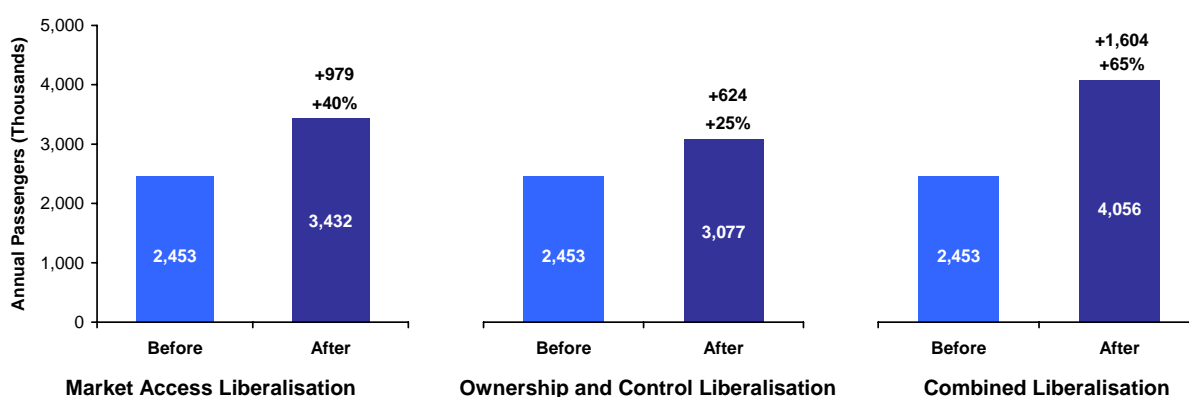
The following subsections detail the various impacts resulting from market access and ownership and control liberalisation, such as:

- Traffic Impacts: the incremental traffic stimulated by liberalisation.
- Passenger Impacts: fare reductions and consumer surplus benefits.
- Employment Impacts in the Aviation Industry: incremental employment generated in the national aviation industry (airports, airlines, air navigation, etc.).
- Tourism Impacts: additional tourists visiting Mauritius and the employment generated.
- Catalytic Impacts: additional employment in the general economy resulting from additional air services facilitating trade, business activity and greater personal productivity.
- GDP Impacts: additional Gross Domestic Product generated.
- Impact on Home Carriers: the impact on the market share and profitability of Mauritius's home carriers.

4.3.1 Traffic Impacts

The projected increase in international traffic to and from Mauritius as a result of liberalisation is provided in **Figure 4-1**. This represents the long term impact manifesting 1-2 years after liberalisation is enacted. Liberalisation of market access is projected to increase international traffic to/from Mauritius by 979,000 annual passengers, an increase of 40%. Liberalising ownership and control is forecast to increase international traffic by 25% or 624,000 passengers. Liberalising market access and ownership and control in combination is projected to increase traffic by 65%, equal to an additional 1.6 million passengers.

Figure 4-1: Traffic Impact of Liberalisation



4.3.2 Passenger Impacts

The fare reductions and consumer surplus benefits were estimated on the basis that much of the traffic stimulation is due to fare reductions. This assumption is supported by the research reviewed in Section 2.3 which found that liberalisation generally results in significant reductions of real (inflation adjusted) fares reductions. In estimating the fare reduction, it was further assumed that on country pairs which already had direct service prior to liberalisation, all of the traffic stimulation was attributable to the fare reductions; while on country pairs that did not previously have direct service, two thirds of the traffic increase was attributable to fare reductions (one third 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

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

Country Pairs With No Prior Direct Service

$$\% \text{ Fare Reduction}_{AB} = 2/3 \times \% \text{ Traffic Increase}_{AB} / \text{Fare Elasticity}_{AB}$$

The fare elasticities were taken from a previous IATA study which provides fare elasticities for different geographic markets.³⁶ The most applicable elasticity was selected for each country pair. Typically, the elasticities ranged from -0.8 to -1.5.

The gain in consumer surplus was calculated from the estimated fare reductions. 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 4-2** which shows a standard demand curve representing the relationship between price and quantity demanded – 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 pay a price higher than P_0 ; summing the difference between each consumer's willingness to pay and P_0 produces the Area A.

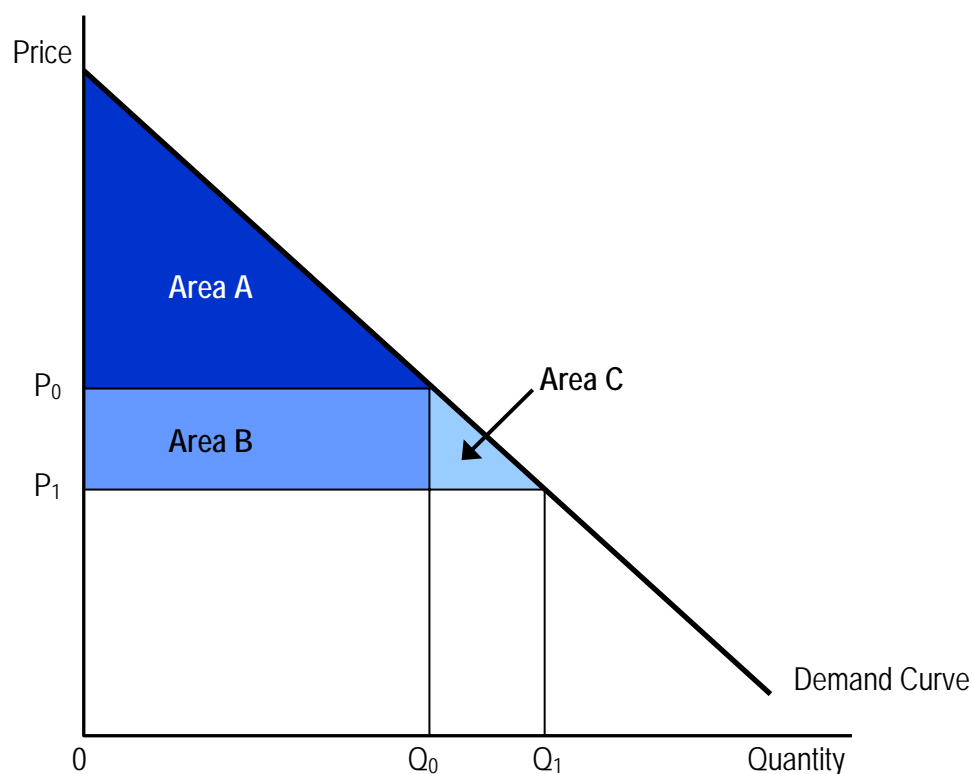
If the price is reduced to P_1 (e.g., in the air market, fares are reduced), then the consumer surplus is increased by an amount equal to Area B and Area C. It is this gain in consumer surplus (Area B + Area C) that is provided in this report. As suggested by the diagram, this gain in consumer surplus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

- 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.³⁷
- 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: $\frac{1}{2} \times$ average fare saving x number of new passengers.

³⁶ "Estimating Air Travel Elasticities", An InterVISTAS Consulting Inc. report for IATA, December 2007.

³⁷ Producer surplus is amount producers benefit by selling at a price higher than they would be willing to sell for.

Figure 4-2: Consumer Surplus



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.

The estimated fare reductions and gain in consumer surplus is presented in **Figure 4-3**. Market access liberalisation is forecast to reduce average fares on international flights by 31%, while liberalisation of ownership and control is expected to reduce average fares by 21%. Liberalising both in combination is forecast to reduce average international fares by 51%. The increase in consumer surplus is projected to be between MUR 1.8 Billion and MUR 4.4 Billion depending on the type of liberalisation undertaken.

Figure 4-3: Fare Impact and Consumer Surplus Benefits of Liberalisation

	% Reduction in Average Fare	Increase in Consumer Surplus (MUR)	Increase in Consumer Surplus (US\$ at PPP)
Market Access Liberalisation	31%	2,538 Million	165 Million
Ownership and Control Liberalisation	21%	1,827 Million	119 Million
Combined Liberalisation	51%	4,364 Million	283 Million

All financial figures are in 2008 prices.

US\$ at PPP: The US\$ figures have been converted in U.S. dollars at purchasing power parity, which controls for cost-of-living differences.

4.3.3 Employment Impacts in the Aviation Industry

Increases in air traffic will require additional resources to handle the additional passengers and aircraft. Employment in the aviation sector is related to the servicing, management and maintenance of additional air services, which includes activities at airlines, airports, air navigation and other aviation-related businesses. Furthermore, this additional aviation activity has “spin-off” impacts into the wider economy known as indirect or multiplier impacts. For example, these include: 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. These indirect impacts generate additional employment in a range of industries. The direct employment impacts (i.e., within the aviation industry) and related indirect impacts are provided in **Figure 4-4**. Market access liberalisation is projected to generate an additional 900 (direct) full-time equivalent (FTE) jobs in the aviation industry. Including the indirect jobs, the total reaches 1,900 new full-time jobs. Ownership and control liberalisation is forecast to generate 1,300 direct and indirect jobs, while combined market access and ownership and control liberalisation is forecast to generate 3,200 jobs. As with the traffic figures, these are the long term projections some 1-2 years after liberalisation.

Figure 4-4: Additional Employment Generated in and by the Aviation Industry

	Direct Employment (FTEs)	Indirect Employment (FTEs)	Total Employment (FTEs)
Market Access Liberalisation	900	1,000	1,900
Ownership and Control Liberalisation	600	700	1,300
Combined Liberalisation	1,500	1,700	3,200

FTE = Full-Time Equivalent Job.

4.3.4 Tourism Impacts

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, theatres, car rentals, etc. In addition, the tourism industry generates significant indirect impacts in businesses that supply and support tourism. For example, food wholesalers for hotels and restaurants, taxi firms, hotel laundering services, delivery trucks, etc.³⁸

The forecast number of tourists to Mauritius stimulated by liberalisation is provided in **Figure 4-5** along with estimates of the direct and indirect employment generated by these additional tourist visits. Liberalising market access is expected to result in an additional 323,000 tourists visiting each year. These tourists will result in an addition 3,000 FTE jobs in the tourism industry and a further 3,500 in connected industries, for a total of 6,500 new jobs. Ownership and control liberalisation is forecast to generate 206,000 tourists to Mauritius and create 4,400 direct and indirect jobs. Combined liberalisation is projected to increase tourist visits by 529,000 and result in an additional 10,900 jobs.

Figure 4-5: Additional Employment Generated in and by the Tourism Industry

	Tourist Visits	Direct Employment (FTEs)	Indirect Employment (FTEs)	Total Employment (FTEs)
Market Access Liberalisation	323,000	3,000	3,500	6,500
Ownership and Control Liberalisation	206,000	1,900	2,500	4,400
Combined Liberalisation	529,000	4,900	6,000	10,900

FTE = Full-Time Equivalent Job.

4.3.5 Catalytic Impacts

As discussed in Section 2.3, air transportation has been linked to economic and productivity growth. Air transport facilitates trade and enables countries to attract new businesses and investment. **Figure 4-6** shows the forecast employment stimulated in the wider economy (excluding air transport and tourism) by the catalytic impacts of increased air services. Market access liberalisation is forecast to generate 2,000 jobs in catalytic impacts, while ownership and control is expected to generate 1,400 jobs and complete liberalisation is forecast to generate 3,400 jobs.

³⁸ 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 4-6: Additional Employment Generated by Catalytic Impacts

	Total Employment (FTEs)
Market Access Liberalisation	2,000
Ownership and Control Liberalisation	1,400
Combined Liberalisation	3,400

FTE = Full-Time Equivalent Job.

4.3.6 Impact on Gross Domestic Product

In addition to employment, another measure of economic impact is the contribution to Gross Domestic Product (GDP). GDP is a measure of the total national income and output of an economy. It includes the sum of wages of employees (and other forms of employment income), company profits, and government taxes and subsidies. The estimates of additional GDP generated by liberalisation provided below includes the employment income associated with the jobs described in the previous sections as well as the profits of the benefiting businesses and any related taxes or subsidies.

The total GDP generated by increased activity in the aviation and tourist industries as well as indirect and catalytic impacts is presented in **Figure 4-7**. Market access liberalisation is forecast to generate approximately MUR 1.3 Billion in incremental GDP each year, equivalent to 0.57% of national GDP. Liberalising ownership and control is expected to generate MUR 0.8 Billion in GDP (0.38% of national GDP), while combined the two forms of liberalisation are expected to generate MUR 2.1 Billion in incremental GDP (0.96% of national GDP).

Figure 4-7: Additional GDP Generated by Liberalisation

	Incremental GDP (MUR)	Incremental GDP (US\$ at PPP)
Market Access Liberalisation	1,260 Million	82 Million
Ownership and Control Liberalisation	839 Million	54 Million
Combined Liberalisation	2,099 Million	136 Million

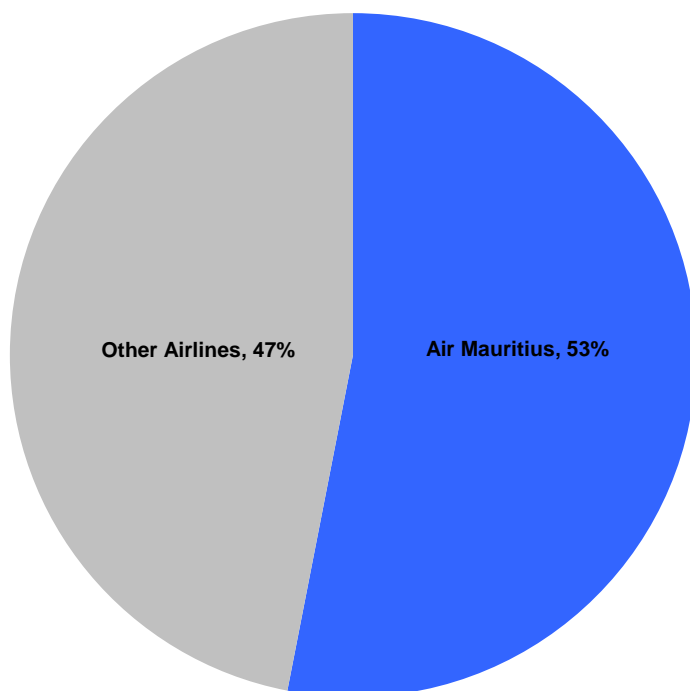
All financial figures are in 2008 prices.

US\$ at PPP: The US\$ figures have been converted in U.S. dollars at purchasing power parity, which controls for cost-of-living differences.

4.3.7 Impact on Home Carriers

Air Mauritius is the national carrier of Mauritius. As illustrated in **Figure 4-8**, in 2007, Air Mauritius accounted for 53% of international capacity (further details can be found in Section 3.1).

Figure 4-8: International Market Share of Mauritius's Home Carrier (2007)



Source: OAG Max Airline Schedule data, 2007.

In general, liberalisation of air service agreements is expected to have a number of impacts on home carriers. Undoubtedly, liberalisation exposes the home carriers to greater competition. Many of the benefits of liberalisation discussed previously, such as fare reductions and increased services levels, are driven by the competitive forces unleashed when markets are deregulated. While this increased competition has the potential to weaken the market position and profitability of the national carriers, liberalisation also offers a number of offsetting benefits to national carriers:

- Access to new markets – liberalising ASAs can offer home carriers access to new routes that previously were unavailable. In addition, fifth freedom rights can provide opportunities to serve markets that previously had been uneconomical.
- Improve access to capital – removing ownership restrictions will allow home carriers to access a wider range of investment options at lower cost.
- Access to world-class expertise – removal of ownership and control restrictions will provide home carriers with greater access to managerial and technological knowledge and best practice.
- Improved efficiency – liberalisation will enable home carriers to achieve efficiencies through greater access to investment and expertise, and through consolidation and mergers (providing economies of scale and scope benefits). This will aid home carriers in remaining competitive and to exploit new opportunities in the deregulated market.

There is very little empirical research into the impact of liberalisation on home carriers. This is due, in part, to the widely varying circumstances of the home carriers (in terms of public ownership, financial strength, managerial excellence, etc.) making it difficult to produce generalised findings from the research. Instead, a number of case studies are provided below to provide insight into the impact of liberalisation on home carriers:

UK-U.S. Liberalisation, 1995

In 1995, the UK and U.S. governments agreed amendments to the existing Bermuda II agreement allowing access to a greater number of airports which essentially deregulated much of the UK-U.S. air market, with the exception of Heathrow and Gatwick airports, allowing carriers to operate any city pair, and at pricing that was commercially determined. The impact of this liberalisation was a significant increase in transatlantic traffic with capacity (seats) growing by 7.8% per annum between 1995 and 2000 compared with 3.9% per annum between 1990 and 1995.³⁹ Liberalisation also led to a shift in market share, with the share of capacity operated by UK carriers (largely British Airways and Virgin Atlantic) declining from 52% in 1990 to 42% in 2000 (a greater share of capacity was operated by the larger U.S. carriers).⁴⁰ Despite the loss of market share, UK carriers still experienced an increase in total traffic of approximately 4.5% per annum between 1990 and 2000.

European Union Single Aviation Market, 1987-1993

Section 2.3.1 provides an overview of the impact on fares and traffic of the deregulation of the EU air market which occurred between 1987 and 1993. Another major impact of deregulation was the rise of low cost carriers (LCCs). The market share of LCCs rose from 1.6% in 1996 to 20.2% in 2003.⁴¹ This placed considerable pressure on the traditional national carriers, many of which responded by reducing capacity on intra-EU markets and focussing on long-haul markets.⁴² The increased competition resulting from the liberalisation of the EU was certainly a factor in the failure or weakening of a number of (generally smaller) national carriers, such as Sabena (Belgium), Swissair (Switzerland) and Alitalia (Italy). However, a greater number of national carriers have managed to restructure and continue operations, and a number of new carriers have become established in the market (Ryanair, EasyJet). Furthermore, liberalisation has facilitated greater consolidation, such as the Air France-KLM merger, and Lufthansa's takeover of Swiss International Air Lines and controlling stakes in BMI and Austrian Airlines.

UK-India Liberalisation, 2004

As part of its review of the liberalisation of the UK-India ASA (previously discussed in Section 2.3.1), the UK CAA conducted a modelling exercise to estimate the impact on the revenues and profits of UK carriers.⁴³ The CAA estimated that liberalisation had resulted in an increase in revenues of approximately £30 million but a reduction in profits of £46 million. In short, UK carriers carried greater numbers of passengers but at a lower per passenger yield. The CAA notes that the analysis may overstate the profit reduction as their analysis assumes fixed unit costs (when greater traffic volumes could lead to economies of scale benefits), and does not take account of the increased connecting traffic (connecting in the UK) also stimulated. In addition, the CAA found that all the incumbent carriers had remained in the market after

³⁹ Source: InterVISTAS-ga², "The Economic Impact of Air Service Liberalisation", June 2006.

⁴⁰ Ibid.

⁴¹ Source: European Commission, "DG TREN: Analysis of the European Air Transport Industry", 2005.

⁴² Ibid.

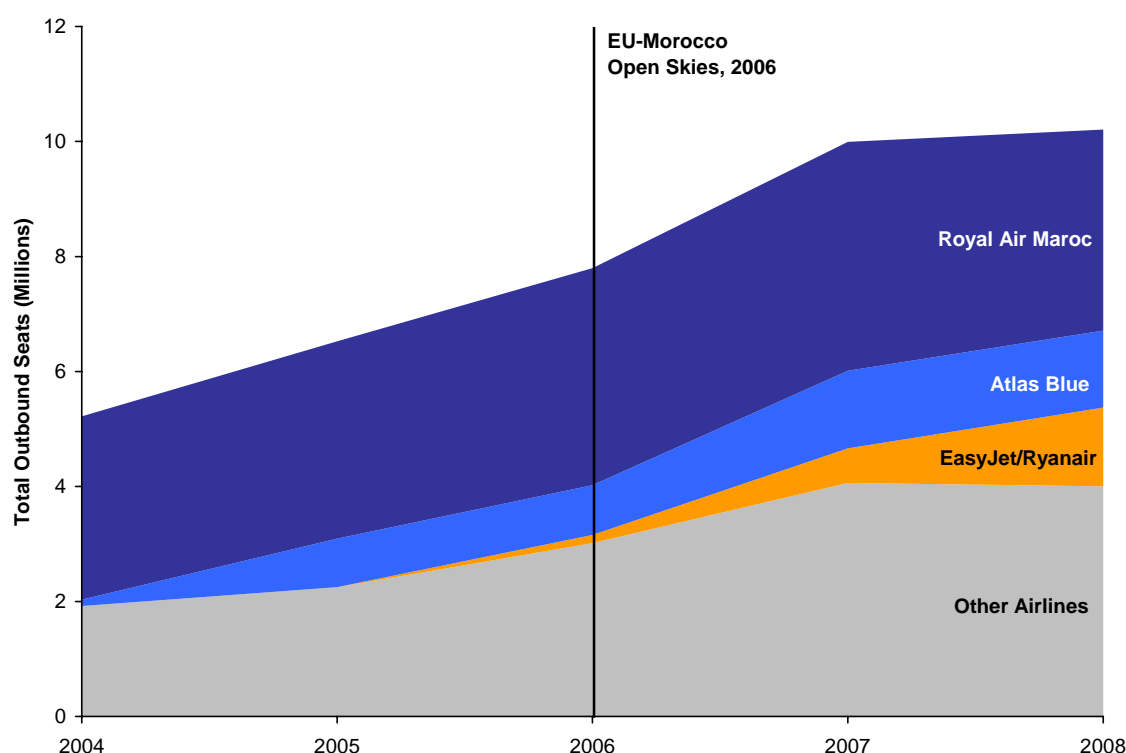
⁴³ UK CAA, "UK-India Air Services: A Case Study in Liberalisation", 22 November 2006.

liberalisation and that they had increased the number of routes and capacity operated between the UK and India. While three new carriers entered the market after liberalisation, two of these exited within a year.

EU-Morocco, 2006

In 2006, an open skies agreement between the EU and Morocco 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 provides fifth freedom rights for carriers from both sides. The impact on the home carrier, Royal Air Maroc, and its low cost carrier subsidiary, Atlas Blue, is illustrated in **Figure 4-9**. In 2005, the combined market share of Royal Air Maroc and Atlas Blue peaked at 66% of the total seat capacity operated between Morocco and the EU. By 2008, after the open skies agreement, that share had declined to 47%. This was the result of entry by European LCCs EasyJet and Ryanair as well as other European carriers. However, while the market share of the home carriers declined, total traffic carried increased by 25% between 2005 and 2007 (by 46% between 2004 and 2008). In addition, the number of routes to the EU operated by the two carriers increased from 26 in 2004 to 40 in 2008.

Figure 4-9: Impact of EU-Morocco Open Skies on the Market Share of Royal Air Maroc Total Seat Capacity Between Morocco and EU Destinations



Source: OAG Max Airline Schedule data 2004-2008.

The evidence on the impact to home carriers of liberalisation is mixed. 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. While increased competition has the potential to weaken the viability and profitability of home carriers in some instances, liberalisation also offers a means to restructure the carriers and protect 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. Whether the home carriers prosper or suffer under liberalisation will depend in greater part on the quality of management of the carrier and how the carrier chooses to respond to liberalisation.

4.4 Summary: Overall Impacts of Liberalisation

Figure 4-10 provides a summary of the impacts of liberalisation detailed in the previous section.

Figure 4-10: Summary of the Impacts of Liberalisation on Mauritius

	Market Access Liberalisation	Ownership and Control Liberalisation	Combined Liberalisation
Increase in International Traffic (Passengers and % increase)	979,000 +40%	624,000 +25%	1,604,000 +65%
Reduction in Average Fare	31%	21%	51%
Increase in Consumer Surplus (Mauritian Rupees, MUR)	2,538 Million	1,827 Million	4,364 Million
Employment (FTEs)			
Aviation Sector (including indirect impacts)	1,900	1,300	3,200
Tourism (including indirect impacts)	6,500	4,400	10,900
Catalytic Impacts	2,000	1,400	3,400
Total Employment Impact	10,400	7,100	17,500
Gross Domestic Product (Mauritian Rupees, MUR)	1,260 Million	839 Million	2,099 Million
Impact on Home Carriers	Liberalisation may lead to a loss of market share by the home carriers; however, this may be offset by high traffic growth as liberalisation stimulates the market. While increased competition has the potential to weaken the viability and profitability of home carriers in some instances, liberalisation also offers the means to protect profitability by expanding into new markets, accessing a wider pool of investment and through consolidation.		

FTE: Full-Time Equivalent Job.
All financial figures are in 2008 prices.

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 a Canadian air carrier to transit U.S. airspace enroute to another country (or as part of a domestic flight, as is sometimes the case for Canadian carriers).

For many countries, this freedom (and the second freedom rights) 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 a Canadian carrier to refuel in the U.S. as part of an onward journey.

The long range of modern aircraft mean 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 a Canadian carrier to transport passengers from Canada to the U.S.

Fourth Freedom



The right of an airline from one country to land in a different country and board passengers traveling to the airline's own country. For example, the right of a Canadian carrier to transport passengers from the U.S. to Canada.

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, a Canadian carrier flies from Canada to the U.S., boards passengers at a U.S. airport and flies those passengers to Mexico.

Two sub-categories exist:

Beyond fifths which allow the carriage of passengers from the second country to the third country (e.g., a Canadian carrier flying Canada-U.S.-Mexico).

Intermediate fifths which allows the carriage of passengers from the third to the second country (e.g., a Canadian carrier flying Canada-Mexico-U.S.)

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, a Canadian carrier transporting passengers from Europe to the U.S. via Canada.

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.⁴⁴ Nowadays, governments rarely place restrictions on sixth freedom traffic.

Seventh Freedom



The right to carry traffic from one country to another state without going through the home country. For example, the right of a Canadian carrier to transport passengers from the U.S. to Mexico as a stand-alone flight.

Seventh freedom rights are fairly rare for passenger services. One example 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 far more common for all-cargo flights.

⁴⁴ Source: Rigas Doganis, "Flying Off Course: The Economics of International Airlines", Third Edition, 2002, Routledge.

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 a Canadian carrier to transport passengers from Denver to Miami as part of service that originated in Vancouver, Canada.

This right is also rarely granted. One example 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, a Canadian carrier operating a service between San Francisco and Houston in the U.S. as a stand-alone service.

It is rare for this right to be granted. The only major example 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 InterVISTAS group.⁴⁵

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:

$$\text{Traffic}_{AB} = F(\text{GDP}_{AB}, \text{ServiceTrade}_{AB}, \text{Intervening}_{AB}, \text{ASAFactors}(0,1)_{AB})$$

⁴⁵ The results of that study can be found in the report, "The Economic Impact of Air Service Liberalisation", InterVISTAS-ga², 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 Air Service Agreements - $ASAFactors(0,1)_{AB}$

$ASAFactors(0,1)_{AB}$ are dummy variables capturing the presence or absence of a specific restriction on the ASA. For example, if ASA 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 ASA. 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 ASA for Singapore-Mauritius) than on large countries with multiple airports (e.g., the ASA 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 travelers. 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 modeled 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 below.

Variable	Coefficient	T Statistic
Intercept	-0.42345	-1.52
GDP Product	0.240543	5.92
Commercial Flows	0.14279	4.30
Intervening Opportunities	-0.05739	-11.19
Single Designation	-0.02101	-2.87
Predetermined Capacity	-0.03687	-3.63
Bermuda Capacity	-0.02578	-2.74
Single Disapproval Pricing	-0.03629	-3.37
Fifth Freedoms	-0.00036	-1.11
Authorized Points	-0.05866	-3.14

The regression provided a reasonable "fit" (Adjusted R-Squared of 0.67) and the signs are consistent with expectations. The coefficient on the ASA 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.

Using the Model to Estimate the Traffic Impacts of Liberalisation

The impacts of liberalisation were estimated by specifying changes to the terms of the ASA, e.g., the ASAFactors dummies were switched from 1 to zero, where relevant, on each ASA 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.⁴⁶ 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 to/from Mauritius from OAG 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

⁴⁶ 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.

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.

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.

Aviation. The economic impact of aviation can be different in different types of economies and in different regions. Accordingly, this study developed 14 categories of nations based on a combination of geographic location and country classifications used by international organisations such as the United Nations, the OECD and the World Bank. The table below provides the fourteen world regions for the aviation sector economic impacts:

<ul style="list-style-type: none"> ▪ Developed Countries North America ▪ Developed Countries Europe ▪ Developed Countries Asia-Pacific ▪ Emerging European Markets ▪ Emerging Markets Latin America ▪ Emerging Markets Asia Pacific ▪ China 	<ul style="list-style-type: none"> ▪ India Sub-Continent ▪ Developing Countries Mexico & Caribbean ▪ Developing Countries Markets Latin America ▪ Developing Countries Middle East ▪ Developing Countries Africa ▪ Developing Countries Asia Pacific ▪ Least Developed Countries
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The aviation sector ratios and economic impact multipliers were estimated based on a number of industry statistical publications and reports, individual airport economic impact studies⁴⁷ and government data.

Existing industry data and reports which provided regional or global impacts included:

- The Air Transport Action Group – The Economic & Social Benefits of Air Transport (2004 data)
- Airports Council International Europe – The Social and Economic Impact of Airports in Europe (2003 data)
- Airports Council International North America – The Economic Impact of U.S. Airports (2002 data)
- Airports Council International North America – The Economic Impact of Canadian Airports (2002 data)
- Airports Council International – 2005 Economic Survey

⁴⁷ An advantage of individual airport economic impact studies is that the researcher typically has access to the most detailed local data available and develops the most appropriate data and multipliers.

- International Civil Aviation Organization – Airports: Vital Catalyst for Economic Growth (2003 data)
- International Civil Aviation Organization – Economic Contribution of Civil Aviation: Ripples of Prosperity (1998 data).
- Wilbur Smith Associates – The Economic Impact of Civil Aviation on the U.S. Economy (2000 data)

The ATAG study was used as the starting point for establishing indirect employment multipliers, as well as direct and indirect GDP multipliers. The numbers were generally consistent with other existing studies, as well as government input-output tables and other published data sources. However, the ATAG study only provided impacts for six world regions (North America, Europe, Latin America, Asia-Pacific, Middle East and Africa). In order to provide a greater level of geographic distinction within individual world regions, input-output data, employment and GDP data for the transport industry was utilised. This data was generally available only at the total transportation industry level, although some jurisdictions had detailed aviation data available. This allowed the model to provide separate economic impacts, for example, for China or the India sub-continent, rather than using a broad set of multipliers for the entire Asia-Pacific region.

Economic impact studies commissioned by individual airports were also analysed to provide additional detail and as a cross-check for the regional and global studies. Airport economic impact studies were most readily available for airports in North America and Europe.

In order to link changes in air passenger volumes to economic impact, a ratio of direct employment to air passenger volumes was developed. The ratios were based primarily on the ACI 2005 Economic Survey and ACI 2005 preliminary global traffic results. However, because the ACI study included breakdowns for only five world regions (North America, Europe, Asia/Pacific, Latin America/Caribbean and Africa/Middle East), country and airport level data was used to refine the ratios.

Tourism. Countries were divided into tourism world regions based on a combination of geographic location and development of the local tourism industry. A total of 13 tourism economic impact categories were created as illustrated below:

<ul style="list-style-type: none"> ▪ North America Well Developed ▪ Europe Well Developed ▪ Latin America Well Developed ▪ Africa Well Developed ▪ Asia Pacific Well Developed ▪ Mexico & Caribbean ▪ Middle East 	<ul style="list-style-type: none"> ▪ China ▪ India ▪ Europe Less Developed ▪ Latin America Less Developed ▪ Africa Less Developed ▪ Asia Pacific Less Developed
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Tourism related expenditures, employment, GDP and multipliers were based primarily on data published by major tourism organisations:

- U.N. World Tourism Organization (UN-WTO)– *Compendium of Tourism Statistics* (1999-2003 data)
- World Travel & Tourism Council (WTTC) – *Country League Tables* (2005 data)

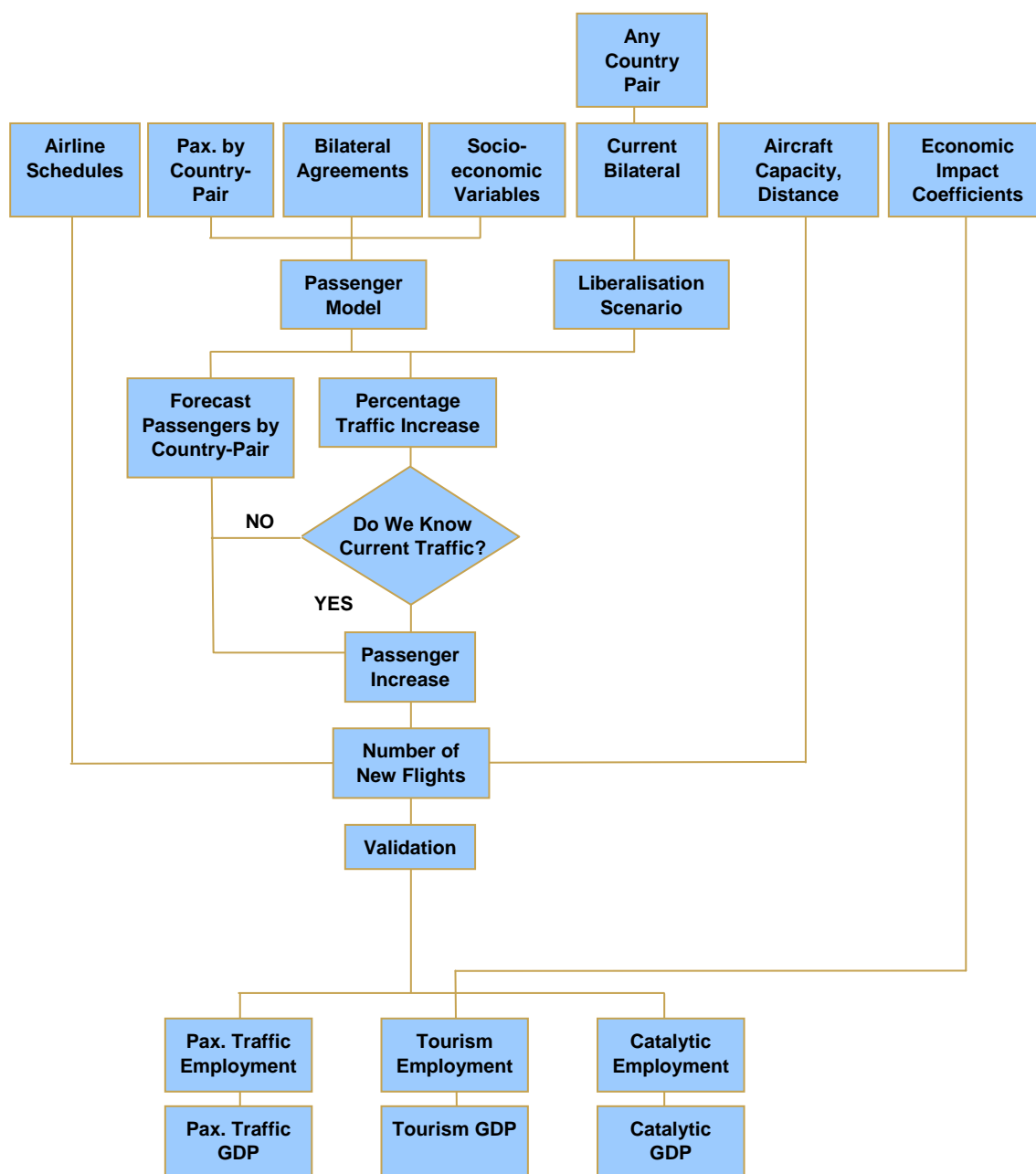
Additional individual country level data was obtained directly from national tourist departments, statistical offices and academic papers. In order to determine the economic impact of international tourists arriving at individual countries by air transportation, various tourism ratios were developed including:

- **Average expenditure per international tourist visit** – international tourist expenditure data was sourced from a combination of UN-WTO and WTTC publications. The data includes all expenditures made by tourists within a destination country or region including hotels, restaurants, sightseeing, local transportation, retail purchases, etc., but does not include purchases made in their home country prior to departure (e.g., air transportation, package tours, etc.). The expenditure data was based on all international visitors, including same-day visitors and visitors arriving by all modes.
- **Employment per \$1 million of tourist expenditure** – total tourism related employment was generally sourced from national tourism satellite accounts published 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. Based on select country tourism satellite accounts which provided employment by sector, an estimated 8% of employment was removed to account for air transport related jobs.

In order to establish the total economic impacts on the broader economy, multipliers were developed from WTTC data sources and tourism economic impact studies for individual tourism markets.

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.





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