TOURISM
TROPICAL NORTH QUEENSLAND
51 The Esplanade
PO Box 866, Cairns 4870
Queensland Australia
Admin: 07 4031 7676
Info: 07 4051 3588
Fax: 07 4051 0127
www.tropicalaustralia.com.au
ACN 009 953 084

Cairns ports
Cnr. Grafton and Hartley Streets
PO Box 594, Cairns Queensland 4870, Australia
Phone 61 7 4052 3888
Fax 61 7 4052 1493
Email enquiries@cairnsport.com.au
Web www.cairnsport.com.au

27 June 2008

# TOWARDS A NATIONAL AVIATION POLICY STATEMENT

**Cairns Airport and Tourism Tropical North Queensland**
**Submission to the Minister for Infrastructure, Transport,**
**Regional Development and Local Government**

## INTRODUCTION

Cairns Ports Limited (CPL) is a Queensland Government Owned Corporation and is the owner and operator of Cairns Airport and Cairns Seaport. Tourism Tropical North Queensland (TTNQ) is the Regional Tourism Organisation for Cairns and the Tropical North Queensland Region.

Cairns is the fifth busiest international airport in Australia and the sixth busiest airport overall (as measured by passenger movements). The Cairns Airport has developed as an international airport based on the tourism attractions of Tropical North Queensland, including the Great Barrier Reef and World Heritage listed rainforests. Tropical North Queensland is the second most visited destination by international holiday visitors to Australia.

Aviation services are critical to the sustained development of the Region, not just for tourism but for other sectors of the local economy including education, mining and health services. However, there are currently many challenges facing the sustained development of aviation services to regional Australia including Tropical North Queensland. The Cairns aviation business, being predominantly leisure-based, is lower yielding for airlines compared to other destinations. This is particularly the case for international services where, in recent years, Cairns has experienced a significant decline in visitors from Japan, which is a key market for the local industry.

The Region has adopted a collaborative approach to aviation development through the involvement of key stakeholders - CPL, Tourism Tropical North Queensland and Tourism Queensland. In addition, the local tourism industry has been particularly active in promoting their businesses (and the destination) in key markets such as Japan, China and India.

Consequently CPL and TTNQ are uniquely placed as key representatives of an economic region where the local economy is predominantly tourism orientated and critically dependent on aviation services.

## EXECUTIVE SUMMARY

### Australia's Aviation Policy Framework

Ensuring Australia's aviation policy framework is conducive to international airlines servicing regional airports directly is a critical starting point for Government. However, this alone has been, and will continue to be, a necessary *but not sufficient* condition for placing regional airports in a position where they can genuinely compete for international services. Further policy measures are needed.
To the extent that the 'open skies' policy for regional airports is only triggered as existing Air Services Agreements are re-negotiated, or new ones entered into, there may still be a considerable lag before this policy, announced some years ago, becomes fully operational.

There is scope to further develop the current policy of 'open skies' for regional airports in ways that would help to make these destinations more desirable to international carriers, and a manner which would benefit both regional airport and international carriers. There are three primary options available to create further incentive for airlines to operate international routs out of regional airports:

- Offering 'beyond rights' capacity to international airlines on flights operated out of regional airports would provide greater impetus for airlines to offer such routes.
- Triangulation rights with major airports could also increase the number of services in regional airports. If those international carriers who are presently constrained by their allowable weekly limits into the four major airports were able to augment their allowable limit through a route to a regional airport, where capacity to the major airport was increased on a seat-for-seat basis with the services offered to regional destinations (contingent upon capacity constraints at the major airport), this would provide incentive for those airlines to offer services to regional airports.
- Australian carriers holding an Australian Air Operators Certificate - irrespective of 'principal place of business' or ownership - should be permitted to operate international air services to and from regional airports.

### Tourism and Regional Development

To many areas serviced by regional airports, tourism is a major element of the local economy. Tropical North Queensland, for example, is heavily reliant on tourism as a source of economic activity. In fact it is the single largest contributor to the Far North Queensland economy. It is also a large contributor to inbound tourism into Australia.

Regional development in such regions therefore hinges on tourism, which in turn, given Australia's geography, hinges heavily on aviation. The ability of international tourists to gain efficient access to regional centres is pivotal to the prospects of these economies. To the extent that the present commercial bias and broader competitive imbalance favours major gateways over regional airports, government may have an interest in initiating policy responses on the grounds of regional development.

Destination marketing is an area where governments, at various levels, have a genuine interest in intervening to promote improved market outcomes. The market unaided will under-supply marketing, due to what's regarded as a 'free rider' problem. The beneficiaries of destination marketing are a disparate group of business, of whom no single entity is able to capture the full benefits of any marketing that they undertake. While region-specific marketing should ultimately be undertaken by regional bodies, to the extent that the Federal Government seeks to pursue regional development objectives in areas that are highly tourism-dependent, there is a strong case for Federal Government regional marketing assistance.

## Airport-Related Costs

There are a number of policy settings which directly influence airport costs and hence will impact on the decisions by airlines to service routes into regional Australia. These particularly include the costs associated with:

1. Air Services Australia Services
2. Border Control; and
3. Airport Security.

### *Air Services Australia services*

Economic efficiency supports location specific, cost-reflective pricing. However, equity or regional development considerations may suggest pricing more akin to a 'network pricing' model (or targeted subsidies to regional ports). If airport charges are not to pose an impediment to regional airports competing with capital city hubs for international flights, then a model that does not produce significant price differentials between regional airports and major gateways is necessary.

### *Border control*

It is considered that the rationale behind the Passenger Movement Charge (PMC) is misguided – it is not international passengers *per se* who are the beneficiaries of these services, it is Australian society as a whole, or, at the very least, certain sectors thereof. The PMC is an unwarranted impost on the Australian tourism industry and its impact is felt disproportionately at regional airports. There is a strong case for funding the PMC out of Federal Government consolidated revenue.

### *Airport security*

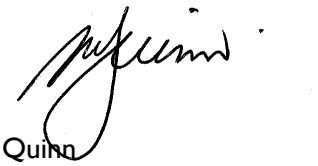
Airport security is increasingly becoming national security. Passengers, while the proximate users of these services, and the part beneficiaries thereof, are bearing the costs of a broader national security campaign. Such charges are to a large extent misdirected, and, particularly in light of the other cost pressures within the industry, are an undesirable burden on international travellers.

Accordingly, there is a strong case that Government mandated security costs should be funded by the Federal; Government through consolidated revenue.

## THIS SUBMISSION

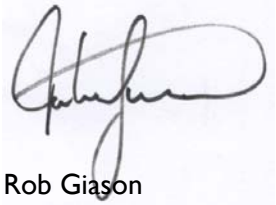
The announcement by the Federal Government provides a unique opportunity to review the current aviation policy settings. In particular, this submission considers policy considerations which are considered to be impediments to the development of international air services to regional Australia.

Cairns Ports Limited and Tourism Tropical congratulates the Government and the Minister on the decision to undertake this policy review. Our detailed submission, prepared by Access Economics, is **attached**.



Neil Quinn
**CHIEF EXECUTIVE OFFICER**
Cairns Ports Limited

Enquiries: Neil Quinn, (07) 4052 3845
Email: neil.quinn@cairnsports.com.au



Rob Giason
**CHIEF EXECUTIVE OFFICER**
Tourism Tropical North Queensland

Enquiries: Rob Giason, (07) 4015 1200
Email: rob.giason@tnq.org..au

ACCESS ECONOMICS Pty Limited

27 June 2008

# Direct international aviation access to regional Australia

Report by Access Economics Pty Limited for

## Cairns Ports

# TABLE OF CONTENTS

# FIGURES



# TABLES

# GLOSSARY OF COMMON ABBREVIATIONS

| | |
|---|---|
| AE-RGEM | Access Economics' Regional General Equilibrium Model |
| ALOS | average length of stay |
| ARFF | aviation rescue and fire fighting |
| ASA | Air Service Agreement |
| BITRE | Bureau of Infrastructure, Transport and Regional Economics |
| C-D | Cobb-Douglas |
| CDE | Constant Differences of Elasticities |
| CIQ | customs, immigration and quarantine |
| CRESH | Constant Ratios of Elasticities Substitution, Homothetic |
| GDP | gross domestic product |
| GRP | gross regional product |
| GSP | gross state product |
| LCC | low cost carrier |
| NPV | net present value |
| PMC | Passenger Movement Charge |
| ROA | Rest of Australia |
| ROQ | Rest of Queensland |
| TNQ | Tropical North Queensland |
| VFR | visiting friend or relatives |

# EXECUTIVE SUMMARY

International air traffic at Australian airports has grown markedly in recent years. Over the decade to 2006-07, total international passenger movements through Australian airports grew by 60%, taking total passenger throughput to 22.1 million. This represents annual growth of around 5% per year compared with Australian GDP growth over the period of around 3.5%.

Over this period however, there has been a shift toward major gateways (Australia's four largest international airports: Sydney, Melbourne, Brisbane and Perth) and away from regional airports (international airports other than the major gateways). The proportion of international movements in Australia which have occurred through regional airports over the last decade has fallen from 7.9% to 6.7%. Over 93% of international passenger traffic now passes through the four major gateways.

Recently, the Minister for Infrastructure, Transport, Regional Development and Local Government, the Honourable Anthony Albanese, announced the Federal Government's commitment to developing a National Aviation Policy Statement. An Issues Paper was released on 10 April 2008 outlining the major areas to be considered in the Statement and calling for submissions from interested parties.

Some key themes emerging from the Issues Paper included access to regional airports, roles for government in attracting international airlines to regional airports and the importance of international air services to economic development, and in particular, regional development.

It is against this background that Cairns Ports commissioned Access Economics to analyse impediments to the development of international air services to regional Australia.

## Challenges facing regional airports

The trends in flight and passenger movements at regional airports over recent years are indicative of a range of factors impacting on the market for international air travel - some on the industry generally, some more directly on regional airports. While the focus of this report is firmly on those areas most amenable to government policy influence, recognition of these more pervasive factors – those beyond the direct control of government, airports, and in some instances even airlines – is pivotal to any case for, and indeed the development of, government policy responses.

Broadly, the major challenges facing regional airports (more or less specifically) include: (i) macro issues such as slowing global economic growth; rising oil prices; and the appreciating Australian currency, (ii) commercially-based trends in international aviation such as major airlines' increasing focus on 'hub and spoke' models and greater emphasis on low cost carriers (LCCs), and (iii) lack of economies of scale, relative to major gateways.

While generalising among regional airports is in some respects limited by their heterogeneity, typically, the leisure-orientated nature of their traveller base coupled with the more marginal nature of regional routes, means that even where macro issues are concerned, the relative impacts are greater at regional airports.

In the current climate, with relatively low-yield travellers, predominantly short-haul flights and higher per-passenger charges (in part, as a result of Government impositions), many flights to regional destinations sit on the margin of viability. Indeed, Access Economics' discussions with airlines indicated that routes to regional airports typically rank lowly in terms of relative profitability. Unsurprisingly therefore, these flights are some of the first to be affected by unfavourable economic conditions.

The challenges facing regional airports are epitomised at Cairns, where international seat capacity continues to be reduced as a result of the combined impact of the factors noted above. As recently as June 2008, the Qantas Group made announcements regarding international schedule changes, resulting in Cairns losing an estimated 31% of international capacity from December 2008, including 62% of total capacity from Japan - the largest source market of international visitors to Cairns. The economic impacts of this are significant, with Cummings Economics estimating a direct economic impact on TNQ of $125 million (Cummings Economics, 2008).

## Broad policy conclusions

In light of the key role aviation plays in a modern, developed economy, Australia's aviation policy framework should be focused on making aviation as open and efficient as possible, while at the same time recognising the importance of aviation in economic and regional development.

To this end, the policy issues considered in this report include:

- Continuing the process of liberalising access to regional airports.
- Improving the cost-competitiveness of regional airports, particularly in those areas where government has a significant impact. This has two key elements:
  - More efficient government provision of services required by airports; and
  - More appropriate charging mechanisms for airport services at regional airports.
- Continuing to support destination marketing as a means of overcoming market failure in its provision and enhancing the prospects of regional airports.
- Consider the importance of tourism, and the inherent links with aviation policy, in the pursuit of any regional development goals that governments may have.

## Enhancing international access to regional airports

The cornerstone of Australia's international aviation policy framework is the bilateral Air Service Agreement (ASA) – arrangements negotiated between two countries that provide the framework within which capacity, designation, frequency, pricing and other matters are negotiated. Australia's policy stance insofar as regional airports are concerned, in principle, is one of 'open skies', with international airlines essentially unrestricted in their ability to fly to regional airports. Restrictions remain on access to major gateways, with most foreign carriers still only permitted a limited number of flights per week into each of Sydney, Melbourne, Brisbane and Perth Airports, in some cases fewer than those they would optimally choose to operate otherwise.

However to the extent that the 'open skies' policy for regional airports is only triggered as existing ASAs are re-negotiated, or new ones entered into, there may still be a considerable lag before this policy, announced some years ago, becomes fully operational.

In addition, there remains scope to further develop the current policy of 'open skies' for regional airports in ways that would help to make these destinations more desirable to international carriers, and a manner which would benefit both regional airport and international carriers. There are three primary options available to create further incentive for airlines to operate international routes out of regional airports:

- Offering 'beyond rights' capacity to international airlines on flights operated out of regional airports would provide greater impetus for airlines to offer such routes.
- Triangulation rights with major airports could also increase the number of services in regional airports. If those international carriers who are presently constrained by their allowable weekly limits into the four major airports were able to augment their allowable limit through a route to a regional airport, where capacity to the major airport was increased on a seat-for-seat basis with the services offered to regional destinations (contingent upon capacity constraints at the major airport), this would provide incentive for those airlines to offer services to regional airports.
- Australian carriers holding an Australian Air Operators Certificate - irrespective of 'principal place of business' or ownership - should be permitted to operate international air services to and from regional airports.

Ensuring Australia's aviation policy framework is conducive to international airlines servicing regional airports directly is a critical starting point for Government. However, this alone has been, and will continue to be, a necessary *but not sufficient* condition for placing regional airports in a position where they can genuinely compete for international services. Further policy measures are needed.

## Improving cost competitiveness

Airport-related costs and charges present a significant challenge to regional airports competing with major gateways for direct international services. The costs incurred by an airline when using an airport are pivotal to decisions to service one particular port over another. The shift toward LCCs – particularly at leisure-focused regional destinations – coupled with the pressure exerted on airline costs by macro and industry-specific factors, has heightened the significance of airport charges at regional airports.

The Federal Government has a major bearing on airport costs in Australia. AirServices Australia charges, levied for the provision of fire fighting, terminal navigation and en route services, are Government regulated. Border control costs are recovered through the Passenger Movement Charge (PMC), a Government-initiated charge on outgoing international passengers and airport security standards are mandated by Government.

Airport-related charges, both airport-determined and otherwise, are driven by a range of factors and through a range of mechanisms, but common themes apply. The lower passenger throughput at regional airports necessitates higher per-passenger charges, as large fixed cost elements must be recovered over a smaller base. As international passenger numbers at regional airports fall, these impacts are accentuated further.

Access Economics' main conclusions in regard to charges levied on airlines at regional airports are as follows:

- **Air Services Australia services**: economic efficiency supports location-specific, cost-reflective pricing. However, equity or regional development considerations may suggest pricing more akin to a 'network pricing' model (or targeted subsidies to regional ports). If airport charges are not to pose an impediment to regional airports competing with capital city hubs for international flights, then a model that does not produce significant price differentials between regional airports and major gateways is necessary.
- **Border control:** the rationale behind the PMC is misguided – it is not international passengers *per se* who are the beneficiaries of these services, it is

Australian society as a whole, or, at the very least, certain sectors thereof. The PMC is an unwarranted impost on the Australian tourism industry with its impact is felt disproportionately at regional airports.

There is a strong case for funding the PMC out of Federal Government consolidated revenue.

- **Airport security:** airport security is increasingly becoming national security. Passengers, while the proximate users of these services, and the part-beneficiaries thereof, are bearing the costs of a broader national security campaign. Such charges are to a large extent misdirected, and, particularly in light of the other cost pressures within the industry, are an undesirable burden on international travellers - particularly at regional airports, where low passenger volumes increase their relative impact.

  Accordingly, there is a strong case that Government-mandated security costs should be funded by the Federal Government through consolidated revenue.

## Destination marketing

To many areas serviced by regional airports, tourism is a major element of the local economy. Tropical North Queensland, for example, is heavily reliant on tourism as a source of economic activity. In fact it is the single largest contributor to the Far North Queensland economy. It is also a large contributor to inbound tourism into Australia.

Destination marketing is an area where governments, at various levels, have a genuine interest in intervening to promote improved market outcomes. The market unaided will under-supply marketing, due to what's regarded as a 'free rider' problem. The beneficiaries of destination marketing are a disparate group of business, of whom no single entity is able to capture the full benefits of any marketing that they undertake. While region-specific marketing should ultimately be undertaken by regional bodies, to the extent that the Federal Government seeks to pursue regional development objectives in areas that are highly tourism-dependent, there is a strong case for Federal Government regional marketing assistance.

## Quantitative modelling of industry reforms

In order to quantify the potential benefits flowing from some of the policy changes discussed in this report, a series of scenarios were modelled using Access Economics' in-house general equilibrium model, AE-RGEM. General equilibrium models like AE-RGEM are a widely accepted tool for estimating the direct *and* indirect impacts of policy changes or other economic shocks.

Briefly, the scenarios modelled include:

- Removing the PMC and using Federal Government consolidated revenue to fund customs, immigration and quarantine (Scenario 1);
- Realigning Airservices Australia charges to remove the competitive imbalance between regional airports and major gateways (Scenario 2);
- Funding airport security out of Federal Government consolidated revenue (Scenario 3); and,
- The hypothetical introduction of a new carrier operating directly to/from Cairns International Airport (Scenario 4).

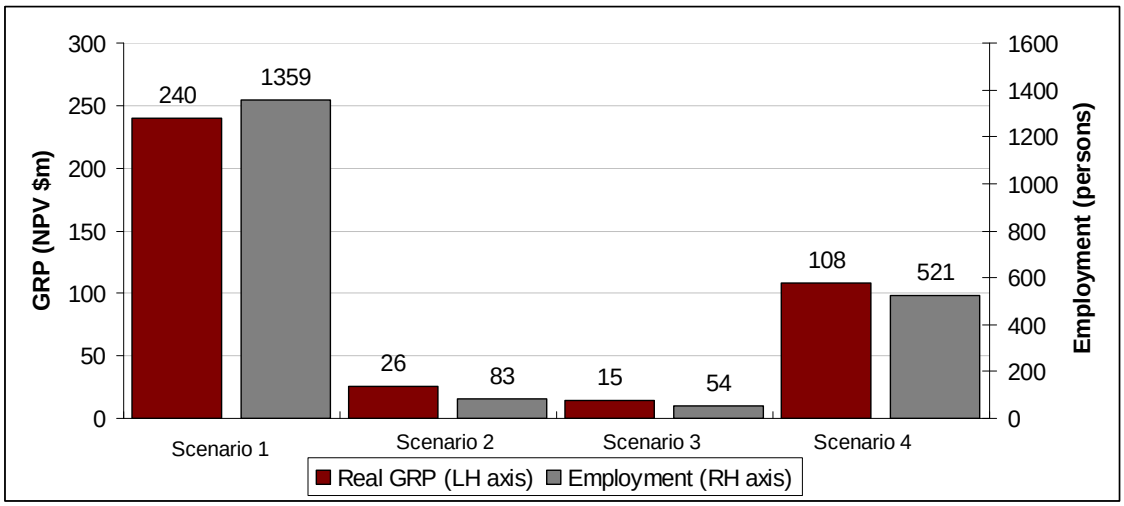
The removal of the PMC results in significant gains to the Australian economy, increasing gross domestic product (GDP) by more than $1 billion and employment by more than 25,000 persons by 2013. More significantly however, in the context of this report, the impact of this reform is greater at regional areas – demonstrated here with the example of Cairns airport and the TNQ region – where the average airfare is lower and where travellers are typically more price-responsive. In this region alone, the net present value of the gross regional product generated over the next five years is estimated at $240 million and the employment gains 1,359 persons (Figure A, below).

Eliminating the competitive disadvantage posed by Airservices Australia cost differentials and funding security costs via consolidated revenue produces non-negligible gains for TNQ, increasing gross regional product, in net present value (NPV) terms, by $26 million and $15 million respectively.

The greater impact of such reforms however are not merely in these marginal gains, but in the benefits which would flow to regions such as TNQ should these or other policy responses be sufficient to entice additional international carriers to service such a route directly.

The impacts of an additional direct service on a regional route – as a result of the reforms outlined in this paper or otherwise - are illustrated here through the entrance of a hypothetical new carrier flying Shanghai-Cairns four times weekly. In this case, the potential benefits of effective Government policy responses are considerably greater. Real output in TNQ is projected to expand by $108 million, in NPV terms, over the next five years, while by 2013, employment in TNQ is estimated 521 persons greater (Figure A).

**FIGURE A: SUMMARY OF RESULTS FOR TNQ, REAL GRP AND EMPLOYMENT**




## Tourism and regional development

Regional development in areas such as TNQ is heavily influenced by tourism, which in turn, given Australia's geography, hinges heavily on aviation. The ability of international tourists to gain efficient access to regional centres is pivotal to the prospects of these economies.

The quantitative analysis undertaken shows that the impact of an Australia-wide reform, in this case removal of the PMC, has a greater proportional impact on the TNQ region. This is reflective of the fact that international travellers to such regions are typically more price-

responsive, the average fare is lower, making any universal change proportionally greater and the economy is heavily concentrated on tourism.

More broadly, the projected benefits from an additional international carrier servicing Cairns – as either a result of the policy initiatives outlined here, or more active efforts by Government - are estimated to be significant. To the extent that the present commercial bias and broader competitive imbalance favours major gateways over regional airports, government may have an interest in initiating policy responses on the grounds of regional development.

***Access Economics***

**June 2008**

# 1. INTRODUCTION

International air travel to and from Australia has grown markedly in recent years. Over the decade to 2006-07, total international passenger movements through Australian airports grew by 60%, taking total passenger throughput to 22.1 million. This represents annual growth of around 5% per year compared with Australian GDP growth over the period of around 3.5%.

More recently, rises in fuel prices and a strengthening of the Australian dollar has put upward price pressure on Australia as a tourist destination, posing a significant challenge to inbound tourism. Indeed, in 2007 Australia tourism imports were larger than exports.

From a regional airport perspective, there has been an increasing centralisation of international passenger numbers through major gateways, with the share of international passenger movements accounted for by regional airports falling steadily over the last decade. To the extent that this limits the dispersal of international visitors, or adversely affects their spending patterns, this is potentially detrimental to the prospects of regional areas – particularly where dependence on tourism is high.

Trends in international aviation are impacted by a raft of influences. Macroeconomic forces, industry-specific factors and commercial considerations are among the greatest. However Government also plays a role. Both through its international aviation policy settings and its regulation and oversight of activities in the industry, Government has considerable bearing on industry outcomes.

It is against this background that Cairns Ports commissioned Access Economics to analyse impediments to the development of international air services to regional Australia. This report addresses this matter and proposes potential policy responses to these impediments.

The project scope included evaluating Australia's current international aviation policy and regulatory framework, as it relates to regional airports. The focus of this evaluation was to identify any restrictions or unreasonable cost disadvantages being imposed by the existing policy regime and where data permitted, quantify the magnitude of these imposts.

The approach to the analysis included literature review and desktop research, data collection and economic modelling and consultation with key industry stakeholders including airlines airports, government authorities and industry bodies. A full list of the parties consulted with can be found at Attachment A.

Shortly after the commissioning of Access Economics to undertake this study, the Minister for Infrastructure, Transport, Regional Development and Local Government, the Honourable Anthony Albanese, announced the Federal Government's commitment to developing a National Aviation Policy Statement. An Issues Paper was released on 10 April 2008 outlining the major themes to be considered in the Statement and calling for submissions from interested parties. Following this announcement, it was agreed that Access Economics report would form the basis of Cairns Ports' submission to the review.

On this basis, the report proceeds as follows:

- Section 2 provides an overview of recent trends in the Australian aviation industry in relation to international air travel;
- Section 3 evaluates the origins of challenges facing regional airports;

- Section 4 considers the current policy framework in Australia and potential deficiencies in this;
- Section 5 analyses the impacts of airport-related costs on competition and regional airport access; and
- Section 6 quantifies the impacts of a series of potential policy responses to the challenges facing regional airports.

# 2. BACKGROUND

## 2.1 TRENDS IN THE AUSTRALIAN AVIATION INDUSTRY

In 2006-07, total international passenger movements through Australian airports totalled 22.1 million, having grown more than 60% over the last decade. Overall, international passenger movements through Australian airports account for 0.5% of the global total (BTRE 2008a).

Table 2.1 shows international passenger movements at Australia's major international airports. Sydney, Australia's busiest international airport, processed more than 10 million passengers in 2006-07 – 46% of Australia's total. Brisbane and Melbourne are the nation's second and third busiest international airports in terms of total passenger movements, with 4.4 million passengers (19.9%) and 3.9 million passengers (17.6%) in 2006-07, respectively. Of the regional airports – defined here as international airports other than the four major gateways (the above three plus Perth) – Cairns has the largest passenger throughput, with 730,000 passenger movements in 2006-07, 3.3% of the nation's total.

**TABLE 2.1: INTERNATIONAL PASSENGER MOVEMENTS BY AIRPORT, 2001-02 TO 2006-07**

| | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 |
|---|---|---|---|---|---|---|
| Sydney | 7,968,165 | 7,752,988 | 8,594,354 | 9,274,692 | 9,667,554 | 10,124,409 |
| Melbourne | 3,303,486 | 3,136,420 | 3,601,072 | 4,144,155 | 4,253,268 | 4,419,551 |
| Brisbane | 2,476,511 | 2,442,918 | 2,912,444 | 3,483,857 | 3,646,891 | 3,885,906 |
| Perth | 1,597,721 | 1,573,543 | 1,734,238 | 1,945,686 | 1,979,750 | 2,191,721 |
| Cairns | 690,632 | 752,526 | 800,801 | 868,145 | 855,949 | 729,664 |
| Adelaide | 229,625 | 207,128 | 250,013 | 317,971 | 347,064 | 441,360 |
| Gold Coast | 66,833 | 136,030 | 137,379 | 159,444 | 210,495 | 192,820 |
| Darwin | 127,768 | 89,306 | 89,957 | 103,215 | 116,454 | 134,217 |
| Norfolk Island | 16,697 | 15,482 | 16,879 | 20,572 | 19,526 | 18,119 |

Source: BTRE 2007a, 2004a

**TABLE 2.2: ANNUAL AND TOTAL GROWTH IN INTERNATIONAL PASSENGER MOVEMENTS BY AIRPORT, 2001-02 TO 2006-07**

| | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | **01-02 to 06-07** |
|---|---|---|---|---|---|---|
| Sydney | -2.7% | 10.9% | 7.9% | 4.2% | 4.7% | **27.1%** |
| Melbourne | -5.1% | 14.8% | 15.1% | 2.6% | 3.9% | **33.8%** |
| Brisbane | -1.4% | 19.2% | 19.6% | 4.7% | 6.6% | **56.9%** |
| Perth | -1.5% | 10.2% | 12.2% | 1.8% | 10.7% | **37.2%** |
| Cairns | 9.0% | 6.4% | 8.4% | -1.4% | -14.8% | **5.7%** |

Source: BTRE 2007a, 2004a

Table 2.2 shows the comparatively slow growth in international passenger movements at Cairns Airport over the last five years and the downward trend evident over the last two. While total growth from 2001-02 to 2006-07 at the major airports ranged from 27.1% at the capacity-constrained Sydney Airport through to 56.9% in Brisbane, total growth at Cairns was just 5.7% for the same period. This is an annualised growth rate of just 1.1%.

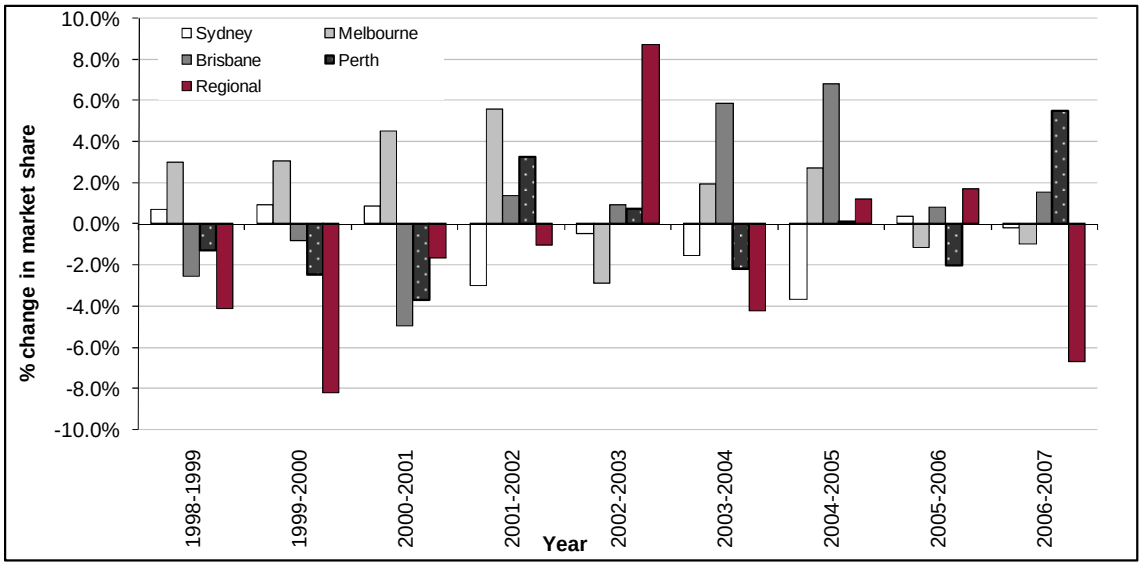
The changing nature of the aviation industry has meant that although the total international passenger traffic in Australia has been increasing, the distribution of this traffic has become

increasingly centralised around major capital city gateways. In fact over 93% of international passenger traffic in Australia is now through the four major gateways, with this share continuing to increase, as full-service airlines move increasingly towards 'hub and spoke' modes of operation.

### 2.1.1 INTERNATIONAL PASSENGER MOVEMENTS AT REGIONAL AIRPORTS

Over the last decade, regional airports have slowly been losing international passenger market share to the four major gateways (see Figure 2.1 below). 2002-03 forms an exceptional year in this trend, as the year Australian Airlines commenced international services. Brisbane and Melbourne have been the main beneficiaries of this decline in market share. The proportion of international movements in Australia which have occurred through regional airports over this period has fallen from 7.9% to 6.7%. Though passenger numbers at regional airports have indeed grown over this period, this growth has been surpassed by that occurring at major gateways.

**FIGURE 2.1: CHANGE IN SHARE OF INTERNATIONAL PASSENGER MOVEMENTS BY AIRPORT, 1998-99 TO 2006-07**




Source: BTRE 2007a, 2004a, 2001a, 2000a

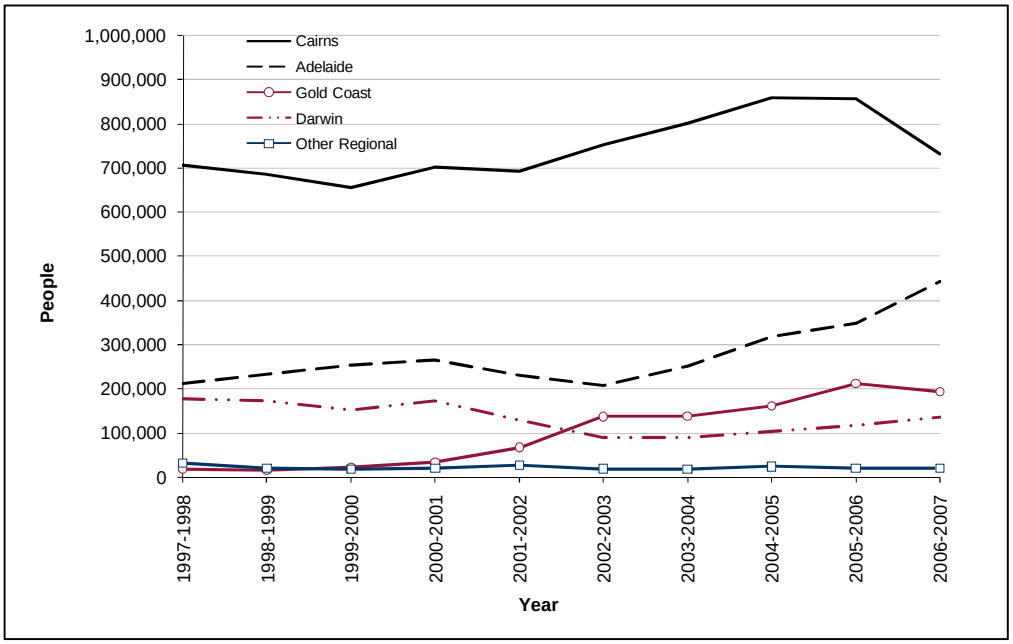
Note: Regional airports are defined here as all international airports outside of Sydney, Melbourne, Brisbane and Perth

In addition to the overall trend toward international movements through Australia's four major gateways, there has also been a shift in the distribution of international passenger traffic between regional airports, detailed in Figure 2.2 below. Notably, passenger numbers at the Gold Coast (at least prior to 2006-07) and Adelaide international airports have been increasing, while passenger numbers at Australia's busiest regional international airport, Cairns, have been falling since 2004-05. One of the major reasons for this can be cited as the Gold Coast and Adelaide's access to substantial outbound markets which make the viability of the route more profitable.

Figure 2.2 also reports international passenger movements at 'other regional airports'. Norfolk Island aside, this category encompasses a number of regional Australian airports, such as Hobart, Canberra, Broome and Newcastle, each of which has attempted to enter the international aviation market, with, in most cases, limited (and often temporary, at best)

success. These airports have typically had international services to a minimal number of destinations, none of which have lasted more than a few years.

**FIGURE 2.2: PASSENGER MOVEMENTS, REGIONAL AIRPORTS, 1997-98 TO 2006-07**




Source: BTRE 2007a, 2004a, 2001a, 2000a

## 2.2 TOURISM AND REGIONAL DESTINATIONS

In 2007, a total of 5,197,000 persons visited Australia. Over half of these (2,579,000) were visiting for a holiday. A significant proportion of tourists visit regional destinations, with 682,000 (26%) of holiday visitors visiting Tropical North Queensland (TNQ), 638,000 (25%) visiting the Gold Coast, and 143,000 (6%) visiting Alice Springs (TRA 2008a).

International visitors contribute significantly to the Australian economy, averaging 30 nights in Australia, and spending an average of $3,016, or $101 per night, over their time in Australia. Tourism Research Australia (2008a) indicates that the total economic value of inbound tourism to Australia in 2007 was $23.3 billion.

### ECONOMIC CONTRIBUTION OF TOURISM TO REGIONAL AUSTRALIA

Tourism is a major component of the Australian economy, directly accounting for 3.7% of Australian GDP. International tourism accounts for around 35% of this (0.9% of GDP), contributing $9.9 billion to Australia's economy annually (ABS 2008a). For many regional destinations, tourism is a major lifeblood. Given the geographic isolation of Australia and the vast expanses of the country itself, the international tourism industry is heavily dependent upon aviation.

The tourism industry is critical to many regional areas of Australia, such as Cairns, Broome and Alice Springs. In the 12 months to March 2008, for example, there were 4.9 million international visitor nights for "holiday" purposes at Cairns – the third greatest among Australian destinations, behind Sydney and Melbourne (Tourism Research Australia 2008b).

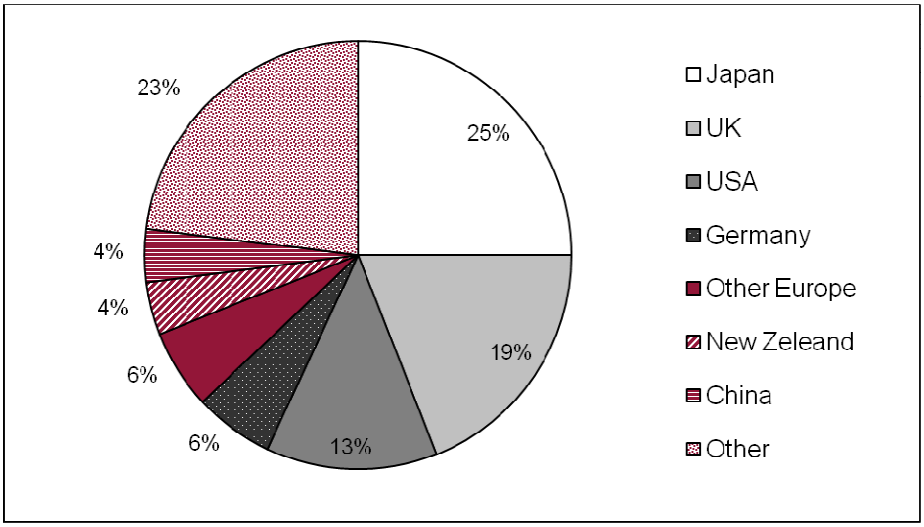
The TNQ region, in particular, is heavily reliant on tourism. Indeed, it is the single largest contributor to the Far North Queensland economy. Access economics (2008) estimated that the direct and indirect value-added economic contribution of tourism to the Great Barrier Reef Catchment Area in Northern Queensland totalled $3.3 billion in 2006-07, of which $870 million was attributable to international visitors. In the same financial year, tourism contributed 9,900 full time equivalent jobs to the Catchment Area in total, and 2006-07 international tourism to the Catchment Area added $1.4 billion directly and indirectly to Australia's total GDP.

## CASE STUDY: TRENDS IN INTERNATIONAL VISITORS AT CAIRNS

Cairns, Australia's second most visited tourist destination, is a prime example of the significance of tourism, and hence aviation, to many regional destinations. The ability of aviation to efficiently augment the travel of visitors, in the face of evolving trends in international tourism, is integral to the economic prospects of these regions.

Figure 2.3 shows a breakdown of international visitors to Cairns by their country of residence. Japan (25%), 'other Europe' (6%) and the United Kingdom (19%) are the major origins for international visitors to Cairns. While Japan remains the most significant origin of international tourists, the number of tourists visiting TNQ from Japan has been in decline.

**FIGURE 2.3: INTERNATIONAL VISITORS TO CAIRNS BY ORIGIN, 2006-07**




Source: Tourism Queensland 2007b

The most rapidly growing market for visitors to TNQ is the USA. Visitor numbers from the USA to TNQ increased by 7% in 2006-07. This is a particularly high-yield market as visitors from the USA tend to stay in luxury or standard commercial accommodation (Tourism Queensland 2007b), meaning the average per night spend from visitors from the USA is higher than that of other destinations. This high yield makes for a highly desirable market however there is a lower average length of stay amongst visitors from the USA than from other countries.

Excluding services from Guam, there are presently no direct international flights between the USA and TNQ, with all visitors from the USA required to either transfer flights at an Asian hub or otherwise to arrive at a major Australian hub and transfer to a domestic flight to Cairns. Present economic conditions in the US may mean a temporary slowing of visitor

numbers however in the longer term improved ease of travelling to Tropical TNQ from the USA would have a positive impact on visitor numbers.

Residents of China presently represent just 4% of total international tourism to Tropical North Queensland. Cairns and its region presently accounts for a much lower share of the Chinese market than the international tourism market as a whole for Australia, and the Chinese share of total visitors to Australia is increasing rapidly, rising from 4% in 2003 to 6% in 2007 (Tourism Research Australia 2008a). Indeed, total visitor numbers to Tropical North Queensland from China fell in 2006. Visitor numbers to Australia as a whole from China totalled 294,000 in 2006, with visitor nights totalling 14,140,000 for the year. Total Chinese visitor numbers increased by 8.5% in 2006, and are forecast to grow at an annual rate of 13% until 2015 (Tourism Queensland 2007a).

In 2007, Chinese visitors on average spent 44 nights in Australia, compared with a total international visitor average of 30 days. Additionally, Chinese visitors on average spent $5,409 during their visit while in Australia (that is, excluding any pre-payments for airfares or accommodation), which compares favourably with the total international visitor average of $3,016 (Tourism Research Australia 2008a). This higher total spend further equates to a higher average spend per night while in Australia with an average per night spend while in Australia of $123 for Chinese visitors, compared with a total average of $101.

There are presently no direct international services between mainland China and Cairns, or even between mainland China and Queensland. Instead, Chinese visitors must either transfer flights at Hong Kong or transfer upon arrival to Sydney, which requires several hours of undesirable backtracking. Such travel difficulties reduce the overall appeal of Cairns and Tropical North Queensland as a holiday destination for Chinese visitors. The rapid growth of the market for Chinese visitors, and the relatively high per night spend of Chinese visitors while in Australia, make for an important market for regional destinations to harness. To this end, obtaining a share in direct flights from mainland China is potentially a highly lucrative tourism opportunity for any destination able to secure such flights.

# 3. CHALLENGES FACING REGIONAL AIRPORTS

In the present economic environment, regional airports – as defined here – face a range of challenges in attracting direct international flights. These challenges are directly related to those facing international tourism.

Broadly, these challenges fall into a number of categories: (i) macro issues such as: slowing global economic growth; rising oil prices; and the appreciating Australian currency, (ii) commercially-based trends in international aviation such as the major airlines' increasing focus on 'hub and spoke' models and greater emphasis on low cost carriers (LCCs), and (iii) regional airport costs, relative to larger airports. Collectively, these factors are the major determinants of commercial airline route decisions.

Macroeconomic trends and commercial imperatives are influenced by government policy, but often only indirectly. However changes in the macro-economy form an important dimension of the overall adverse economic climate that regional airports are facing at the present time. While the focus of this report is firmly on those areas which are amenable to policy influence, recognition of these more pervasive factors – those beyond the direct control of government, airports, and in some instance even airlines – is pivotal to the development of appropriate policy responses. This recognition is also central to the development of realistic expectations about what is feasible and what is not.

## 3.1 MACROECONOMIC FACTORS

At the macro-level, a number of factors are placing significant pressure on the international aviation industry in Australia. These factors are of less relevance from a policy perspective than areas where government has direct industry involvement, however to the extent that they are adding to the challenges facing regional airports, they add important context to the policy debate.

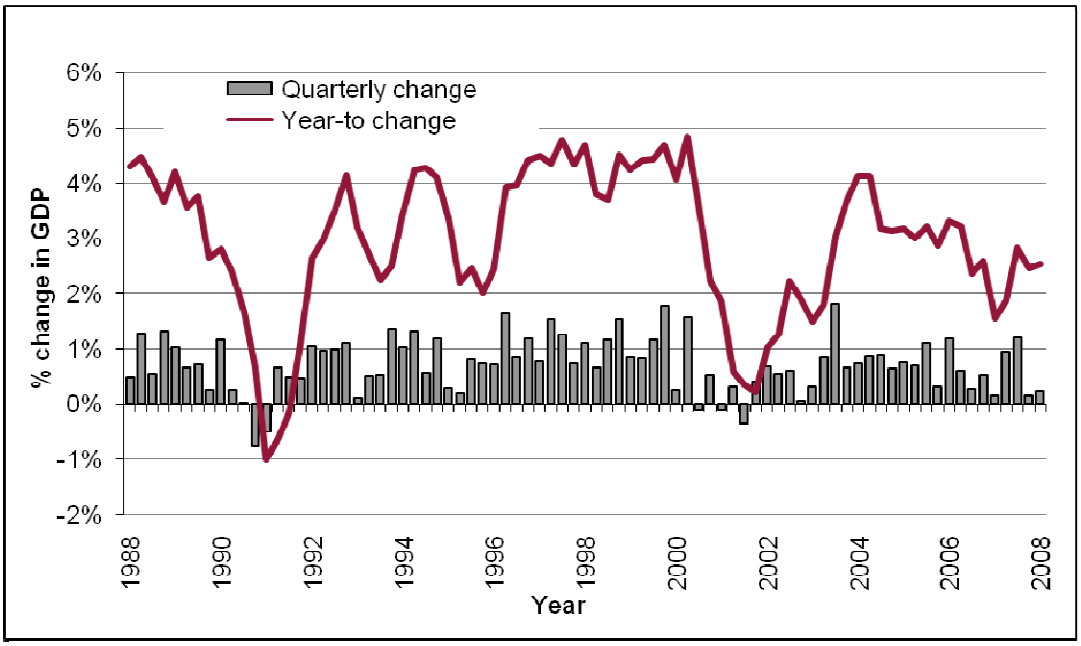
### Slowing World Economic Growth

The biggest single driver of tourism demand is world economic growth. Typically, the 'income elasticity' of tourism spending with respect to world economic growth is large (that is, greater than +1). The means that strong world growth generates even stronger world tourism demand. The converse is also true.

Economic growth in the United States is often a good barometer of world economic growth. As Figure 3.1 shows, since 2004 there has been an overall slowing of economic growth in the United States from the middle to late 1990s and early 2000s.

Slowing world growth – driven partially by the slowdown in the US, but increasingly a deliberate policy objective as central banks move to head off a resurgence in global inflation – is likely to be a major negative for world tourism growth in the years ahead.

**FIGURE 3.1: US GDP GROWTH, 1988-2008**




Source: US Bureau of Economic Analysis

From another perspective, tourism is being 'crowded out' around the world. The burgeoning demand for resources driven by China, India, and the other BRICs (Brazil and Russia), plus smaller developing economies catching this development wave, is driving up input prices (crude oil and other energy products, other hard commodities and increasingly food-related soft commodities) and, for countries well endowed with such products, their currency values.

Slowing growth around the world will be the single most important reason why world tourism demand growth will slow, or may even contract in the near future.

## Rising crude oil prices

Crude oil prices are particularly significant for a transport-intensive industry such as international tourism. There are limited fuel substitution possibilities, especially for aviation (and within that, especially long-haul aviation). High crude oil prices also make tourism (transport) more expensive.

With the price of crude oil increasing to record historical nominal and real highs (illustrated in Figure 3.2), significant upward pressure is being placed on jet fuel prices. Airlines have a limited ability to continue to hedge against, or absorb, such cost increases. As a result, rising fuel prices are increasingly being passed onto passengers through higher ticket prices (through fuel surcharges and otherwise).

Rising airfares reduce demand for air travel, with the impact greatest among relatively more price-sensitive leisure travellers (and not least long-haul travellers). These are travellers on whom many of Australia's regional airports have heavy reliance. As one response, rising crude oil prices are resulting in the withdrawal of international services, including to regional destinations, as higher costs render these services economically unprofitable. Indeed in June this year, in the face of crude oil prices in excess of US$135/barrel, the Qantas Group determined several routes to be unviable and grounded aircraft as a result.

**FIGURE 3.2: NOMINAL OIL PRICE (WEST TEXAS INTERMEDIATE), 2005-2008**

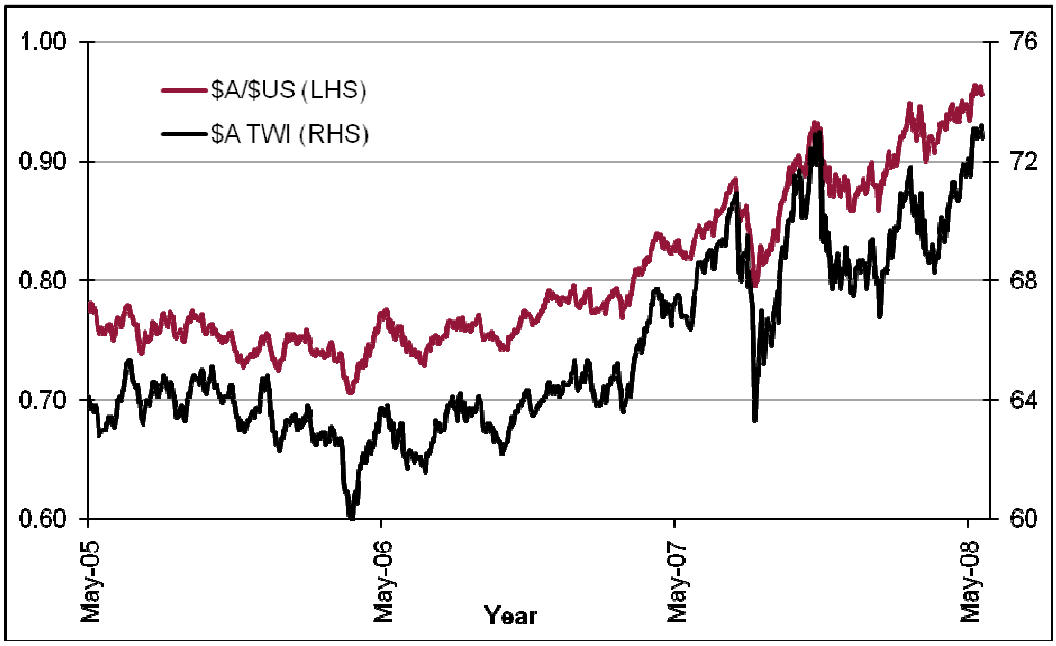

Source: Thomson Financial

In the current climate, with leisure-oriented travellers, predominantly short-haul flights and higher per-passenger charges (in part, as a result of Government impositions) many flights to regional destinations sit on the margin of profitability. Indeed, Access Economics' discussions with airlines indicated that routes to regional airports typically rank lowly in terms of relative profitability. Unsurprisingly therefore, these flights are some of the first to be affected by escalating fuel costs.

## Exchange rates: the rising Australian Dollar

The Australian dollar has appreciated over recent years relative to other major currencies, including notably the US dollar and major Asian currencies. Figure 3.3 shows the value of the Australian dollar relative to the US currency and on a trade weighted basis. As both indices show, the value of the Australian dollar has experienced a strong and sustained appreciation over the last three years. While on the positive side, the appreciating currency mitigates the increase in US dollar oil prices, which determine fuel prices. The downside is that the appreciating currency is reducing the global competiveness of Australian tourism, and hence the attractiveness of Australia as a holiday destination for international travellers. In addition, the appreciating currency makes an overseas holiday more attractive from an Australian's point of view.

FIGURE 3.3: $US/$A V $A TRADE WEIGHTED INDEX




Source: Thomson Financial

Past studies have shown that the tourism industry is sensitive to movements in the exchange rate. As the Australian currency has strengthened, tourism exports have been adversely affected. Both tourism numbers, and per-tourist expenditure has fallen. Indeed, recent analysis by Tourism Research Australia found a strong (inverse) correlation between the value of the Australian currency, relative to a basket of other currencies, and the level of inbound tourism (TRA 2007). With many regional destinations heavily dependent on leisure travellers, the relative impacts of the reduced competitiveness of Australia's tourism industry are greatest in these areas.

## 3.2 INDUSTRY-SPECIFIC FACTORS

At the industry level, emerging trends in international aviation are increasingly favouring capital city airports over their regional counterparts. Commercial developments such as increasing emphasis on 'hub and spoke' models for major carriers, the introduction and rapid rollout of LCCs and advances in aviation technology are combining to challenge the capacity of regional airports to attract direct international flights.

### International networking

The increasing propensity for airlines (especially the major carriers) to operate under 'hub and spoke' models, rather than multiple point-to-point, is having adverse impacts on regional airports. Under 'hub and spoke' models, international flights network through major 'hub' airports, then, in the case of arrivals to Australia, transfer on to domestic 'spoke' flights, to service regional destinations. It is a model driven by the economics of aviation – cost minimisation and network efficiencies. This trend is not new. It has been building for many years.

The net impact on regional airports of the trend towards 'hub and spoke' models is that airlines are providing fewer direct international services to these non-hub destinations. As

noted above, a number of international services to and from Cairns have been cancelled since 2001, while several more were cancelled in the second half of the 1990s. At the same time, domestic connections have increased consistently. International networking heavily favours major international gateways over regional airports insofar as attracting direct international flights is concerned, as commercial imperatives strongly favour hubs at these major airports. This creates a situation where travelling to a regional destination such as Cairns may involve several hours of 'backtracking' from Brisbane or Sydney, which is undesirable and may dissuade visitors, preferring instead an overseas destination they are able to travel to directly.

## The rise of low cost carriers

The advent of low cost carriers has changed the landscape of international aviation around the world. For leisure-focused destinations such as Cairns, this has meant a gradual shift away from full-service carriers, toward LCCs – observable most evidently through the Qantas Group's move to replace Qantas services with its low-cost subsidiary, Jetstar. While the introduction of LCCs may reduce the attractiveness of such destinations to travellers seeking full-service travel (elements of the European market for example), where the alternative is to discontinue the services altogether, LCCs have proven beneficial to regional airports.

At the same time however, LCCs present additional challenges to regional airports. The low cost business model, by its very nature, places a greater emphasis on minimising costs. While there are measures airports can adopt to provide a low cost airport service to LCCs, many of the costs imposed at regional airports are, to a large extent, beyond the airport's direct control. LCCs typically operate on extremely low margins – anecdotally, often as low as a few dollars per seat-passenger. Regional airports' ability to compete on cost is crucial to their prospects of attracting new, and maintaining existing, international LCCs.

Table 3.1 shows the change in international flights and seats per week at Cairns between 2001 and 2008. Although the overall seats per week available on international flights to Cairns have increased in this time period (up by 5.3%), the airlines providing these services have changed significantly. Many of the services to Asian destinations previously operated by Qantas are now on the schedule of Jetstar, its LCC subsidiary. The implications of this trend for regional airports, and their ability to attract and retain direct international services, is discussed below.

Many of the international flights to and from regional airports cancelled in recent years have been replaced by domestic services, as per the 'hub and spoke' mode of network operation detailed above. A key example of this is Cairns, where there has been significant international-domestic service substitution. As Figure 3.4 shows, international passenger movements at Cairns have levelled off in recent times, and since 2004-05, have in fact fallen. At the same time, however, domestic passenger movements at Cairns have been growing rapidly, increasing 16% in 2006-07 alone. The Brisbane-Cairns route was the tenth largest Australian domestic route in 2006-07, with around 1.2 million passenger movements in 2007 (BTRE 2007b).

At least part of the growth in domestic passengers at Cairns can be attributed to international visitors who are no longer able to gain direct access and instead transit through Brisbane and Sydney. Indeed, 42% of domestic arrivals to Cairns are international visitors (Cairns Airport Visitor Survey). Although many of these arrivals are tourists visiting Tropical North Queensland (TNQ) as part of a longer Australian holiday, some are redirected from international routes.

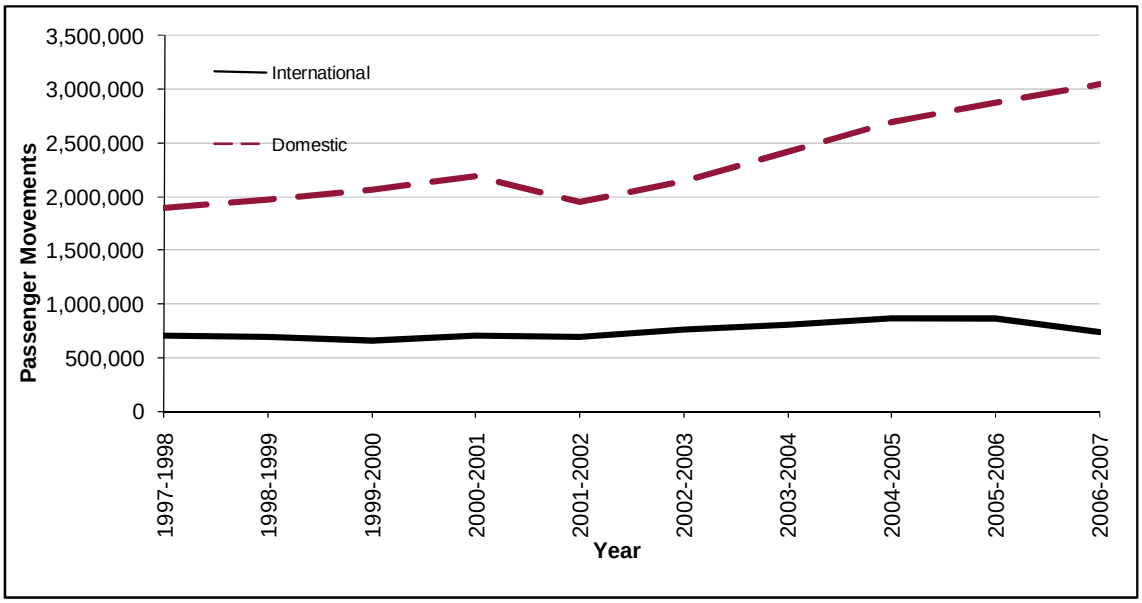
**TABLE 3.1: INTERNATIONAL FLIGHTS, CAIRNS AIRPORT, NORTHERN SUMMER, 2001 AND 2008**

| Origin | 2001 | | 2008 | |
|---|---|---|---|---|
| | Airline | Seats/Week | Airline | Seats/Week |
| Hong Kong | Cathay Pacific | 1,244 | Cathay Pacific | 1,866 |
| | Qantas | 687 | | |
| Denpasar | Garuda | 312 | | |
| Nagoya | Qantas | 2,744 | Jetstar | 1,515 |
| Osaka | | | Jetstar | 909 |
| Tokyo | Qantas | 2,884 | Qantas | 3,206 |
| Kuala Lumpur | Malaysia | 588 | | |
| Auckland | Air New Zealand | 234 | Air New Zealand | 723 |
| Port Moresby | Air Nuigini | 869 | Air Nuigini | 855 |
| | | | Airlines of PNG | 252 |
| Singapore | Qantas | 1,421 | Jetstar | 1,218 |
| Guam | Continental Micronesia | 310 | Continental Micronesia | 308 |
| | Total Seats/Week | 11,293 | Total Seats/Week | 10,852 |

Source: Department of Infrastructure, Transport, Regional Development and Local Government 2008a, 2001a

This is significant for the regional tourism industry as those international visitors who arrive in Australia via Cairns stay longer in TNQ than do those who arrive via Brisbane or another international gateway. In 2007, an international visitor who arrived in Australia at Cairns Airport would on average stay in TNQ for 9.0 nights. This is in contrast to those who arrived via Brisbane and all other Australian airports, staying in TNQ for an average of 7.4 nights. Given the average expenditure per night of $95 for visitors to regional Queensland (TRA 2008b), therefore, a visitor who travels directly to Cairns will, on average, spend $152 more in TNQ than one who travels via another international airport.

**FIGURE 3.4: DOMESTIC AND INTERNATIONAL PASSENGER MOVEMENTS, CAIRNS, 1997-98 TO 2006-07**




Source: BTRE 2007a, 2007c, 2004a

On 5 June 2008, the Qantas Group made announcements regarding international schedule changes, purportedly in response to rising costs of operation, in particular the rising cost of aviation fuel. As a result, at the end of 2008, scheduled international flights to Cairns are set to fall to 55 flights per week. This includes the withdrawal of 8 weekly services to Osaka-Nagoya, as well as 7 services to Tokyo per week. Those services that remain will be operated by Jetstar in place of Qantas. In net however, the result is still a weekly loss of 3,509 seats.

In effect, Cairns will lose an estimated 31% of international capacity from December 2008, and 62% of total capacity to Japan - the largest source market of international visitors to Cairns, accounting for over 20% of the total. Additionally, these services on-carry passengers from other key markets such as Europe and Korea, and thus the reduction in services from Tokyo in particular make it more difficult for such tourists to get to Cairns.

## Other commercial factors

In addition to these broader industry trends, there is also a range of other commercial factors affecting international routes to regional airports, which can themselves present challenges to the viability of these services. Airline costs are driven by a plethora of factors. Key elements from an operational perspective include:

- aircraft size: larger aircraft have lower unit costs;
- route length: longer flights have lower unit costs; and
- frequency of operation: higher frequency increases utilisation levels and reduces per unit costs.

International flights to Australian regional airports are typically flights from locations within the Asia-Pacific region, with lower capacity, narrow-body aircraft operating on a relatively less frequent basis. Consequently, these routes are some of the most costly (on a per-unit basis) and cost-sensitive, in airlines' networks. Taken in the context of the other considerations discussed here – at the macro level, at the industry level, and at the route level – these factors contribute to international flights to regional destinations being some of airlines' most marginal, and hence most at-risk to withdrawal if market conditions become less favourable.

## Freight possibilities

On a marginal route, freight can be the difference between profitable and unprofitable operations. Airlines may be willing to accept reduced load factors or lower yields if sufficient revenue can be generated from freight. Given the significantly greater freight opportunities at capital city airports – 97% of international freight passes through major gateways[1] – this represents another avenue where regional airports face a competitive disadvantage. Again, this is not an area where government is, or arguably, should be, having an impact on market outcomes, however it is but another example of the challenges facing regional airports in attracting, and retaining direct international flights.

## Limited outbound passenger base

An additional factor which limits the viability of many regional destinations for direct international services is the relatively smaller local populations, which limit outbound passenger potential. Even for a location which attracts large numbers of mono-destination

[1] BITRE

international tourists, a sufficiently large local outbound passenger base is an essential element of viability. Discussions with airlines, particularly LCCs, highlighted the significance of outbound passenger catchment to international scheduling decisions. Among Australia's regional airports, this factor is evidenced in the recent successes of the Gold Coast airport – based in one of the nation's fastest growing populations, South East Queensland – compared with, for example, Cairns, where the estimated residential population at 30 June 2007 was a mere as 140,913 (ABS 2008c).

## 3.3 ECONOMIES OF SCALE

The provision of airport services, like many aspects of the aviation industry, is characterised by significant economies of scale. Large fixed cost elements mean that on a per-unit basis, costs are heavily driven by passenger volume. This is reflected both in the charges airports levy for their own services and charges influenced by Government mandated requirements, such as charges for security, and fire fighting and rescue. Regional airports – where passenger throughput is generally lower – find themselves at a competitive disadvantage in this regard, restricted in their ability to compete on per-passenger charges with major gateways.

Economies of scale facing international airlines also present a challenge to regional airports, as it limits their capacity to attract new carriers. Airlines themselves incur substantial fixed costs in production. In a comparison between a major gateway with existing infrastructure, and a regional airport where infrastructure establishment is necessary and passenger throughput is often lower, regional airports' capacity to compete is limited. From an airline's perspective, higher risk is associated with route establishment at a regional airport, biasing their scheduling decisions towards major gateways.

# 4. POLICY FRAMEWORK

## 4.1 AUSTRALIA'S AVIATION POLICY FRAMEWORK: IS POLICY RESTRICTING REGIONAL AIRPORT ACCESS?

The Australian Government has jurisdiction over international aviation policy, as well as interstate domestic aviation. That said, the powers of the Australian Government to develop aviation policy are constrained somewhat by international arrangements, such as the authority of the International Civil Aviation Organisation under the Convention on International Civil Aviation (the Chicago Convention, 1944), to which Australia is a signatory.

### 4.1.1 AIR SERVICE AGREEMENTS

Under the Chicago Convention, the primary tool used for regulation in international aviation is a bilateral Air Service Agreement (ASA). These are negotiated between two countries, and provide the framework within which countries negotiate capacity, designation, frequency, pricing and other matters.

#### Determination of ASAs in Australia

Historically, Australia has placed limitations upon foreign carrier access to Australian airports. For example, it has been past practice for a foreign carrier that wishes to operate flights into Australia to be offered a specific, limited number of frequencies per week. Qatar Airways, for example, was initially offered three flights per week into Australia, with the stated aim of reviewing the frequency as the market grows. However, such arrangements are impractical for an international airline. They frequently argue as it is difficult to run operations profitably with any fewer than daily flights to a given destination, and the regulatory uncertainty of the timing and likelihood of success in any future review have acted as a deterrent to international carriers.

Despite widespread liberalisation since the late-1980s, the Australian system of allocations of airline capacity remains somewhat restrictive. At present, the *International Air Services Commission Act (Cth) 1992* legislates at Section 7 Part 2(a) that allocations of airline capacity be made to a country only if "the Commission is satisfied that the allocation would be of benefit to the public" (section 7 (2)(a)). This is effectively a reversal of the standard onus of proof. Rather than being granted access unless it can be demonstrated that international airlines would unduly damage Australian interests, the airlines are required to demonstrate gains to Australia from such air access being granted. Access Economics (2006) has previously argued that such restrictive access ultimately harms Australia as the net result is higher airfares and, consequently, fewer tourists.

In developing the designation provisions in most of Australia's bilateral treaties in terms of what constitutes "domestic" and "international" airlines, a substantial ownership and control test was applied when designating carriers from both sides. For some years, Australia's preferred approach was to allow designation on a so-called 'principal place of business test'. That is, a carrier's 'nationality' was defined by the country which their principal place of business was located in, and not by nationality of owners. This position was taken because many airlines, particularly those from developing countries, were unable to finance their growth and maintain safe operations if their national designation were to be contingent upon ownership by citizens of that country.

Although Australia has expressed its support for this approach in the past, Australian-based carriers wishing to enter the international market are precluded under domestic law. The *Air Navigation Act* provides that prospective Australian international carriers must be majority Australian owned in order to receive international designation as such. Under this requirement, foreign owned carriers such as Tiger Airways are precluded from accessing Australian bilateral rights, and not all carriers would agree to a change of ownership structure.

In an environment where there are ultimately limited opportunities for growth in domestic capacity, Australian domestic carriers will increasingly seek opportunities for international operations. Restriction of foreign owned carriers as it stands limits the potential for international flights to be operated out of regional airports, while the ability for foreign owned-LCCs to tap into international source markets is important if they are to have access to the volume of passengers required to make operations sustainable.

A principal place of business approach, as in operation in other countries, would allow such carriers into the international aviation market within Australia, and would benefit regional airports such as Cairns. Such an approach could be made conditional, for example on access to any of the four restricted airports. Additionally, it would be possible to allow international operations only on uncontested routes and only from regional centres to given destinations, for example points in the Pacific and East of Bali to East Malaysia and the Southern Philippines as a commencement strategy.

## Current ASAs in Australia

Australia presently has ASAs and associated arrangements with 67 countries. There are formal and operational 'open skies' arrangements in place between Australia and New Zealand, and reasonably open arrangements for Singapore Airlines to operate flights between Australia and Singapore. The airlines of other nations, however, including those of some Middle Eastern countries, continue to have access arrangements which constrain the number of services they would otherwise supply.

The Australia-New Zealand open skies arrangement gives the national carriers of the respective countries 'fifth freedom' rights, that is, a New Zealand airline is able to operate a trans-Tasman service which stops in Australia, and then continues on to a third country, and vice versa. Airlines of both countries may also provide domestic services in either country, and unlimited trans-Tasman services (Anderson 2000). The Australia-New Zealand open skies arrangement was an Australian first and, until February 2008, when a similar agreement (although without domestic rights) was settled between Australia and the United States (Albanese 2008), the only such Australian arrangement.

These arrangements, however, do not allow for third nation carriers to operate these services, both of which Singapore Airlines has expressed an interest in operating. This requirement is restrictive for regional airports such as Cairns, Darwin or the Gold Coast, which would be a natural fit as an Australian stop on a route between New Zealand and many hub destinations in Asia. There are also some negotiated ASAs which are not currently being utilised. For example, the existing agreement with Myanmar (Burma), which provides for the national airline of Myanmar to operate a service between Rangoon and Sydney (Commonwealth of Australia 1976), while the prevailing ASA between Australia and Switzerland allows for 2800 saleable seats per week to the four major Australian airports, and unlimited capacity to regional airports (Commonwealth of Australia 1993). The rights afforded under these agreements are not currently being utilised by the national carrier(s) of either country, however there is presently no mechanism by which unused rights can be forwarded on to the carrier of a third nation.

There may well be scope, therefore, for improving access to Australian airports through a 'use it or lose it' policy whereby unused rights under an ASA may be bid for by third nation carriers. Under such a scenario, an unused ASA could be auctioned off such that carriers of countries with which does not have an agreement could access the Australian market, or carriers from countries currently facing capacity constraints on their allowable aircraft movements could gain further access to the Australian market. The former may lead to increased international traffic at Australia's regional airports, however this will only be the case if the third nation has no existing ASA with Australia, or an older ASA which does not include the 'open skies' arrangement to regional airports. Granted that more recently negotiated ASAs offer virtually unfettered access to Australia's regional airports (see below), handing rights to an airline from a country with an ASA negotiated in the past five years is unlikely to have the desired benefits for regional airports.

The allocation of air access to Australia can be somewhat problematic, as the demand from airlines tends to be focused on trunk routes flying into the four major airports – particularly Kingsford Smith Airport in Sydney, which already faces capacity constraints, particularly for long-haul international flights, for which available slots in the present schedule would necessitate operating flights which arrive in European destinations during their curfew hours. In an attempt to maximise the number of international flights to Australia while encouraging flights to regional areas to reduce pressure on the large airports, all new ASAs now provide caps on flights per week into the four major airports, while allowing unlimited access to all other international airports.

As it stands, the current policy therefore favours the regional airports.

However, there are several important caveats that limit the usefulness of this as a means of attracting traffic to regional routes.

- There is a 'lead a horse to water' element to this policy – that is, no matter how much access to regional airports the Australian Government grants, airlines will not operate services to these destinations if the routes are not commercially viable.
- There are several limitations upon the commercial viability of such routes:
  - setup and ongoing costs at new destinations are relatively higher, and thus volumes and yields will need to be high in order to justify adding a non-hub destination;
  - the lack of cabotage rights (for example, limiting the ability of a foreign carrier to land in Cairns, then travel on to Brisbane before leaving Australia) reduces possible passenger volumes for international carriers; and
  - the lack of 'fifth freedom' 'beyond rights' to fly to destinations such as New Zealand (for non-NZ airlines) means an airline such as Tiger Airways is unable to complete a potentially lucrative route such as Singapore to Cairns, then on to Auckland. The volume of traffic on a SIN-CNS and return route may be insufficient to justify operation.

### 4.1.2 AIRPORT PRICE REGULATION

Until 1997 most Australian airports were owned by the Australian Government and operated by the Federal Airports Corporation. When the privatisation of these airports commenced, the Government utilised its market power to introduce price regulation at all capital city airports, as well as some regional airports (Productivity Commission 2006). Charges for

aeronautical services were determined primarily by the regulator, rather than arising out of any commercial negotiations.

Following a review of airport charges (Productivity Commission 2002) a more light-handed method of price regulation was implemented. Under this system, the regulator had no power to set prices, rather the Australian Competition and Consumer Commission (ACCC) was charged with monitoring the prices charged for aeronautical and related services at Adelaide, Brisbane, Canberra, Darwin, Melbourne, Perth and Sydney Airports. This lighter handed approach was adopted to facilitate innovation and investment by airports, while reducing the scope for misuse of market power, where airports have significant ability to use or misuse.

This light handed approach, in the subsequent review of the price monitoring system, was not found to have led to any excessive increases in the prices charged by these airports, although the asymmetry of market power between airport and airline was found to be greater than had been envisaged, particularly at the major airports (Productivity Commission 2006). Nevertheless, it was recommended by the review that Canberra and Darwin Airports be excluded from the price monitoring regime. It was further recommended that, for those airports still monitored, that this regime should encompass all services for which the airport has some market power. These recommendations were subsequently enacted by the Federal Government, with the next review of the regime to take place in 2013.

### 4.1.3 THE NATIONAL AVIATION POLICY STATEMENT

In recognition of the fact that the aviation industry has changed markedly since much of Australia's existing aviation policy was formulated, the Federal Government has committed to developing a National Aviation Policy Statement. The intention of this statement is to provide greater planning and investment certainty to the industry. The statement is intended to address, among other things, two areas of particular relevance to this paper:

- means of encouraging international airlines to fly to destinations outside of the four major gateways of Sydney, Melbourne, Brisbane and Perth, and the role in which government can play in achieving this; and
- the appropriateness of current restrictions on foreign airlines operating services to third markets, or whether offering greater 'fifth freedoms' and even 'seventh freedoms' (where the service does not need to pass through the airline's home country) would be beneficial to the industry.

### 4.1.4 BROAD FINDINGS ON REGIONAL ACCESS POLICY

Access Economics' main conclusions concerning the effects of aviation policy settings on regional airport access to direct international flights are as follows:

- In principle, current restrictions on international aviation access favour regional airports over the four main Australian gateways. Operationally, it is less clear how much this is the case. To the extent that the 'open skies' policy for regional airports is only triggered as existing ASAs are re-negotiated, or new ones entered into, there may still be a considerable lag before this policy, announced some years ago, becomes fully operational. Access Economics has previously recommended that this 'open skies' policy be unilaterally enacted in all existing Australian ASAs, without the need for re-negotiation, and a determination as such by the Federal Government is called for.
- A move towards generalised 'open skies' access for all Australian airports would be likely to *disadvantage* regional airports overall. If foreign carriers were to have

unlimited access to the major airports, save for capacity constraints, there would be little remaining impetus to service regional destinations. Granted that Sydney already faces capacity constraints, therefore, such a policy would be of most benefit to Brisbane, Melbourne and Perth.

- There is scope to further develop the current policy of 'open skies' for regional airports in ways that would help to make these destinations more desirable to international carriers, and a manner which would benefit both regional airport and international carrier. There are three primary options available to create further incentive for airlines to operate international routes out of regional airports:
  - Presently very few 'beyond rights' are offered to international carriers operating in Australia, New Zealand airlines aside. Offering 'beyond rights' capacity to international airlines on flights operated out of regional airports, therefore, would provide greater impetus for airlines to offer such routes. For example, if an Asian carrier were to be offered the right to arrive in Cairns from their home country, and then have so-called 'fifth freedom' rights to continue on to a New Zealand destination (without similar rights available from the four major airports), the potential additional volume of traffic would create a greater incentive to provide services to Cairns.
  - Triangulation rights with major airports could also increase the number of services in regional airports. If those international carriers who are presently constrained by their allowable weekly limits into the four major airports were able to augment their allowable limit through a route to a regional airport, where capacity to the major airport was increased on a seat-for-seat basis with the services offered to regional destinations (contingent upon capacity constraints at the major airport), this would provide incentive for those airlines to offer services to regional airports.
  - Australian carriers holding an Australian Air Operators Certificate - irrespective of 'principal place of business' or ownership - should be permitted to operate international air services to and from regional airports
- Evaluating the merits of such alterations to prevailing arrangements in any quantitative sense is beyond the scope of this report. However, Access Economics notes that:
  - Either of these options *will* switch some existing demand away from indirect/domestic access to regional airports to direct international access, that is, those passengers travelling on these regional routes are not all 'new' passengers, many will be visitors who would have come to Australia irrespective of the availability of the direct route. This pure substitution effect (i) may be export income-negative for Australia as a whole (as carriers with higher foreign ownership levels replace domestic carriers with lower foreign ownership levels), while (ii) possibly shifting other tourism income benefits away from areas around major gateways to the regions. The net *national* interest benefits of such pure substitution effects are therefore qualitatively ambiguous.
  - Either of these options *may* increase total international tourism export demand for Australia, plus shifting market share to the regions. If so, the case for change to current policy may be stronger. However, if the Commonwealth Government is true to its commitment to 'evidence based' policy, this case will need to be demonstrated with some rigour.

## 4.2 REGIONAL DEVELOPMENT POLICY AND AVIATION

Regional development policy in Australia, and its application to the aviation industry, has been somewhat disparate. Federal Government regional development policy is generally limited to quite remote areas, and thus 'regional' international aviation destinations such as Broome or Cairns do not meet the criteria for most regional development support plans.

At this stage the only budgeted Federal Government funding for aviation is for the *Remote Air Services Subsidy*. This funding, valued at $24.6 million over four years, subsidises air service operators for the provision of regular weekly air transport services for the carriage of passengers and goods to 237 isolated communities in remote areas of Australia. Some of these flights are operated out of regional airports such as Cairns and Darwin. However the airports do not directly benefit from these subsidies.

Tourism Australia has a significant amount of funding available to it for promoting and developing the tourism industry, which is of high importance to many regional destinations. The total funds from Government available to Tourism Australia under the 2008-09 Budget are over $135 million; funding for Tourism Australia, however, is for the most part aimed at promoting Australia as a whole as a destination, with the Federal Government focusing on attracting tourists *to* Australia, rather than to particular destinations *within* Australia.

At the State level, much of the Queensland Government's policy insofar as regional development focuses on broadening the economic base of regions. Regional Queensland has historically been dependent upon the agriculture and mining sectors, and the "Smart State" strategic plans for Queensland are aimed at expanding into new industries, and new areas of economic production. Granted that the tourism industry is well-developed in many areas, particularly TNQ, much of the focus in this region for future development plans has shifted away from known 'winners' for the region, such as tourism and the supporting infrastructure of the aviation industry, towards 'new' areas such as manufacturing.

In the face of recent setbacks to the Queensland tourism industry, both levels of government have responded with support. Tourism in Queensland generally and in TNQ in particular has been struggling in recent years, a trend that has been compounded by increasing oil prices and the strength of the Australian dollar making Australia a comparatively expensive destination. The troubled times experienced by tourism to TNQ has resulted in the withdrawal of Qantas international services from Cairns, as discussed above, and this prompted the Queensland Government to announce a so-called 'rescue deal'.

The Queensland Government has pledged $4 million in funding, a sum which has since been matched by the Federal Government. This funding will be used to invest in marketing campaigns as well as send the Queensland Tourism Minister to China to negotiate over establishing new international aviation routes to Queensland, and may be offered to airlines, although not for subsidies (Cairns Post, Courier Mail 2008). This money is focused at the Cairns region in particular, as the biggest loser in the Qantas/Jetstar route alterations.

### Policy implications

Given the significance of tourism to many regional destinations and the vital role of aviation in facilitating this, ensuring that conditions at regional airports are conducive to efficient access by international visitors is integral to the economic prospects of these regions.

While many of the policy measures discussed in this report are justified purely on the grounds of economic efficiency, regional development objectives may warrant more active

policy responses by Government. Naturally, this could take many forms, however one area where there is a strong rationale for Government involvement is destination marketing.

Destination marketing is an area where governments, at various levels, have a genuine interest in intervening to promote improved market outcomes. The market unaided will under-supply marketing due to the problem of 'free riding'. The beneficiaries of destination marketing are a disparate group of business – in most instances, no single entity is able to capture the full benefits of any marketing undertaken. Accordingly, unless these spillovers can be effectively internalised, destination marketing will be provided at a sub-optimal level in absence of government intervention.

Reflecting this, governments actively engage in marketing initiatives, typically on a scale that reflects their jurisdiction – the Federal Government markets Australia, the Queensland Government markets QLD and so on. As such, regional marketing (vis-à-vis national or state marketing) is generally the domain of regional marketing authorities.

That said, where the Federal Government has a goal of promoting regional development, the provision of marketing support to regional marketing is a valid mechanism for achieving this – particularly in regions where tourism is a central industry, as many areas serviced by regional airports are.

# 5. AIRPORT-RELATED COSTS: IMPACTS ON COMPETITION AND REGIONAL AIRPORT ACCESS

Airport-related costs and charges present a significant challenge to regional airports competing for international services with major city hubs. The costs incurred by an airline when using an airport are important to decisions to service one particular port over another. The shift toward LCCs – particularly at leisure-focused regional destinations – coupled with the pressure exerted on airline costs by escalating fuel prices, has heightened the significance of airport charges.

Airport charges, both airport-determined and otherwise, are driven by a range of factors and through a range of mechanisms, but common themes apply. The lower passenger throughput at regional airports necessitates higher per-passenger charges, as large fixed cost elements must be recovered over a smaller base. Passenger throughput at Brisbane for example, is some five times higher than at Cairns. Where economies of scale are a determinant, regional airports will always be at a competitive disadvantage to their capital city counterparts.

There may be risk of a 'downward spiral' developing, whereby increasing passenger charges lead airlines to withdraw, diminishing the passenger base, increasing passenger charges, and so on. The future of regional airports under such a scenario is under pressure.

While the focus of this report is on those areas most amenable to policy influence – where government does, or potentially may, play a role in affecting market outcomes – consideration is also given to the airports' own charges, as these are integral to an understanding of the dynamics of international aviation at regional airports.

This section of the report therefore considers (i) airport-determined charges: those charges imposed by the airport itself, (ii) air services charges: fees levied by Airservices Australia for aviation services, (iii) security charges: charges imposed to recover the costs of Government-mandated security requirements, and (iv) government-imposed border control charges: the costs of customs, immigration and quarantine, recovered (in part) through the Passenger Movement Charge (PMC).

## 5.1 AIRPORT-DETERMINED CHARGES

Airports charge airlines a range of fees for the use of airport facilities such as runways, apron and terminal facilities. Typically, this includes a landing charge, based on aircraft weight, and some form of passenger service charge to cover the use of aerobridge/stairs, terminal facilities, etc. Often, however this is aggregated into a single per-passenger or per tonne charge.

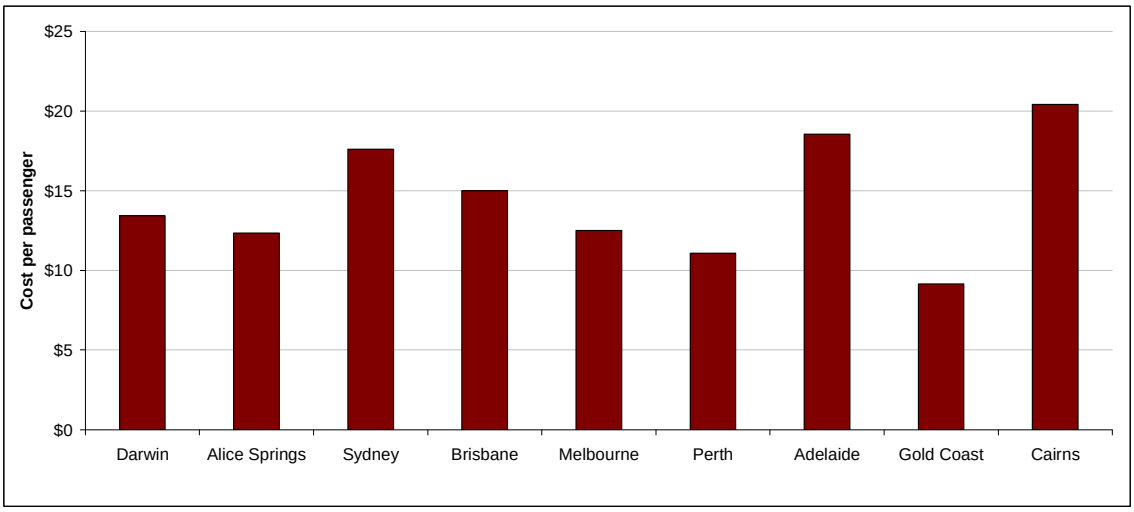
As well as using such fees to cover the cost of providing airport services, airports also use them as a mechanism for recovering the costs of airport investment, such as terminal upgrades/expansions and runway development. Airports' landing charges tend to fluctuate over time with their capital expenditure. For example, the recent approval for Brisbane airport to construct a new runway will likely see landing charges increase in coming years to cover the costs of construction.

Like many of the sources of competitive imbalance pervading regional airports, landing fee differentials are driven partly by the level of passenger throughput. The per-passenger

charge required to recover the cost of a $500 million terminal expansion at Cairns will be significantly greater than at, say, Brisbane, where annual international passenger movements are five times greater (as discussed above).

However as Figure 5.1 below shows, while an important part of the equation, passenger throughput is not the sole determinant of per-passenger airport charges. The Gold Coast, for example, which has one of the lowest levels of international passenger movements of the airport's listed, is in fact the most cost-competitive on a per passenger basis, at $9.15 per passenger. Among other regional airports, Darwin ($13.42), sits mid-range in terms of airport charges, while Cairns ($20.40) and Adelaide ($18.54) are the highest and second highest, respectively.

**FIGURE 5.1: AIRPORT-LEVIED CHARGES, SELECTED AUSTRALIAN INTERNATIONAL AIRPORTS, 2007**




Cost comparison for an A320 aircraft.

Importantly, it should be noted in interpreting Figure 5.1, that differences in the cost accounting practices across airports can have a bearing on reported airport charges. Cairns for example recovers all capital expenditure costs through their passenger service charge. This includes investment in government-mandated security requirements such as passenger and baggage screening devises (discussed in detail below). Cost recovery varies between airports however, with some including all security-related costs – variable *and* capital costs – in their security charge, and others taking a similar approach to Cairns. As such, comparisons of airport-levied charges reported in Figure 5.1 should be undertaken with caution.

## 5.2 AIRSERVICES AUSTRALIA CHARGES

Airservices Australia (ASA) is the provider of terminal navigation services, en-route services and aviation rescue and fire fighting (ARFF) services to the Australian aviation industry. Charges are levied on the airline itself, but are ultimately borne mostly by passengers (with the extent of pass-through dependant on traveller characteristics). While Airservices Australia is not a statutory monopolist – indeed there are provisions for competition in ARFF services – the low contestability of the services provided by Airservices Australia means it continues to operate as essentially the sole provider of these services.

### 5.2.1 CURRENT APPROACH TO CHARGING

The current pricing model for Airservices Australia services sees charges set on a per-tonne, location-specific basis, reflecting the cost of providing those services at each individual airport. It is based on a 'building block' model whereby an allowable revenue for a port location is determined, from which pricing is then based. En-route charges are less affected by the nature of the airport itself, with the $/km charging regime (based on aircraft category) linking geography as a major determinant. In other areas, however, traffic volumes generate significant economies of scale in the provision of these services, giving major gateways unit-cost advantages over regional airports.

A 2005 discussion paper prepared by Airservices Australia outlined options for charging for ARFF charges (Airservices Australia, 2005). A number of models were canvassed ranging along a spectrum from location-specific pricing to network pricing, with a number of hybrid options in between. While the adopted model moves somewhat away from location-specific pricing in its purest form, the core principles of this approach remain intact.

The current charging model was introduced over 1998 and 1999, in place of a 'network pricing' model. Under network pricing, charges were equalised across airports, and hence high-cost (smaller, lower traffic volume) airports were cross-subsidised by larger, low cost ports.

### 5.2.2 IMPACTS OF THE CURRENT APPROACH

Location-specific pricing plays an important role in encouraging economic efficiency, as well as ensuring appropriate incentives for investment. To the extent that the actual cost of providing services such as ARFF are higher at regional airports, then the charges levied for these services should reflect this. In other words, location-specific pricing, insofar as it results in cost-reflective pricing, is efficiency-enhancing from an economy-wide perspective, sending appropriate signals to producers and consumers about their production and consumption decisions. Furthermore, by ensuring cost-reflective pricing, not only is efficiency, and hence the allocation of resources, enhanced, but the appropriate incentives are given to providers about the optimal level of investment.

Despite the strong economic rationale for location-specific pricing, it is not without its drawbacks – especially as far as regional airports are concerned. As noted above, the economies of scale generated by traffic volumes mean that per-passenger charges for Airservices Australia services at major gateways are relatively lower than regional airports. This places regional airports at a competitive disadvantage when competing for international flights, which, at the margin, can be highly sensitive to airport charges - particularly in the current cost-focused environment. Again, passenger volume is by no means the sole determinant of differentials across airports, however it is an important factor.

As Table 5.1 indicates, the Airservices Australia charges – shown here for an Airbus A330, ex-Singapore – vary considerably from location to location. While en-route charges are a function of route distance (as well as aircraft weight), differences in terminal navigation and ARFF charges are affected by location-specific factors. The impact of this pricing model, between Cairns and Brisbane, for example, is around $4.55 in terminal navigation and $1.90 in ARFF charges, per passenger. In the case of an A332, this totals about $1,400 per flight (assuming standard fit-out (303 seats) and a load factor of 75%). These figures are especially significant in the case of LCCs.

**TABLE 5.1: INDICATIVE AIRSERVICES AUSTRALIA CHARGES, AIRBUS A332, EX-SINGAPORE, 2007**

| | Terminal Navigation Charge | ARFF Charge | En route Charge | Meteorological Service Charge | Total charges |
|---|---|---|---|---|---|
| Adelaide | $10.16 | $8.24 | $9.80 | $0.48 | **$28.69** |
| Brisbane | $5.18 | $2.31 | $9.75 | $0.48 | **$17.73** |
| Cairns | $9.73 | $4.21 | $5.54 | $0.27 | **$19.76** |
| Darwin | $2.38 | $13.32 | $1.41 | $0.07 | **$17.18** |
| Gold Coast | $9.62 | $3.32 | $9.33 | $0.46 | **$22.72** |
| Melbourne | $4.33 | $1.97 | $10.20 | $0.50 | **$17.01** |
| Perth | $7.67 | $2.70 | $6.13 | $0.30 | **$16.80** |
| Sydney | $4.95 | $1.80 | $10.82 | $0.53 | **$18.09** |

Source: Access Economics based on ASA charges data

Charges per arriving passenger

### 5.2.3 CONSIDERATIONS FOR REGIONAL AIRPORT PRICING

The primary objective of pricing should be economic efficiency. Price signals send important messages to consumers and producers about their market decisions, and are hence key determinants of the allocation of resources in the economy. It is generally accepted that, in regulated industries, seeking to replicate the prices generated by competitive markets is the first-best method for determining pricing.

If efficiency were *the only* consideration, then cost-reflective pricing (i.e. possibly akin to a location-specific model, but possibly with more transparency about how costs are determined) would be optimal.

However, in practice, government may have other objectives which it seeks to preserve or even pursue – simplicity, equity or regional development objectives, for example. If equity *is* a consideration of government in the context of international aviation, or there is a desire to encourage the dispersion of international visitors to regional areas, then alternative pricing models may be appropriate.

The pursuit of regional development objectives may require regional airports to be able to compete on a level playing field with major gateways. This however is a necessary, but not sufficient, condition for the dispersion of international visitors and the achievement of regional development objectives.

### 5.2.4 POLICY IMPLICATIONS

#### Pricing

Economic efficiency supports location-specific, cost-reflective pricing. However, equity or regional development considerations may suggest pricing more akin to a 'network pricing' model (or targeted subsidies to regional ports).

If airport charges are not to pose an impediment to regional airports competing with capital city hubs for international flights, then a model that does not produce significant price differentials between regional airports and major gateways is required. This is not the result of concentrating on economic efficiency however.

Ultimately, attempting to use a single tool (price) to achieve multiple objectives (efficiency and regional development), will be ineffective, and potentially detrimental. A possible policy solution to this impasse, should Government seek to pursue multiple objectives, therefore requires a multi-instrument approach. First, maximise efficiency by allowing price signals to function as effectively as possible through a location-specific pricing model. Second, achieve a more competitive pricing structure for regional airports, through a Budget-transparent direct subsidies to airlines.

The economy-wide modelling below (Section 6) analyses the economy-wide impacts of such an approach.

### Efficiency

Governments must seek to ensure that efficiency in the delivery of air services is optimised – for the industry's sake in general, and for regional airports' sake specifically. In the current cost environment, this is becoming increasingly critical. This means encouraging competition where contestability is likely to be efficiency-enhancing and creating the appropriate regulatory incentives elsewhere.

Current Government policy is that, where feasible, contestable supply of ARFF services should be introduced. Despite this, there is little evidence that competition has developed. Though discussions with airports indicated alternative providers had been considered - including self-provision – ASA remains the primary provider of ARFF service at Australian airports. It is unclear to what extent this outcome is cause for concern. If ASA is indeed the least-cost provider of these services, then it may in fact be welfare-enhancing that they are the sole provider. At any rate, Government must create an environment conducive to the development of efficiency-enhancing competition - paying particular attention to the impacts of pricing – and leave it to the market to determine whether competition develops.

In sum, Government should continue to drive efficiencies in the provision of ASA services – these will benefit the industry generally, and regional airports specifically.

## 5.3 BORDER CONTROL

The costs of border control – customs, immigration and quarantine (CIQ) – are recovered via a per-passenger charge on all outgoing international passengers, the Passenger Movement Charge (PMC). The charge is collected by airlines from their passengers and remitted to the Commonwealth Government where it is pooled into the Consolidated Revenue Fund (CRF). While the PMC is framed as a cost-recovery tool, it is widely acknowledged, including by Government itself, that the PMC significantly over-recovers the costs of CIQ (and the other costs it is purported to recover such as the cost of issuing visas). In effect, it is part cost recovery, part tax.

The PMC has increased numerous times since its introduction in 1995[2], increasing in 1999, 2001 and most recently, in this year's 2008 Federal Budget, by $9 from $38 to $47 – an increase of 24% (see Table 5.2). Overall, since implementation in its present form, the PMC has increased 74% - on average, annually, by 4.4%.

[2] From 1978 to 1995 a Departure Tax was administered

**TABLE 5.2: PASSENGER MOVEMENT CHARGE, 1995 TO 2008**

| Year | Rate per pax | % increase |
|---|---|---|
| 1995-1998 | $27 | n/a |
| 1999-2001 | $30 | 11.1% |
| 2001-2008 | $38 | 26.7% |
| 2008 onward | $47 | 23.7% |

Source: Australian Parliamentary Library

### 5.3.1 APPROPRIATENESS OF THE CURRENT APPROACH

The rationale behind the PMC is misguided. It is asserted that under the principles of 'user pays' and/or 'beneficiary pays', it should be international passengers (Australians and visitors) who bear the cost of border control. But are international travellers genuinely the users of these services? Are they the beneficiaries of these services – customs, immigration, quarantine? In the case of Australian residents departing overseas, partially they are, but arguably no more so than any other Australian resident.[3] International travellers are even less so. In general, it is not travellers that benefit from border control, it is the Australian society as a whole. Travellers at best are a sub-set, or in some cases are insignificant beneficiaries.

In addition, the belief that the PMC is *entirely* a charge on foreigners is ill-conceived. Not only is the PMC borne by Australians travelling overseas, as well as foreigners departing Australia, but in the case of the latter, it is simply an additional charge which is factored into the overall cost of the travel package. It is not a cost borne fully by foreigners, it is a cost born by the Australian tourism industry through reduced tourism expenditure, and in the extreme, reduced tourism visitation. Given the increasingly competitive international tourism market, coupled with the range of other factors placing upward pressure on ticket prices and Australia's international competitiveness as a destination for the international tourist, the PMC is an unwarranted impost for the Australian tourism industry.

Furthermore, the impact of the PMC is felt disproportionately at regional airports, where the greater reliance on short-haul services (where the PMC, as a proportion of the total fare, is greater) and leisure-orientated travellers (who are relatively more sensitive to price) accentuate its impact.

### 5.3.2 POLICY ALTERNATIVES

Under the widely accepted principle of beneficiary pays, to which Government authorities, including the Productivity Commission, openly subscribe, there is a strong case for abolition of the PMC. Outgoing international travellers are not the users, nor the beneficiaries of CIQ (at least no more so than any other travelling Australians, and possibly less than certain industries such as agriculture) and they should not bear the costs of these services. To the extent that the PMC over-recovers the costs of CIQ – that is, actually taxes departing passengers – the case is even stronger. Under principles of optimal tax design, taxing foreign travellers, elements of whom are relatively price-responsive, ranks lowly as an efficient tax instrument. In general indirect taxes should neither tax business inputs nor exports.

[3] Indeed some industries, agriculture for example, may benefit more from quarantine than society as a whole.

Customs, immigration and quarantine are services which benefit society as a whole and the funding of these services should reflect this. There is a strong case for the costs of CIQ to be funded out of consolidated revenue.

Based on Access Economics analysis, it is estimated that the revenue foregone as a result of removing the PMC is $455 million in 2007-08, increasing over the forward estimates period to $694 million by 2011-12. This is based on the PMC remaining at its current level of $47 over this period, and with outgoing international passenger movements growing at the rate projected by the BITRE (BITRE, 2008).

**TABLE 5.3: ESTIMATED BUDGET IMPACTS OF REMOVING THE PMC[4], 2008-08 TO 2011-12**

| | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 |
|---|---|---|---|---|---|
| Outgoing international travellers | 11,966,500 | 12,718,000 | 13,373,500 | 14,060,500 | 14,773,000 |
| Estimated PMC revenue | $454,727,000 | $597,746,000 | $628,554,500 | $660,843,500 | $694,331,000 |

Source: Access Economics based on BITRE 2008

Note the PMC is also applied to passengers departing through ocean ports

The economy-wide impacts of removal of the PMC are analysed below in Section 6.

### 5.3.3 POLICY CONCLUSIONS

There is a strong case for abolishing the PMC and funding border control services out of consolidated revenue. To the extent that the PMC is over-recovering the cost of these services, thereby taxing outgoing international passengers, the case is strengthened. Passengers should not be forced to bear these costs. As airlines' operating costs in other areas necessitate further fare increases, the opportunity costs of continuing to levy the PMC, through reducing Australia's tourism exports, will grow.

## 5.4 SECURITY COSTS

Airport security has come under increasing scrutiny in recent years following a series of international security scares, including most notably the September 11 2001 attacks in the United States and the foiled London terror plot in August 2006. Following each of these incidents, security at Australian international airports has been stepped up, a prime example being the introduction of restrictions on the quantity of liquids, aerosols and gels permitted in a passenger's carry-on luggage, introduced following the London threat.

The Federal Government mandates the security standards that are required at international airports, prescribing, *inter alia,* baggage and passenger screening requirements, minimum security personnel and airport access restrictions. Airports are then responsible for meeting these requirements and incurring the costs of their provision - not only the ongoing cost, but also the capital expenditure, such as passenger and baggage screeners. These costs are then recovered from airlines through per-passenger charges, resulting ultimately, in them being born by passengers themselves.

While the safety of air travellers is paramount – indeed, ensuring the security and safety of its citizens is one of Government's most central roles – the imposition of mandated security

[4] Note the PMC is also applied to passengers departing through seaports. Estimates contained in the Table give consideration to air travel only and hence the including of sea travel would increase these estimates.

requirements at international airports places a heavy burden on airport operators, particularly at regional destinations.

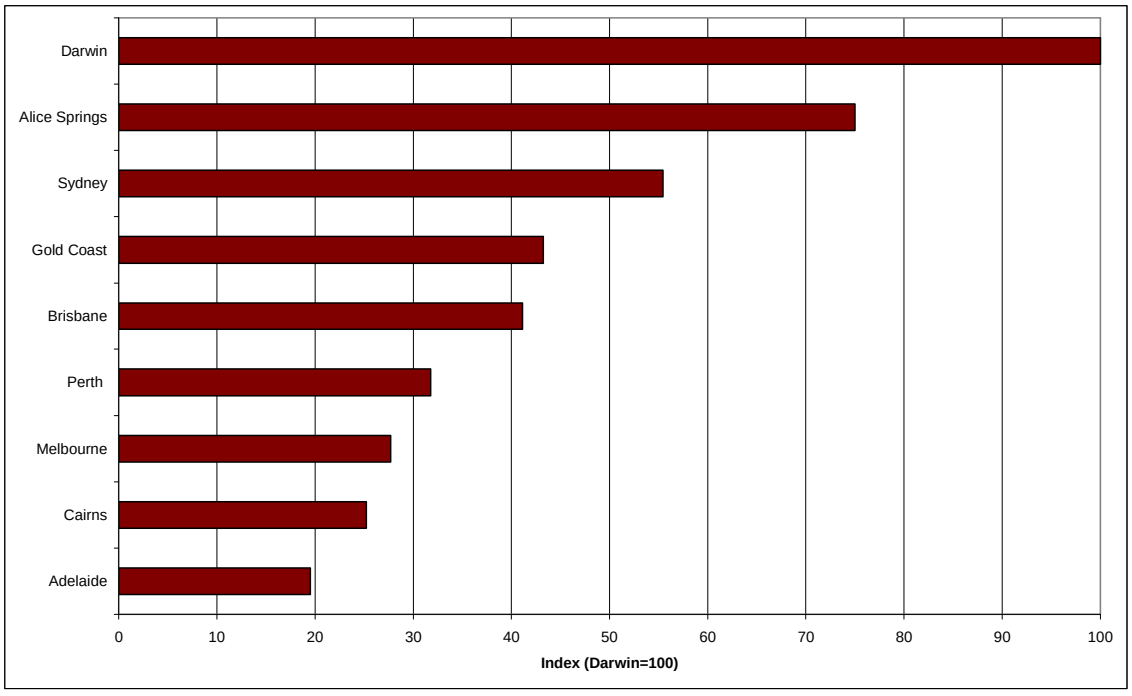
### 5.4.1 IMPACTS OF THE CURRENT APPROACH

In a similar fashion to many other airport costs, economies of scale are a major determinant of the impacts of the costs associated with mandated security requirements. Regional airports face a considerable disadvantage in this sense, with their reduced throughput providing a lower base over which to spread fixed costs such as electronic baggage screeners and minimum staffing requirements.

On a per passenger basis, security charges vary considerably from airport to airport (Figure 5.2). Costs at Darwin are by far the greatest, some 30% higher than the next airport, Alice Springs, and around five times greater than Adelaide, the airport with the lowest per passenger security costs. While there is definite correlation, it is evident from Figure 5.2 that there are factors other than passenger volumes – hours of airport operation and airport design being pivotal ones – which influence security costs.

As noted, the mechanism through which security costs are passed on varies among airports, with some recovering them through security charges *per se,* and others through a passenger service charge (along with landing fees, terminal fees etc.). Again, this can limit the direct comparability of headline security charges.

**FIGURE 5.2: PER PASSENGER SECURITY COSTS, SELECTED INTERNATIONAL AIRPORTS, 2007**




Source: Access Economics based on data provided by NT Airports

Estimates for an A320 aircraft.

### 5.4.2 POLICY CONCLUSIONS

Airport security is increasingly becoming national security. Passengers, while the proximate users of these services, and the part-beneficiaries thereof, are bearing the costs of a broader

national security campaign. Such charges are misdirected, and, particularly in light of the other cost pressures within the industry, are an undesirable impost on travellers. Accordingly, Government-mandated security costs should be funded by the Federal Government through consolidated revenue.

## 5.5 ROUTE ESTABLISHMENT RISK

For an airline seeking to establish a new international route, the risks associated with doing so are considerably higher at regional airports than at major gateways. The sources of this are twofold: (i) start-up costs and (ii) revenue uncertainty.

Both of these elements vary according to a variety of factors such as the characteristics of the specific route and the airline's business model, however for an 'all else constant' comparison, regional airports are typically more risky, from the airline's perspective, than major gateways.

On the cost side, it is more likely at a regional airport that the airline will have to incur greater fixed costs up front such as personnel, equipment and infrastructure, compared with at major gateways where existing facilities – either the airline's own or other airlines' – can be leveraged off. Again, this depends on the nature of the route and the commercial model of the airline – different business models mitigate this risk to a greater or lesser extent. Some carriers for example are more willing to contract-out their service requirements than others. Lower passenger volumes at regional airports will mean that any fixed costs incurred by the airline must be recovered over a smaller base, at higher, and hence less competitive, per-passenger rates.

The revenue profile on international routes to regional destinations is also often less favourable. Discussions with airlines indicate that slower take-up on regional routes can be a major source of route-establishment risk – while the costs are certain, the benefits are often less so.

Taken together, the higher per-passenger costs and reduced revenue certainty on new international routes to regional destinations, place these ports at a competitive disadvantage compared with major gateways.

### 5.5.1 POLICY IMPLICATIONS

In many respects, the higher start-up costs associated with regional airports, at least to the extent that they reflect the higher risks faced by international airlines on such routes, are not cause for concern. If the commercial risk is indeed greater at these ports, then airlines, as those who predominantly assume that risk, should bear its costs. This is critical in ensuring that appropriate incentives are faced.

However, if government seeks to facilitate the dispersion of international travellers through encouraging the provision of direct international services to regional airports, then the higher start-up risks on such routes should be potentially be addressed. If the Federal Government is to provide incentives for new routes to be established to regional destinations, then this should be facilitated through open, transparent, and accountable mechanisms. As discussed above, one possible avenue where a strong economic rationale exists, is marketing.

# 6. QUANTIFICATION OF POLICY OPTIONS

In order to quantify the economy-wide impacts of implementing selected reform options discussed in this report, and in particular their impacts on regional areas, general equilibrium modelling has been undertaken. The policy options considered concentrate on Australia's, particularly regional Australia's, ability to attract more international flights and passengers.

The first consideration in the analysis is the impact of lower passenger charges. Given the emergence of low cost carriers, and general price pressures placed on international airlines due to rising oil prices, it is generally recognised that on a global scale, the more expensive a particular region is, the more difficult it will be to attract and maintain international services. This is particularly true in the price sensitive leisure market (on which many regions depend).

The second consideration relates to regional development in Tropical North Queensland (TNQ). This analysis considers the economic impacts of establishing a new international route into TNQ, as an illustration of the potential flow on effects to the region.

## 6.1 MODELLING FRAMEWORK

The economy-wide quantitative analysis is carried out using Access Economics' in-house general equilibrium model, AE-RGEM (Access Economics' Regional General Equilibrium Model). Models such as AE-RGEM are a widely accepted tool for estimating the direct *and* indirect impacts of policy changes or other economic shocks.

The model is primarily based on input-output or social accounting matrices, as a means of describing how economies are linked through production, consumption, trade and investment flows. For example, the model considers:

- Direct linkages between industries and countries through purchases and sales of each other's goods and services; and
- Indirect linkages through mechanisms such as the collective competition for available resources, such as labour, that operates in an economy-wide or global context.

A more detailed discussion of the specifications of AE-RGEM can be found at Appendix B.

The base data of the model is derived from the Global Trade Analysis Project (GTAP) and the Queensland Treasury Office of Economic and Statistical Research. A four-region modelling framework was developed for this exercise. The regions specified include:

- Tropical North Queensland (TNQ) regional economy;
- the rest of Queensland (ROQ) economy (adding this region to TNQ gives the State economy);
- the rest of Australia (ROA) economy (adding this to TNQ and Rest of Queensland gives the national economy); and
- the rest of the world economy (the global economy).

TNQ serves to illustrate the impacts of the modelled reforms on a specific regional area. The regions and industries specified in AE-GEM are summarised in Table 6.1. The model contains a representation of tourism-reliant industries such as air transport, trade (accommodation, retail and restaurants) as well a recreation and other services.

**TABLE 6.1: REGIONS AND SECTORS IN GENERAL EQUILIBRIUM MODELLING**

| Regions | | Sectors | | |
|---|---|---|---|---|
| No. | Description | No. | Description | ABR. |
| 1 | Tropical North Queensland (TNQ) | 1 | Agriculture, Forestry and Fishing | AFF |
| 2 | Rest of Queensland (ROQ) | 2 | Coal, Oil and Gas | COG |
| 3 | Rest of Australia (ROA) | 3 | Other Minerals | OMN |
| 4 | Rest of The World (ROW) | 4 | Light Industry | L_I |
| | | 5 | Petroleum, Coal Products and Chemicals | PCC |
| | | 6 | Non-metallic Mineral Products | NMM |
| | | 7 | Metals and Metal Products | MMP |
| | | 8 | Machinery, Appliances and Equipment | MAE |
| | | 9 | Other Manufacturing | OME |
| | | 10 | Electricity, Gas and Water | EGW |
| | | 11 | Construction | CNS |
| | | 12 | Trade | TRD |
| | | 13 | Air Transport | ATP |
| | | 14 | Other Transport | OTP |
| | | 15 | Communication | CMN |
| | | 16 | Finance, Insurance and Business | FIB |
| | | 17 | Government, Defence, Health and Education | GHE |
| | | 18 | Recreation and Other Services | ROS |
| | | 19 | Dwellings | DWE |

Source: Access Economics

### 6.1.1 UNDERLYING PARAMETERS & REFERENCE CASE PROJECTIONS

The economy-wide modelling is underpinned by a range of parameters and projections relating to the operation of the aviation sector, the behaviour of travellers and the regional, state and national economy. This section briefly outlines key modelling assumptions.

#### 6.1.1.1 ECONOMIC AGGREGATES

Measuring the economic impact of the policy changes using a general equilibrium model such as AE-GEM requires a reference case projection against which to compare the changes. The reference case scenario in this case is based on a set of input assumptions regarding economic growth, labour force growth and population growth. Table 6.2 sets out these assumptions.

**TABLE 6.2: KEY MACROECONOMIC REFERENCE CASE INPUT ASSUMPTIONS, 2008-2020, ON AVERAGE (%)**

| | Real output | Labour supply | Employment | Population |
|---|---|---|---|---|
| Tropical North Queensland | 3.40 | 1.75 | 1.65 | 1.34 |
| Rest of Queensland | 3.91 | 2.26 | 2.16 | 2.05 |
| Rest of Australia | 3.16 | 1.37 | 1.41 | 1.20 |
| Rest of World | 2.86 | 1.11 | 1.11 | 1.11 |

Source: Access Economics

Population growth projections for TNQ are sourced from the Queensland Government Office of Economic and Statistical Research, while population projections for Rest of Queensland

and Rest of Australia are sourced from Access Economics' in-house demographic model, AE-DEM.

#### 6.1.1.2 THE CHARACTERISTICS OF INTERNATIONAL TRAVELLERS

### Composition of travellers

Data from Tourism Research Australia and the Australian Bureau of Statistics provide a snapshot of international travellers at Australian airports, including the purpose of their trip. Purpose of trip is critical to the analysis as different travellers behave in different ways – in particular, as discussed in greater detail below, leisure travellers tend to be more price responsive than either business travellers, or travellers visiting friend or relatives (VFR).

As Table 6.3, shows the composition of travellers varies markedly across airports. Cairns, being a major holiday destination, is predominantly leisure travellers (75%), with only a very small contingent of business travellers (3%). International arrivals at Brisbane are also mostly leisure travellers, with 65% of international arrivals travelling for this purpose, 19% for business, employment or education, and 16% for VFR. At other Australian airports, the mix is more balanced, with 49% of communing for leisure, 30% for business and 21% for VFR.

**TABLE 6.3: PRIMARY PURPOSE OF TRIP, INTERNATIONAL ARRIVALS, SELECTED AUSTRALIAN AIRPORTS**

| | Business, employment or education | Leisure | VFR |
|---|---|---|---|
| Cairns (TNQ entry point) | 3% | 75% | 22% |
| Brisbane (ROQ entry point) | 19% | 65% | 16% |
| Other airports (ROA entry point) | 30% | 49% | 21% |

Source: Access Economics based on Tourism Research Australia and ABS data

### Elasticity of demand

The own-price elasticity of demand is a measure of consumers' responsiveness to changes in price (in this case, airfares). It captures the percentage change in quantity demanded for a given change in the price of the good or service in question. Elasticities are important in the analysis for modelling how fare changes are likely to impact on traveller behaviour. For example, Table 6.4 shows that the most price responsive travellers are foreigners, travelling to Australia for leisure purposes. The elasticity estimate of -1.54 implies that for every one percent rise in airfares, demand from this group of travellers will fall by just over 1.5%.

**TABLE 6.4: ESTIMATED ELASTICITIES, BY PRIMARY PURPOSE OF TRAVEL**

| | Business, employment, education | Leisure | VFR |
|---|---|---|---|
| Foreign travellers to Aust | -0.33 | -1.54 | -0.72 |
| Aust residents travelling overseas | -0.22 | -0.65 | -0.81 |

Access Economics based on BTRE elasticities database

Combining these elasticities with the purpose of trip information in Table 6.3 allows for the derivation of composite elasticities for each key port of entry. These parameters, shown in Table 6.5 below are key drivers of the location-specific impacts resulting from changes in the

price of air travel. Overall, of the airport groups considered, travellers to Cairns are the most responsive to price. For Cairns, a 1% rise in price results in a 1.32% fall in the quantity demanded. The estimated composite elasticity for Brisbane is -1.18, while for other Australian airports, it is -1.01.

**TABLE 6.5: COMPOSITE ELASTICITIES, SELECTED PORTS OF ENTRY**

| Airport | Elasticity |
|---|---|
| Cairns (TNQ entry point) | -1.32 |
| Brisbane (ROQ entry point) | -1.18 |
| Other airports (ROA entry point) | -1.01 |

Access Economics

## Net tourism exports

Based on Overseas Arrivals and Departure data, it is assumed that 66% of all international passenger movements at Cairns relate to travel by foreigners and 34% to travel by Australian residents. In terms of economic accounting, an international visitor to Australia is regarded as a tourism export and an Australian resident travelling overseas, a tourism import. Therefore, for every 100 international passenger movements, 64 relate to tourism exports and 36 to tourism imports for the TNQ region. Or, in net terms, every 100 international passenger movements are associated with 28 net tourism movements, or 14 net tourism exports.

This is a pivotal parameter in the modelling as it captures the offsetting impacts that occur for a given change in the air travel market, ensuring that the benefits are not overstated. That is, certain reforms may increase both inbound and outbound tourism, and it is imperative that the changes in travel patterns of Australians (i.e. potentially less domestic travel and more international travel) are netted out of the changes in international tourism.

## Visitor expenditure

The average per-visitor expenditure for international visitors to Australia in 2007 was $2,921 (BITRE), however this varied markedly according to point of entry. Assuming that per-day expenditure is, on average, constant, then the per-visitor expenditure for different points of entry can be estimated on the basis of average length of stay (ALOS) according to entry point. The ALOS for all visitors to Australia is 19.8 days. For a visitor whose port of entry is Brisbane, this figure is 15.9, while for Cairns, it is 11.9. Adjusting per-visitor expenditure to reflect this, results in estimated per-visitor expenditure for Brisbane and Cairns entrants of $2,346 and $1,667, respectively.

Naturally however, not all of this expenditure occurs within the area that the passenger arrives. For example, a passenger arriving at Cairns will spend some money in TNQ, as well as some in ROQ and ROA. To determine the pattern of expenditure based on point of entry to Australia, and hence the distribution of benefits accruing from additional tourism, visitor nights data supplied by Tourism Queensland was used.

Tourism expenditure across different regions was determined by the proportion of total visitor nights that the average tourist, entering through Cairns, Brisbane and other Australia airports, spends in each region. Implicitly underlying this approach is the assumption that the per-visitor nights spend for an international tourist is constant, regardless of where that nights were spent. The data are summarised in Table 6.6.

**TABLE 6.6: VISITOR NIGHTS BY PORT OF ENTRY TO AUSTRALIA ('000 AND %)**

| | Cairns | | Brisbane | | Other airports | | All Australian airports | |
|---|---|---|---|---|---|---|---|---|
| **TNQ** | **9,402** | **53.5%** | **3,487** | **3.6%** | **12,558** | **2.9%** | **27,136** | **4.3%** |
| *QLD* | *12,615* | *71.8%* | *76,940* | *79.8%* | *45,167* | *10.5%* | *143,493* | *22.6%* |
| **ROQ** | **3,213** | **18.3%** | **73,452** | **76.2%** | **32,609** | **7.6%** | **116,357** | **18.3%** |
| *Australia* | *17,577* | | *96,361* | | *431,163* | | *636,248* | |
| **ROA** | **4,962** | **28.2%** | **19,422** | **20.2%** | **385,996** | **89.5%** | **492,755** | **77.4%** |

Source: Access Economics based on data supplied by Tourism QLD.
Totals may not sum due to rounding.

## 6.2 MODELLING RESULTS

### 6.2.1 REMOVAL OF THE PASSENGER MOVEMENT CHARGE

#### Implications of the reform

Access Economics has modelled the impact of abolishing the PMC and replacing it with Federal Government consolidated revenue. This reform results in additional expenditure by those travellers already visiting Australia, induced visitation as a result of reduced travel cost to Australia and a loss of Government revenue.

Assuming a fixed travel budget for each traveller, the direct effect of abolishing the PMC is to increase per-visitor expenditure in Australia by $47 in 2008. This expenditure is distributed throughout the regions based on the port of entry visitor nights parameters outlined above.

In addition, the impact of abolishing the PMC is to reduce the return ticket price faced by international travellers (Australians and foreigners) by $47 in 2008. In line with the average growth in the PMC over the last decade, this figure is assumed to grow by 4.4% annually.

The impacts of the $47 fare reduction vary between locations, reflecting the average international fare at each region. In percentage terms, the impact is proportionally greater in Cairns - where the average international fare is lower - than in either Brisbane or other Australian airports. Furthermore, the impact of this fare reduction on passenger behaviour varies across regions, in line with the elasticities discussed above. Note also, that the abolition of the PMC increases the propensity of Australians to travel overseas – this is captured through the use of the net exports parameter discussed above.

Given the impact on passenger numbers in each region and the composition of travellers, the impact of this policy change on Australia's tourism exports can be calculated. It is estimated that in 2008, the abolition of the PMC directly results in an additional net tourism exports (i.e. inbound less outbound) of 10,100 in TNQ, 46,000 in ROQ and 158,000 in ROA – 214,000 in total. This equates to an addition $587 million in tourism expenditure across Australia, including $17 million in TNQ alone.

The loss of Commonwealth Government revenue associated with this reform is calculated as the PMC multiplied by the total projected outgoing passengers, as forecast by the BTRE. This equates to $600 million in 2008, increasing to $727 million by 2013. In this scenario, it is assumed that the government makes up for this shortfall by a general rise in taxation. The means that the economic impacts described below are net of any government efforts to fund the PMC.

### Economy-wide results

The economy-wide impacts of removing the PMC and replacing it with Federal Government revenue are shown in Table 6.7. It is assumed that the policy is implemented in 2008. The results are then determined 5 years after the reform, relative to the baseline in 2013. In percentage terms, the impacts are greatest in TNQ, however as the PMC applies to all outgoing passengers, there are significant positive impacts across all regions.

In TNQ, real gross regional product (GRP) is projected to increase by 0.49% or $65 million relative to the reference case, while real consumption, a commonly used measure for economic welfare, increases by 0.36% or $27 million. Removing the PMC also results in significant employment gains, with 1,360 additional employment positions in TNQ in 2013.

The results for ROQ and ROA show that gross state product (GSP), and gross domestic product (GDP) increase by $168 million and $890 million, while economic welfare (real consumption) is increased by $99 million in ROQ and $823 million in ROA, by 2013. Removing the PMC also produces sizeable employment effects across the nation, increasing employment by 7,060 in ROQ and 16,640 in ROA.

The proportional increase in TNQ's aggregate output (GRP) and employment is considerably higher than for the ROQ and ROA. This is for two reasons. First, travellers into TNQ (Cairns) are relatively more price responsive and so any Australia-wide price response is likely to have a greater proportional affect on travellers into that region. Second, the TNQ economy is relatively more dependent on tourism than other forms of production. Therefore, any additional tourism expenditure is likely to have a relatively larger impact on the TNQ economy than the Australian average.

**TABLE 6.7: KEY MACROECONOMIC RESULTS, POLICY SCENARIO VS BASELINE, 2013**

| | TNQ | ROQ | ROA |
|---|---|---|---|
| **% DEVIATION BASELINE** | | | |
| Real GRP | 0.49 | 0.15 | 0.18 |
| Real consumption | 0.36 | 0.16 | 0.28 |
| Real investment | 4.39 | 1.93 | 1.54 |
| Employment (persons) | 0.52 | 0.32 | 0.18 |
| **$M DEVIATION FROM BASELINE** | | | |
| Real GRP | 65 | 168 | 890 |
| Real consumption | 27 | 99 | 823 |
| Real investment | 130 | 500 | 1,723 |
| Employment (persons) | 1,359 | 7,060 | 16,640 |

## 6.2.2 REALIGNMENT OF AIRSERVICES AUSTRALIA CHARGES

### Implications of the reform

Modelling the impact of realigning Airservices Australia charges in a fashion that does not leave regional airports at a competitive disadvantage has been illustrated using the example of Cairns airport and Brisbane airport. The scenario modelled is not one of network pricing *per se,* rather, it is a scenario that analyses the implications of alleviating the price differential in Airservices Australia charges between Cairns and Brisbane, through a reduction in charges at Cairns.

How, in practice, Government might eliminate this differential is uncertain, however for the purposes of completeness, it is assumed in the modelling occur through a Government subsidy.

The mechanisms through which the realignment of Airservices Australia charges transmits through the model are similar in fashion to the PMC. However, as the formal incidence of Airservices Australia charges is born by airlines, an additional assumption is required regarding the extent to which these charges are passed through to passengers. Given the competitive nature of the airline industry at present, it is assumed cost savings accruing on Cairns services as a result of the realignment are fully passed through to consumers. That is, the reduction in Airservices Australia charges on flights to and from Cairns is fully reflected in a reduction in ticket prices on these routes.

Accordingly, under this scenario, the cost of international air travel falls by $12.90 for a return trip to/from Cairns. This has both a direct effect of increasing the per-passenger expenditure of existing visitors to Cairns and an indirect effect of inducing addition visitation through lower air travel prices. This second effect is estimated to result additional net tourism exports to the TNQ region of 2,800 persons in 2008.

Critically, this analysis does not take into account the impacts that would result should the effects of this policy change be sufficient to alter airlines' decision making and result in the introduction of additional serves on Cairns routes. The cost-benefit analysis would have to be marginal for this to occur, however, even *if* sufficient data were available to model such impacts, it would be extremely difficult to determine the response of airlines.

## Economy-wide results

The estimated impacts of realigning the Airservices Australia charges between Cairns and Brisbane are reported in Table 6.8, below. This reform predominantly affects TNQ, with the impacts on ROQ only reflecting spill-overs from additional passengers on Cairns routes. Accordingly, in 2013, real output in TNQ increases by 0.06% or $7.5 million, real consumption by 0.03% or $2.5 million and employment by 0.03% or 82 persons.

The flow-on benefits to the ROQ results in gross state product (GSP) increasing by a modest $7.9 million, real consumption $13.2 million and employment by 34 persons.

**TABLE 6.8: KEY MACROECONOMIC RESULTS, POLICY SCENARIO VS BASELINE, 2013**

| | TNQ | ROQ |
|---|---|---|
| **% DEVIATION BASELINE** | | |
| Real output | 0.06 | 0.01 |
| Real consumption | 0.03 | 0.02 |
| Real investment | 0.29 | 0.03 |
| Employment (persons) | 0.03 | 0.00 |
| **$M DEVIATION FROM BASELINE** | | |
| Real output | 7.5 | 7.9 |
| Real consumption | 2.5 | 13.2 |
| Real investment | 8.6 | 6.5 |
| Employment (persons) | 82 | 34 |

### 6.2.3 GOVERNMENT FUNDING OF SECURITY COSTS

#### Implications of the reform

Airport security costs are a major source of competitive disadvantage for regional airports, where passenger volumes are lower, and as a result, per-passenger charges higher. Due to the limited amount of data which is available on the true magnitude of airport security costs, coupled with the fact that even where it is available, significant differences in accounting practices limit comparability, accurately modelling, across all airports, the impacts of funding airport security through consolidated Government revenue, was not possible.

As such, this scenario has been analysed in the context of TNQ only, with the effects of funding airport security costs at Cairns out of consolidated Government revenue considered. The transmission mechanisms under this scenario are similar to the abolition of the PMC, although smaller in magnitude, and confined to flights to Cairns. Again, the modelling assumes that the security cost savings are fully passed through to airlines.

#### Economy-wide results

Reforming airport security charges at Cairns Airport brings modest benefits to the TNQ region. Real output increases by $4.6 million, economic welfare (real consumption) by $1.6 million and employment by 54 persons.

**TABLE 6.9: KEY MACROECONOMIC RESULTS, POLICY SCENARIO VS BASELINE, 2013**

| | TROPICAL NORTH QUEENSLAND |
|---|---|
| **% DEVIATION BASELINE** | |
| Real output | 0.03 |
| Real consumption | 0.02 |
| Real investment | 0.18 |
| Employment (persons) | 0.02 |
| **$M DEVIATION FROM BASELINE** | |
| Real output | 4.6 |
| Real consumption | 1.6 |
| Real investment | 5.4 |
| Employment (persons) | 54 |

### 6.2.4 AN ADDITIONAL DIRECT INTERNATIONAL ROUTE

In addition to the reforms to airport-related costs, a further scenario has been modelled quantifying the benefits of a new carrier initiating services to Cairns. The intention of this scenario is to estimate, in an indicative sense, the possible impacts of any policy change or Government program that resulted in an additional carrier being attracted to a regional airport such as Cairns.

Given the absence of direct international flights from mainland China to Queensland and the efforts being undertaken by a number of airports to attract Chinese carriers, the hypothetical new route modelled is Shanghai-Cairns. It is assumed that the route would be serviced by an Airbus A330, as per Shanghai-Melbourne, with a seating capacity of 335 passengers. Further, it is assumed that the service commences with four weekly flights and that capacity ramps up over the first four years to the average load (254 passengers or 76%). Per-visitor expenditure in 2008 is modelled based on the average expenditure of a Chinese visitor to Australia, $4052, adjusted to take account of the ALOS for visitors who enter Australia through Cairns.

Additional benefits such as increases in the efficiency of the airport which result in lower per-passenger charges and additional flow-on benefits are not captured in the modelling.

#### Economy-wide results

The economy-wide modelling shows that the estimated impacts of such a new carrier servicing Cairns – under the parameters assumed here – results in considerable benefits to the TNQ region, with positive spillovers to ROQ. By 2013, real output in TNQ increase by 0.27% or $36.5 million, real consumption by 0.18% or $13.2 million and employment by 521 persons.

**TABLE 6.10: KEY MACROECONOMIC RESULTS, POLICY SCENARIO VS BASELINE, 2013**

| | TNQ | ROQ |
|---|---|---|
| **% DEVIATION BASELINE** | | |
| Real output | 0.27 | 0.01 |
| Real consumption | 0.18 | 0.02 |
| Real investment | 1.69 | 0.03 |
| Employment (persons) | 0.20 | 0.01 |
| **$M DEVIATION FROM BASELINE** | | |
| Real output | 36.5 | 7.6 |
| Real consumption | 13.2 | 10.1 |
| Real investment | 50.0 | 7.6 |
| Employment (persons) | 521 | 192 |

## 6.3 SUMMARY OF MODELLING RESULTS

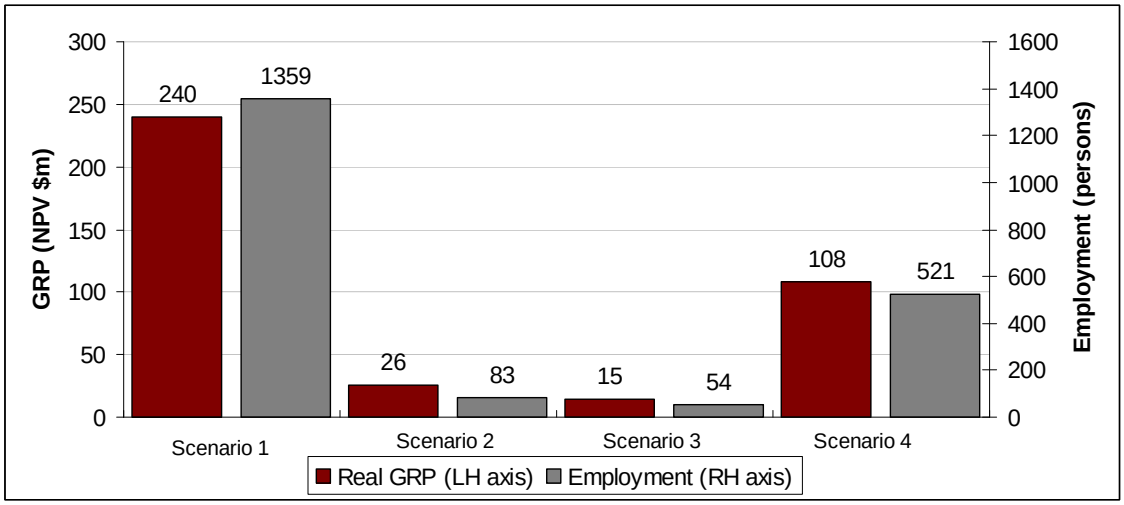
Overall, there are several key messages evident from the modelling which has been undertaken here.

First, the removal of the PMC results in significant gains to the Australian economy, increasing GDP by more than $1 billion and employment by more than 25,000 persons by 2013. More significantly however, in the context of this report, the impact of this reform is greater at regional locations – demonstrated here with the example of Cairns airport and the TNQ region – where the average airfare is lower and where travellers are typically more price-responsive. In this region alone, the net present value of the gross regional product generated over the next five years is estimated at $240 million and the employment gains 1,359 persons.

Eliminating the competitive disadvantage posed by Airservices Australia cost differentials and per-passenger security costs at Cairns airport produces non-negligible gains to TNQ, increasing GRP, in NPV terms, by $26 million and $15 million respectively (Figure 6.1). However the greater benefits of such reforms are potentially not in these marginal gains, but in the benefits which would flow to regions such as TNQ should these reforms be sufficient to entice an additional international carrier to service such a route directly.

The impacts of an additional direct service on a regional route – as a result of the reforms outlined in this paper or otherwise - are illustrated here through the entrance of a hypothetical new carrier flying Shanghai-Cairns four times weekly. In this case, the potential benefits of increasing competitiveness at regional airports are considerably greater. Real output in TNQ is projected to expand by $108 million, in NPV terms, over the next five years, while by 2013, employment in TNQ is estimated 521 persons greater.

FIGURE 6.1: SUMMARY OF RESULTS FOR TNQ, REAL GRP AND EMPLOYMENT




## 6.4 LIMITATIONS OF THE ANALYSIS

### Airline response

The modelling assumes that only passengers respond to the modelled policy changes. It takes no account of the fact that reduced charges may result in airlines re-structuring their international schedules. If airlines were to respond with additional capacity on international routes, particularly to regional airports, the benefits of these reforms would in fact be greater than those estimated here.

### Airport efficiency

As noted, the modelling does not take account of the additional benefits that may flow from the increase in airport efficiency that results from these reforms. Were the changes outlined here to result in greater efficiencies at airport which were passed onto airlines, and ultimately passengers, the benefits would again be greater than the results here indicate.

# 7. REFERENCES

Access Economics 2008, *Measuring the Economic & Financial Value of the Great Barrier Reef Marine Park, 2006-07,* March, Canberra

Access Economics 2006, *The Economic Impact of Reforming Australian Aviation Policy*, November, Canberra

Access Economics 2001, *International Aviation Access and Regional Tourism and Business: An Analysis of Current and Emerging Problems and Recommended Policy Responses*, June, Canberra

Airservices Australia 2005, *Aviation Rescue and Fire Fighting Services: options for charging*, *Options Paper,* Canberra.

Albanese A 2008, *Media Release: Historic Australia-United States 'Open Skies' Aviation Agreement Reached*, 15 February, Canberra

Anderson J 2000, *Media Release: Australia-New Zealand Open Skies Agreement*, 20 November, Canberra

Australian Bureau of Statistics 2008a, *Tourism Satellite Account 2006-07*, cat. no. 5249.0, ABS, April, Canberra

Australian Bureau of Statistics 2008b, *Year Book Australia*, cat. no. 1301.0, ABS, February, Canberra

Australian Bureau of Statistics 2008c, *Regional Population Growth, Australia, 2006-07*, cat. no. 3218.0, ABS, March, Canberra

Bureau of Infrastructure, Transport and Regional Economics (BITRE) 2008 "Air passenger movements through capital city airports to 2025-26" *Working Paper 72,* Canberra, Australia.

Bureau of Infrastructure, Transport and Regional Economics (BITRE) 2008a, *International Scheduled Traffic to/from Australia*, BTRE, March, Canberra

Bureau of Transport and Regional Economics (BTRE) 2000a, *Air Transport Statistics: International Scheduled Air Transport 1999-2000*, BTRE, December, Canberra

Bureau of Transport and Regional Economics (BTRE) 2001a, *Air Transport Statistics: International Scheduled Air Transport 2000-01*, BTRE, November, Canberra

Bureau of Transport and Regional Economics (BTRE) 2004a, *Air Transport Statistics: International Airlines 2003-04*, BTRE, October, Canberra

Bureau of Transport and Regional Economics (BTRE) 2007a, *Aviation Statistics: International Scheduled Air Transport 2006-07*, BTRE, November, Canberra

Bureau of Transport and Regional Economics (BTRE) 2007b, *Aviation Statistics: Australian Domestic Airline Activity 2006-07*, BTRE, October, Canberra

Bureau of Transport and Regional Economics (BTRE) 2007c, *Airport Traffic Data 1997-98 to 2006-07*, BTRE, December, Canberra

Bureau of Infrastructure, Transport and Regional Economics (BITRE) 2008, *Air passenger movements through capital city airports to 2025-26*, Working Paper 72, Canberra.

Cairns Post 2008, *Funds to fight flight cuts*, June 11, Cairns

Commonwealth of Australia 1976, *Air Transport Agreement between the Government of Australia and the Council of Ministers to the Socialist Republic of the Union of Burma*, Australian Government Publishing Service, September, Canberra

Commonwealth of Australia 1993, *Agreement between the Government of Australia and the Swiss Federal Council relating to Air Services*, Australian Government Publishing Service, February, Canberra

Courier Mail 2008, *Flight plan 'on the cheap'*, June 11, Brisbane

Cummings Economics 2008, *Impact of changes to Qantas/Jetstar services to Cains on the Cairns Regional Economy,* report for Cairns Ports, June, Cairns.

Department of Infrastructure, Transport, Regional Development and Local Government 2008a, *Northern Summer 2008: Passenger Services*, DITR, April, Canberra

Department of Infrastructure, Transport, Regional Development and Local Government 2001a, *Northern Summer 2001: Passenger Services*, DITR, April, Canberra

Productivity Commission 2002, *Price Regulation of Airport Services*, Report no. 19, January, Canberra

Productivity Commission 2006, *Review of Price Regulation of Airport Services*, Report no. 40, December, Canberra

Qantas 2008, *Media Release: Qantas Announces International Schedule Changes*, 5 June, Sydney

Tourism Queensland 2007a, *China Market Update: Year ended December 2006*, Brisbane

Tourism Queensland 2007b, *Tropical North Queensland Region: Year ended June 2007*, Brisbane

Tourism Research Australia (TRA) 2008a, *Quarterly Results of the International Visitor Survey, December 2007*, Tourism Australia, March, Canberra

Tourism Research Australia (TRA) 2008b, *Quarterly Results of the International Visitor Survey, March 2008*, Tourism Australia, June, Canberra

Tourism Research Australia (TRA) (2007) "Forecast*" Issue 1,* Canberra.

# APPENDIX A: LIST OF CONSULTATIONS

**Advance Cairns**: Russell Beer, Chairman

**Darwin Airport**: Jim Parashos, Aviation Development Director

**Gold Coast Airport**: Paul Donovan, Chief Operation Officer

**Jetstar Airways**: Alex Featherstone,Manager, Regulatory Affairs & Aviation Charges

**Jetstar Airways**: Unni Menon, General Manager, Govt. & Commercial Partnerships

**Qantas Airways**: Samantha McGivern, General Manager, Airports Commercial

**Queensland Regional Development**: John Strano, Executive Director Manufacturing Industries & Investment

**Tiger Airways**: Luke Lovegrove, Business Development Manager

**Tourism Tropical North QLD**: David Rose, Director Strategy & New Markets

**Tourism Tropical North QLD**: Rodger Robertson, Director

**Tourism Queensland**: Andrew Parle, Director Aviation

**V Australia**: David Hanlon, Manager Ground Operations

# APPENDIX B: AE-RGEM TECHNICAL NOTE

AE-RGEM is a large scale, dynamic, multi-state/region, multi-commodity computable general equilibrium model of the world economy. The model allows policy analysis in a single, robust, integrated economic framework. This model projects changes in macroeconomic aggregates such as GDP (or GSP at the State level), employment, export volumes, investment and private consumption. At the sectoral level, detailed results such as output, exports, imports and employment are also produced.

The model is based upon a set of key underlying relationships between the various *components* of the model, each which represent a different group of agents in the economy. These relationships are solved simultaneously, and so there is no logical start or end point for describing how the model actually works. Figure 1 shows the key components of the model for an individual region (say, Queensland). The components include a representative household, producers, investors and international (or linkages with the other regions in the model, including other Australian States and foreign regions). Below is a description of each component of the model and key linkages between components. Some additional, somewhat technical, detail is also provided.

AE-RGEM is based on a substantial body of accepted microeconomic theory. Key assumptions underpinning the model are:

- The model contains a 'regional consumer' that receives all income from factor payments (labour, capital, land and natural resources), taxes and net foreign income from borrowing (lending).
- Income is allocated across household consumption, government consumption and savings so as to maximise a Cobb-Douglas (C-D) utility function.
- Household consumption for composite goods is determined by minimising expenditure via a CDE (Constant Differences of Elasticities) expenditure function. For most regions, households can source consumption goods only from domestic and imported sources. In the Australian regions, households can also source goods from interstate. In all cases, the choice of commodities by source is determined by a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function.
- Government consumption for composite goods, and goods from different sources (domestic, imported and interstate), is determined by maximising utility via a C-D utility function.
- All savings generated in each region are used to purchase bonds whose price movements reflect movements in the price of creating capital.
- Producers supply goods by combining aggregate intermediate inputs and primary factors in fixed proportions (the Leontief assumption). Composite intermediate inputs are also combined in fixed proportions, whereas individual primary factors are combined using a CES production function.
- Producers are cost minimisers, and in doing so choose between domestic, imported and interstate intermediate inputs via a CRESH production function.

- The model contains a more detailed treatment of the electricity sector that is based on the 'technology bundle' approach for general equilibrium modelling developed by ABARE (1996).[5]

- The supply of labour is positively influenced by movements in the real wage rate governed by an elasticity of supply (assumed to be 0.2).
- Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. A global investor ranks countries as investment destinations based on two factors: global investment and rates of return in a given region compared with global rates of return. Once the aggregate investment has been determined for Australia, aggregate investment in each Australian sub-region is determined by an Australian investor based on: Australian investment and rates of return in a given sub-region compared with the national rate of return.
- Once aggregate investment is determined in each region, the regional investor constructs capital goods by combining composite investment goods in fixed proportions, and minimises costs by choosing between domestic, imported and interstate sources for these goods via a CRESH production function.
- Prices are determined via market-clearing conditions that require sectoral output (supply) to equal the amount sold (demand) to final users (households and government), intermediate users (firms and investors), foreigners (international exports), and other Australian regions (interstate exports).
- For internationally-traded goods (imports and exports), the Armington assumption is applied whereby the same goods produced in different countries are treated as imperfect substitutes. But in relative terms imported goods from different regions are treated as closer substitutes than domestically-produced goods and imported composites. Goods traded interstate within the Australian regions are assumed to be closer substitutes again.
- The model accounts for greenhouse gas emissions from fossil fuel combustion. Taxes can be applied to emissions, which are converted to good-specific sales taxes that impact on demand. Emission quotas can be set by region and these can be traded, at a value equal to the carbon tax avoided, where a region's emissions fall below or exceed their quota.

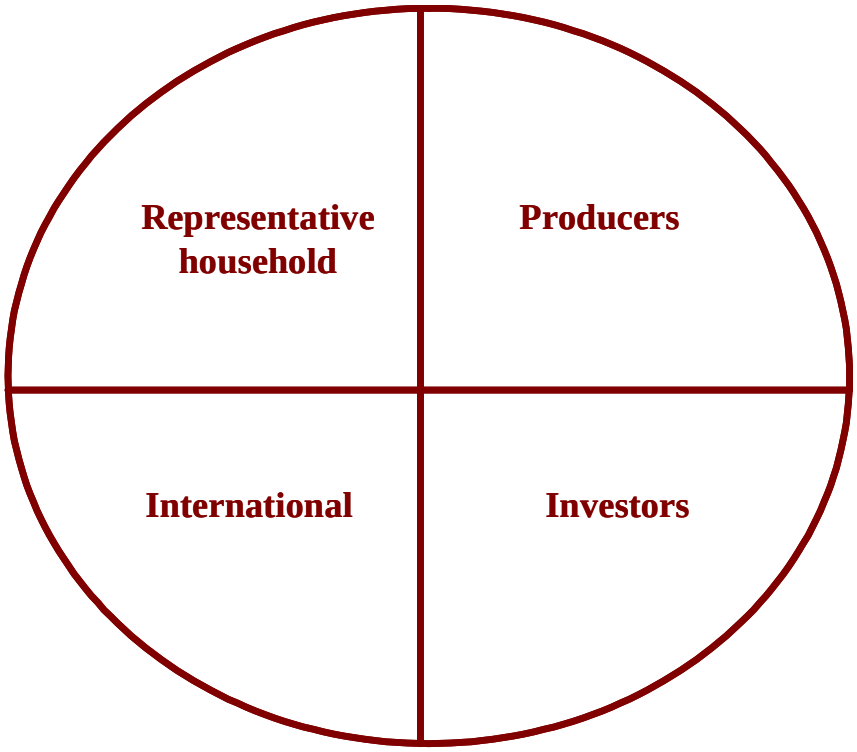
## THE REPRESENTATIVE HOUSEHOLD

Each region in the model has a so-called *representative household* that receives and spends all income. The *representative household* allocates income across three different *expenditure* areas: private household consumption; government consumption; and savings.

Going clockwise around Figure 1, the representative household interacts with producers in two ways. First, in allocating expenditure across household and government consumption, this sustains demand for production. Second, the representative household owns and receives all income from factor payments (labour, capital, land and natural resources) as well as net taxes. Factors of production are used by producers as *inputs into production* along with intermediate inputs. The level of production, as well as supply of factors, determines the amount of income generated in each region.

[5] Australian Bureau of Agricultural and Resource Economics (ABARE), 1996, *MEGABARE: Interim Documentation*, Canberra.

FIGURE 1: KEY COMPONENTS OF AE-RGEM




The *representative household's* relationship with investors is through the supply of investable funds – savings. The relationship between the *representative household* and the international sector is twofold. First, importers compete with domestic producers in consumption markets. Second, other regions in the model can lend (borrow) money from each other.

### Some detail

- The representative household allocates income across three different expenditure areas – private household consumption; government consumption; and savings – to maximise a Cobb-Douglas utility function.
- Private household consumption on composite goods is determined by minimising a CDE (Constant Differences of Elasticities) expenditure function. Private household consumption on composite goods from different sources is determined is determined by a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function.
- Government consumption on composite goods, and composite goods from different sources, is determined by maximising a Cobb-Douglas utility function.
- All savings generated in each region is used to purchase bonds whose price movements reflect movements in the price of generating capital.

## PRODUCERS

Apart from selling goods and services to households and government, producers sell products to each other (intermediate usage) and to investors. Intermediate usage is where

one producer supplies inputs to another's production. For example, coal producers supply inputs to the electricity sector.

Capital is an input into production. Investors react to the conditions facing producers in a region to determine the amount of investment. Generally, increases in production are accompanied by increased investment. In addition, the production of machinery, construction of buildings and the like that forms the basis of a region's capital stock, is undertaken by producers. In other words, investment demand adds to household and government expenditure from the representative household, to determine the demand for goods and services in a region.

Producers interact with international markets in two main ways. First they compete with producers in overseas regions for export markets, as well as in their own region. Second, they use inputs from overseas in their production.

### Some detail

- Sectoral output equals the amount demanded by consumers (households and government) and intermediate users (firms and investors) as well as exports.
- Intermediate inputs are assumed to be combined in fixed proportions at the composite level. As mentioned above, the exception to this is the electricity sector that is able to substitute different technologies (brown coal, black coal, oil, gas, hydropower and other renewables) using the 'technology bundle' approach developed by ABARE (1996).
- To minimise costs, producers substitute between domestic and imported intermediate inputs is governed by the Armington assumption as well as between primary factors of production (through a CES aggregator). Substitution between skilled and unskilled labour is also allowed (again via a CES function).
- The supply of labour is positively influenced by movements in the wage rate governed by an elasticity of supply is (assumed to be 0.2). This implies that changes influencing the demand for labour, positively or negatively, will impact both the level of employment and the wage rate. This is a typical labour market specification for a dynamic model such as AE-RGEM. There are other labour market 'settings' that can be used. First, the labour market could take on long-run characteristics with aggregate employment being fixed and any changes to labour demand changes being absorbed through movements in the wage rate. Second, the labour market could take on short-run characteristics with fixed wages and flexible employment levels.

## INVESTORS

Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. The global investor ranks countries as investment destination based on two factors: current economic growth and rates of return in a given region compared with global rates of return.

### Some detail

- Once aggregate investment is determined in each region, the regional investor is constructs capital goods by combining composite investment goods in fixed proportions, and minimises costs by choosing between domestic, imported and interstate sources for these goods via a CRESH production function.

## INTERNATIONAL

Each of the components outlined above operate, simultaneously, in each region of the model. That is, for any simulation the model forecasts changes to trade and investment flows within, and between, regions subject to optimising behaviour by producers, consumers and investors. Of course, this implies some global conditions must be met such as global exports and global imports are the same and that global debt repayments equals global debt receipts each year.

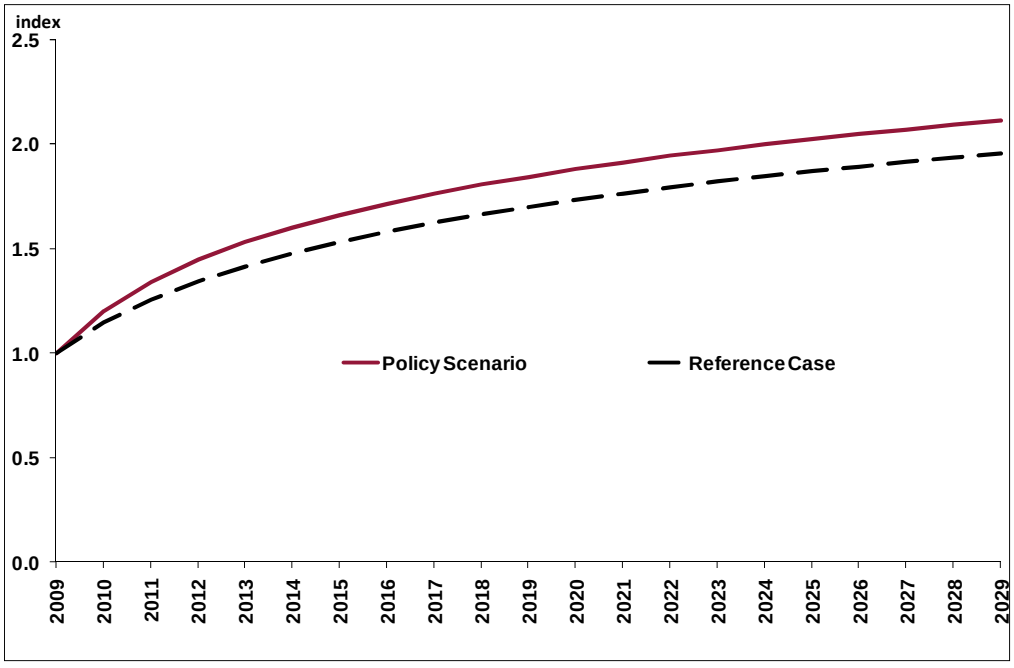
## DYNAMICS

AE-RGEM is a recursive dynamic model that solves year-on-year over a specified timeframe. The model is then used to project the relationship between variables under different scenarios, or states, over a predefined period.

Set against the reference case scenario (i.e., the model's path under a no policy change assumption) is a 'scenario projection'. This scenario represents the impacts of imposing a policy change, which results in a new projection of the path of the model's variable over the simulation time period. The impacts of the policy change are reflected in the differences in the reference case and policy simulations for each model variable at each point in time.

As shown in Figure 2**Error! Reference source not found.**, the index (=1.0 in shock reference year of 2009, for instance) on the vertical axis can represent all sorts of macroeconomic indicators (i.e. real GSP/GDP, GNP, household consumption etc.) and microeconomic ones (i.e. industry output and exports etc.). And it can be projected to increase over time.

FIGURE 2: DYNAMIC SIMULATION USING AE-RGEM




Source: Access Economics