Chapter 4

QUANTIFYING THE IMPACTS OF STRUCTURAL REFORMS ON AIR TRAFFIC FLOWS IN APEC ECONOMIES

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- More liberal arrangements for freight, passenger charters, designation of international airlines, code sharing and ground handling are common among APEC members.
- Restrictions on foreign ownership and on cabotage remain.
- Further reform would have a significant effect on traffic flows.

4.1 INTRODUCTION

Air transport services are provided within a structure of a network of bilateral agreements. These agreements are similar to free trade agreements but they apply to only one service. A typical air service agreement specifies the rights of access to the terms of the agreement, that is, they allocate to airlines designated by the signatories the rights to fly across borders between APEC member economies and around the globe. Designation usually applies only to the airlines owned and controlled by residents of the economy making the designation. As a result, airlines from third parties are discriminated against: they either cannot fly on the routes between the economies involved in the bilateral agreement or they have only restricted access. Some bilateral agreements also restrict the capacity and frequency of the services which the designated airlines provide.

Some agreements that do not have so many restrictions are called 'Open Skies' agreements. However, even these agreements have restrictions on access to routes by third parties. In the past, agreements have also attempted to control fares but that now is rare. In fact, the control of fares is redundant in the context of the control of capacity. The International Air Transport Association's (IATA's) Director General once labelled the bilateral system, the ownership rules and the attitude of competition authorities towards airline mergers and alliances as 'the three pillars of stagnation' for they have hindered the modernisation of air transport industry.[3]

The interest of this paper is the impact of air transport policy on the performance of the markets in which air transport services are provided. This has been prompted by the apparently highly restrictive regimes operating under a series of these bilateral agreements in which economies exchange rights of access to markets. These arrangements might be expected to raise costs and prices, and possibly also to raise profits, leading to a 'tax' on the movement of goods and people and inhibiting the extent of international integration. The severity of these effects is the question, the answers to which can be used to make the case

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[3] See http://www.iata.org/pressroom/speeches/Pages/2003-08-06-02.aspx, accessed on 1 February 2010.

for reform. Options for reform were explored by Findlay and Round (2006), and as an extension of their analysis, this paper examines the policy environments in the APEC economies in air transport and provides empirical evidence of the cost of the restrictions to liberalisation – a significantly lower level of movement of people and goods.

Section 4.2 provides a brief overview of the current policy and recent reforms that have occurred in the major APEC economies. This is followed by a methodology for converting the policy information into a series of quantitative measures that can be compared across economies. The impact of the policy on route traffic flows between the major capital cities of APEC economies is then illustrated using a gravity model. The final section contains some summary remarks.

4.2 LIBERALISATION OF AIR SERVICES

APEC was founded in 1989 with a commitment to pursuing cooperation and economic prosperity in the Asia-Pacific region. However, its members are not bound by any treaty obligations and decisions within APEC are made on a consensus basis and implemented voluntarily. The Bogor Goals specify APEC objectives for free and open trade and investment in the Asia-Pacific region by 2010 for industrialised economies and 2020 for developing members. The fast economic growth in many APEC economies is powered by fast increasing international trade and the rapidly growing tourism industry, both of which in turn need the support of well developed air transportation systems.

At their meeting in Auckland in 1999, reforms in the air transport sector were endorsed by the APEC leaders. The Eight Options for More Competitive Air Services with Fair and Equitable Opportunity reforms include air carrier ownership and control, doing-business matters, air freight, multiple airline designation, tariffs, charter services, cooperative arrangements between airlines and market access. The Eight Options were prioritised as high, medium and low, based on their ease of implementation. It was acknowledged that the member economies could have their own ways to achieve the goals set in the Eight Options and in fact there have been some successes.

The single aviation market between Australia and New Zealand was created in 1996, and the domestic air market has subsequently been opened up to the airlines of the other side of the Tasman Sea. A formal Open Skies agreement was signed in 2002, further eliminating the limitation of beyond rights and allowing the international airlines of both economies to operate from any international airport in Australia and New Zealand to third economies for cargo services (7th freedom rights, see Box 4.1 for the details of the nine freedoms and an illustration of the aircraft movements involved).

In 2004 the Association of Southeast Asian Nations (ASEAN) adopted the Roadmap for Integration of the Air Travel Sector (RIATS) and the Action Plan for ASEAN Air Transport Integration and Liberalisation 2005–2015, with the aims 'to advance the full liberalisation of air transport services in ASEAN, to achieve the ASEAN Leaders' vision of Open Sky in the ASEAN region'.[4] Full liberalisation will be achieved through a staged and progressive approach. The RIATS encourages two or more members to negotiate and sign liberal bilateral or multinational agreements on a sub-regional basis in the move to full liberalisation.

[4] See http://www.aseansec.org/16666.htm, accessed on 1 March 2010.

Box 4.1: Freedoms of the air.

First Freedom of the Air – the right of over-flight

Second Freedom of the Air – the right to land for non-traffic purposes

Third Freedom of the Air – the right to put down traffic originating from the carrier's home base

Fourth Freedom of the Air – the right to pick up passengers bound for the carrier's home base

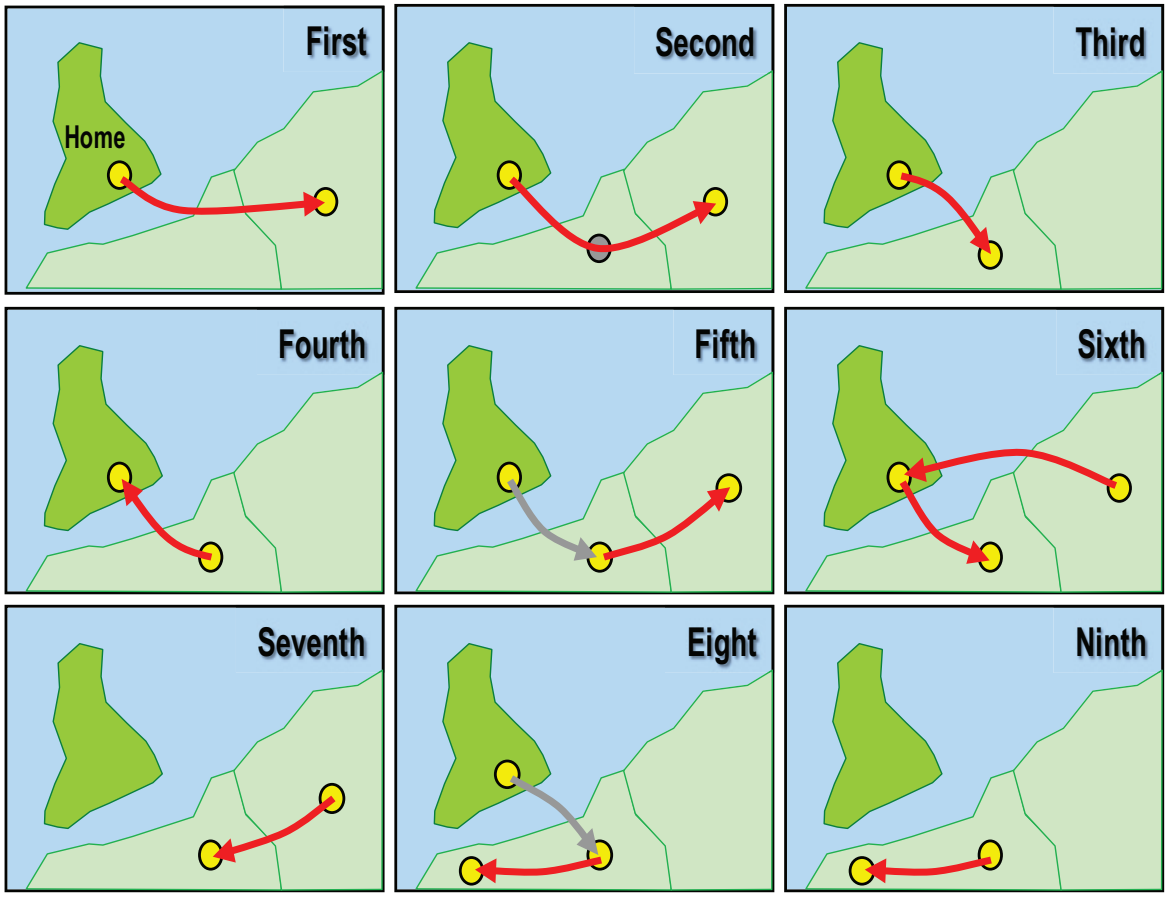
Fifth Freedom of the Air – the right to put down or pick up passengers from or bound for third locations on a flight either bound for or originating at the carrier's home base

Sixth Freedom of the Air – the right to transport, via the home base of the carrier, traffic moving between two other locations

Seventh Freedom of the Air – the right to transport traffic between two other locations without stopping at or having a connection to the home base of the carrier (i.e., the right to base aircraft offshore)

Eighth Freedom of the Air –the right to carry traffic between two domestic points within another economy on a flight bound for or originating at the carrier's home base

Ninth Freedom of the Air – 'stand alone' cabotage, that is, carrying traffic between domestic points offshore without any connection to the carrier's home base



Based on ICAO (2004): graphic provided by Dr Jean-Paul Rodrigue, Department of Global Studies and Geography, Hofstra University (permission provided).
http://people.hofstra.edu/geotrans/eng/ch3en/conc3en/airfreedom.html

In 2003 Cambodia, Laos, Myanmar and Viet Nam concluded a Multilateral Agreement on Air Transport of the Sub-region consisting of air transport liberalisation and comprehensive cooperation among the four economies, and in 2004 Brunei; Singapore; and Thailand signed a Multilateral Agreement (MA) on the Liberalisation of Passenger Air Services in Bangkok, which allowed for unlimited flights among the three economies. It is expected that an Open Skies pact with no limitations on 5th freedom traffic rights for the capital cities will be signed by the ASEAN members in 2010.

In 2001 Brunei; Chile; New Zealand; Singapore; and the United States of America (USA) signed a multilateral Open Skies agreement including the 7th freedom rights. However, this agreement was amended in 2004 for freight services only. By the end of 2009 twelve APEC economies had concluded agreements with the USA – Singapore; Chinese Taipei; New Zealand; Chile; Thailand; Malaysia; Brunei; Peru; Korea; Indonesia; Canada; and Australia (see Table 4.1).

Table 4.1: Open Skies agreements signed by APEC economies.

APEC member	Economies with which Open Skies agreement signed (year signed)
Japan	Partial with Korea (2007), Thailand (2007) (Tokyo excluded)
Korea	USA (1998), Mexico (2008), partial with Japan (Tokyo excluded) (2007), Shandong province, China (2006), Malaysia (2007)
China	Hainan (2003) and Shandong (2006) provinces
Singapore	More than 30 economies, including USA, 15 European economies, Thailand (2004), Brunei (2004)
Thailand	Singapore (2004), Brunei (2004), USA (2005), partial with Japan (2007), Kuwait (2008)
Malaysia	Sri Lanka (2005), USA (1997), Chinese Taipei (1997), Korea (2007), New Zealand (1997), Qatar, United Arab Emirates, Yemen, Scandinavian economies, USA
Indonesia	USA (2004)
Philippines	Cargo Open Skies in two international airports (2003)
Brunei	Singapore (2004), Thailand (2004), USA (2001), New Zealand (2001), Hong Kong, China
Viet Nam	USA (2008) cargo only
Australia	New Zealand (2002), USA (2008). No restrictions on capacity with Singapore and UK
United States	Over 90 economies and regions as of 2009
Canada	More than 34 economies, including USA and European Union
Mexico	UAE (2007), Korea (2008), Hong Kong, China
Hong Kong, China	Mexico, Brunei
Chinese Taipei	USA (1997), Malaysia (1997)
Chile	Singapore (2001), New Zealand (2001), Brunei (2001), USA (2001), Uruguay (2003), Paraguay (2005), Finland (2005), United Arab Emirates (2005), UK (2008) etc.
Peru	USA (1998), Singapore (2009)

There have been regular meetings among the aviation authorities of the three Northeast Asian economies. Korea is keen to pursue an Open Skies deal in this region, given its relatively small domestic market and its close cultural and economic links with China and Japan. The signing of an Open Skies agreement between Japan and Korea has lifted restrictions on frequency, capacity and destinations, with the exception of the congested Tokyo airports, covering both cargo and passenger services. Chinese aviation authorities acknowledge the need for liberalisation but prefer a progressive approach, especially when the major Chinese airlines are still less competitive than their foreign counterparts. Interestingly, the local provincial governments are always keen to push for more liberal arrangements as they understand the benefits to their local economies.

China opened 5th freedom rights to all foreign airlines in Hainan Province in 2004. The effect of this unilateral Open Skies policy on the tourism industry has been tremendous. In 2002 Hainan Province received less than 400 000 overseas tourists but this figure had increased to about 1 million in 2008. Open Skies arrangements have also been implemented between Chinese Shandong province and Korea since 1996. As a result, fares on the routes between Seoul and Shandong's major cities have now decreased.

APEC Air Services Sub-group published the Second Eight Options survey outcomes in 2009, providing progress on the Eight Options for Liberalisation of Air Services from the first

survey in 2006 to the second survey in 2008.[5] The main points of this can be summarised as follows:

- Substantial ownership and effective control remains the most common barrier in most economies.
- Although double approval of tariffs remains in places, the filing requirement has been eased. In reality, market forces play key role in determining fares.
- Most economies are relaxing the restrictions on ground handling services and competition is being introduced. Airlines including foreign carriers are allowed to offer ground handling services at some airports.
- A significant number of economies have open freight arrangements with their partners in APEC.
- Multiple designation provisions have become common in the new bilateral agreements.
- The majority of APEC economies are willing to approve charter services as supplements and complements to the scheduled services.
- Code sharing and airline alliances are becoming common with little opposition from authorities.
- Significant progress has been made in terms of relaxing 3rd and 4th freedoms. However, 5th freedoms operations and 7th in cargo services are less common, but are increasing in number. Cabotage remains rare in the APEC region.

4.3 METHODOLOGY AND THE POLICY INDICES

The air transport sector around the world has been undergoing significant changes towards liberalisation over the past three decades. As a result of deregulation and the emergence of the low cost carriers, productive efficiency in the industry has increased and fares have declined. Fares on most domestic and international routes are largely determined by market forces and, although most bilateral agreements still restrict outputs such as frequency and the number of seats offered, these restrictions have been largely relaxed. In some instances the agreed capacity and frequency are so large that the designated airlines do not use their full allocation. Occasionally, 5th freedoms have been granted to a foreign carrier even though the two economies have not signed an Open Skies agreement.

The main elements of an Open Skies agreement include free determination of the frequency of services and fares, no restrictions on engaging in code-sharing, pro-competitive doing-business provisions and grant of the 5th freedom – allowing the other economy's airline to carry traffic to a third economy.[6] However, the so-called Open Skies agreements are not as open as people imagine. A typical agreement does not touch the issues of relaxing foreign ownership restrictions or the adoption of 'principal place of business', nor does it mention cabotage rights.

Regulatory systems that impede entry and discriminate among suppliers would be expected to have some impact on the costs of air transport and the profits of the incumbents. Since air transport is an input into other traded sectors, this system reduces the volume of trade and of people movement and therefore the extent of integration among economies. Higher costs of air transport add to the costs of international trade and reduce international demand for the

[5] See http://www.apec-tptwg.org.cn/new/Modal-Expert-Groups/Aviation/AEG-SRV/air-services-group.htm, accessed on 25 June 2010.

[6] See http://www.state.gov/e/eeb/rls/fs/2009/119760.htm for Open Skies agreement highlights, accessed on 15 March 2010.

exports of the tourism sector and other sectors dependent on people movement – education or health services, for example.

The steps in the work examining regulation cost are first to characterise the policy environment in a number of economies (preferably over time) and then to relate that index to indicators of performance such as the price/quantity of the services provided (Hoekman 1995). Even better is to infer the effects on markets from the effects on the costs and profits of firms operating in those markets. There are special challenges in the case of air transport, since firms operate in more than one jurisdiction and are subject to different policy environments. However, with sufficient data, the contribution of different policy regimes could be identified.

There have been some studies of the impact of these regulatory arrangements. Doove et al. (2001) extended earlier work by the OECD (Gonence & Nicoletti 2001) to examine the impact of the agreements on prices. Other studies have examined the effect of Open Skies agreements. In a study of freight routes from the USA, Micco and Serebrisky (2006) found that signing an Open Skies agreement reduced air transport costs by 9% and increased by 7% the share of imports arriving by air. Using the Air Liberalisation Index (ALI) – the sum of the points obtainable by a given Air Services Agreement (2005 database), prepared by the WTO (2006), Geloso Grosso (2008) and Geloso Grosso and Shepherd (2009) – evidence showed that there is a positive relationship between the openness of the bilateral agreement and passenger movement and bilateral trade in APEC. Piermartini and Rousova (2008) provides a similar conclusion, using a sample of 184 economies. However, the ALI values used by these studies were based on incomplete and outdated bilateral agreement data.

This study seeks to build on and improve this method by constructing policy indices using the most up-to-date information, but not generated from bilateral agreements, and by addressing the same problem from a slightly different perspective. The construction of the indices has been guided by APEC's Eight Options, with a focus on areas covered by a typical Open Skies agreement as well as indicators that can reflect the aviation authorities' attitude towards domestic and international market liberalisation. Although to some extent the coverage of the indices is restricted to items for which comparable data are available, the indicators of restrictiveness are closely linked to deregulation in market access.

The components of the first set of indices are shown in Table 4.2. They include ownership conditions (for private equity and for foreign equity), the existence of established low cost carriers and the number of effective passenger airlines (reflecting the ease of entry in the domestic market), multiple designation of local airlines on international routes, the presence of Open Skies agreements and the grant of the so-called 7th freedom rights for cargo services. The information for various components comes from the economies' aviation authorities and relevant airlines' websites and was valid to mid 2009.

There are good reasons for the inclusion of these indicators in constructing the policy index. The first is that it is important not to underestimate the cost of restrictions on ownership. Findlay and Round (2006, p. 259) point out that concern about ownership rules has been made more intense by the emergence of a new low cost carrier business model in air transport: 'the incumbent full service operators can respond to that threat by stressing their network advantages and will be assisted by a relaxation of ownership rules'. The ability of airlines to enter markets for air transport services, or to enter markets for inputs to air transport, is increased by foreign investment in air transport that they host. The current regulatory system impedes that investment, which denies opportunities to both incumbents and newcomer suppliers.

Table 4.2: Policy indicators.

Aviation market regulations and liberalisation constraints		**Score**
Ownership	Government does not have majority ownership control, nor retain 'golden share' veto right	0
	Government does not control the majority of the ownership, but retains 'golden share' veto right	0.33
	Government controls the majority of the ownership	0.67
	No	1
Foreign equity participation in domestic airlines	No cap: domestic market open to foreign investment/adopt principal place of business	0
	A cap greater than 50%	0.25
	A cap between 35% and 50% (inclusive)	0.5
	A cap less than 35%	0.75
	Foreign investment in airlines not allowed	1
Existence of low cost carriers (reflecting ease of market access and fair competition)	Has an established low cost carrier which has actively engaged in both domestic and international service provisions	0
	Has a relatively new/small sized low cost carrier	0.5
	No low cost carrier	1
Number of effective passenger airlines (reflecting ease of entry)	More than 5	0
	3 to 5 (inclusive)	0.5
	2 or fewer	1
Multiple designation on international routes Private airlines allowed to fly international routes	2 or more carriers, including private carriers roughly have the equal right in being designated for flying international routes	0
	The flag carrier (usually government-owned) has priority in gaining international rights over domestic private carriers; or domestic private carriers are not eligible to fly international routes before fulfilling some conditions such as servicing domestic market for a certain period of time	0.5
	The flag carrier is predominantly the designated airline servicing international routes	1
Open Skies agreement	Number of Open Skies agreements is greater than 2	0
	Number of Open Skies agreements is 2 or fewer	0.5
	Not yet signed any Open Skies agreement	1
7th freedom rights (cargo)	7th freedom rights (cargo) are granted to some foreign carriers	0
	No	1

Secondly, it is quite often difficult to observe an economy's policy on market access by low cost carriers. In some economies it has been argued that conditions on the launch of a new carrier are not transparent.[7] Some anti-trust authorities do not treat the incumbent and new airlines equally when enforcing the anti-trust laws, so low cost and new private airlines would find it difficult to survive in such an environment. For example, price-fixing activities and price wars among Chinese major airlines have never received any serious investigation, while a new low cost airline was fined for selling cheap tickets. A government's favouring of incumbents would be a significant barrier preventing new airlines from accessing lucrative domestic and international markets. The existence of the established low cost carrier and the number of effective passenger airlines can be used as a proxy to represent an economy's policy towards new carriers.[8] It is believed that fairness and openness will encourage competition and thereby

[7] A call for clear air transport policy in Malaysia is available at http://www.mmail.com.my/content/38500-tan-sri-abdul-aziz-abdul-rahman-urgent-need-air-transport-policy, viewed on 13 August 2010.

[8] Effective passenger airlines are defined as airlines that have at least five aircraft and provide regular services. If one airline is wholly owned by another airline in the same economy, such as Dragonair and Cathay Pacific in Hong Kong and Jetstar and Qantas in Australia, they are not regarded as effective competitors in this study even though they operate separately. However, we acknowledge that competition in economies with a small population may not be less than those with a large population and thus this indicator may underestimate the openness of the small economies. The results need to be interpreted bearing this limitation in mind.

foster more efficient and effective competitors. Multiple designation rules would not be an issue if there were no discrimination against the new and private airlines. Two issues should be distinguished regarding multiple designation: multiple designation provisions in the Air Services Agreements (ASAs) and the allocation of the negotiated capacity to the carriers of an economy. The former is no longer a significant issue in many economies, including Hong Kong, China; Australia; and New Zealand, because most of the ASAs allow for multiple designation. This study focuses on whether the flag and non-flag airlines have been treated equally in allocating the negotiated traffic rights.

Finally, despite criticism of the USA version of Open Skies agreements (e.g., the exclusion of the ownership issue), that model has been widely accepted and pursued by many economies. It is also expected access to 7th freedom rights will be the next step in reform towards a more liberal air transport regime. The number of Open Skies agreements signed clearly demonstrates an economy's resolution to pursue liberalisation and can be used as an indicator to reflect an economy's openness in air transport. For the same reason, the 7th freedom (cargo only) has been included as an indicator in the construction of the policy index. Excluded are the very rare 7th freedom rights for passenger services.

The scores for each component of the index can be found in Table 4.3. The components can be added up to form an overall index, values of which range from 0 to 7. The higher the score, the higher is the level of restrictiveness.[9]

Table 4.3: Scores of the policy index components.

APEC member	Privatised	Foreign equity	Low cost airline	Effective competitors	Designation	Open Skies	7th freedom	Total score
Australia	0	0	0	0.5	0.5	0	0	1
Brunei	1	0	1	1	1	0	0	4
Canada	0	0.75	0	1	1	0	0	2.75
Chile	0	0	1	1	1	0	0	3
China	0.67	0.5	0.5	0	0.5	1	1	4.17
Hong Kong, China	0	0	0.5	1	0.5	0	1	3
Indonesia	1	0.5	0.5	0	0.5	0.5	0	3
Japan	0	0.75	0.5	0	0	0.5	1	2.75
Korea	0	0.5	0.5	0.5	0	0.5	1	3
Malaysia	0.67	0.5	0	0	0.5	0	0	1.67
Mexico	0	0.5	0.5	0.5	0	0	1	2.5
New Zealand	0.67	0	0.5	0.5	0.5	0	0	2.17
Peru	0	0.5	0.5	0.5	0.5	0	0	2
Philippines	0	0.5	0.5	0	0.5	1	1	3.5
Russia	0.67	0.75	0.5	0	0.5	0	1	3.42
Singapore	0.67	0	0	0.5	0	0	0	1.17
Chinese Taipei	0.67	0.5	1	0.5	0	0.5	0	3.17
Thailand	0.67	0.5	0	0	0.5	0	0	1.67
United States	0	0.75	0	0	0	0	0	0.75
Viet Nam	1	0.5	0.5	0.5	1	0.5	0	4

[9] The index values reported so far are based on the sum of the component values without any weights being assigned. A factor analysis approach could be used to give statistical weight and to avoid the subjectivity of using expert judgement for weight assignment (see Nicoletti et al. 1999, Doove et al. 2001). However, given the small sample in this study, it is inappropriate to use this method.

Figure 4.1 presents the total scores for each of the 20 economies under study. Measured by the abovementioned indicators, many economies in this sample are relatively liberal in their aviation sector. It is not surprising that the USA is the leader in pursuing more liberal policies but it is not a leader in relaxing foreign ownership limits, when most of the other economies have already allowed a participation in domestic airline equity of up to 49%. The debate of increasing the limit to 49% has been going on for many years but it still remains at 25%.

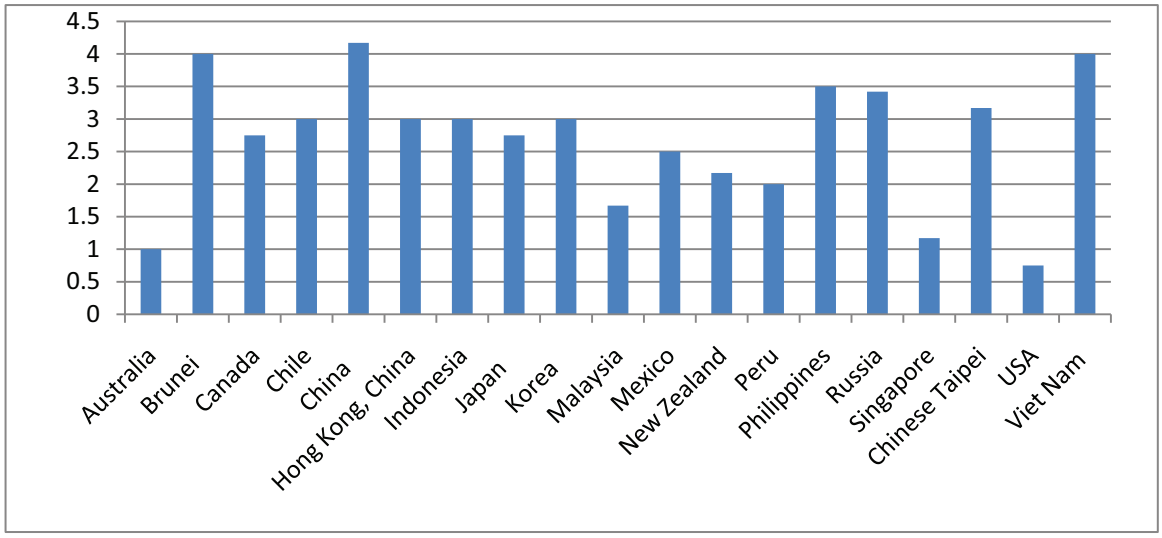


Figure 4.1: The aviation regulation and liberalisation restrictiveness indices for APEC economies.

A related issue is a clause which is embedded in almost all bilateral agreements, even the 'liberal' ones, which requires that the designated airline must be 'substantially owned and effectively controlled' by the designating economy. Hong Kong, China; and Chile are the only two economies in this region to have accepted the 'principal place of business' in place of this clause. In fact, for all the policy indicators used to construct the index, ownership is central. Once ownership control has been loosened, it is likely that government interference will be reduced and further liberalisation measures would be expected to follow. It would then be no longer necessary to restrict the 5th and 7th freedom rights as well as the cabotage rights.

Canada's 'Blue Sky' policy states that it will proactively pursue Open Skies arrangements similar to the one negotiated with the USA in 2005. However, it excludes the possibility of a cabotage right in the negotiation. The CEO of Air Canada was reported to have lobbied the government for relief in 2008, claiming that job and service cuts would be lost as he criticised Emirates Airlines' service expansion plan in Canada although the provincial government and tourism and trade groups were in favour of it (Vancouver Sun 2010). Similar reports have appeared in Australia. Although some may argue that a particular market is not big enough to support more than one carrier[10], the market in which an airline can provide services would expand if more liberal bilateral and multilateral arrangements are pursued.

Australia and Singapore have the most liberalised environment in the Asia-Pacific region. Although Australia still retains a 49% cap on foreign investment in Australian international airlines it has allowed 100% foreign investment in domestic airlines (i.e., right of establishment, which also applies in New Zealand). Singapore has signed more than 30 Open

[10] See, for example, the view expressed by Air Canada's former president, Hollis Harris, at http://www.canadianencyclopedia.ca/index.cfm?PgNm=TCE&Params=M1ARTM0010589, accessed on 15 August 2010.

Skies agreements and has even called for more liberal arrangements than its current Open Skies framework. Thailand and Malaysia are two leaders in liberalising their aviation sector in ASEAN. These economies have well established aviation industries and their airlines, including the low cost airlines, are relatively competitive in this region.

The three Northeast Asian economies are in the middle ranking position. Arrangements have been made that allow the flights linking Shanghai, Seoul and Tokyo to use those three cities' domestic airports (i.e., Shanghai Hongqiao, Kimpo and Haneda) to reduce travel time and cost. As noted earlier, even without any formal pre-set procedures, these economies are moving towards greater liberalisation in air transport. In the meantime, as can be seen from Table 4.1, both Japan and Korea have struck partial Open Skies deals with several ASEAN economies. China has also expressed interest in inking an Open Skies deal with ASEAN.

Since 2008, apart from a handful of busy cities, there have been no restrictions on the frequency of flights and the number of airlines flying between mainland China and Hong Kong, China. Restrictions on the frequency of flights to busy cities like Shanghai have made fares artificially high, and many passengers have complained (Yang 2010). In mid 2009, after several years of charter flight services, scheduled flights were finally launched between mainland China and Chinese Taipei. The integration of air transport in these three economies will be an interesting research topic in the next few years.

Some people may argue that there is a big change in performance once an airline is in private hands, but this is not so evident if the government controls the majority share, no matter what percentage it commands. It has also been argued that the competition outcome does not differ greatly when the number of competitors in a market increases from two to three. Following these arguments, and to test the sensitivity of the results to changes in the design of the index, changes to the scores assigned to some of the policy indicators are shown in Table 4.4.

Table 4.4: The alternative policy index indicators.

Aviation market regulations and liberalisation constraints		**Score**
Ownership	Government does not have a majority ownership control	0
	Government controls the majority of the ownership	1
Foreign equity participation in the domestic airline	A cap greater than 50%; domestic markets open to foreign investment/adopt principal place of business	0
	A cap less than 50%(inclusive)	1
Existence of low cost carriers	Has an established low cost carrier which has actively engaged in both domestic and international service provision	0
	No effective low cost carriers/small in size with limited services	1
Number of effective passenger airlines	3 or more	0
	2 or fewer	1
Multiple designation on international routes Private airlines allowed to fly international routes	2 or more carriers including the private carriers roughly have the equal right in being designated for flying international routes	0
	The flag carrier (usually government-owned) has priority in gaining international rights over domestic private carriers; or domestic private carriers are not eligible to fly international routes before fulfilling some conditions such as servicing domestic market for a certain period of time	0.5
	The flag carrier is predominantly the designated airline servicing international routes	1
Open Skies agreement	Number of Open Skies agreements is greater than 2	0
	Number of Open Skies agreements is 2 or fewer	0.5
	Not yet signed any Open Skies agreement	1

As the 7th freedom rights, although optional, are frequently granted when an Open Skies agreement is concluded, this indicator has been dropped in the new policy index (hereinafter called the alternative policy index). Details can be found in Table 4.5 and observed in Figure 4.2. The results of the two sets of indices are consistent. Figure 4.2 shows that while Australia; the USA; and Singapore remain the leaders in liberalisation, Australia has overtaken the USA to be first. The alternative policy index will also serve as a sensitivity test of our gravity model to be discussed below.

Table 4.5: Scores of the alternative policy index components.

APEC member	Privatised	Foreign equity	Low cost airline	Effective competitors	Designation	Open Skies	Total score
Australia	0	0	0	0	0.5	0	0.5
Brunei	1	0	1	1	1	0	4
Canada	0	1	0	1	1	0	3
Chile	0	0	1	1	1	0	3
China	1	1	1	0	0.5	1	4.5
Hong Kong, China	0	0	1	1	0.5	0	2.5
Indonesia	1	1	1	0	0.5	0.5	4
Japan	0	1	1	0	0	0.5	2.5
Korea	0	1	1	0	0	0.5	2.5
Malaysia	1	1	0	0	0.5	0	2.5
Mexico	0	1	1	0	0	0	2
New Zealand	1	0	1	0	0.5	0	2.5
Peru	0	1	1	0	0.5	0	2.5
Philippines	0	1	1	0	0.5	1	3.5
Russia	1	1	1	0	0.5	1	4.5
Singapore	1	0	0	0	0	0	1
Chinese Taipei	1	1	1	0	0	0.5	3.5
Thailand	1	1	0	0	0.5	0	2.5
United States	0	1	0	0	0	0	1
Viet Nam	1	1	1	0	1	0.5	4.5

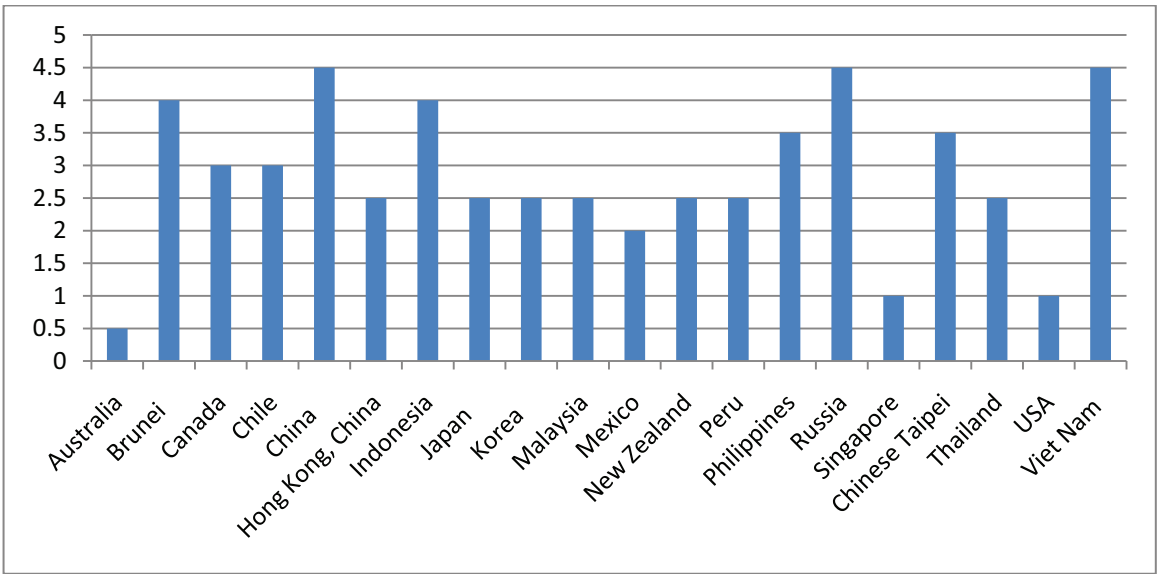


Figure 4.2: The alternative policy indices.

4.4 IMPACT OF POLICY ON TRAFFIC FLOWS

A relationship is expected between passenger and cargo traffic flows and the policy environment, other things being equal. More restrictive regimes would be associated with low traffic movement. This relationship has been estimated using a gravity model which is widely used for predicting bilateral trade flows. The form of the model used in this study is:

$\ln(traffic)=\beta_0+ \beta_1\ln(GDPpc1)+ \beta_2\ln(GDPpc2)+ \beta_3\ln(pop1)+ \beta_4\ln(pop2)+ \beta_5\ln(area1)+ \beta_6 \ln(area2)+ \beta_7 \ln(distance)+ \beta_8 index1+ \beta_9 index2+$ other dummies $+\varepsilon$

Due to difficulty in gathering the traffic data at the economy level, the 2008 ICAO city-pair passenger and cargo traffic data has been used. The dependent variable is air traffic (passenger numbers and cargo volume respectively) carried from the capital city of economy 1 to that of economy 2. The capital cities can be either a political centre or a major commercial centre of an economy. As major political and commercial centres are usually the gateways through which an economy's residents travel internationally, it is appropriate to use an economy's GDP per capita in the model with 1 denoting the departure economy and 2 denoting the destination economy. Likewise, pop1 and pop2 denotes the populations of the original economy and arrival economy respectively, representing the sizes of the economies. The GDP and population data are from the World Development Indicators Database, World Bank (July 2009).[11] It is expected that GDP per capita and population variables are positively linked to the traffic flows. Land area variables (area1 and area2) are also included on the right hand of the equation. In large economies, there are usually two or more international cities, and the use of traffic flows between the major capital cities may underestimate the movement of people and goods. Therefore, land area variables should have negative signs. The land area data can be found in the CIA World Factbook.[12]

The distance variable is also included and should have an inverse relationship with the traffic flow in a typical gravity model. The departure and arrival economies' air transport policy indices (index1 and index2 respectively) developed earlier in this paper, which are the main interest of this study, are included together with the following regional dummy variables: Northeast Asia, North America and ASEAN. The Northeast Asia dummy represents traffic movement between cities within China; Korea; and Japan. Similarly, the North America dummy takes value 1 when the traffic is carried between two cities within the USA; Canada; and Mexico. The ASEAN dummy is used to see if the traffic flows within the Southeast Asian region are higher or lower than other regions, *ceteris paribus*. An FTA dummy is included if two economies have signed a Free Trade Agreement. As with many other studies using gravity models, a common border dummy is used in the equation.

The estimation results are reported in Table 4.6. Robust standard errors are reported to accommodate a possible heteroskedasticity problem. The effects of the policy indices are statistically significant at the 5% level with expected negative signs, that is, higher restrictiveness in aviation policy leads to lower levels of movement of people and goods between international cities. The impact of the policy on cargo flows is greater than on the movement of people. On average, if the policy value of the departure economy were to decrease by 1 point at the current values of the policy index and of passenger flows, the passenger traffic would increase by 36%, whereas the decrease in policy value of the

[11] Available at http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20535285~menuPK:1192694~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html, accessed on 16 March 2010.

[12] Available at https://www.cia.gov/library/publications/the-world-factbook/, accessed on 1 March 2010.

Table 4.6: Impact of the policy index (the first set).

	Dependent variable: passenger		Dependent variable: cargo	
	Coefficient	Robust std. err.	Coefficient	Robust std err
Constant	11.773***	1.663	16.573***	4.094
pop1	0.274***	0.043	0.593***	0.119
pop2	0.248***	0.046	0.436**	0.115
GDPpc1	0.131	0.108	-0.188	0.147
GDPpc2	0.267***	0.096	0.145	0.156
area1	-0.172***	0.020	-0.451***	0.063
area2	-0.152***	0.024	-0.358***	0.051
index1	-0.358***	0.098	-0.797***	0.173
index2	-0.230**	0.109	-0.685***	0.164
Distance	-0.403***	0.110	-0.543**	0.256
Northeast Asia	0.472	0.277	1.301**	0.483
North America	-0.470***	0.159	-1.384***	0.483
ASEAN	-0.786**	0.345	-1.936***	0.449
FTA	0.185	0.134	0.008	0.274
Border	0.015	0.209	-0.320	0.457
R^2	0.55		0.63	
Observations	152		146	

All variables except index1, index2 and dummies are expressed in natural logarithms. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

destination economy by 1 point leads to an increase in passengers carried by 23%. The magnitudes are 80% and 69% respectively for the transport of freight at current values of both the index and freight volumes. This shows that both departure and arrival economies' air transport policies matter in promoting the movement of people and goods. When the index1 and index2 variables take logarithmic form, the coefficients are 0.64 and 0.44 for passenger movement equation and 1.44 and 1.32 for cargo movement, all with negative signs.[13] The elasticities of policy indices show that the cargo flows are more sensitive to the change in policy.[14]

The variables of population, land area and distance also have the expected signs and are statistically significant at the 5% level for both passenger and cargo traffic models, as can be seen from Table 4.4. Destination economy's GDP per capita is significant in the model, using passenger traffic as the dependent variable. However, the FTA and common border dummies are not significant for both models – in fact, the common border dummy is not consistently significant in other studies such as Geloso Grosso (2008).

Interestingly, cargo movement within Northeast Asia is significantly higher (at the 5% level) after other variables are controlled for, indicating the close economic ties between those three economies. It is a different story for the North America and ASEAN dummies, where the coefficients are significant but with negative signs. The possible explanation might be that in North America there are many international cities and the choice of looking at the traffic between the major capital cities in this study (Vancouver, Toronto, New York, Los Angeles, Chicago and Mexico City only) obviously understates the true traffic movement in this region. Surface transport also plays an important role in this region. The negative sign for the ASEAN dummy might suggest that there is room for taking action to promote the movement of people and goods in Southeast Asia.

[13] The coefficients of other variables are similar to those in Table 4.6, but are not reported here. They can be provided on request. The elasticity magnitude is greater than estimated by Geloso Grosso (2008) whose index is based on the ICAO Air Services Agreements.

[14] It is worth noting that the use of the 2008 traffic data may underestimate the effects of the air transport policy. The long-run effect could be even higher.

The regression was re-estimated by replacing the first set of policy index with the alternative policy index (variables aindex1 and aindex2) and the results are reported in Table 4.7. For both regressions, the indices of departure and arrival economies are statistically significant. However, the magnitudes do not too greatly differ from those reported in Table 4.6, although the scales of the two sets of policy indices are different (only six indicators in the alternative index). The coefficients of other control variables are largely consistent.

Table 4.7: Impact of the alternative policy index.

	Dependent variable: passenger		**Dependent variable: cargo**	
	Coefficient	Robust std err	Coefficient	Robust std err
Constant	11.479***	1.590	16.945***	4.156
Pop1	0.273***	0.046	0.608***	0.117
Pop2	0.255***	0.042	0.450***	0.116
GDPpc1	0.176**	0.072	-0.212	0.173
GDPpc2	0.193**	0.084	0.019	0.169
area1	-0.162***	0.020	-0.429***	0.085
area2	-0.149***	0.020	-0.341***	0.051
aindex1	-0.224***	0.059	-0.688***	0.181
aindex2	-0.284***	0.065	-0.728***	0.152
Distance	-0.387***	0.114	-0.531*	0.262
Northeast Asia	0.372	0.283	1.029**	0.524
North America	-0.553***	0.150	-1.571***	0.454
ASEAN	-0.645*	0.350	-1.551***	0.459
FTA	0.265**	0.124	0.138	0.267
Border	0.146	0.191	-0.070	0.438
R^2	0.54		0.63	
Observations	152		146	

All variables except index1, index2 and dummies are expressed in natural logarithms. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

4.5 CONCLUSION

This paper has summarised the air transport policies of 20 APEC economies by constructing two sets of policy indices. The policy measures show wide variation between economies and in some cases the data indicate that the policy regimes are relatively restrictive. Our gravity model using cross-sectional data suggests that liberalisation is significantly and positively associated with the movement of people and goods. Passenger travel is clearly hampered by restrictive air transport policies.

It is important in future work to break down the cost and profit effects of policy reform, since their relative sizes affect the welfare gains from reform. Because of the restrictions imposed by current arrangements on network design, the cost effect of restrictions in air transport is likely to be significant. This adds to the gains from reform, compared to that of reform of measures that act mainly as barriers to entry and create profits. This analysis is vital in the next stages of policy design. It can help build the momentum for change and provide guidance on its direction. The creation of the EU single aviation market and the recent development of ASEAN's single aviation market suggest that the likely next steps in reform will be plurilateral, which will be especially valuable if the costs of the constraints on network design are as significant as expected.

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