Demand for international air travel under AEC agreements

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Abstract

Since the development of economic in most East Asia countries nowadays, air transportation becomes more important in order to facilitate the economic activity across nations and regions. For Thailand, aviation sector contributes 139 billion Baht or 1.5% to Thai GDP. In addition aviation sector can induce the overall contribution through tourism to 818 billion Baht or 9% of GDP (Oxford Economics, 2011). Hence, infrastructure management of air transportation in Thailand should be concerned to deal with these advancements. Moreover, the upcoming of ASEAN Economic Community (AEC) in 2015, causing many ASEAN countries ratified the ASEAN multilateral agreements on air transportation, is another reason that airport regulator should improve airports' capacity especially the ones having potential international traffic such as Suvarnabhumi, Don Mueang, Phuket, and Chiang Mai airport. To focus on more concern of improving, this study aims to provide the evidence support of demand development on international air service by analyzing the effect of all determinants to international air passenger service between airports in Thailand and ASEAN countries including China, Hong Kong, and Korea (AEC plus) by applying the partial adjustment model from DARGAY and HANLY (2001). The models analyze both inward and outward air travelling of airports in Bangkok and AEC plus countries which were affected by relevant variables such as GDP per capita of origin countries, relative GDP between Thailand and destination countries, cost of living in foreign countries compared to home countries, and ratifying AEC agreement on air passenger service. The Generalized Least Square (GLS) technique is used to estimate fixed effect model. The results show the positive relationship between AEC agreement and international passengers both inward and outward which supports the idea of issuing the development plan for air transport infrastructure in Thailand.

Keywords: Demand for international air travel, International air transport model, Effect of AEC multilateral agreement on air service, Determinants of international air travel, Future air transport development in Thailand

1. Introduction

Air transportation is an important mode for travelling and facilitating the economic activity across nations and regions. In 2011, aviation sector contributes 139 billion Baht or 1.5% to Thai GDP and induce the overall contribution through tourism to 818 billion Baht or 9% of GDP (Oxford Economics, 2011). However, the proportion of air freight service in Thailand is rather less than other mode (less than 1% in 2007-2011). Hence, this study focuses more on air passenger service sector which has potential to be one of key drivers for economic development in near future.

Air transport industry in Thailand was operated by government until the coming of open skies policy for domestic route that introduced the emerging airlines to market, especially low-cost-carriers (LCCs) in 2003.

For domestic air service, the successful of air passenger transport liberalization policy of Ministry of Transport was the bill enacted in 2004. The policy does not only allow private sectors to freely compete in the market but also regulate a fair competition by not allowing the operators operate only in beneficial routes, thus, domestic routes have been classified by number of operated airlines. After that, domestic air service market is facing higher demand continuously.

For international air passenger service, the development of airline from ASEAN, Middle East, China, and India; especially LCCs, is the vital

factor for higher competition in Thai airline industry. The number of scheduled airlines is increasing from 90 to 99 airlines in 2009 and 2010, respectively, while the number of international passengers increases from 29.4 to 33.5 million people in 2009 and 2010, respectively. Department of Civil Aviation (DCA) report, as of October 2002, expects high competition of full passenger carriers (FSCs) and LCCs in ASEAN region especially the intention to be ASEAN Single Aviation Market (ASAM) when ASEAN becomes ASEAN Economic Community (AEC) in 2015. Hence, since many potential countries in ASEAN are willing to operate the air service as a hub of the region, then, Thailand is facing the intense challenge and needs to prepare capacity to deal with.

The key question of this study is whether Thailand is ready for the challenge of facing the effect of air passenger service industry in the context of ASEAN agreement on air service to become ASAM. The study aims to find out how the effect would be by studying the determinants and displaying the evidence support from econometric method, and then provides some policy suggestions.

2. Air transport regulations under AEC

ASEAN air transport policy is under AEC framework and Master Plan on ASEAN Connectivity (MPAC). MPAC indicates that ASEAN open sky policy is needed for capacity building of air industry, then, Roadmap for Integration of Air Travel Sector (RIATS) and concept of ASEAN Single Aviation Market (ASAM) are introduced to face with demand development in world airlines market. Moreover, higher number of LCCs from open sky policy is appreciated in order to facilitate tourist sector in ASEAN and enhance people-to-people connectivity.

Hence, compositions of RIATS are Multilateral Agreement on the Full Liberalization of Air Freight Service (MAFLAFS), Multilateral Agreement on Air Service (MAAS), and Multilateral Agreement on the Full Liberalization of Passenger Air Service (MAFLPAS). In addition, working on RIATS, agreements with other countries outside ASEAN, and ASAM roadmap are aimed to achieve MPAC.

Timeline of MPAC is described as

- Ratify and implement Multilateral Agreement on the Full Liberalization of Air Freight Service (MAFLAFS) and its Protocols 1 and 2 as soon as possible, in support of the establishment of the AEC by 2015, noting that the implementation timelines of the MAFLAFS and its Protocols 1 and 2 as agreed by ASEAN Transport Ministers are 31 December 2008. Until now, every country ratified this agreement, except Indonesia.
- Ratify and implement Multilateral Agreement of Air Services (MAAS) and its Protocols 1 to 6 as soon as possible, in support of the establishment of the AEC by 2015, noting that the implementation timelines of the MAAS and its Protocols as agreed by ASEAN Transport Ministers are 31 December 2008 for Protocol 5 and 31 December 2010 for protocol 6. Until now, there are every country ratified this agreement. However, Indonesia and Philippines are ratified only Protocols 1-2 and 1-4, respectively.
- Sign the ASEAN Multilateral Agreement on the Full Liberalization of Passenger Air Service (MAFLPAS) by 2010 and ratify and implement MAFLPAS and its Protocols as soon as possible, in support of the establishment of the AEC by 2015, noting that the implementation timelines of Protocols 1 and 2 are 30 June 2010 and 2013, respectively. Until now, there are 6 countries in ASEAN ratified this agreement, except Brunei, Cambodia, Indonesia, and Laos.
- Conclude the Air Transport Agreement (ATA) with China by 2010, India and South Korea, and possibly other regional partners, not later than 2015, and there after consider the possible expansion to other partners. Until now, Malaysia Myanmar, Singapore, Thailand and Vietnam are ratified ATA agreement with China and its 1st Protocol.
- Formulate an ASEAN Single Aviation Market (ASAM) Roadmap and implementation strategy by 2011 and develop ASAM by 2015.

3. Literature reviews

The previous literatures are involved with the determinants of demand for air passenger analysis which can be separated into the study of air travelling demand determinants and the model studying the determinants of demand for air travelling.

3.1 The study of air travelling demand determinants

To study the determinants for air passenger service, Kopsch (2011) estimated price elasticity of demand for domestic air travelling in Sweden by using national aggregated data on passenger numbers and air fares. The results show negative price elasticity of demand which is higher in the long-run and fairly elastic in the short-run. The negative result of price elasticity demand is also discovered by Jung and Fuji (1976), Strazhein (1978), Brons et al. (2002), and Anger and Kohler (2010) so air fare is another interesting determinant, however, Anger and Kohler (2010) found that changes in quantity demand for air transport will insignificantly small due to relatively small changes in air fares. Unfortunately, there is no available standardized data of air fare in Thailand for analyzing in this time. Moreover, since Brons et al. (2002) states that the difference between short-run and long-run elasticity has to be taken into account when using price elasticity for policy implication, then this will be useful for further study.

Kopsch (2011) also provides the evidence support on using some variables which are air fares, population, income (or GDP), and each characteristic of other transportation modes such as price, time spent, comfort, etc. Similar to Brons et al. (2002), this study provides more insights on determinants of price elasticity in the aviation sector such as income, income related factors, distance of travelling, geographical location, cultural changes, relative abundance of ground transport network, and objective of travelling. For income, the study finds the positive price elasticity for income and also finds that consumers with higher income levels are more price sensitive than consumers with lower income. Since long distance is hardly substituted by other modes of travelling, then distance is another factor for pricing which relates to demand changing. Furthermore, other factors affecting air fares, geographical location, cultural changes, relative abundance of ground transport network, and objective of travelling, can affect the demand level for air transport via price elasticity demand.

With these results from previous studies, the study of demand determinants for international air travelling can apply these types of data to explain the factor from pricing to demand since there is no available standardized data for air fares in Thailand in this time

3.2 The model studying determinants of demand for air passenger transport analysis

The models for studying determinants for air passenger service are involved with determinants of demand for domestic and international travelling.

For domestic travelling, TDRI (2012) studied the effect of liberalization of domestic air passenger service in Thailand from 2001 - 2010. The study measures changes of passenger and flight number, travelling for domestic route, in 21 airports providing service in domestic route and having more than 10,000 passengers per year, thus, the models are separately considered into the effect for number of passengers and flights. The dependent variables in both models are similar, gross provincial product (GPP) per capita and population of each province where each airport is located are employed in both models, moreover, dummy variables represented domestic air service liberalization are included in the models. The study estimates these panel data fixed effect models by Ordinary Least Square (OLS) and the key results show that liberalization policy has positive significant effect on number of passenger only in major route (having 400,000 passengers per year and unlimited competition) which shows that government protection policy in minor routes might reduce some benefit from competition.

For international travelling, DARGAY and HANLY (2001) studied demand for international travelling of United Kingdom and analyzed determinants for those demands. The models are separately analyzed demand for leisure and business travelling between UK and 20 OECD countries for both arrivals and departures. The determinants considering in the models are disposable income, population, and retail price index of 20 OECD countries, trade volume between UK and 20 OECD countries, exchange rate in local currency per £, and air fares from UK to 20 OECD countries which was obtained from International Passenger Survey (IPS). For the dependent variables, the study measures changes of air trips

between UK and 20 OECD countries from IPS. The study applies the cross section-time series data into the analysis and employs Partial Adjustment model since previous demand is influenced by previous determinants, and similarly for all other previous periods, then demand in any period is determined by the entire past history of prices and other relevant variables. This model implies that the effects of the independent variables decline geometrically over time. However, the disadvantage of this technique is the assumption of the demand relationship and the elasticity are the same for travel to all countries. Furthermore, these fixed effect models also take difference between countries into account which allows country-specific intercepts and estimate the effects by using Generalized Least Square (GLS) method. The results show the negative significant effects of air fares and relative price while international trade volume and relative exchange rate have positive significant effects to demand for air travelling service.

Therefore, the previous studies provide useful means for defining the model for investigating the determinants for air travelling demand. It is practical for this study to apply international air travelling model from DARGAY and HANLY (2001) and available variables employed in the models as TDRI (2012) and all studies in 2.2.

4. Methodology

This study follows the idea of DARGAY and HANLY (2001) in order to analyze the demand for air travel to and from Thailand during 2000 – 2011 and to investigate the determinants of its development. The determinants are involved with economic and ASEAN agreement on air passenger travel aspects. Moreover, the study also applies the variable showed cost of living of destination countries as another factor in the model. Pooled time-series cross-section data are used to estimate partial adjustment models for air passenger travel from Thailand to countries in ASEAN, China, Hong Kong, and Korea and from these countries to Thailand.

To analyze the demand for air passenger travel of Thailand, the study focuses only on Suvarnabhumi and Don Mueang Airports. Since service for International route in Bangkok was available only at Don Mueang Airport until the establishment of Suvarnabhumi Airports in 2005, thus, the data from these two airports are combined and analyzes as Bangkok international airport; having the highest number of international passengers among all international airports (See table 1).

Table 1 Number of International Passengers in 2009-2012, specified by airports (million people)

Airport	2009	2010	2011	2012
Suvarnabhumi	30.28	32.94	36.60	38.69
Don Mueang	0.02	0.02	0.03	0.10
Bangkok	30.30	32.96	36.63	38.79
Chiang Mai	0.22	0.26	0.39	0.49
Hat Yai	0.02	0.13	0.21	0.22
Phuket	2.29	3.34	4.37	4.82
Chiang Rai	0.0004	0.0004	0.0009	0.0093

Source: Airport of Thailand Plc. (AOT)

4.1 The Model

The study analyzes the determinants of demand for international air travelling measured by number of passengers and flights in Bangkok international airports both arrival and departure. Since the presence of demand in previous period can be accounted as what individuals did in the past also affects their future behavior, then the partial adjustment model is employed in the study and it implies the effects of the independent variables declining geometrically over time.

The models for international travelling of airports in Bangkok can be considered as in (1)-(4).

- Inward Travelling

$$\ln(Passin_{it}) = \alpha + \beta_{p1}\ln(GPC_{it}) + \beta_{p2}\ln(RPin_{it}) + \beta_{p3}agreement_{it} + \beta_{p4}\ln(Passin_{it-1}) \quad (1)$$

$$\ln(Flighin_{it}) = \alpha + \beta_{f1}\ln(GPC_{it}) + \beta_{f2}\ln(RPin_{it}) + \beta_{f3}agreement_{it} + \beta_{f4}\ln(Flighin_{it-1}) \quad (2)$$

- Outward Travelling

$$\ln(Passout_{it}) = \alpha + \beta_{p1}\ln(RGDP_{it}) + \beta_{p2}\ln(RPout_{it}) + \beta_{p3}agreement_{it} + \beta_{p4}\ln(Passout_{it-1}) \quad (3)$$

$$\ln(Flighout_{it}) = \alpha + \beta_{f1}\ln(RGDP_{it}) + \beta_{f2}\ln(RPout_{it}) + \beta_{f3}agreement_{it} + \beta_{f4}\ln(Flighout_{it-1}) \quad (4)$$

where

$Passin_{it}$ is number of international passengers travelling from country i to airport in Bangkok in year t

$Flighin_{it}$ is number of international flights from country i to airport in Bangkok in year t

$Passin_{it-1}$ is number of international passengers travelling from country i to airport in Bangkok in year t-1

$Flighin_{it-1}$ is number of international flights from country i to airport in Bangkok in year t-1

$Passout_{it}$ is number of international passengers travelling from Bangkok to airport in country i in year t

$Flighout_{it}$ is number of international flights from Bangkok to airport in country i in year t

$Passout_{it-1}$ is number of international passengers travelling from Bangkok to airport in country i in year t-1

$Flighout_{it-1}$ is number of international flights from Bangkok to airport in country i in year t-1

GPC_{it} is Gross Domestic Product (GDP) per capita of country i in year t

$RGDP_{it}$ is relative GDP between Thailand and country i in year t which $RGDP_{it} = (\frac{GDP_{tht}}{GDP_{it}})$.

$RPin_{it}$ is cost of living in Thailand compared to origin country i in year t which $RPin_{it} = (\frac{CPI_{tht}}{CPI_{it}}) \times (\frac{Exchange\ Rate_{tht}}{Exchange\ Rate_{it}})$

$RPout_{it}$ is cost of living in destination country i compared to Thailand in year t which $RPout_{it} = (\frac{CPI_{it}}{CPI_{tht}}) \times (\frac{Exchange\ Rate_{it}}{Exchange\ Rate_{tht}})$

$agreement_{it}$ is dummy variable which equals to 1 if there is a ratification agreement on air passenger service between country i and Thailand, for example, Multilateral Agreement on Air Service (MAAS) of ASEAN countries and Bilateral agreement on air service with China

The models are estimated using GLS method with fixed effect model specification that represents countries and time differences. The results demonstrate the relationship between number of international air passengers travelling and its determinants.

4.2 Data

All variables analyzed in the models are involved with number of international air travelling, economic status, relative cost of living between origin and destination, and AEC agreement on air passenger travel as described in table 2.

Table 2 Data and variables in the models

Number of international air travelling	
Data	Number of international passengers and flights between Bangkok and Phuket airports and airports in ASEAN, China, Hong Kong, and Korea, both inward and outward travelling.
Variables	$Passin_{it}$, $Flighin_{it}$, $Passout_{it}$, $Flighout_{it}$
Sources	AOT
Economic status	
Data	GDP and GDP per capita of countries in ASEAN, China, Hong Kong, and Korea
Variables	GPC_{it}, $RGDP_{it} = (\frac{GDP_{tht}}{GDP_{it}})$
Sources	World Bank
Relative cost of living between origin and destination	
Data	- Relative CPI between Thailand and countries in ASEAN, China, Hong Kong, and Korea - Relative exchange rate between Thailand and countries in ASEAN, China, Hong Kong, and Korea
Variables	$RPin_{it} = (\frac{CPI_{tht}}{CPI_{it}}) \times (\frac{Exchange\ Rate_{tht}}{Exchange\ Rate_{it}})$ $RPout_{it} = (\frac{CPI_{it}}{CPI_{tht}}) \times (\frac{Exchange\ Rate_{it}}{Exchange\ Rate_{tht}})$
Sources	IMF's International Financial statistics (IFS)
AEC agreement on air passenger travelling	
Data	Dummy variable represents the occurrence in each year
Variables	$agreement_{it}$
Sources	Department of Civil Aviation (DCA), ERIA and IDE-JETRO (2012)

4.3 Results

The models are estimated using Generalized Least Squares (GLS) with fixed effect model specification that represents countries and time differences. The results demonstrate the relationship between number of international air passengers travelling and its determinants.

The results in table 3 shows the positive effect of AEC agreement on air passenger service to international passengers of inward and outward travelling, at 95% of confidence level, about 35% and 17%, respectively. Similar to the effect on inward flights, the AEC agreement leads to the 19% increase of inward flights at 85% of confidence level.

For inward travelling, 1% change in cost of staying in Thailand compared to origin countries leads to negative effect on international passengers and flights around 0.39% and 0.21%, respectively, at 95% and 85% of confidence level, respectively.

For outward travelling, 1% change in relative GDP between Thailand and destination country leads to positive effect on international passengers and flights around 1.77% and 1.55%, respectively, at 95% of confidence level. While 1% change in cost of staying in destination countries compared to Thailand leads to negative effect on international passengers and flights around 1.58% and 1.54%, respectively, at 90% of confidence level.

Table 3 Results of international inward and outward travelling

Model	**Inward Travelling**	
	(1)	**(2)**
Independent / Dependent	**$Passin_{it}$**	**$Flighin_{it}$**
$\ln(Passin_{it-1})$	0.0743 (0.49)	- -
$\ln(Flighin_{it-1})$	- -	0.300 (1.29)
$\ln(GPC_{it})$	0.00408 (0.09)	0.0212 (0.54)
$\ln(RPin_{it})$	-0.386*** (-2.11)	-0.206* (-1.46)
$agreement_{it}$	0.302*** (2.20)	0.175* (1.48)
Model	**Outward Travelling**	
	(3)	**(4)**
Independent / Dependent	**$Passout_{it}$**	**$Flighout_{it}$**
$\ln(Passout_{it-1})$	-0.107 (-0.92)	- -
$\ln(Flighout_{it-1})$	- -	0.300 (1.29)
$\ln(RGDP_{it})$	1.772*** (2.14)	1.554*** (2.14)
$\ln(RPout_{it})$	-1.581** (-1.82)	-1.535** (-2.03)
Model	**Inward Travelling**	
	(1)	**(2)**
Independent / Dependent	**$Passin_{it}$**	**$Flighin_{it}$**
$agreement_{it}$	0.160*** (2.34)	0.0638 (0.83)

Note:t statistics in parentheses which **** p<0.01 ***p<0.05 **p<0.10 and *p<0.15

5. Conclusion and Policy Suggestion

AEC agreement on air passenger service has positive effect on international passenger both inward and outward travelling and has similar effect on inward flight at airports in Bangkok. Therefore, international airports in Thailand are highly possible to handle with the effect of AEC agreement on air service which is increasing in the future as ASEAN becomes AEC.

Moreover, international economic is one of the important factor to demand for international air travel as ASEAN economic growth is increasing continuously.

Since AEC agreement on air transport leads to positive effect on international air passenger service, airports dealing with higher demand for international travel have substantial effect from these agreements. Hence, Suvarnabhumi, Don Mueang, and Phuket airports would likely to have this consequence. Moreover, international airports located in tourist attraction provinces; i.e. Chiang Mai and Phuket, are also affected from this advancement.

However, there are several main obstacles of aviation sectors nowadays.

- poor mass transport system for regional airports accessibility and public service in provinces
- Limited area for airport capacity increasing
- Different management of different regulators
- Lack of available flight in some domestic routes
- Social problems from advancement

Since these problems are obstacles for air transport infrastructure improvement, hence, having master plan as an integration plan for solving these problems should be done together with airport capacity improving.

Despite having the transport master plan in 2011-2020, some solutions are not stated in the plan. Therefore, this study would like to state some suggestions for developing master plan for air

transport which composes of economic regulation, regional airport development, airport accessibility, passenger's rights protection, airport environment regulation, and connecting policy between air transport and other modes.

5.1. Economic regulation

Clarify and appropriate pricing policy will be benefit for airport competitiveness when aviation market in ASEAN is liberalized. Airport fee should be different between international and domestic airports, fee for international airports have to be profit while some domestic airports in non-attracted tourist provinces should be subsidized by the government. In addition, accountability of regulator in this topic should be stated in the master plan.

5.2. Regional airport development

Due to their potentials, Phuket and Chiang Mai airports should be developed to be regional hub of ASEAN to handle with higher demand for air transport service from ASEAN countries, China, Hong Kong, and South Korea which will benefit for economic activity in region.

5.3. Airport accessibility

Mass transport system should be provided to not only international airports in Bangkok but also regional airports; i.e. Phuket and Chiang Mai airports, by building or expanding road, operating public transport system, investing monorail, etc.

5.4. Passenger's rights protection

Passenger's rights in master plan on air transport should concern on fair compensation of error-occurred in service, appropriate service for handicapped and defining regulators and their accountability.

5.5. Airport environment regulation

Master plan on air transport should provide the regulation on environment and spatial planning and development in both urban and rural areas.

5.6. Connecting policy between air transport and other modes

At present, there is no linkage between air transport policy and other modes. Since some other modes have more competitiveness than air transport, for example, rail transport operating by State Railway of Thailand (SRT) has more market power than Airport Authority of Thailand (AOT) and Department of Civil Aviation (DCA) in order to operate with lower cost. Hence, the intention to invest in high speed rail system in near future would be take over air transport's market share in some routes in medium length if there is no linkage plan for every modes of transportation.

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