

## The Impact of Low Cost Airlines to Airline Industry: An Experience of Thailand

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### ABSTRAK

*The deregulation of airline industry of Thailand has allowed three low cost airlines (LCAs) to operate in domestic routes. This study explored the impact of LCAs to three stakeholders in airline industry, full-service airlines, airports and passengers. The main question was who gained or lost from LCAs. In answering the question, the demand for airline industry was estimated. The change in revenue of airlines and airports were considered as private benefits. The change in consumer's surplus, amount of money that passengers were willing to pay for the airfare but did not pay, was regarded as the social benefit. Comparison of benefits between the expansion and recession periods of the airline industry were examined. Moreover, the change in traveling pattern from Thailand to Laos was also investigated. This study proved that, in the expansion period, LCAs were not harmful to full-service airlines. In turn, they were important to the growth of the industry. However in the recession period, LCAs were growing at the expense of full-service airlines. For passengers, consumer's surplus was increased in the expansion period but decreased in the recession period due to higher airfare. Airports gained in both expansion and recession period. LCAs encouraged tourists to change their traveling pattern from Thailand to Laos via an indirect route, Bangkok - Udorn Thani - Nongkhai - the Friendship Bridge instead of the direct route from Bangkok to Vientiane.*

*Key words: Low Cost Airlines (LCAs); Airline Industry; Consumer's Surplus; Tourism; Greater Mekong Sub-region (GMS)*

### INTRODUCTION

Greater Mekong Sub-region (GMS) is the golden destination for the spread of Low Cost Airlines (LCAs) in Asia. After setting the operation in Thailand,

LCAs extended flying points to Cambodia, Vietnam and Southern China. Because it is new to the GMS, LCAs are still suspicious for their impact to the GMS economy. Thailand as the first experimental country with LCAs in GMS has gained some experiences. This paper will share those experiences to GMS partners, revealing the impact of LCAs to stakeholders in the airline industry.

As Mingsarn (2003) raised a concern on the effect of globalisation to the openness of countries including an introduction of new products and services especially air transport, the issue of benefits distribution should be seriously investigated. It is indeed an aim of this study to explore the pros and cons of LCAs in terms of the impact to stakeholders, mainly measured by revenue and consumer's surplus. The main answer is who gains from LCAs and at what extent.

Some indirect impacts are also in the consideration. Border tourism is another point that LCAs may affect especially Thai-Lao border tourism. Even though Laos has not allowed LCAs to operate domestically, the country may benefit from the LCAs serving from Bangkok to Udon Thani where tourists come to Nongkai and cross the border to Laos via the friendship bridge. The importance of the intra-regional tourism to Laos, 66.4% of total Lao tourism (Mingsarn and Akarapong 2005), makes this issue of the indirect impact as important as the direct impact.

Low Cost Airline (or Low Fare Airline or Budget Airline) is a new business model in the airline industry. It was firstly introduced by Southwest Airline (SWA) in the United States of America in 1971. The success of SWA led to the spread of the model to Europe and then Asia. LCAs compete with lower fare than those of full-service airlines. Fringes in services are cut so that cost can be reduced. Efficiency is the major consideration in LCAs' operation. Several strategies in cutting the cost down are created.

Three Low Cost Airlines are allowed to operate in Thailand due to the deregulation of the domestic airline industry. One-Two Go is the first LCA, taking-off in December, 2003. Thai Air Asia is the second airline, flying since February 2004. The third airline is Nok Air, starting the operation in July 2004.

The major market segment of LCAs belongs to price-sensitive passengers especially in business trips (Treterway and Oum 1992). The lower fare allowed people with lower income to fly more frequent. Passengers even switch from other sources. The first source is other vehicles such as buses, trains and cars. The second source is full-service airlines. Therefore, LCAs may be harmful to other players in transportation

industry. For this hypothesis, Komsan (2005) pointed out that LCAs did not significantly grasp passengers from trains or buses but from full-service airlines. At that time, his study was not completed since it was the very first year of the operation of LCAs. Fine time-series data were not available. To this day, after two years of LCAs operation, the investigation of the impact of LCAs to full-service airlines can be done properly. Moreover, more topics including the impact to passengers and airports are included to summarize the all-round impact of LCAs to the airline industry.

## METHODOLOGY

This study explored the impact of LCAs to three stakeholders in airline industry, full-service airlines, airports and passengers. The main question was who gained or lost from LCAs. In answering the question, the demand for airline industry was estimated. The change in revenue of airlines and airports were considered as private benefits. The change in consumer's surplus, amount of money that passengers were willing to pay for the airfare but did not pay, was regarded as the social benefit.

This section will introduce the demand estimation method. The calculation of the change in revenue of airlines and airports will be briefed. The concept and the illustration of consumer's surplus will be explained. Lastly, two indicators constructed for finding the impact of LCAs in Thailand to traveling pattern from Thailand to Laos will be presented.

## DEMAND ESTIMATION

In this study, demand function is assumed to be linear. The demand function can be derived by two points in the X-Y space where axis X represents the airfare (P) and axis Y represents the number of passengers (Q). The demand function follows the law of demand so that the slope of the function is negative. The number of passengers in two years, 2003 and 2004, are plotted with its average airfare of the industry. The airfare in 2003 is solely the fare of full-service airlines because there were no LCAs available at that year. However, the weighted average airfare was calculated for the year 2004 when three LCAs entered to the industry.

Having two points in the X-Y plane, a simple calculation of linear function is proceeded by this formula,

$$Y - Y_1 = m(X - X_1) \quad (1)$$

where  $m$  is the slope of the function.

$$m = \frac{\Delta Y}{\Delta X} = \frac{Y_2 - Y_1}{X_2 - X_1} \quad (2)$$

Substitute  $P$  and  $Q$  for  $Y$  and  $X$  respectively. Let year 2003 as the first year and 2004 as the second year. Then, the demand for airline industry can be written as below.

$$P = \left\{ \left( \frac{P_{2004} - P_{2003}}{Q_{2004} - Q_{2003}} \right) (Q - Q_{2003}) \right\} + P_{2003} \quad (3)$$

To illustrate the demand for airline industry in Thailand, the data is presented in the Table 1.

TABLE 1. Number of passengers ( $Q$ ) and average airfare ( $P$ ) of airline industry in Thailand, 2003 - 2004

Year	Passengers (Million persons)	Average Airfare (Baht per seat)
2003	7.38	2,600
2004	10.39	2,243*

Source: Numbers of passengers are provided by Airports of Thailand Public Co., Ltd. Average airfares are calculated by this study.

Note: \*Weighted average airfare, detail is shown in Table A1.

TABLE A1. Data for the calculation of weighted average price of airline industry in 2004

Airline	Airfare	Weights (Market Share)
Full-service airlines	2,600	0.67
Thai Air Asia	1,600	0.11
Nok Air	1,700	0.11
One-Two Go	1,250	0.11

Note: Total weight is  $0.67+0.11+0.11+0.11=1.00$

Thus, the demand for airline industry in Thailand can be formulated to be this function.

$$P = 3,475 - 118.605Q \quad (4)$$

The function can be illustrated as a graph in the  $X$ - $Y$  space, shown in Figure 1.

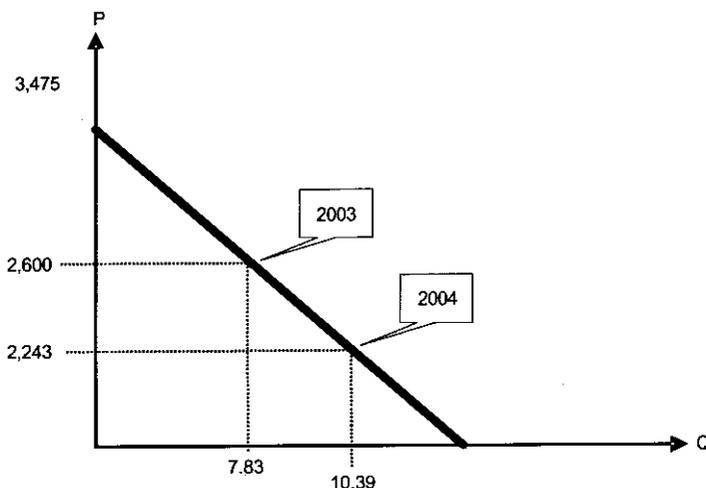


FIGURE 1. The linear demand function of airline industry in Thailand

#### CHANGE IN REVENUE OF AIRLINES

The change in revenue of airlines can be separated to two parts. The first part belongs to full-service airlines and the second part belongs to LCAs. The following section will explain how to derive the change in both parts of revenue.

#### CHANGE IN REVENUE OF FULL-SERVICE AIRLINES

For the calculation of the revenue of full-service airlines (FSAs), the demand for FSAs has to be estimated. There are some assumptions according to the estimation, the assumption about price and the slope of the function.

Even though the oil price started to increase sharply in 2004, the airfare of FSAs was remained at almost the same level as in 2003. Instead, fuel surcharge was adopted heavily later in 2005 by airlines when the fuel cost was irresistible. Therefore, it is assumed in this study that the airfare of FSAs in 2003 and 2004 are the same.

Despite LCAs led to many changes in the airline industry but the consumer preference was not affected dramatically in terms of price elasticity. This is because LCAs lowered the airfare and consumers responded to the lower airfare by purchasing more services. The circumstance was accordant to the law of demand and that was called the change in demand. This type of change does not affect the slope of the demand function. Therefore, the slope of the demand function remained

the same. Technically, it can be said that the price elasticity does not change by the entry of LCAs. Passengers only reflected to the price change but did not produce the change in consumer behaviour.

Before the entry of LCAs in Thailand, the airline industry was monopolised by FSAs. At that time, should the airfare of FSAs dropped to the level that LCAs offered, passengers would respond by purchasing more services to the level as if they did for the market with LCAs. To this point, the demand for airline industry can be used to analyse in both cases, the first case the price reduction with only FSAs in the market and the second case the lower price offered by LCAs. Without LCAs, the demand function for airline industry is clearly the demand for FSAs. Thus, the slope of the demand for FSAs is as the same as the slope of the overall market demand. This reason allows this study to share the same slope between the demand for airline industry and the demand for FSAs.

To illustrate the demand for FSAs, the data is provided in Table 2.

TABLE 2. Number of passengers (Q) and average airfare (P) of full-service airlines in Thailand, 2003 - 2004

Year	Passengers of FSAs (Million persons)	Average airfare (Baht per seat)
2003	7.38	2,600
2004	8.33	2,600

Source: Numbers of passengers are provided by Airports of Thailand Public Co., Ltd. Average airfares are calculated by this study.

Using equation (3) and assumptions mentioned above to calculate linear demand function, the demand for FSAs can be written as follow.

$$P = 3,588 - 118.605Q \quad (5)$$

The function can be illustrated as a graph in the X-Y space, shown in Figure 2.

The expansion of the airline industry in 2004 yields more revenue to FSAs. The revenue of FSAs increased from 19,188 million baht (7.38 Million passengers with 2,600 baht per seat) to 21,658 million baht ( 8.33 million passengers with 2,600 baht per seat). The change in revenue of FSAs was 2,470 million baht (shown by area ABCD in Figure 2).

For the calculation of the change in revenue in 2005, the same demand for FSAs was used. The situation of rising oil price drove the airfare up by additional 100 baht of fuel surcharge. Thus the average airfare of FSAs raised up from 2,600 to 2,700 baht. The market responded to the higher

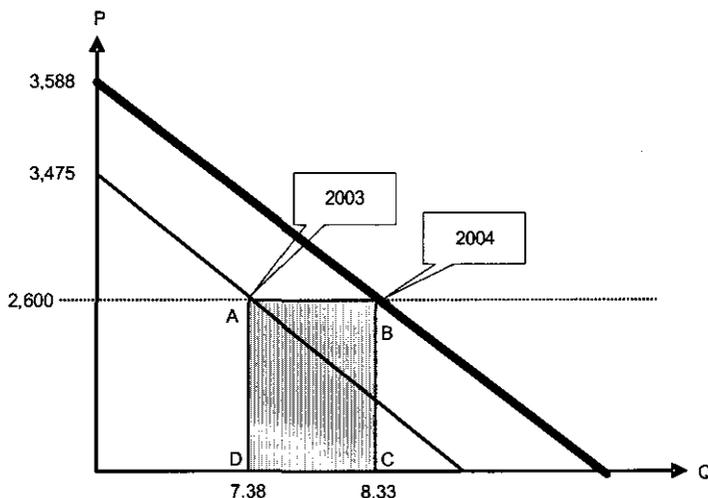


FIGURE 2. The linear demand function of full-service airlines in Thailand

airfare by the reduction of passengers using FSAs. The number of passengers reduced 12 % as shown in Table 3.

TABLE 3. Number of passengers (Q) and average airfare (P) of full-service airlines in Thailand, 2004 - 2005

Year	Passengers of FSAs (Million persons)	Average airfare (Baht per seat)
2004	8.33	2,600
2005	7.31	2,700

Source: Numbers of passengers are provided by Airports of Thailand Public Co., Ltd. Average airfares are calculated by this study.

The change in demand from point C to B led to the decreasing in the revenue of FSAs, showing in Figure 3.

From figure 3, the revenue of FSAs decreased from 21,658 million baht in 2004 (area ODCF) to 19,737 million baht in 2005 (area OABE). The change in revenue was minus 1,921 million baht.

#### CHANGE IN REVENUE OF LOW COST AIRLINES

The calculation method in the previous section can be applied for the change in revenue of LCAs. However, the year 2004 was the first year of

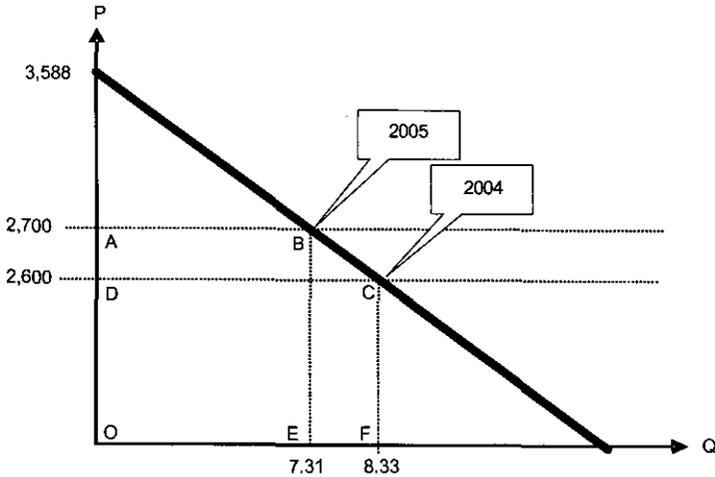


FIGURE 3. The decrease of revenue of full-service airlines in 2005

operation of LCAs. Therefore only one set of data about airfare (P) and number of passengers (Q) were available. The formula in equation (3) cannot directly applied without having an assumption. The slope of the demand function of LCAs is assumed to be the same as the slope of the airline industry. The proper of making this assumption was explained in the previous section.

TABLE 4. Number of passengers (Q) and average airfare (P) of Low Cost Airlines in Thailand, 2004

Year	Passengers of LCAs (Million persons)	Average airfare * (Baht per seat)
2004	2.07	1,517*

Source: Numbers of passengers are provided by Airports of Thailand Public Co., Ltd. Average airfare is calculated by this study.

Notc: \*Weighted average airfare, detail is shown in Table A2.

TABLE A2. Data for the calculation of weighted average price of LCAs in 2004

Airline	Airfare	Weights (Market Share)
Thai Air Asia	1,600	0.33
Nok Air	1,700	0.33
One-Two Go	1,250	0.33

Note: Total weight is 0.33+0.33+0.33=0.99, not 1.00

According to data in Table 4, the demand for LCAs can be derived by using equation (3) with the assumption about the slope of the function. The result is presented below.

$$P = 1,763 - 118.605Q \tag{6}$$

The function can be illustrated as a graph in the X-Y space, shown in Figure 4.

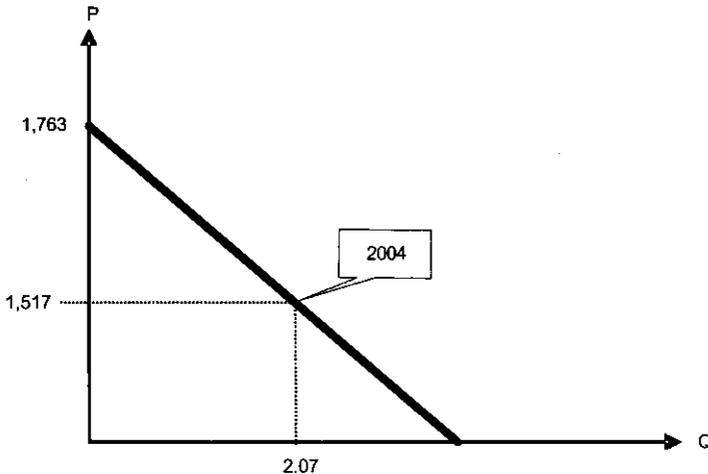


FIGURE 4. The linear demand function of Low Cost Airlines in Thailand

Even though One-Two Go started the operation in December, 2003, there was only one route, Bangkok-Chiang Mai, available at that time with the very cheap price, 999 Baht per seat. The appearance of LCAs was dominant in 2004. This study therefore ignored the revenue of LCAs in 2003 and assumed it to be zero.

The influential concept of domestically retained value added introduced by Mingsarn et al. (2005a) led this study to adjust the revenue of LCAs to only those belonged to the Thai. Although this study did not compute value added, it is intended to count only the Thai share in the revenue as the impact of LCAs to the Thai airline industry. The reason is that if all shares were held by foreigners, it was nothing to the Thai from the growth of LCAs enterprises in terms of the distribution of revenue. The gains from LCAs can be realised only if the Thai receives those benefits. Thus, the revenue of LCAs will be counted only the Thai's share, about 83% on average (Table A3).

According to the data and the Thai share holding in LCAs, the change of the Thai revenue in 2004 was 2,601 million baht.

TABLE A3. Data for the calculation of weighted average share holding of the Thai in LCAs

Airline	Thai share	Weight (Market share)
Thai Air Asia	0.51	0.33
Nok Air	1.0	0.33
One-Two Go	1.0	0.33

Note: Total weight is  $0.33+0.33+0.33=0.99$ , not 1.00

In 2005, the airfare of LCAs rose gradually due to the fuel cost. Despite the higher airfare, more passengers chose to fly with LCAs. In this case, the demand for LCAs in 2005 shifted to the right-hand side of the demand in 2004. Both demand function are shown in Figure 5. The data to construct the demand in 2005 is available in Table 5.

TABLE 5. Number of passengers (Q) and average airfare (P) of Low Cost Airlines in Thailand, 2005

Year	Passengers of LCAs (Million persons)	Average airfare* (Baht per seat)
2005	3.03	1,617*

Source: Numbers of passengers are provided by Airports of Thailand Public Co., Ltd.

Note: \*Weighted average airfare was raised by 100 baht from 2004 due to fuel surcharge.

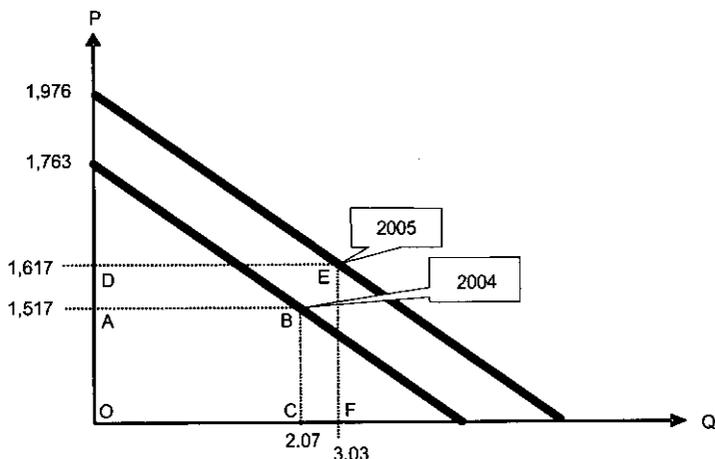


FIGURE 5. The linear demand function of Low Cost Airlines in 2004 and 2005

The demand for LCAs in 2005 is the function below.

$$P = 1,976 - 118.605Q \quad (7)$$

The revenue of LCAs in 2005 was 4,900 million baht (area ODEF in Figure 5). However, after adjusted by the Thai share holding, about 83% on average, the Thai revenue was 4,058 million baht. The change in revenue in 2005 then counted for 1,457 million baht.

#### CHANGE IN REVENUE OF AIRPORTS

Airports gain benefits from LCAs in two channels, domestic routes and international routes. In this study, both channels were examined. In domestic routes, major revenue comes from landing fee, collected from airlines, and airport tax, collected from passengers using airlines. In international routes, the sources of revenue are the same. There is another source of revenue, the parking fee, but this revenue shares only little portion of total revenue. LCAs avoid parking for long time at airports, making a turnaround in 45 minutes, so that they rarely pay for the parking fee. Therefore, this study will ignore the parking fee. In this section, the estimation of airports' revenue due to LCAs will be presented. The first part will be the revenue from domestic routes. Later, the revenue from international routes will be presented in the second part.

*Change in Revenue of Airports from Domestic Routes.* In this section, the revenue from landing fee and airport tax will be separately presented. Firstly the landing fee will be examined, and secondly the airport tax will be investigated.

**Landing fee.** The rate to calculate the landing fee differs among aircraft types. It is measurable in terms of weights of an aircraft. Even the same type of aircraft, the fee can be different due to different number of passengers which affect the total weight of the aircraft. However, this study by passed this complexity by using an indirect estimation by the division of total landing fee that an airline paid to airports by total aircraft movements of the airline. With this calculation, the rate of landing fee was averaged for each airline. The detail of the average landing fee of each airline is presented in Table A4.

**Airport tax.** All domestic passengers have to pay 50 baht per flight for the airport tax. The tax is usually included in the ticket price. The calculation of airport tax is direct, multiplying the number of passengers with 50 baht.

TABLE A4. Average landing fee for each airline

Airline	Landing fee(baht per flight)	Major aircraft type
Full-service airlines	6,024	Airbus A300
		Airbus A330
		Boeing 737
		Boeing 747
		Boeing 777
Thai Air Asia	1,515	Boeing 737
Nok Air	1,665	Boeing 737
One-Two Go	5,960	Boeing 747

Source: Calculation using data from AOT, Chiang Mai office, May 2005

*Change in revenue of airports from international routes.* For international route in 2004, four airlines are involved in the calculation, Thai Air Asia with international flights, Air Asia, Tiger airways and Valu air. According to aircrafts type Boeing 737 which all these airlines use, this study assumed the landing fee to be 1,515 baht per flight as applied to Thai Air Asia's domestic flight. The minimum rate is used to avoid the over-estimation. The calculation is multiplying the arrival flights to Thailand of these airlines with the landing fee.

The airport tax in international routes is 500 baht per passenger. The revenue comes from only departing passengers. Therefore, the calculation is to multiply the number of passengers in departure flights with 500 baht.

In 2005, the data of international flights is still not available. This study assumed the same amount of revenue in the sense that the revenue at the time of expandable LCAs in international routes should not less than the previous year.

#### CONSUMER'S SURPLUS

Consumer's surplus (CS) is the amount of money that a passenger is willing to pay but does not have to pay. It is the money that a passenger can save. The saving money is considered as a benefit for passengers. The benefit is concerned as a social benefit due to it is good to public.

The lower airfare offered by LCAs raises the CS of passengers. As passengers will to pay at a constant price, the lower price widens the difference of the willingness to pay and the real payment. The wider gap between these two amounts, the more CS a passenger gains.

In calculation of the CS, the demand functions that were constructed in previous sections are prerequisites. This section will present the CS of passengers using FSAs and LCAs respectively.

*Consumer's surplus of passengers using full-service airlines.* According to the demand for FSAs in 2003, CS of passengers using FSAs can be shown by the shading area in Figure 6. The amount of CS can be calculated by the area of the triangle.

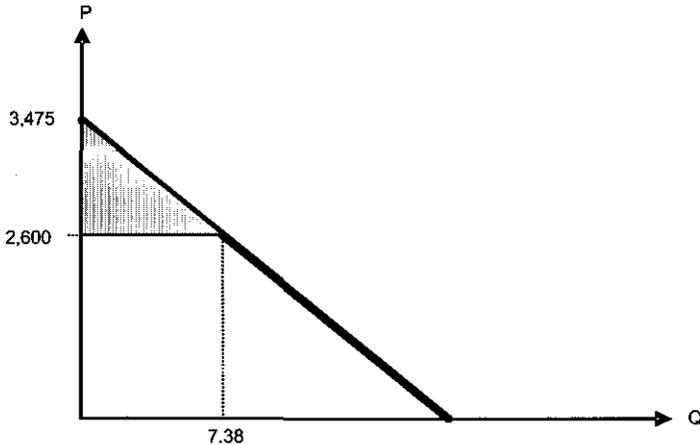


FIGURE 6. Consumer's surplus of passengers using full-service airlines in 2003

In 2004, as the demand for FSAs shifted up, the CS rose proportionally. Theoretically, the CS should have been calculated by the area of triangle ULR. However, as the author believes, an increasing demand means that, at the same price, the number of passengers increase. A passenger may not want to pay more for having a ticket. With this opinion, this study ignores the area of triangle NLM. Therefore, CS is only the area UNMR in Figure 7.

In 2005, as the airfare of FSAs rose along with the reduction of the number of passengers, the CS for FSAs decreased. The CS can be shown as the shading area in Figure 8, the area VNMJ.

*Consumer's surplus of passengers using low-cost airlines.* The CS of passengers using LCAs can be calculated by the same fashion. Using the demand for LCAs, the CS in 2004 is the area of triangle AWB and the CS in 2005 is the area DWFE in Figure 9. As most LCAs emerged in 2004, the CS in 2003 is ignored to be zero.

#### INDICATORS MEASURING IMPACT OF LCAS TO TRAVELING PATTERN

To investigate the impact of LCAs to the traveling pattern from Thailand to Laos, two indicators were constructed. The first one was the ratio of

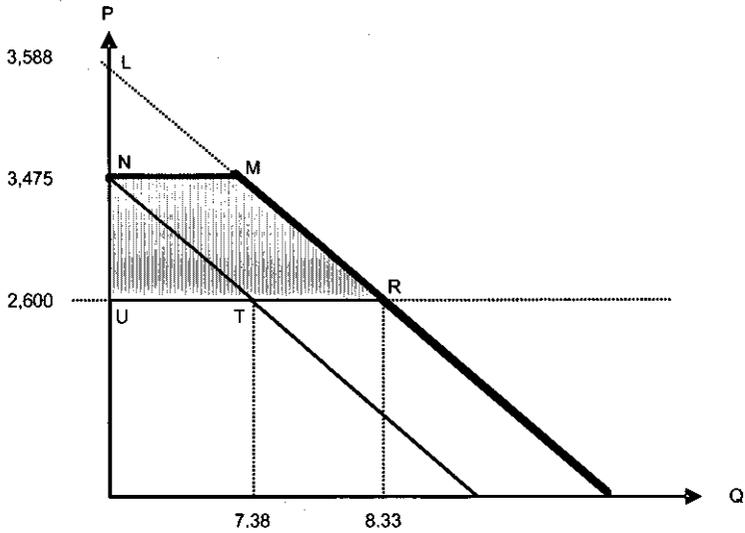


FIGURE 7. Consumer's surplus of passengers using full-service airlines in 2004

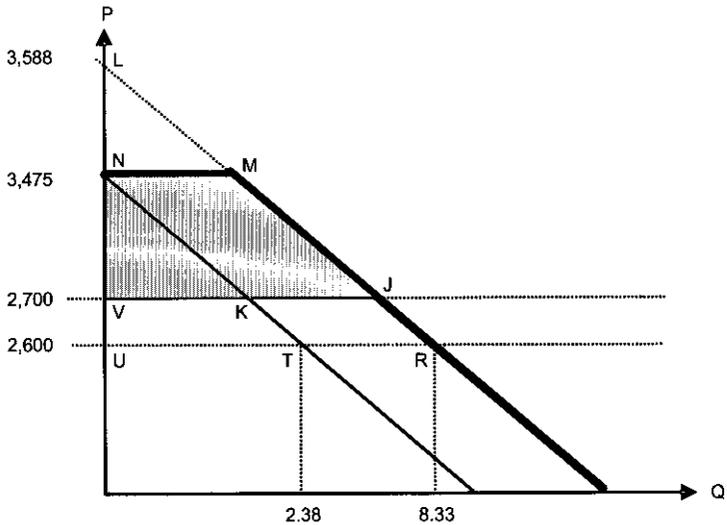


FIGURE 8. Consumer's surplus of passengers using full-service airlines in 2005

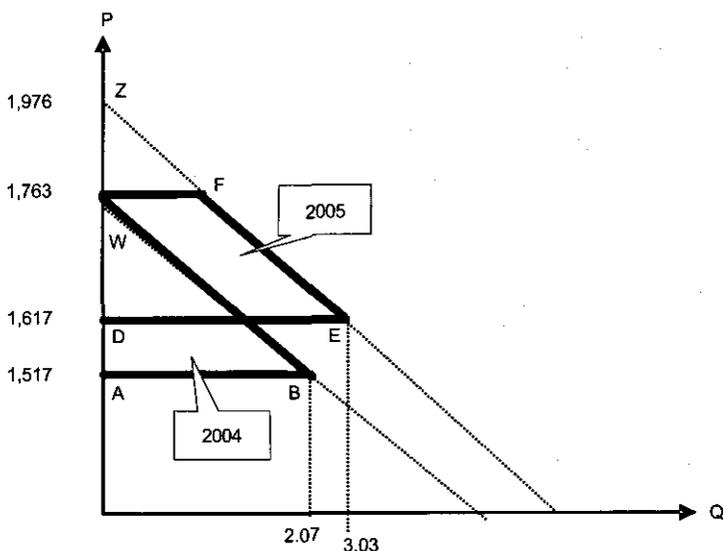


FIGURE 9. Consumer's surplus of passengers using low-cost airlines in 2004 and 2005

passengers of LCAs from Bangkok to Udon Thani by the number of tourists entering Laos via the friendship bridge. The second was the ratio of passengers of full-service airlines from Bangkok to Vientiane by the total number of tourists to Laos. The formulas were shown below.

**Udon - Friendship Bridge Ratio (UFB).** Thai Air Asia serves passengers from Bangkok to Udon Thani in Thailand. This route is crucial for travelers who want to cross the border to Laos with lower cost. The airfare, 970 baht, plus the bus fare to Nongkai, 200 baht, are totally 1,170 baht. Compared with the FSAs fare from Bangkok to Vientiane, 4,925 baht, LCA helps saving as much as 3,755 baht. The 75 % saving price induces more travelers using this indirect route to Laos rather than the direct route.

A ratio was constructed to monitor the relationship between people flying with LCAs from Bangkok to Udon Thani and people crossing the friendship bridge to Laos. The ratio is presented below.

$$UFB = \frac{M}{N} \times 100 \quad (8)$$

UFB = Udon - friendship bridge ratio

- M = Number of passengers flying with LCA from Bangkok to Udon Thani  
 N = Number of tourists crossing the friendship bridge to Laos

The meaning of this ratio is that out of 100 people crossing the friendship bridge to Laos, how many people come from LCAs flights serving from Bangkok to Udon Thani. The rising of the indicator may reveal that more tourists using the LCA route to travel to Laos. However, an only indicator may not enough to be an evidence to validate this hypothesis. Therefore, another indicator was constructed, the Bangkok-Vientiane by all tourist to Laos ratio.

Bangkok - Vientiane by all tourists ratio to Laos (BVTL). The Bangkok - Vientiane by all tourists ratio to Laos will help the first ratio, UFB, to make a concrete confirmation of the hypothesis. The rationale behind this indicator is that if tourists switched from the direct route, Bangkok-Vientiane by FSAs, to the indirect route, Bangkok-Udon Thani-Nongkhai-the Friendship Bridge using LCAs, then the number of passengers flying with FSAs in the direct route should drop.

However, measuring in terms of number of tourists may not make anything clear. The uptrend of Lao tourism presents more tourists flying in the direct route. Thus, a ratio of those tourists to all tourists may be clearer to figure out the situation.

The formula to construct the indicator is shown below.

$$BVTL = \frac{F}{A} \times 100 \quad (9)$$

- BVTL = Bangkok - Vientiane by all tourists ratio to Laos ratio  
 F = Number of passengers flying with FSA from Bangkok to Vientiane  
 A = Number of all tourists to Laos

The meaning of this ratio is that among 100 tourists visiting Laos, how many tourists enter Laos by flying with FSA From Bangkok to Vientiane. The drop of this ratio means that the travel mode is less popular. Travelers may switch to other travel modes. The inverse signs of the two indicators, BVTL and FSA, will confirm the switching from the direct route to the indirect route.

## RESULTS AND DISCUSSION

In the first year of the emergence of LCAs, 2004, the airline industry of Thailand grew 41%, 28 percent from LCAs and 13% from full-service airlines. The high growth was partly because of the recovery from the four-month Severe Acute Respiratory Syndrome (SARS) outbreak in Thailand in March to June, 2003. SARS caused the reduction of 34.72% of tourists who should visit Thailand in that year and the lost of 34,515 million baht from tourism revenue (Mingsarn et al 2005b). The rebound to the normal situation boosted the rapid growth of tourism industry as well as the airline industry in Thailand.

In 2004, LCAs served 2 million passengers, about 20% market share of the industry. Among the passengers of LCAs, 1.2 million were new to the industry while 0.8 million switched from full-service airlines. The switching passengers accounted for 40% of LCAs' consumers and 11 percent of full-service airlines' clients.

In the second year after the entry of LCAs, 2005, the airline industry was in recession due to Tsunami catastrophe and rising oil price. Although the industry declined by 0.5%, LCAs continued to expand by 42%. At the same time the market share of full-service airlines declined by 12%.

This section will present the results which were obtained from the study. Some discussions will be also placed here. The contents are to present the impact of LCAs to private benefits, social benefits and the switching travel pattern to Laos respectively.

### IMPACT OF LCAS TO PRIVATE BENEFITS

As mentioned, private benefits are measured in terms of the change of revenue of airlines and airports. Comparison between the expansion, 2004, and recession periods, 2005, are presented.

*Impact of LCAs to full-service airlines.* In the expansion period, 2004, full-service airlines were not harmed by LCAs. Their revenue increased 2,470 million baht. However, in the recession period, 2005, the revenue decreased 1,921 million baht. The lost in revenue was partly due to the switching passengers from FSAs to LCAs to enjoy lower airfare.

*Impact of LCAs to full-service airlines.* In the first year of operation, 2004, the revenue of LCAs were accounted for 2,601 million baht. Assumed that the revenue in 2003 is zero, this amount is the change in revenue

accordingly. In 2005, even the overall industry was in recession, the revenue of LCAs increased 1,457 million baht. The increasing of revenue did not mainly come from passengers who were new to the industry but from switching FSAs passengers.

*Impact of LCAs to airports.* Airports gained in both years. Due to only revenue received from LCAs, 311 million baht was added to the airports' accounts in 2004 (Table 6). Despite the experience suffered by FSAs in the competition with LCAs in 2005, airports still gained 25 more million baht from LCAs.

TABLE 6. Airport's revenue due to the operation of low-cost airlines

Items	Sub-items	2003 (Baht)	2004 (Bath)
Domestic revenue		150	216
	Landing fee	46	65
	Airport Tax	104	151
International revenue		161	161*
	Landing fee	4	4 *
	Airport Tax	157	157 *
Total revenue		311	377
Previous year's revenue		0*	311
The Change in airport's revenue		311	66
Lost from decreasing FSAs flights		0	-41
Grand Total of the change in airport's revenue		311	25

Source: Calculation using data from Airports of Thailand Public Co. Ltd.

Note: \*Assumed

#### IMPACT OF LCAS TO SOCIAL BENEFITS

Consumer's surplus (CS) of passengers using FSAs in 2004 increased 833 million baht proportionally to the expansion of the amount of passengers enjoying flying with FSAs. However, due to the higher airfare in 2005, the Consumer's surplus reduced 782 million baht.

For passengers using LCAs, in 2004, the CS increased dramatically as it is the first year of most carriers in Thailand. The CS was accounted for 255 million baht. In 2005, despite the higher airfare was charged to passengers of LCAs, the rising amount of passengers using LCAs helped compensating the price effect. At the result, the CS in this year did not

drop. It was maintained at almost the same level as in the previous year. The change of CS was accounted for 8 million baht, a small amount but a positive one. This result can be said that LCAs is a stabiliser of consumer's surplus in the airline industry. If they keep growing, passengers will be the major stakeholder who benefit from the growth.

IMPACT OF LCAS TO TRAVELING PATTERN

Adopting the two indicators presented in equations (8) and (9) with average value before and after the emergence of LCAs, satisfactory signs of the indicators were obtained.

In Table 7, data and the average value of the first indicator is presented. Next in Table 8, the data and the value of the second indicator is also shown.

TABLE 7. Udom-Friendship Bridge Ratio (UFB)

Year	Number of passengers arrival to Udom Thani <sup>1</sup> (persons)	Number of tourists crossing border to Laos via the friend-bridge <sup>2</sup> (persons)	UFB ratio	Average UFB ratio
2001	194,294	355,192	54.70	51.03
2002	184,269	417,320	44.16	
2003	183,439	338,274	54.23	
2004	311,067	474,228*	65.59	63.78
2005	335,295	541,016	61.98	

Sources: <sup>1</sup>Department of Air Transportation, Ministry of Transportation, Thailand.

<sup>2</sup>Statistical Report on Tourism in Laos.

Note: \*Estimated by the author.

TABLE 8. Bangkok-Vientiane to all Tourists to Laos Ratio (BVTL)

Year	Number of passengers flying from Bangkok to Vientiane (persons)	Number of all tourists visiting Laos (persons)	BVTL ratio	Average BVTL ratio
2001	68,391	673,823	10.15	
2002	73,546	735,662	10.00	10.01
2003	62,943	636,361	9.89	
2004	80,326	894,806	8.98	8.98

Sources: <sup>1</sup>Airports of Thailand Public Co. Ltd.

<sup>2</sup>Statistical Report on Tourism in Laos.

Note: Data in 2005 from Airports of Thailand Public Co. Ltd. is still not available.

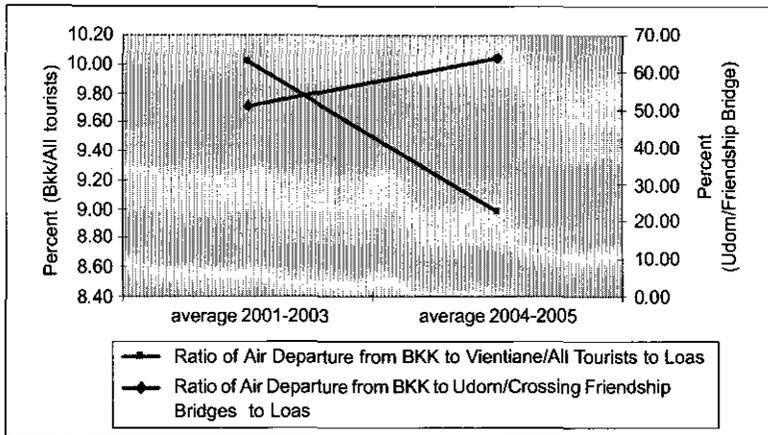


FIGURE 10. The combination of UFB and BVTL ratio to confirm the switching travel pattern from Thailand to Laos

Comparing the two indicators before and after the emergence of most LCAs in Thailand, UFB ratio was rising whereas the BVTL was dropping. This is satisfactory to the hypothesis of this study. It may be an evidence that travelers switch patterns from using a direct route with FSAs to Laos to an indirect route with LCAs via Udon Thani and the friendship bridge. A clearer illustration of these indicators is shown in Figure 10.

It is worth to remark that the switching travel pattern did not confirm anything about the increasing number of tourists to Laos in the future. However, it can be expected that Laos should gain benefits from this pattern. As Mingsarn and Akarapong (2005) found that Laos has tourism potential in Southeast Asian market, especially in its neighboring markets of Thailand with the Tourism Competitive Advantage Ratio (CAR) of 33.9, and with the statistic record that about 85.9% of tourists came to Laos by Land in 2003, it is expectable that LCAs which enhance more tourists crossing the border from Thailand to Laos via the friendship bridge will enhance more tourists crossing the border to Laos. If this is true, LCAs will be a beneficial agent to help strengthen Laos' tourism potential. LCAs may also rescue Laos from the position of "Lost opportunity" and "Falling star" in several tourism markets as indicated by dynamic RCA indicators (see full definitions of dynamic RCA in Mingsarn and Akarapong 2005). This is an interesting point to be monitored when more time-series of LCAs data are available in the future.

## CONCLUSION

In this section, the conclusion of the impact of LCAs to airline industry will be presented in two parts. The first part will conclude the direct impact to private and social benefits which comparable between expansion and recession periods. The second part will be the conclusion of the indirect impact to the traveling pattern.

### IMPACT OF LCAS TO THE TOTAL BENEFITS: COMPARISON BETWEEN EXPANSION AND RECESSION PERIODS.

The prosperities of the industry in the expansion period were shared among stakeholders. Total benefits, both private and social benefits, produced by the industry in 2004 were 6,470 million baht (table 9). Private benefits accounted for 5,382 million baht (83 %) whereas the society gained 1,088 million baht (17 %). For private benefits, LCAs' revenue increased 2,601 million baht. Full-service airlines' revenue also increased 2,470 million baht. Airports gained 311 million baht solely from LCAs. Airport tax and landing fee in international routes accounted 52 % of airports' benefits whereas domestic routes contributed to 48.5. For social benefits, consumer's surplus was raised 1,088 million baht by both the expansion of demand for full-service airlines (833 million baht or 77 %) and the birth of LCAs (255 million baht or 23 %). For summary, LCAs contributed to 3,167 million baht (48 %) for both private and social benefits (LCAs and airports' revenue plus LCAs passengers' CS). Full-service airlines contributed to the remaining 3,303 million baht (52 %).

In the second year, total benefits decreased 1,213 million baht (Table 9). Private benefits were lost 439 million baht (33 % of total benefit lost) whereas social benefit was lost 774 million baht (67 %). LCAs raised their revenue up 1,457 million baht at the expense of 1,921 million baht lost in revenue of full-service airlines. One million passengers switched from full-service airlines to LCAs. Airports still gained 25 million baht more than the previous year, receiving additional 66 million baht from rising LCAs while losing 41 million baht from the decline of full-service airlines. Consumer's surplus of full-service airlines' clients dropped 782 million baht according to the increasing of fuel-surcharge. However, passengers of LCAs did not lose consumer's surplus because of the compensability between increasing demand for LCAs and the climbing airfare.

TABLE 9. Summary table

Unit: Million baht			
Items	Sub-items	2003	2004
Total Benefit		6,470	-1,213
Private Benefit		5,382	-439
	Change in FSAs revenue	2,470	-1,921
	Change in LCAs revenue	2,601	1,457
	Change in airports' revenue	311	25
Social Benefit		1,088	-774
	Change in FSAs passengers		
	Consumer's surplus	833	-782
	Change in LCAs passengers		
	Consumer's surplus	255	8

Source: Calculation

Second Impact of LCAs to traveling pattern.

Two indicators were constructed for finding the impact of LCAs in Thailand to the traveling pattern from Thailand to Laos. The first one was the ratio of passengers of LCAs from Bangkok to Udorn Thani by the number of tourists entering Laos via the friendship bridge. The second was the ratio of passengers of full-service airlines from Bangkok to Vientiane by the total number of tourists to Laos. The first ratio increased at the decrease of the second ratio. This result showed that the more LCAs serving from Bangkok to Vientiane, the more tourists entering Laos via the friendship bridge at the diminishing of full-service airlines serving directly from Bangkok to Vientiane.

#### ACKNOWLEDGEMENTS

The author is grateful to Prof. Mingsarn Kaosa-ard for her granting of this opportunity to do the research. Airports of Thailand Public Co. Ltd (AOT), especially Ms. Chuleeporn Sathityanuruk, provided beneficial air transportation data. Data of Lao tourism was kindly provided by Mr. Thavipheth Oula and Mrs. Korawan Sangkakorn. Finally, the author would like to thank you Ms. Siriporn Srichoochart for her perennial support and understanding.

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