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THE TAXATION EFFECTS OF TOURISM UNDER AVIATION DEREGULATION IN A SMALL OPEN ECONOMY

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ABATRACT

In the past four years, Chinese tourists' consumption in Taiwan has contributed to the Taiwanese economy. However, there is a limited literature documenting the actual tax effects under the aviation deregulation. Based on the models established by Leontief (1966) and Miyazawa (2002) and by adding the effective tax rate, which is employed by the Japan National Tourism Organization (2010), the present study measures the indirect tax, the personal income tax, and the corporate income tax resulting from the change in the transport policy. This allows us to get better understanding the tax effects of the change in a transport policy. The empirical results show that the total tax revenue of the aviation deregulation generated for US$1,047.3164 million, equivalent to the total tax revenue of 1.78% in 2011 in a small open economy. The indirect tax revenue, the personal income tax revenue and the corporate income tax revenue accounted for 0.76%, 0.81%, 0.21%, respectively. As for the industrial sector, the tax revenue from the service-related industry is US$939.7126 million, which accounts for up to 89.73% of the total tax revenue under the aviation deregulation.

KEYWORDS: Aviation Deregulation; Effective Tax Rate, Tax Revenue Effect

JEL: H29, R28, R38

INTRODUCTION

The economic development of most Asian countries has long depended on trade. The manufacturing sector has been the focus of government's economic policies. With increasing gross domestic product, the magnitude of the government spending and the accumulated fiscal deficit also rise continually. The financial crisis in 2008 shattered the global economy. (Lane and Milesi, 2008; Apergis and Tsoumas, 2009; Farhi and Tirole, 2009; Hume and Sentance, 2009; Warnock and Warnock, 2009; Hall, 2010; Woodford, 2010; Campello, Graham and Harvey, 2010; McCauley and Scatigna, 2011) Subsequently, Taiwan's exports declined significantly. Even though the Taiwanese government attempted to maintain its economic growth by increasing public investments and by implementing an expansionary monetary policy, its economic downturn continues in Taiwan, and the expected fiscal revenue could not be achieved. However, the development of the international tourism industry could bring a lot of foreign exchange reserves. The tourism industry is a pollution-free green one with little concerning of the external costs. Therefore, the Taiwan's government attempts to increase international tourists to solve the financial predicament. On December 15, 2008, both China and Taiwan permitted the direct entry of their travelers.

Before this, China and Taiwan had not provided a direct transport mode for their travelers or commodities. Their travelers and commodities had to be transported using transitional modes from other regions or countries. In 2010, the designated direct air routes increased to 31 and the flights between China and Taiwan

had also expanded to 370 flights per week. In June 2011, Taiwan authority further relaxed its restrictions by allowing Chinese people to visit freely and individually, In July 2012, the designated direct air routes further increased to 41 and expanded weekly flights to 558. On December 15, 2012, it has further increased 9 direct air routes and increased weekly flights to 616 in response to the New Year's holiday. With the aviation deregulation and the increase of direct air routes, the amount of Chinese tourists visiting Taiwan increased rapidly from 329,204 in 2008 to 972,123 in 2009, 1,630,735 in 2010, 1,784,185 in 2011, and 2,235,636 in 2012. The government hoped that the consumption of foreign tourists would boost economic growth and increase national income.

In the past four years, Chinese tourists' consumption in Taiwan has contributed to the Taiwanese economy. There is a little literature documenting the role of the actual tax effects under the aviation deregulation. Based on the models established by Leontief (1966) and Miyazawa (2002) and by adding the effective tax rate, which is employed by the Japan National Tourism Organization (2010), the present study measures the indirect tax revenues, the personal income tax revenues, and the corporate income tax revenues resulting from the change in the transportation policy. This might allow us to get better understanding the tax effects of the change in the transportation policy. The remainder of this paper is organized as follows: Section 2 reviews previous studies. Section 3 describes the methodology. Empirical results are presented in Section 4. The final section concludes with a brief summary

LITERATURE REVIEW

Some previous studies focused on the supply-demand analysis of change in the aviation market to examine the effect of the aviation deregulation. Aviation Deregulation (Dargay, 1993; Witt and Witt, 1995; Karlaftis et al., 1996; Cline et al., 1998; Abed et al., 2001; Goh and Law, 2002; Lai and Lu, 2005). Others investigated the effect of aviation deregulation in terms of cost (Waters, 1970; Gillen et al. 1988, 1990; Dresner and Tretheway, 1992; Robinson, 1994; Barrett, 2000; Youdi et al., 2003; Hummels, 2007). However, prior studies have mixed results in identifying a relationship between deregulation and airline industry cost of capital. Allen et al. (1990): Deregulation of U.S. Airline Industry might have lowered the systematic risk because pricing freedom and route flexibility improved airline management reaction to various economic conditions. Reduced systematic risk offers lower cost of equity capital for the industry as a whole as well as for individual carriers. In addition, some studies had evaluated the compelling economic effects of aviation deregulation (Shaw, 1982; Wilson, 1986; Thornicroft, 1989; Barrett, 1992; Doganis, 1994; Button, 1996; John, 1997; Gillen and Lall, 2002; Schipper et al., 2003; Oum et al., 2003, 2004; Ida and Tamura, 2005; Schipper et al., 2007).

Schipper et al. (2003) documented how the presence of external costs has affected the welfare effect of the liberalization of airline markets..The economic evaluation of this policy change has generally shown favorable outcomes in terms of consumer welfare. These welfare effects may be termed market internal effects, as they reflect the welfare consequences of transactions that take place in the market. Thornicroft (1989) suggested that the Airline Deregulation Act of 1978 has had a significant impact on the airline industry and its labor market. Schipper et al. (2007) estimated the welfare effects for various types of post-deregulation entry. Quiggin (1997) concluded that the representative passenger has probably experienced a small reduction in the cost of air travel since deregulation. In economic analyses of tourism, the impact of the tourism consumption on the economy has been explored by using the perspective of trade and income multipliers to demonstrate the importance of the tourism industry (Johnson and Thomas, 1990; Fletcher and Archer, 1991). Although the development of the tourism provides economic benefits, it also results in the volatility in commodity prices and wages, subsequently having an impact on employment (Copeland, 1991; Janaki and Wiktor, 2000).

Regarding the research methodologies which were applied to the tourism economy, Lee(1996) used the input-output model to estimate the effects of tourism consumption on a country's income, employment,

added value, indirect tax, and imports. A perspective from employment and tax was adopted to demonstrate that the tourism industry had a superior contribution to the economy compared to other industries. In some previous studies, the input-output model was employed to measure the economies of scale and added value generated by the tourism industry (Henry and Deane, 1997; Kweka et al., 2003). There are regional characteristics in the tourism industry. In an economic analysis of a regional tourism industry, Frechtling and Horvath (1999) employed the regional input-output model to investigate the increases in employment and labor income created by tourism expenditures. An analysis of the multiplier effects of 37 industries indicated that the tourism sector yielded a higher labor income. Zaman et al. (2010) employed the input-output model to analyze the effects that tourism has on the regional economy. Zaman et al. (2010) documented that the direct and disseminated effects of tourism consumption are crucial impacts on country's economies of scale.

The computable general equilibrium models (CGE) have been employed by numerous studies to investigate issues in the tourism industry, and the emphasis was placed on the changes in tourism demands to analyze the extent of their effect on the economy (Adams and Parmenter, 1995; Zhou et al, 1997; Dwyer et al., 2000, 2003). As environmental protection issues attract increasing international attention, the tourism industry is no longer only valued by developed countries. Instead, an increasing number of emerging developing countries have gradually acknowledged its role on the economy. Sustainable management of the tourism industry has become an emphasized consensus. Previous studies have recommended that tourism-related industries use taxes to develop tourism (Brida and Pereyra, 2008; Pasquale, 2011). Pasquale(2011) introduced a taxation mechanism to explore the internalized external costs of the tourism industry to pursue sustainability of the local economy.

In the present study, we employ the industry-related spillover model to measure the tax effects of the change in the transportation policy and examine whether the change in transportation policy achieved the objective of improving the government's fiscal budget. Through the empirical results, we attempt to uncover whether the tourism could play an important role in the future economic development, which has long been neglected by the government.

Data Source and Model Developmemt

The data of this study were compiled by the Tourism Bureau of the Executive Yuan in Taiwan. The means of the Chinese tourists' expenditures in Taiwan between 2008 and 2012 was primarily in the retail sector (50.67%), followed by accommodation services (29.15%), catering services (6.68%), land transport (6.38%), and others (7.12%). The annual amounts of Chinese tourists visiting Taiwan are shown in Figure 1. The amount of the average daily spending was US$213.1 in 2008, US$232.11 in 2009, US$246.23 in 2010, US$236.48 in 2011, and US$237.01 in 2012.The average travel-day was five.

The trip intentions of Chinese people visiting Taiwan were for business, tourism, family visits, conferences, and study. Table 1 presents the percentage of the various trip-intension visitors following the change in the transport policy. The tourism-oriented accounted for the majority of Chinese visitors, in which the tourism-oriented accounted for more than 70% in 2010, 2011, and 2012. Increases in the pattern of visitors resulted from the change to the transport policy.

Figure 1: Amounts of Chinese People Visiting Taiwan around the Periods of Aviation Deregulation

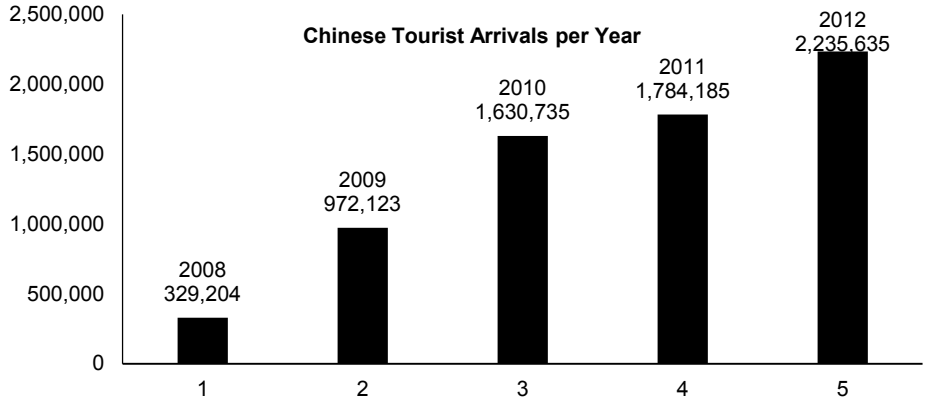

Table 1: Trip-Intension Visitors after the Change in Transport Policy

Year	Total (Persons)	Business	Tourism	Family Visiting	Conference	Study	Others	Unstated
2012	2,235,636	1.93%	78.33%	2.32%	0.14%	0.15%	0.15%	1.62%
2011	1,784,185	7.03%	72.35%	6.67%	1.26%	0.51%	6.67%	5.50%
2010	1,630,735	5.49%	75.31%	6.38%	2.01%	0.51%	6.62%	3.68%
2009	972,123	7.17%	55.46%	7.34%	2.36%	0.41%	11.3%	15.96%
2008	329,204	11.12%	28.79%	17.33%	4.06%	0.37%	20.33%	18%

Note: (1)The data is compiled by the National Immigration Agency in Taiwan.(2) The amount for year 2008 is covered before the aviation deregulation.

Model Development

Following Miyazawa (2002) and adding the effective tax rate(JNTO, 2010), the tax revenue model could be formulated as follows:
The indirect tax revenue could be measured from equation (1)

$$\mathrm{TAX}^{\mathrm{i}} = \left\{(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}} + \mathrm{B}^*\left[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}}\right] + \mathrm{B}^*[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_2^{\mathrm{d}}]\right\} * (\mathrm{w}_{\mathrm{j}}^{\mathrm{G}}) * (\mathrm{t}_{\mathrm{i}}^{\mathrm{e}}) \qquad (1)$$

where I is the identity matrix; $\bar{\mathrm{M}}$ represents the diagonal matrix of import coefficient (n×n); F^{d} deducted import from the aggregate expenditures is the matrix of Taiwanese final consumption and investment; $[\mathrm{I} - (\mathrm{I} - \bar{\mathrm{M}})\mathrm{A}]^{-1}$ is the Leontief inverse matrix; A is the input coefficient matrix (n×n). Let $[\mathrm{I} - (\mathrm{I} - \bar{\mathrm{M}})\mathrm{A}]^{-1}$ be B^*; the indirect effective tax rate $(\mathrm{t}_{\mathrm{i}}^{\mathrm{e}})$ is measured as the indirect tax revenue divided by GDP; $\mathrm{w}_{\mathrm{j}}^{\mathrm{G}}$ denotes the rate of gross induced added value.

The personal income tax revenue ($\mathrm{TAX}^{\mathrm{pi}}$) could be estimated by equation (2)

$$\mathrm{TAX}^{\mathrm{pi}} = \left\{(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}} + \mathrm{B}^*\left[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}}\right] + \mathrm{B}^*[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_2^{\mathrm{d}}]\right\} * (\mathrm{w}_{\mathrm{j}}^{\mathrm{L}}) * (\mathrm{t}_{\mathrm{pi}}^{\mathrm{e}}) \qquad (2)$$

where the effective tax rate of personal income $(\mathrm{t}_{\mathrm{pi}}^{\mathrm{e}})$ is measured by the ratio of individual direct tax revenue to the income of employment; $(\mathrm{w}_{\mathrm{j}}^{\mathrm{L}})$ is the rate of Induced Income of Employment. The corporate income tax could be measured by equation (3)

$$\mathrm{TAX}^{\mathrm{ci}} = \left\{(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}} + \mathrm{B}^*\left[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_1^{\mathrm{d}}\right] + \mathrm{B}^*\left[(\mathrm{I} - \bar{\mathrm{M}})\delta\mathrm{F}_2^{\mathrm{d}}\right]\right\} * (\mathrm{r}_{\mathrm{ce}}) * (\mathrm{t}_{\mathrm{ci}}^{\mathrm{e}}) \qquad (3)$$

where the effective tax rate of the corporate income(t_{ci}^{e}) is computed by the corporate income tax revenue divided by the corporate earnings; r_{ce} is the corporate earnings ratio. In the present study, we measure the indirect tax revenue (TAX^{i}), the personal income tax revenue(TAX^{pi}) and the corporate income tax revenue(TAX^{ci}) by employing equations (1), (2) and (3), respectively.

EMPIRICAL RESULTS

The present study first measure the tax revenue from the tourism of Chinese tourists under the aviation deregulation. The taxes consist of the indirect tax revenue, the personal income tax revenue and the corporate income tax revenue in seven sectors. Table 2 presents the tax effects under the aviation deregulation. The tax revenue was only US$42.555 million before the aviation deregulation in 2008. Right after the aviation deregulation, due to the substantial increase of Chinese travelers, it has also led to an increase in tax revenue from US$149.47 million in 2009 to US$353.53 million in 2012. Comparing those before and after aviation deregulation, the tax revenues in 2012 are 8.3 times of those in 2008. The total tax revenue after the aviation deregulation is US$1,047.32 million, which is equivalent to 1.78% of Taiwan's total tax revenue in 2011.

Table 2: Taxation on Tourism of Aviation Deregulation

Year	Indirect Tax	Personal Income Tax	Corporate Income Tax	Total
2008	1,804.9	1,940.1	510.47	4,255.5
(1)2009	6339.5	6,814.6	1,793	14,947
(2)2010	11,120	11,953	3,145	26,218
(3)2011	11,966	12,863	3,384.4	28,214
(4)2012	14,994	16,118	4,240.8	35,353
(5)=(1)+(2)+(3)+(4)	44,420	47,749	12,563	104,732

Note: (1) The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation

The personal income tax revenue of US$477.49 million is the biggest, accounting for 45.59%, followed by the indirect tax revenue (42.41%) and the corporate income tax revenue (12%). Based on the input-output table compiled by Taiwan authority, we classified the 165 sectors into seven major sectors, as shown in Table 3. The Chinese tourists spend most of the expenditures on shopping, followed by accommodation and catering, which all belong to service-related industries. As to the tax effects, the tax revenues from the service-related industry is US$939.71 million, accounting for 89.73 percent of the total tax revenue, the second one of tax revenues is from the light industry, which is only 3.7% of the total tax revenue. This exhibits that the largest one of tourism tax effect is from the service-related industry under the aviation deregulation.

Table 3: Tax Revenues of Industries under Aviation Deregulation

Sector	**2008**	**(1) 2009**	**(2) 2010**	**(3) 2011**	**(4) 2012**	**(5)= (1)+(2)+(3)+(4)**	**Percentage**
Agriculture and Food Processing	84.1	295.39	518.14	557.59	698.67	2,069.8	1.98%
Light Industry	157.49	553.17	970.29	1,044.2	1,308.3	3,876	3.7%
Chemical	50.47	177.27	310.94	334.61	419.28	1,242.1	1.19%
Iron and Non-Ferrous	21.88	76.86	134.82	145.08	181.8	538.56	0.51%
Machinery	41.06	144.21	252.94	272.2	341.08	1,010.4	0.96%
Infrastructure	82.22	288.79	506.55	545.12	683.05	2,023.5	1.93%
Service-related	3,818.3	13,411	23,524	25,315	31,721	93,971	89.73%
Total	4,255.5	14,947	26,218	28,214	35,353	104,732	100%

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

As shown in Table 4, the tax revenue of US$397.71 million was generated in the service-related industry, accounting for 89.54% of the total tax revenue of US$444.2 million. It was followed by those in the light industry and the infrastructure sector, which accounts for only 3.6%, 2.34% of the indirect tax revenues, respectively.

Table 4: Indirect Tax Revenues of Aviation Deregulation

Sector	2008	(1) 2009	(2) 2010	(3) 2011	(4) 2012	(5)= (1)+(2)+(3)+(4)	Percentage
Agriculture and Food Processing	30.14	105.86	185.69	199.83	250.39	741.77	1.67%
Light Industry	65.05	228.48	400.77	431.29	540.41	1,600.95	3.60%
Chemical	25.24	88.66	155.51	167.35	209.69	621.21	1.40%
Iron and Non-Ferrous	8.61	30.25	53.07	57.11	71.56	211.99	0.48%
Machinery	17.53	61.56	107.98	116.20	145.61	431.35	0.97%
Infrastructure	42.31	148.6	260.65	280.50	351.47	1,041.22	2.34%
Service-related	1,615.99	5,676.06	9,956.1	10,714.10	13,425.08	39,771	89.54%
Total	1,804.9	6,339.5	11,120	11,966.37	14,994.21	44,420	100%

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

In Table 5, the personal income tax ((US$ 427.57 million) in the service-related sector is still the most, accounting for 89.55% of total personal income tax (US$477.49million). Those in the light industry and the agriculture and food processing sector are only 4.29% and 1.77%, respectively.

Table 5: Personal Income Tax under Aviation Deregulation

Sector	2008	(1) 2009	(2) 2010	(3) 2011	(4) 2012	(5) =(1)+(2)+(3)+(4)	Percentage
Agriculture and Food Processing	34.37	120.72	211.74	227.87	285.52	845.85	1.77%
Light Industry	83.19	292.19	512.51	551.54	691.09	2,047.3	4.29%
Chemical	20.67	72.59	127.32	137.02	171.69	508.62	1.07%
Iron and Non-Ferrous	10.69	37.56	65.88	70.90	88.84	263.18	0.55%
Machinery	19.86	69.75	122.34	131.66	164.97	488.72	1.02%
Infrastructure	34.04	119.56	209.72	225.69	282.79	837.76	1.75%
Service-related	1,737.3	6,102.2	10,704	11,518	14,433	42,757	89.55%
Total	1,940.1	6,814.6	11,953	12,863	16,118	47,749	100%

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

As for the corporate income tax in Table 6, the highest proportion of them is from the service-related, up to 91.08% (US$114.43 million). The tax revenue of the agriculture and food processing sector came to the second place, accounted for 3.84% (US$ 4.8216 million). In contrast, the corporate income tax is smaller than the indirect tax and the personal income tax under the aviation deregulation, respectively. Table 7 shows the tax revenues obtained from various sectors. The consumption patterns of Chinese tourists have a tendency for shopping activities. It could be reflected in the tax effect of the retail sector, which generated US$359.45million in tax revenues, accounting for 53.42% of the total tax revenue from tourism-related industries. The tax revenues in the retail sector is followed by that for the accommodation and catering sectors, which generated tax revenues of US$142.77 million and US$45.982 million, accounting for 22.08% and 6.83% of the total tax revenue from tourism-related industries. Besides, the financial intermediaries sector yielded US$44.186 million in tax revenues, accounting for approximately 6.55% of the total tax revenue from the tourism-related industries. The tax revenue in the tourism-related industries in 2011 accounts for 1.10% of Taiwan's total tax revenue, accounting for 61.73% of those under the aviation deregulation. In addition to the amount of tourists, these tax effects were significantly influenced by the extent of economic spillover effect, which is related to tourists' consumption patterns. The inducement

dependency ratio of the final domestic production shown in Table 8 suggests the different tax effects in the various tourism-related sectors.

Table 6: Corporate Income Tax under Aviation Deregulation

Sector	2008	(1) 2009	(2) 2010	(3) 2011	(4) 2012	(5)= (1)+(2)+(3)+(4)	Percentage
Agriculture and Food Processing	19.59	68.81	120.70	129.89	162.76	482.16	3.84%
Light Industry	9.25	32.5	57.00	61.34	76.86	227.7	1.81%
Chemical	4.56	16.02	28.11	30.25	37.9	112.28	0.89%
Iron and Non-Ferrous	2.58	9.05	15.87	17.08	21.40	63.4	0.5%
Machinery	3.67	12.9	22.62	24.34	30.5	90.36	0.72%
Infrastructure	5.87	20.63	36.18	38.94	48.79	144.54	1.15%
Service-related	464.94	1,633.1	2,864.5	3,082.6	3,862.6	11,443	91.08%
Total	510.47	1,793	3,145	3,384.4	4,240.8	12,563	100.00%

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

Table 7: Tax Revenues from Tourism-Related Industries

sector	2008	(1)2009	(2)2010	(3)2011	(4)2012	(5)=(!)+(2)+(3)+(4)
Retail	1,403.4	4,929.7	8,646.7	9,305.1	11,660	3594.5
Other Land Transportation	144.82	508.71	892.29	960.23	1,203.2	3,564.4
Air Transportation	5.03	17.66	30.98	33.34	41.77	123.75
Accommodation	580.08	2,037.6	3,574	3,846.1	4,819.3	14,277
Catering	179.53	630.62	1,106.13	1,190.4	1,491.5	4598.2
Telecommunication	65.33	229.48	402.51	433.16	542.76	1,607.9
Financial Intermediate	172.07	604.42	1,060.2	1,140.9	1,429.6	4,418.6
Insurance	56.11	197.09	345.7	372.02	466.15	1,381
Arts, Entertainment and Leisure	20.53	72.10	126.46	136.09	170.52	505.17
Total	2,626.9	9,227.3	16,184.9	17,417	21,824	64,654

Note: (1)The unit of amount is ten thousand US dollars. (2) According to the data from the Taiwanese Tourism Bureau, Chinese tourists stayed in Taiwan for an average of five days. (3) The amount for year 2008 is covered before the aviation deregulation.

The inducement dependency ratio of the final domestic production indicates the extent to which various industries' production levels depend on the ultimate demand sectors. Table 7 shows that the tax effects from the retail and the accommodation sectors are larger. The retail sector is a domestic-demand-dependent industry, which means it relies on domestic consumption. The production inducement dependency ratio for the retail industry was 80.56%. By contrast, the accommodation sector is an output-dependent industry, which means it relies on foreign tourists' consumption.

Table 8: Domestic Production Inducement Dependency Ratios in the Tourism-Related Industries

Sector	Domestic Private Consumption	Government Consumption	Gross Capital Formation	Change in Inventory	Export
Retail	80.56%	1.03%	9.09%	0.09%	9.23%
Other Land Transportation	42.32%	3.06%	15.16%	-0.20%	39.66%
Air Transportation	50.82%	1.24%	1.07%	0.01%	46.86%
Accommodation	28.06%	0.78%	2.09%	0.01%	69.06%
Catering	82.34%	3.10%	2.08%	0%	12.47%
Telecommunication	67.64%	8.05%	6.89%	0.02%	17.40%
Financial Intermediate	61.17%	5.68%	7.39%	0.03%	25.73%
Insurance	73.91%	4.45%	3.21%	0.02%	18.42%
Arts, Entertainment and Leisure	79.2%	6.69%	1.53%	0%	12.58%

Note: The inducement dependency ratio of the final domestic production is measured as $\frac{v_i \sum_j b_{ij} f_j^d}{v_i X_i} = \frac{\sum_j b_{ij} f_j^d}{X_i}$

The domestic production inducement dependency ratio of the accommodation sector was 69.06%. The

influx of Chinese tourists increased the demand for hotels. In addition, Chinese tourists are strongly inclined to shopping. Consequently, the induced employment income and the gross added value of these industries were increased. The level of induced employment income and gross added value determines the amount of tax revenue.

CONCLUDING COMMENTS

The world financial crisis in 2008 has exposed Taiwan's economic growth strategy with stretched and the governments have eventually decided to lift the aviation regulation between Taiwan and China in the end of 2008. After they reached an aviation agreement between China and Taiwan, the travelers do not need to convert the flights. The aviation deregulation could reduce the transportation costs of the goods. Travelers could also save time and costs. It would drive the increase in the number of visitors and promote its economic growth. It might improve the fiscal deficit accumulated in recent years in Taiwan. In the present study, we aim to investigate tax effects under the aviation deregulation. Based on the models established by Leontief (1966) and Miyazawa (2002) and by adding the effective tax rate, which is employed by the Japan National Tourism Organization (2010), we estimate the indirect tax revenues, the personal income tax revenues, and the corporate income tax revenues resulting from the change in the transportation policy. The data of this study were compiled by the Tourism Bureau of the Executive Yuan in Taiwan.

Our results show that the total tax revenue under the aviation deregulation generated US$ 1,047.32 million, equivalent to the total tax revenue of 1.78% in 2011in Taiwan. The indirect tax revenue, the personal income tax revenue and the corporate income tax revenue accounted for 0.76%, 0.81%, 0.21%, respectively. As for the industrial sector, the tax revenue from the service-related industry is US$939.71 million, which accounts for up to 89.73% of the total tax revenue after aviation deregulation. The aviation deregulation brings a great impact of industries, especially tourism-related industries. The tax revenues from the retail industry are US$359.45 million, which is the largest one. Taiwan never had a long period of economic recession like the current financial crisis. It has relived a small part (billion) of the fiscal deficit at the beginning under the aviation deregulation.

However, it has created the tax revenues of billions of US dollars only within four years. It might be meaningful for the budget of the small open economy later. In the present study, we investigate the taxation effects of tourism under aviation deregulation. Although aviation deregulation generated substantial taxation effects in a short period because of Chinese tourists visiting Taiwan, various tourist facilities cannot meet the demands of Chinese tourists, and price competition among travel agencies in Taiwan and China has resulted in a poor quality of tourism. Therefore, tourist facilities and tourism quality urgently require improvement. Although this study examined the taxation effects produced by aviation deregulation, aviation deregulation is not the only consideration for an economic perspective regarding transport policy changes. Liberalization and globalization have engendered economic prosperity in the region and also led to regional non-economic conflicts. Cross-strait aviation deregulation requires additional consideration and planning from numerous aspects. In other words, in addition to economic factors, political, social, cultural, and environmental issues must be considered to encourage sustainable transportation.

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