

## QUANTIFYING THE IMPACTS OF THE 2007 ECONOMIC CRISIS ON A LOCAL TOURISM INDUSTRY AND ECONOMY

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### ABSTRACT

*The purpose of this study is to explore the accuracy issue of the Input-Output model in quantifying the impacts of the 2007 economic crisis on a local tourism industry and economy. Though the model has been extensively used in the tourism impact analysis, its estimation accuracy is rarely verified empirically. The Metro Orlando area in Florida is investigated as a case study, and the visitor expenditure change between 2007 and 2008 is taken as the direct shock. The total impacts are assessed in terms of output and employment, and are compared with the actual data. This study finds that there are surprisingly large discrepancies among the estimated and actual results, and the Input-Output model tends to overestimate the negative impacts. By investigating the local economic activities during the study period, this study made some explorative efforts in explaining such discrepancies. Theoretical and practical implications are then suggested.*

**Key words:** tourism impact analysis, Input-Output model, economic crisis, modeling accuracy

### INTRODUCTION

The purpose of this study is to explore the accuracy of the I-O model in investigating the impacts of the 2007 economic crisis on a local tourism industry and economy. There are a couple of reasons for focusing on the local level. First, for a local area, resources tend to mobilize more freely, which approximates one of the model's assumptions, the absence of capacity/supply constraint. Second, local areas generally have less financial sources. Thus, the I-O model is more practical because it is less costly as compared to other more sophisticated ones (Dwyer, Forsyth, & Spurr, 2004). In this paper, two questions are going to be answered.

1. How does the recent economic crisis impact the industry output and employment in a local economy?
2. How accurate are the estimated results as compared to the actual data?

The remainder of the paper is structured as follows. The next section is a literature review on the tourism impacts of economic/financial crises and on the I-O model. The section following it explains the research methodology and data collection. Then the modeling and comparison results are presented. The last section further discusses the study findings, explains the study implications, and suggests future research directions.

### LITERATURE REVIEW

#### The 2007 economic crisis

The US economy officially entered a recession in December 2007 (NBER, 2008). Soon, it deteriorated rapidly after the major US financial institutions of Lehman Brothers and American

Insurance Group (AIG) failed unexpectedly in September 2008 (CBS News, 2009). Under such an adverse economic circumstance, the US tourism industry started to suffer. To worsen the situation, the news on the AIG executives retreating in a luxury resort shortly after receiving a \$ 85 billion “bail-out” attracted enormous negative publicity (Whoriskey, 2009). This incident caused the US government to discourage corporations and executives to make unnecessary or extravagant travel (Skolnik, 2009). Some hotels even dropped the very word of “resort” from their names to contend with the public backlash against corporate luxury travel (Hudson, 2010). The US tourism industry was thus given a heavy blow. According to the US Travel and Tourism Satellite Accounts, the national tourism output decreased at a faster pace than the GDP. While the former fell severely at the rate of 8.6%, 7.6% and 8.9% in the 3<sup>rd</sup> and 4<sup>th</sup> quarters of 2008 and the 1<sup>st</sup> quarter of 2009 respectively, the latter fell at a much lower rate of 2.7%, 5.4% and 6.4% (BEA, 2010a, b). In addition, tourism-related employment was greatly reduced. Starting from the 2<sup>nd</sup> quarter of 2008, the industry underwent seven consecutive quarters of employment drop nation-wide. This was the first continuous job-loss period since 2003. In the second quarter of 2009, the employment decline reached its trough of negative 7.5%, which translated to 163,700 cases of tourism-related job loss (BEA, 2010b).

So far, there are only a few studies investigating the impacts of the 2007 economic crisis on tourism industry (Ritchie, Molinar & Fretchling, 2010; Semera, 2009; Song & Lin, 2010). Ritchie and his colleagues (2010) compiled statistics from various sources, and described the current and evolving status of the tourism industry in three countries: Canada, US, and Mexico. Their examination revealed that the recent economic crisis did not evenly affect these countries. Some other studies mainly concentrated on tourism demand forecasting. Semeral (2009) focused on forecasting the demand for international travel of the EU 15 countries in 2009 and 2010. The study projected that these countries, depending on their economic outlook, could experience a demand decrease ranging from 8% to 15% in 2009 and from 0.5% to 8.4% in 2010. In the case of Asian countries, Song & Lin (2010) forecasted the tourist arrivals from the 12 major source markets to Asia and the expenditures of the Asian tourists to the 11 non-Asian countries. Their study suggested that the inbound tourism to Asia decrease significantly in 2009, especially from the long-haul markets. The outbound tourism from Asia also declined remarkably except from Hong Kong and mainland China. Our study is intended to provide better understanding on the impacts of the economic crisis, and thus helps build the knowledge body in this area.

### **Theoretical discussion on the I-O model**

In tourism literature, the I-O model is extensively applied to examine the tourism economic contributions and the impacts of external events ( Heng & Low, 1990; Hara, 2004; Lee & Taylor, 2004). The researchers in this supportive view generally emphasize the model’s advantages of being objective, comprehensive and flexible. Although they also are aware of the model’s shortcomings, they hold that the model’s limitations are minimized when the investigation is intended for a limited time period and a small and open economy (Archer, 1995; Fletcher, 1989).

There is another tourism literature stream, which tends to consider the I-O model as an inadequate tool. The salient criticisms are directed to the model’s two strict assumptions of constant input coefficient and absence of supply constraint. The constant input coefficient means that the production of one unit output requires fixed amounts of inputs. This assumption implies that the I-O model does not consider the interference of economics of scale and input substitution

(Briassoulis, 1991; West, 1995). The absence of capacity/supply constraint suggests that resources are freely and readily available for production (Fletcher, 1989). It infers that the model does not consider the role of price and the interaction between production activities and other markets such as labor or consumer markets (Zhou, Yanagida, Chakravorty, & Leung, 1997). Some researchers contend that the limitation of these strict assumptions could cause serious estimation misleading (Dwyer, Forsyth, & Spurr, 2004). Thus, they turn to more sophisticated modeling such as the Computable General Equilibrium (CGE) (West, 1995).

The CGE model relaxes the Input-O model's assumptions by incorporating the supply-demand mechanism, input substitution and market interactions (West, 1995). Recently, the CGE is applied to investigate a variety of issues including tourism's economic contribution, the SARS epidemic, foot and mouth disease and globalization impacts (Sugiyarto, Blake, & Sinclair, 2003; West, 1995; Yang & Chen, 2009; Zhou, Yanagida, Chakravorty, & Leung, 1997). Zhou and his colleagues (1997) conducted a comparative study using the I-O and CGE models to estimate Hawaii's economic impacts from a hypothesized reduction in visitor expenditures; and they concluded that the I-O model had the propensity of overestimation, because it did not recognize resources allocation as the CGE did. However, some researchers also acknowledged that the CGE model had to make more assumptions, which were subject to the modeler's discretion (Yang & Chen, 2009). Also, the CGE model, to some degree, is embodied of the core of an I-O model (Sugiyarto, Blake, & Sinclair, 2003).

Though both proponents and opponents of the I-O model make sound arguments on the model's applicability and accuracy, there is rarely any empirical research validating its accuracy by comparing estimation results with actual data. This study is to verify the accuracy of the I-O model in the investigating the negative impacts of the recent economic crisis on a local tourism industry and economy.

## **METHODOLOGY AND DATA COLLECTION**

This study takes a case study approach, and selects the Metro Orlando Area in Florida as the study area. The region is highly dependent on tourism, and remarkably suffered from the recent economic crisis, as evidenced by the large decrease of more than \$ 4.3 billion dollars in visitor expenditures from 2007 to 2008 (Orlando CVB, 2009a,b,c). The study time period is set between 2007 and 2008, mainly because of data availability and the purpose to exclude the confounding effects of the avian flu in 2009. This study takes the change in visitor expenditures between 2007 and 2008 as a proxy measurement of final demand change from the recent economic crisis. The resulting total effects are estimated in terms of industry output (or sales value) and employment. The modeling results are then compared to the actual data for accuracy verification

### **The Metro Orlando Area and its tourism industry**

The Metro Orlando Area officially is comprised of Osceola, Orange, Seminole and Lake Counties. However, the Lake County is excluded in this study because of data unavailability.

Located in the center of Florida, the tri-county area is a world-known leisure and business destination. The region is the home to seven of the top 10 theme parks in the US, which include four theme parks in World Disney World Resort, SeaWorld, Universal Orlando, and Islands of Adventure. In 2008, the seven theme parks draws 64.6 million visitors, accounting for 72% of the total attendance of the 10 most visited theme parks in US (Orlando CVB, 2010a). The

Orange County Convention Center, the nation's second largest convention facility, is another draw for visitors. The area is well served by the world-class Orlando International Airport, which is the 3<sup>rd</sup> largest in the US and provides non-stop flights to 74 domestic destinations and 17 international destinations (GOAA, 2009). The area also has the nation's 2<sup>nd</sup> highest lodging inventory of 115, 875 hotel rooms, 4,154 restaurants and 65 major shopping centers/malls, which provides visitors a wholesome experience (GOAA, 2009; MOEDC, 2009).

The tourism industry is a top economic and employment contributor in this area. In 2007, Metro Orlando area received 48.7 million visitors, which generated 31.1 billion dollars for the local economy. It created 236, 556 direct industry jobs, representing 24% of the total employment in these three counties (Orlando CVB, 2008, P.1). Moreover, the industry also contributed significantly in tax revenue. In 2007, it generated a total of 202.87 million dollars in resort tax (Orlando CVB, 2010b).

### **Data collection & modeling procedures**

This study primarily uses secondary data. The visitor expenditure data are obtained from the 2008 visitor profile reports compiled by the Orlando/Orange County Convention and Visitor Bureau. The data on output and employment are retrieved from the databases of the US Bureau Economic Analysis and the Metro Orlando Economic Development Commission respectively.

Because the final demand estimation, the 2007-2008 visitor expenditure change, is the most important in ensuring the accurate assessment of total impacts, thus its calculation procedures are detailed here. The visitor expenditures are retrieved from the Orlando CVB reports, and these reports concentrate on three main visitor groups: domestic leisure visitors, domestic business visitors and overseas visitors excluding those from Canada and Mexico. The domestic business visitors are subcategorized into group meeting visitors and transient business visitors. Visitor number is provided for these four detailed groups. Also, average visitor expenditure per person per trip is available at two data levels: aggregated and disaggregated (into six tourism-related categories). Both aggregated and disaggregated expenditure data are provided for domestic leisure visitors and group meeting visitors, and only aggregated data for overseas visitors. Unfortunately, there is no expenditure data for transient business visitors, thus this group is omitted in the final demand estimation. This procedure is likely to lead to a smaller estimated negative shock and more conservative modeling results.

The total change in visitor expenditure is calculated by adding up the changes of domestic leisure visitors, group meeting visitors and overseas visitors between 2007 and 2008. The expenditure changes in each group are disaggregated to six tourism-related categories, namely room, transportation, entertainment, food, shopping and miscellaneous services. In this procedure, a couple of assumptions are made. First, this study assumes that the Floridian average transportation expense (per person per trip) is close to the ground transportation spending for both domestic leisure visitors and group meeting visitors. This step is to exclude the airfare from the all-inclusive transportation expenditures in the CVB reports. Thus, the average transportation expenditure for domestic leisure visitors is adjusted from \$ 136 to \$38 in 2007 and from \$109 to \$ 27 in 2008. For group meeting visitors, this expenditure is adjusted from \$ 218 to \$ 38 in 2007 and from \$ 206 to \$27 in 2008. The adjusted transportation spending takes up 6% to 8% of the total average expenditure. Second, since the CVB reports only provide the aggregated average expenditure for overseas visitors, this study assumes that the visitor group has the same expenditure distribution ratios over the six categories as the domestic leisure visitors do. This

assumption is made based on the observation that most overseas visitors came to the study area for leisure purposes (91% in 2007 and 88% in 2008). While it is highly debatable that the domestic and overseas visitors exhibit the same characteristics in consumption, it is more sensible to have a complete estimation of a direct shock, instead of totally ignoring the impacts from this group, even though this step involves in making further assumptions.

The total change in visitor expenditure is presented in Table 1. The Metro Orlando area experienced a total decrease of visitor expenditure of \$ 4.3 billion. Among the six tourism-related categories, shopping, room and entertainment suffer the most, with reduction of \$ 1.09 billion, \$ 1.01 billion and \$0.74 billion respectively.

**Table1: Total change in visitor expenditure between 2007 and 2008**

	Domestic leisure visitor	Domestic group meeting	Oversea visitors	accumulative difference	% change from 2007
Total difference	-\$3,976,856,000	-\$659,040,000	\$329,079,000	-\$4,306,817,000	-19.1%
Room	-\$710,528,000	-\$379,665,000	\$74,064,327	-\$1,016,128,673	-20.4%
Transportation	-\$390,078,000	-\$74,774,000	\$11,680,111	-\$453,171,889	-26.2%
Food	-\$782,808,000	-\$42,395,000	\$131,522,173	-\$693,680,827	-11.8%
Entertainment	-\$781,976,000	-\$57,644,000	\$97,589,011	-\$742,030,989	-15.3%
Shopping	-\$1,063,140,000	-\$36,752,000	\$2,934,540	-\$1,096,957,460	-27.8%
Miscellaneous	-\$248,326,000	-\$67,810,000	\$11,288,839	-\$304,847,161	-24.7%

## STUDY RESULTS

### The Impacts on Industry Output

The estimated and actual impact on output is presented in Table 2 below. The I-O model estimates that the study area experienced a total decrease of \$ 7.1 billion in output between 2007 and 2008, due to the dramatic visitor expenditure reduction of \$4.3 billion. The estimation results show that all industries in the area were negatively affected, with the five tourism-related sectors the most inflicted. “Accommodation and food services” and “retail trade” sectors appeared to suffer the most, reducing total output of \$ 1.7 billion and \$ 1.3 billion respectively.

The actual data reveals a surprisingly different picture. The area had a total \$1.98 billion output growth during the study period. Most industries in the area maintained a decent output increase, including the four tourism-related industries, which are “accommodation and food services”, “arts-entertainment and recreation”, “transportation and warehouse” and “other services”. Some non-tourism industries achieved very impressive output growth. The outputs of the “real estate and rental”, “government and non NAICS”, “professional-scientific and technological”, and “health and social services” sectors were up by \$ 1.1 billion, \$ 0.56 billion, \$0.52 billion and \$ 0.37 billion respectively. However, “construction” and “finance and insurance” sectors underwent a much larger decrease than estimated, with a reduction of \$ 0.931 billion for the former and \$ 0.444 billion for the latter.

The absolute discrepancy shows that the negative impact on “accommodation and food services” sector was the most overestimated, with a difference of nearly \$2 billion. Among the top four industries receiving the largest overestimation, three were tourism-related. Due to the unexpected remarkable performance in the non-tourism industries, “real estate and rental”, “government and non NAICS”, “professional-scientific and technological” and “health and

social services” sectors also had greatly inflated estimates. On the other spectrum, the negative impacts on the “construction” and “finance and insurance” sectors were underestimated. The sample-paired t-test statistics confirm that difference between the estimated and actual results are statistically significant at the 0.05 confidence level ( $t=3.299$ , shown as Pair 1, see table 4)

**Table 2: The estimated and actual annual changes on Output**

Discrepancy Ranking	Industrial Sectors (NAICS 2 digit)	Estimated impact	Actual impact	Absolute Discrepancy
1	72 Accomodation & food services	(1,720,924,160)	190,000,000	1,910,924,160
2	53 Real estate & rental	(294,343,904)	1,127,000,000	1,421,343,904
3	71 Arts- entertainment & recreation	(812,585,088)	375,000,000	1,187,585,088
4	44-45 Retail trade	(1,332,153,216)	(228,000,000)	1,104,153,216
5	92 Government & non NAICS	(238,388,448)	567,000,000	805,388,448
6	54 Professional- scientific & tech	(266,227,024)	526,000,000	792,227,024
7	62 Health & social services	(285,241,088)	374,000,000	659,241,088
8	48-49 Transportation & Warehousing	(551,179,520)	40,000,000	591,179,520
9	31-33 Manufacturing	(338,680,064)	127,000,000	465,680,064
10	81 Other services	(413,197,600)	39,000,000	452,197,600
11	51 Information	(94,529,224)	119,000,000	213,529,224
12	22 Utilities	(36,600,096)	109,000,000	145,600,096
13	55 Management of companies	(86,184,256)	51,000,000	137,184,256
14	42 Wholesale Trade	(176,435,712)	(47,000,000)	129,435,712
15	56 Administrative & waste services	(141,768,736)	(29,000,000)	112,768,736
16	61 Educational services	(29,743,808)	13,000,000	42,743,808
17	52 Finance & insurance	(235,026,928)	(444,000,000)	(208,973,072)
18	23 Construction	(45,925,864)	(931,000,000)	(885,074,136)
	11 Ag, Forestry, Fish & Hunting	(7,326,237)	N/A	N/A
	21 Mining	(115,464)	N/A	N/A
	Total	(7,106,576,436)	1,978,000,000	9,084,576,436

### The impacts on employment

The estimated and actual impact on employment is presented in Table 3 below. As it shows, the I-O model indicates that the direct negative shock created a strong traction for all industries to shed jobs, resulting in a total of 83,393 job losses in the study area. The five tourism-related industries are projected to generate the most job cuts. However, the study area, in reality, experienced a much smaller magnitude of job loss: 20,700 cases. The area’s gloomy job prospect is overwhelmingly attributed to the server job-shedding of the “administrative/waste service” sector (19,500 job cuts) and “construction” sector (7,700 job cuts). Surprisingly, the tourism-related industries demonstrated a strong ability to absorb a large amount of surplus labor, which was totally against the Input-Output estimation. “Accommodation and food services” sector employed 5,400 new hires, which made it the strongest employment generator in the area between 2007 and 2008. “Arts-entertainment/recreation” and “retail trade” sectors also took in 2,400 and 900 extra labor respectively. Along with their large growth in output, “health and social service” and “real estate/rental service” sectors increased employment by 3,900 and 1,600 respectively. Interestingly, despite their robust output growth, “information” and “professional-scientific and technological” sectors incurred a moderate job cut, reducing employment by 700 and 100 respectively.

Among the top four discrepancy ranking sectors, three are tourism-related, including “accommodation and food services”, “retail trade” and “art-entertainment and recreation” sectors. The estimated employment change in the administrative and waste services sector has a stark difference of 17, 375 from the actual data. The paired-sample t-test statistics shows that the difference between the estimated and actual results in employment is not statistically significant at the 0.05 confident level (t=1.365, shown as Pair 2 in Table 4).

**Table 3: The estimated and actual annual changes in employment**

Discrepancy Ranking	Industrial Sectors (NAICS 2 digit)	Estimated impact	Actual Impact	Absolute Discrepancy
1	72 Accommodation & food services	(27191)	5400	32,591
2	44-45 Retail trade	(19450)	900	20350
3	71 Arts- entertainment & recreation	(9091)	2400	11491
4	62 Health & social services	(2975)	3900	6875
5	53 Real estate & rental	(1655)	1600	3255
6	48-49 Transportation & Warehousing	(4760)	(2100)	2660
7	61 Educational services	(492)	1900	2392
8	92 Government & non NAICS	(2214)	100	2314
9	54 Professional- scientific & tech	(2246)	(100)	2146
10	81 Other services	(6124)	(4600)	1524
11	31-33 Manufacturing	(1268)	(100)	1,168
12	55 Management of companies	(456)	600	1056
13	42 Wholesale Trade	(1130)	(500)	630
14	11 Ag, Forestry, Fish & Hunting	(127)	0	127
15	21 Mining	(0)	0	0
16	51 Information	(374)	(700)	(326)
17	52 Finance & insurance	(1273)	(2200)	(927)
18	23 Construction	(369)	(7700)	(7331)
19	56 Administrative & waste services	(2125)	(19500)	(17375)
	22 Utilities	(74)	N/A	N/A
	Total	(83393)	(20700)	62693

**Table 4: Paired Samples T-Test Statistics**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 estimatedoutput - actualoutput	-5.04285E8	6.48507E8	1.52855E8	-8.26780E8	-1.81790E8	-3.299	17	.004
Pair 2 estimatedemploy - actualemploy	3350.33333	10413.14680	2454.40224	-8528.66941	1828.00274	1.365	17	.190

## DISCUSSION & CONCLUSION

Though there are large discrepancies between the estimated and actual results in output and employment, it should be reminded that these two results are not based on exactly identical sources. The model simulation in this study only considers the multiplier effects of the 2007-2008 visitor expenditure decrease attributed to the recent economic crisis, while the actual data

reflects the total impacts of all industries' interactions under the influence of the economic crisis. This could explain why the I-O model underestimates the negative impacts on "construction" and "financial and insurance" sectors in terms of output. Since this economic crisis was driven by the slumping housing market and tumbling financial sector, the two above-mentioned industries not only negatively affected indirectly from the visitor expenditure reduction, but also impacted directly from the recent economic crisis. The same logic can explain why "construction" and "administrative and waste service" industries incurred more job loss than estimated.

Although the estimated and actual results are not exactly the same, the comparisons between them are still meaningful. Especially for the tourism-related industries, the estimated and actual results are more directly comparable. That is because the tourism-related industries in reality were mainly affected directly from the falling tourism demand, as the model simulated. Also, the tourism-related industries had relatively weak forward linkage with other non-tourism industries (Cai, Leung & Mak, 2006). This suggested that the tourism-related industries were not strong suppliers to meet the demands from other non-tourism industries. Thus, the demand decline of other industries in this recent economic crisis had minimal indirect impacts on the tourism-related industries.

### **Better-performing sectors in output**

As table 2 indicates, the "accommodation and food services" and "arts-entertainment and recreations" were the two tourism-related sectors which performed far better than estimated. One explanation could be that the expansion activities in these two sectors counteracted the negative effects from the decreased visitor expenditures. Between 2007 and 2008, Universal Orlando started the 200-million-dollar development of the Wizarding World of Harry Potter (Bevil, 2010; Powers, 2007). SeaWorld, meanwhile, introduced its 60-acre water park, Aquatica (Gieszl, 2007). Early in 2007, The Walt Disney World announced its development plans for a 900-acre luxury resort complex and a 450-acre value-oriented retail, dining and lodging district (The Disney Company, 2007). The Hilton hotel family invested \$ 550 million to build the 497-room Waldorf Astoria and the 1000-room Hilton Orlando Bonnet Creek (Waldorf Astoria Orlando, 2008).

Arguably, such a strong investment confidence was stemmed from the area's competitiveness as a tourist destination and its capability in navigating through the crisis. The area's private and public sectors were actively making concerted efforts to fend off the negative impacts of the recent crisis. Despite the tough economic time, ample funds were still granted to the area's convention and visitor bureaus in sustaining constant and effective marketing campaigns inside the US and abroad. According to its 2008 annual budget, the Orlando/Orange County CVB was provided with a total of \$ 64.3 million, and planned to spend \$ 42.5 million in leisure and travel industry marketing in that year ( Orlando CVB, 2008). The representatives of tourism industry convened regularly with local government officials, and shared concerns and strategies on effective use of tourism tax (Garcia, 2009). To attract more visitors, the local tourism venues were offering various ticket deals, hotel discounts and value meals. Both Disney World and Universal, cooperating with their on-property hotels, offered a free overnight stay in hope of capturing extra park ticket and merchandise revenues (Powers, 2009).

As the I-O model in this study takes the visitor expenditure reduction as a proxy measurement of the crisis's direct impact, and it certainly does not account for the positive effects of the new capital injection through expansion activities. Also, it is not able to capture the positive feedback effects of the crisis management efforts from the private and public sectors.



Therefore, the I-O model tends to overestimate the negative impacts on the tourism-related industries in term of output.

### **Better-Performing sectors in employment**

The “accommodation and food services”, “retail trade”, and “art-entertainment and recreation” are the three tourism-related industries which performed far better than the I-O model estimated in term of employment. As matter of fact, these industries still experienced quite significant employment increase in such a turbulent economic time (see table 3). The employment growth in these sectors could be possibly attributed to the expansion activities in some local theme parks and hotels as discussed previously.

Another possible explanation is that the apparently-stable number of visitors in 2008 helped maintain labor in the these three industries. The tourism-related industries mainly offer intangible service, which is delivered primarily through people-to-people contacts. Unlike the other sectors such as manufacturing, it is practically challenging for the tourism-related sectors to deploy automation and mechanization to replace personal interactions. As in this case, the Metro Orlando area saw only a slight decrease of 0.03% in visitor arrivals between 2007 and 2008(Orlando CVB, 2009a,b,c). In order to ensure service quality, the amount of service staff needs to be in proportion with the visitor number regardless the latter’s spending extent. Therefore, though the total visitor expenditures in 2008 reduced dramatically due to the falling average spending per person per trip, managers in the tourism-related industries still had to prepare sufficient labor to provide premier service to visitors, whose arrival was relatively stable. Since the I-O model is expenditure-based, it does not incorporate tourism-related industry’s labor requirement corresponding to the visitor number, and thus overestimates the effects in tourism-related employment loss.

In addition, the tourism-related employment could be explained by the labor supply-demand dynamic initiated by the economic crisis. As considerable workers were unemployed due to a worsening economy, especially in the administrative & waste service and construction sectors, the market is fraught with surplus labor. At the supply side, the unemployed labor tends to be mobilized to the tourism-related industries relatively smoothly as these industries have low entry barriers and require limited skill sets. At the demand side, the tourism-related industries are primarily filled with temporary positions, which are relatively low-wage, thus these industries could make a large “stretch” in absorbing high-quality talents without resulting in a heavy fixed cost burden during the downturn. Because the I-O model does not account for the tourism-related industries’ ability in absorbing surplus labor, it over emphasizes the crisis’s negative effects on the employment of these industries.

### **STUDY IMPLICATIONS**

This study bears meaningful implications for tourism professionals, policy makers and researchers. First, it empirically demonstrates the I-O model’s tendency in overestimating negative impacts. It also makes explorative efforts to explain these overestimations. Possible explanations include that the model does not consider the positive feedback effects of the optimistic investment atmosphere, the area’s crisis management and the labor market dynamics. This study also reveals the model’s limitation as an expenditure-based model, which is not able to incorporate the cofounding effects from unchanged visitor numbers. Although the I-O model has the propensity to overestimate negative impacts, this study does not totally denounce the model’s significance in impact analysis. Rather, this study should serve as a reminder for tourism

professionals and policy makers to reconsider the validity of the estimation results from not only the I-O model, but all other economic models, before they make any important decision based on modeling simulations. Indeed, conceptual models, no matter how sophisticated or complex, are not able to include all variables in the real world and to avoid making assumptions.

Second, this study demonstrates effective strategies to fend off the negative impact of the recent economic crisis, include continuous supports with tourism funding, active marketing campaigns, and regular communications between related government official and tourism professionals. Last but not the least, the observation of how different industrial sectors responded to the apparent negative shock in term of employment might have revealed an interesting argument regarding the under-recognized versatility and flexibility of the tourism-related sectors. The tourism industry is known to be labor-intensive with lower-barriers of entry, which appeared to provide greater flexibility in absorbing surplus labor force in recession period than the capital intensive industries such as the “professional-scientific and technological” sector.

### **STUDY LIMITATIONS AND FUTURE RESEAERCH**

There are several limitations for this study. First, this study mainly uses secondary data for the model simulation, and the validity of these data is assumed. Second, this study makes an attempt to explain the large discrepancies between the estimation results and actual data. However, these explanations might not fully account for the entire discrepancies, and their casual relations need to be confirmed by further research. Third, this study focuses on the one-year period between 2007 and 2008. Further research could investigate a longer time span in examining how the progression of the economic recession impacts a local tourism industry and economy system.

Another direction for future research is to conduct a field-based research to understand the labor mobility among industries during the economic downturn period. Lastly, this study could be replicated using the Computable General Equilibrium (CGE) model to find whether the CGE simulation results will be close to the real numbers on the ground by manipulating these exogenous variables to better reflect reality.

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