Enhancing Tourist Satisfaction: A Study on Sample Selection Methods[1]

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Abstract

Tourist satisfaction evaluation is one of the key issues of tourism management research, and it can also provide important decision-making references for the development of the tourism service industry and service providers. Based on the micro-data of tourism during China's National Day Golden Week, this article surveys tourist satisfaction with a tourist attraction. The statistical treatment of the sample selection problem is carried out based on obtaining the sample data. Based on the classical regression, the Heckman model, the Switch model, and the treatment effect model for the statistical treatment of sample selection are compared and studied. From the methodological perspective, the study finds that the statistical method after processing the sample selection problem confirms the absolute positive correlation between tourist income and tourist satisfaction; classical regression does not apply to the analysis of micro cross-section data; the standard Heckman model is less adaptable than the other two methods in dealing with sample selection. On this basis, according to the results of empirical analysis, it is suggested that personalized and differentiated tourism services should be provided according to the different identities of tourists to improve their satisfaction.
Keywords: Tourist Satisfaction; Tourism Management; Tourism Service; Tourism Economy

Introduction

China is the country with the fastest-developing tourism economy in the world. With the economy's and society's rapid development, people gradually shift from material consumption and enjoyment to spiritual consumption and experience. Tourism has become an important industry that drives economic growth.

The development of China's tourism industry is undergoing a period of transformation from the concept of the tourism industry to product development and design. As the tertiary industry focuses on audiences' experience, the research on tourist satisfaction is particularly important. First, it serves as the driving force for the tourism industry to improve the quality of products and services continuously. Second, it is also one of the sources of target formulation for upgrading and optimizing the tourism industry. However, due to the sampling control method or the subjectivity of the sample objects, the microscopic data obtained from surveys rather than statistics will have systematic errors with reality because it does not meet the principle of randomness. Traditional tourism enterprises (scenic spots, hotels, travel agencies.) must regularly conduct surveys to improve service quality continuously. In addition, it is very important and necessary to deal with the problem of sample selection in tourism research and to estimate the non-systematic bias in the analysis of tourist satisfaction.

From the perspective of the connotation of sample selection, statistical data based on the sampling results without the characteristics of unbiased estimation will inevitably result in inconsistent conclusions, which is statistically called biased and inconsistent, namely, the sample selection problem.

In fact, handling sample selection problems is an inevitable processing step for quantitative research based on survey data. Therefore, regular tourist satisfaction surveys are very important for the tourism industry, whether tourism management agencies or companies. The survey and analysis results after handling the sample selection problem can correctly reflect the current問problems, give room for improvement in the products and services provided by tourism companies, and urge tourism management agencies to effectively formulate supervision on the actual problems of tourism service providers, which can ensure the regularization and sustainable development of China's tourism industry and give full play to its role in the status of sunrise industry in the national economy. Based on the micro-data of tourism during China's National Day Golden Week, this article surveys tourist satisfaction with a tourist attraction. The statistical treatment of the sample selection problem is carried out based on obtaining the sample data. Based on the classical regression, the Heckman model, the Switch model, and the treatment effect model for the statistical treatment of sample selection are compared and studied. From the methodological perspective, the study finds that the statistical method after processing the sample selection problem confirms the absolute positive correlation between tourist income and tourist satisfaction; classical regression does not apply to the analysis of micro cross-section data; the standard Heckman model is less adaptable than the other two methods in dealing with sample selection.

Literature review

The research on tourist satisfaction originates from the period of rapid economic development in Western countries and the transition stage of consumer consumption concepts. The research on tourist satisfaction is mainly carried out from two aspects: concepts and influencing factors. Tourism satisfaction is generally believed to be the degree to which tourists can meet expectations in their tourism experience. Tourism satisfaction is generally believed to be the degree to which tourists can meet expectations in their tourism experience. The

research on tourist satisfaction in China begins at the end of the 20th century and the beginning of the 21st century. At first, it focused on improving tourist satisfaction and satisfaction evaluation. It then gradually expanded to establishing the evaluation index system and the research on the factors affecting satisfaction. The following discusses the connotation, evaluation, and factors influencing tourist satisfaction.

(1) The connotation of tourist satisfaction

In 1965, Cardooz used the concept of "satisfaction" for the first time in the marketing field, proposing that "if the customer is satisfied, they will buy again." Later, the American scholar Pizam first applied it to the tourism industry and put forward the concept of tourist satisfaction. He believes that tourist satisfaction is the result of comparing tourists' expectations of tourist destinations with on-site tourism experience. The tourists are satisfied if the on-site experience exceeds the expected value. All subsequent studies on tourist satisfaction are based on this (Pizam et al.,1978). One of the most extensive conceptualizations of tourist satisfaction comes from Oliver's expectation-disconfirmation model, which regards satisfaction as "the level of expectation and the resulting feeling of uncertainty." Specifically, satisfaction comes from the evaluation process through which travel consumers compare their expectations of certain products or services with their feelings after using them. This comparison will reflect whether the product or service exceeds, meets, or falls below the expectations before use, resulting in a positive, neutral, or negative confirmation (Oliver, 1980). According to this paradigm, Parasuraman et al. further propose that satisfaction is "the quality perceived by consumers in a service is a function of the size and direction of the gap between the expected service and the perceived service" (Parasuraman et al., 1985).

From an experience perspective, Francken believes that tourism satisfaction is determined by tourists' perceptions of the difference between the ideal leisure experience and the experience and their perceptions of internal and external factors that hinder them from obtaining the expected experience. Visitors will compare the destination of the experience with the area or journey they have visited in the past, and the difference between the two will become the benchmark for evaluating the travel experience (Francken & van Raaij, 1981). Chon further believes that tourist satisfaction is a good fit between tourists' expectations of the destination and their perceived experience after experiencing it on the spot. It results from comparing the destination positioning before traveling and what the tourist sees, feels, and obtains. In other words, whether tourists are satisfied depends on the gap between the expectations of tourists and the actual perceived experience. If the expected value is equal to or less than the actual feeling, the tourists are satisfied (Chon, 1989).

Regarding the discussion related to quality and satisfaction in the tourism industry, Crompton and Love and Baker and Crompton suggest distinguishing between the two structures of service quality and customer satisfaction by conceptualizing the quality of performance (Crompton, 1995; Baker & Crompton, 2000). Performance quality will measure the provider's output. At the same time, satisfaction should be considered in terms of "experience quality" as the emotional state of tourists after exposure to opportunities, that is, tourists' judgments. Other scholars distinguish between perceived quality and customer satisfaction. They explain customer quality with a longer-lasting personal perception and overall service. These services are mainly based on cognitive elements. Swan discusses how tourists form satisfaction from the transaction perspective: tourists compare the costs and benefits (subjective feelings) generated during travel; if the costs are less than or equal to the benefits, they will be more satisfied, and vice versa (Swan & Mercer, 1981).

There are a few studies on the connotation of tourist satisfaction in China. Researchers analyze tourist satisfaction from three progressive levels: material, spiritual, and social. They propose that improving tourist satisfaction is the basis for the destination to achieve profits, can enhance the attractiveness of the scenic area, and increase the revisit rate of tourists.

(2) Evaluation of tourist satisfaction

The earliest domestic customer satisfaction assessments were conducted in Europe, America, and other more developed regions. For example, Sweden, the United States, and other E.U. countries have established customer satisfaction index models. Among them, Sweden is the first country to conduct customer satisfaction surveys worldwide. Nowadays, the research on tourist satisfaction evaluation mainly focuses on the evaluation index system, evaluation model, and evaluation method. Because the specific research objects vary greatly, different index systems, models, and methods are used for different research objects. Some studies analyze from the perspective of emotion, cognition, and satisfaction (Bosque et al., 2008), and some use the hierarchy of needs theory and two-factor theory in management to analyze from the perspective of the happiness index (Lee et al., 2014). Some use the scoring method for measurement (Moital, 2013), and some use the IPA model (Lee, 2015). Chinese domestic scholars (2004-2008) mainly use multiple regression analysis methods, fuzzy comprehensive evaluation methods, structural equation models, and pure perception models to study tourists' satisfaction in a certain area.

Dong Guanzhi and Yang Fengying think the tourist satisfaction evaluation index system is divided into three levels: overall tourist satisfaction index, project level index, and evaluation factor level index (Dong & Yang, 2005). A. Yüksel et al. also point out that tourist satisfaction can be measured from three aspects: overall satisfaction, product service satisfaction, and dimensional satisfaction (Yüksel & Yüksel, 2008). Similarly, Bai Kai and Ma Yaofeng measure the quality of tourist experience from two dimensions, namely, tourists' expectation index (tourism expectation) of destinations before traveling and tourists' experience in tourist destinations, their subjective feelings of various tourism services and the evaluation level of the overall environment (tourist satisfaction) (Bai & Ma, 2007).

In addition, there are some dimensions for evaluating tourism satisfaction: evaluating the tourism quality at different stages of experience rather than the overall evaluation of the entire tourism experience from a psychological perspective. The quality of the tourism experience includes the quality of tourism environmental facilities, tourism services, and tourism results. Zhou Xuejiao et al. and Zeng Xiangtian et al. construct a tourist satisfaction index system for theme parks and tourist attractions, respectively, and apply the partial least squares method. They use real numbers, interval numbers, triangular fuzzy numbers, intuitionistic fuzzy linguistic variables, and intuitionistic fuzzy numbers to analyze the factors that affect the satisfaction of tourists (Zhou et al., 2017; Zeng et al., 2017).

Moreover, Chinese scholars have used tourist satisfaction indicators to conduct a large number of empirical studies in recent years, mainly from the perspective of tourism supply (scenic area, transportation, tourism projects, cultural factors, tourism facilities, and tourism services.), which provide sufficient quantitative evidence for the development of China's tourism industry and for the improvement of enterprises' tourism services. For example, Liu Yan et al. conducted an empirical study on the satisfaction evaluation of inbound tourists from the Chengdu Giant Panda Research Base. Through questionnaire survey and data analysis, they concluded that inbound tourists' satisfaction with the panda base is higher than expected (Liu et al., 2009). Zhou Yang et al. conducted a field survey on rural tourism spots in four regions of Guangdong Province. They employed a logistic regression model to analyze the factors that

affect tourists' satisfaction in rural tourism. It is concluded that the overall satisfaction of tourists in rural tourism is relatively high, but the satisfaction evaluation gap of each component of rural tourism is obvious (Zhou et al., 2016). In addition, Liu Zhicheng and Qian Yiling adopted the structural equation model to find that the perception of tourism resources, consumption value, ecological protection, and natural environment have a greater impact on tourist satisfaction (Zhou et al., 2016). Wang Yuwen and Luo Peicong., use Meizhou Island tourist network reviews as object and study the impact of scenic factors, cultural factors, price and traffic factors, environmental factors, and reputation factors on tourist satisfaction (Wang et al., 2018). Zhao Chunyan and Chen Aimei utilize online text analysis methods to evaluate tourist satisfaction from four dimensions: landscape features, location and transportation, tourism services, and tourism environment (Zhao & Chen, 2009).

(3) The influencing factors of tourist satisfaction

Many factors affect tourist satisfaction. As early as 1978, Pizam adopted a factor analysis method. Through a survey of 685 holiday tourists, eight factors affecting tourist satisfaction are found, which are beaches, opportunities, costs, broadband, eating facilities, accommodation facilities, and environment and the degree of commercialization (Pizam et al., 1978). Different researchers in China and other countries sort out the factors that affect tourist satisfaction from different perspectives and find that the factors that affect tourist satisfaction are different in different regions and cultural backgrounds. Shi Chunyun and Liu Zehua studied Jiuzhaigou and Lushan and found that many factors affect tourist satisfaction, and these are regional. The only certainty is that there is a positive correlation between loyalty and tourist satisfaction (Shi & Liu, 2009). The research of L. Lu et al. and Y. Yoon et al. conclude that the formation mechanism of satisfaction is the combined effect of multiple factors. Moreover, due to the cultural diversity and differences in living environments in various countries, there are also huge differences in the specific effects of multiple factors (Lu et al., 2015; Yoon & Uysal, 2005). Larry Yu and Munhtuya Goulden, Tak Kee Hui et al., and Sangjae Lee et al., respectively, address international tourists from Mongolia, Singapore, China, and Peru to conduct surveys to study tourist satisfaction. In the research process, they find that tourists are of different types; different types of tourists have different socio-economic and cultural factors, which in turn determine their different tourism motives. The study of Larry Yu and Munhtuya Goulden also confirms this point. Tak Kee Hui et al. find that the price factor has a negligible impact on tourist satisfaction.; no factor can attract all tourists. For tourists in different regions, the most important influencing factors are different. For example, tourists in North America value accommodation and food, tourists in Oceania value culture, and tourists from Europe and Asia value sightseeing most (Yu & Goulden, 2006). Sangjae Lee et al. only surveyed Chinese tourists and concluded that tourism expectations have a negative impact on the quality of the tourism experience; tourism motivation has a positive impact on tourism experience quality, and tourism experience quality has a positive impact on tourist satisfaction. They also demonstrate the relationship between satisfaction, loyalty, and complaints. The results show that satisfaction and complaints are inversely related; satisfaction and loyalty are positively related; the more complaints, the lower the loyalty (Sangjae et al., 2011).

Recently, Chinese and foreign researchers have explored the factors affecting tourist satisfaction. However, some studies have shown how satisfaction with certain aspects of tourism affects the overall satisfaction of tourists (Geva & Goldman, 1991). For example, Bosque et al. propose that tourism embodies the emotions and cognition tourists exhibit due to experience during travel. W. Jo et al. study the relevant factors of Hanok Guesthouse, subdividing the perceived value into functional value and emotional value, and conclude that

these values will affect the formation of tourist satisfaction (Jo et al., 2014). However, few studies have attempted to cover all aspects of the travel experience, which may interact with tourist satisfaction. In addition, most studies still regard satisfaction with the destination experience as a global measure. This approach needs to consider how satisfaction with different aspects of travel (such as pre-travel services and transit routes) will affect the overall visitor experience.

Neal, Sirgy, and Uysal explore the impact of travel service satisfaction on overall life satisfaction. They hypothesize that satisfaction with different aspects of travel services (including pre-trip, on-the-trip, and return services) would significantly impact travel service satisfaction. The results show that overall satisfaction with tourism services and reflection on travel will significantly impact the overall satisfaction of the tourism experience (Haber & Lerner, 1998). Shen Xiangyou analyzes tourist satisfaction from the perspective of travel agencies and finds that service performance and tourism experience have a greater impact on tourist satisfaction (Shen, 1999). Sigal Haber and Miri Lerner conduct in-depth interviews with tourism companies and find that the attractiveness of tourism companies' locations is positively correlated with tourist satisfaction; the company's conditions have an important influence on tourist satisfaction, such as the strength of tourism companies, the services provided, the management skills and entrepreneurial characteristics of the business owner, the interaction between the price effect on satisfaction and various advertising media (such as television). etc (Haber & Lerner, 1998).

Abraham et al. find that the host-guest relationship of tourist destinations significantly impacts tourist satisfaction (Abraham Mehrez et al., 2000). Oom et al. use the SEM model to confirm that tourist satisfaction positively correlates with tourists' post-travel behavior. [36] Tourists' satisfaction with specific services provides a basis for the explanation and better prediction of overall tourist satisfaction. Kim et al. (2010) evaluate tourist satisfaction in the accommodation industry and find that it has a greater impact on their loyalty (Oom do Valle et al., 2006). Mohamed et al. study the factors affecting tourist satisfaction from the perspective of tourist motivation (Mohamed M. Battour et al., 2012). According to theories of appraisal, Bosque and Martin think that personal emotions will be affected by different interpretations and evaluations of things. Tourists' emotions will change during the trip due to different travel experiences. Existing studies also use emotion as an important dimension of perceived value (emotional value) to explore its impact on tourist satisfaction (Sweeney & Soutar, 2001). Li Ying concludes that tourism satisfaction is negatively correlated with expectations, and tourism expectations are positively correlated with actual perceptions through a survey in Xi'an. Zhou Xuejun et al. take the Three Gorges Waterway Tour of the Yangtze River as the research object and find that route arrangements, cruise services, and other services are significantly positive with tourist satisfaction; tour guide services are significantly negative; the demographic characteristics of tourists are closely related to the satisfaction of tourists, showing a positive correlation to a certain extent (Zhou & Zheng, 2016).

In summary, the research based on tourist satisfaction and the factors influencing it is mostly carried out from the perspective of tourists' subjective feelings and from the matching degree of tourism service supply to tourists' demand. These studies focus more on better meeting the needs of tourists in tourism supply, such as tourism facilities, transportation conditions, tourism resources, tourism services, and tourism projects, thereby improving tourism satisfaction. However, from the point of view of its definition and connotation, tourism satisfaction is more determined by the comparison between the tourist's subjective perception and the quality of tourism. People of different genders, different identities, and different experiences also have certain differences in the evaluation of tourism satisfaction. Therefore,

studying tourist satisfaction more scientifically according to different samples to more accurately grasp the demand of tourism consumption in the tourism market has great practical significance and theoretical value for tourism development and service providers.

Empirical analysis

(1) Data

This article uses commercial survey data from a city's tourist attraction during China's National Day Golden Week in 2019. The survey objects are visitors to the tourist attractions and potential tourists who participate in online and telephone surveys. Obviously, the survey groups are formed due to the differences in the objects. Because there are certain differences in various aspects between the on-site tourists and the potential tourists who participate in investigating the scenic spot during the National Holiday, the representativeness of grouped samples to all samples is also different. Additionally, the estimation of the grouped samples may be biased to the system due to subjective selection bias.

Therefore, based on the micro-individual data from the tourist satisfaction survey, this study explores the tourism industry's development and demand. It provides factor analysis from a micro perspective for the future development of the tourism market and industry. The setting of indicators in the questionnaire is mainly based on the survey objects' tourism satisfaction. The demand for tourism is divided into two perspectives: tourism consumption power and tourist satisfaction. Tourism consumption power is mainly expressed by income level. Tourist satisfaction is determined by establishing the five-level Richter scale index of tourist satisfaction. Through the relationship between the two, the development trend of the local tourism market and tourism industry in the future can be determined from a micro perspective.

Table 1 Descriptive statistics of continuous variables in the analysis of tourist satisfaction

	Variables	Number of Samples	Mean	SD	Max Value	Min Value
Tourist Sample	Income^2	578	4.712951	0.1913751	3	7.23784
	Age		64.16309	8.043982	19	84
All samples	Income	1611	4.036219	0.258960	2	7.56871
	Age		68.45792	11.74982	18	84

As shown in Table 1 above, the sample size of all samples is 1611, of which 579 are tourists. Based on the descriptive analysis of the original data, from the comparison of the average value, the income level of tourists is higher than the income of all samples. It can be considered that residents consume tourism based on certain consumption power. In addition, the age of the tourist sample is lower than the age of all samples, which also reflects that the tourism industry belongs to the leisure service industry, and consumers are doing it under the conditions of their practice. The age values of the tourist sample and all samples are based on adult survey subjects to ensure the authenticity and availability of survey research questions.

In addition, the survey finds that families make up the majority of tourists. That is, marriage has become an important variable in tourism grouping. For survey data with sample selection, it is better to deal with the problem of tourist samples with marital status as a

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[2]The personal income is processed logarithmically, and its economic significance is the income growth rate.

structural variable. In the empirical research part, this paper will use the OLS analysis results as a comparison model and then use the Heckman, the Switch, and the treatment effect model to deal with the sample selection problem of the tourist samples from the survey data. Generally speaking, according to the basic data source of the sample selection problem (truncated, merged data set), there are five main methods to deal with the corresponding sample selection problem. Hence, the solutions to the sample selection problem are also very different. The problem with the tourist sample in this study is the systematic bias caused by the non-randomness of subjective selection due to the sampling investigation of the specific tourists of the scenery spots during China's National Day Golden Week. Therefore, this article will process the data through the Heckman, the Switch, and the treatment effect model, accurately grasp the tourism demand based on the tourist attractions during the Golden Week, and provide quantitative evidence for the development direction of the tourism market at the attractions in a recent period.

(2) Three statistical treatment results and comparison of sample selection problems

To sum up, when only the sample of tourists who have entered the tourist attraction is used to predict the demand of tourists through tourist satisfaction, there will be such a sample selection problem. That is because the tourists who have entered the scenic spot as the survey subject have enough time and income. Suppose it is used to infer the future tourism demand for tourist attractions. In that case, there is a difference between the current tourist sample and the entire sample because the future tourism demand market includes more potential tourists. Therefore, this article first uses the classic regression OLS as the comparison model and then uses the standard Heckman selection model, the Switch model, and the treatment effect estimation method to correct the sample selection bias caused by the sample selection problem.

Table 2 OLS estimation results in the demand analysis of tourist attractions based on tourist samples

Variable	Entire Sample OLS	Tourist Sample OLS
Age	-.0002027 (.0013205)	-0.00104** (.0005264)
Age squared	5.84e-08 (6.40e-07)	5.07E-07** (2.56e-07)
Income	.2257448*** (.0541503)	0.027044*** (.0193312)
Coefficient	-.481202** (.2456669)	0.937419*** (.0903935)

Note: (1) The standard deviation is shown in parentheses;
   (2) *, **, *** indicate 10%, 5%, and 1% significance respectively, and no * means insignificant.

The above-mentioned classic regression comparison based on tourist samples shows that if there is a certain demand deviation between the tourist sample and the overall sample, this confirms the existence of the sample selection problem in the tourist satisfaction survey. This is due to the inconsistency of the tourist sample caused by system errors, which are different from the entire sample. From the analysis results, the relationship between age and income is negatively correlated in the tourist sample, but the degree is smaller than that of the entire sample. The positive correlation between tourist satisfaction and income indicates that the increase in income is positively correlated with tourists' travel perception or experience.

This means that tourism demand will increase with the experience of tourists and the spending power of tourists, which explains to a certain extent the attraction of place to potential tourists, and the tourism market will show a growth trend in the future. Therefore, the OLS comparison between the tourist sample and the entire sample further confirms the sample selection problem of the survey and results in inconsistent statistical differences. Further statistical measures must be taken to solve this problem.

1. Standard Heckman and Heckman two-step method

In this paper, the sample selection processing of tourist samples is realized in Stata12.0 by Heckman's command. The Heckman standard treatment method, namely maximum likelihood estimation (MLE) and two-step method, are used for estimation. The results are shown in Table 3 below. The results under the Heckman model are very different. For the selected structural variables, two Heckman equations pass the significance level test and show that the marital status in the tourist sample positively correlates with tourist satisfaction. From this perspective, it can be explained that the family's demand for tourism consumption will become the main support force for developing the tourism market. Suppose this factor is considered in the design of tourism products and services. In that case, it will stimulate tourism demand to a certain extent, thereby prompting a substantial increase in tourism consumption.

Table 3 Estimated results of the standard Heckman selection model

Variable	Heckman MLE		Heckman two-step method	
	Selection equation	Result Equation	Selection equation	Result Equation
Marital status	.1537117*** (.4404614)		.2307552*** (.4174873)	
Age		-.0048864*** (.0011207)		-.0044861 (.0133764)
Age squared		2.34e-06*** (5.45e-07)		2.14e-06 (6.50e-06)
Income		.1306074 *** (.0892884)		-.0242031 (.3175934)
Coefficient		4.246351*** (.1157792)		4.208753 (.0817396)
	chi2(1) =1.61Prob> chi2 = 0.2046		Wald chi2(3) =0.13 Prob> chi2 =0.9877 lambda 2.794854 rho 1.00000 sigma 2.7948539	

Note: (1) The standard deviation is shown in parentheses;
(2) *, **, *** indicate 10%, 5%, and 1% significance respectively, and no * means insignificant.

From the above Heckman analysis results, none of the Wald-chi2 values pass the significance test; that is, the Heckman method is ineffective in dealing with the problem of tourist sample selection in this study. Moreover, in MLE, the P value based on the null hypothesis is 0.2046, and the null hypothesis that the overall equation coefficient is insignificant is accepted. In the two-step estimation, based on the ratio of the Mills Lamda value to the rho value, the significant coefficient sigma=2.794853 is obtained. The difference

between the results of the two Heckman analyses further illustrates that the research conditions of the investigation do not satisfy the Heckman model. Therefore, it is unsuitable for this study's sample selection problem.

2. Switch-based MLE

The selected result variable is whether the survey object is a tourist or a potential tourist, and Switch estimation corresponds to other survey indicators. First, this paper reclassifies the corresponding micro-personal characteristics of tourist and potential tourist samples in all samples. Then, it estimates the relationship equation between tourist satisfaction and tourist income by grouping and forecasting the demand for tourist attractions based on this. We employ the movestay command in the Stata analysis software and select the built-in maximum likelihood estimation algorithm for sample selection processing. The results are shown in the following table.

Table 4 Estimated results of the Switch selection model

Variable	Switch		
	Selection equation	Result equation: Tourist sample	Result equation: Potential tourist sample
Marital status	0.31569032*** (.1865732)		
Age	0.10457891 (.0367822)	-0.0475216* (.06733514)	-0.00891*** (.0004565)
Age squared	-0.00004711 (.0007361)	0.0005139 (.000257)	7.41E-06*** (5.70e-07)
Income	0.3356825 (.0493744)	0.069173*** (.0395671)	0.061589*** (.0073659)
Coefficient	-2.4297123 (.55783667)	5.366944*** (.24655963)	3.214789*** (.0713365)
Wald chi2(3) =	76.40Prob> chi2 =	0.0000	

Note: (1) The standard deviation is shown in parentheses;
(2) *, **, *** indicate 10%, 5%, and 1% significance respectively, and no * means insignificant.

From Table 4 above, it can be seen that the Switch model estimates the relationship between the two microscopic individual tourism needs of tourists and potential tourists in tourist attractions: the relationship equation between income and tourist satisfaction. This research aims to make inferences about all the samples based on the tourist samples. Therefore, we are more concerned about the result of the equation estimated based on the tourist sample. First, the Wald-Chi value shows that the overall equation passes the hypothesis of significance level, which means there is a significant positive correlation between marriage and tourist satisfaction. That is, the development of the tourism industry should take the initiative in the development and design of family-based tourism products and services and focus on the perception and experience of family tourists, which will greatly promote the increase in tourism consumption demand and provide an effective development path for the development of local tourism market. At the same time, the positive correlation between tourist spending power (income) and tourist satisfaction, once again from micro-survey data, confirms that tourism, as

a sunrise industry in the national economy, will realize the impact of income consumption on the economy and give support for the development of the national economy. From the above two aspects, it is appropriate to deal with the problem of selecting tourist satisfaction samples based on the Switch model.

3. Treatment effect estimation method

Compared with the Heckman model, the Switch model and the treatment effect estimation method are for all samples rather than a single sample. The treatment effect estimation method is also estimated using the maximum likelihood (MLE) method. The treating command is used in Stata to correct the sample selection problem. The estimated results are shown in Table 5 below.

Table 5 Results of treatment effect estimation method

Variable	Treatment effect estimation method	
	Operation equation	**Result equation**
Marital status	0.2901467*** （0.1580532）	
Age	0.01381007 （0.0266546）	-0.003759*** （0.0045577）
Age squared	-0.00049752 （0.00017547）	2.347E-06*** （2.65e-07）
Income	0.07852141 （0.066547）	0.064088*** （0.0084123）
Coefficient	-2.1089576 （0.6699854）	0.0775541*** （0.0179782）
Tourist		.1198527** （0.326806）
Wald chi2(4) = 111.58 Prob> chi2 = 0.0000 sigma=-1.65778, lamda= -.008415		

Note: (1) The standard deviation is shown in parentheses;
　　　(2) *, **, *** indicate 10%, 5%, and 1% significance respectively, and no * means insignificant.

The same applies to the Switch model. The Wald-Chi range and the corresponding probability show that the treatment effect estimation method has obvious effects on solving sample selection problems, and the overall equation is significant.

Under the statistical inference that rejects the null hypothesis, we find that the microdata used for the tourist satisfaction survey in scenic spots can be used to study the relationship between tourism consumption ability and tourist satisfaction and further can be used to draw a relatively clear conclusion on the demand of the local tourism market. The study finds that tourists' perception and experience of tourist attractions indicate that tourism consumption desire is positively affected by tourism consumption power (income), so it can be inferred that the tourism market will be further stimulated by tourism demand and show a growth trend. In addition, the positive stimulation of marriage is a significant factor in the demand for tourism. Therefore, the local tourism market will obtain further development space by developing and designing tourism products and services from potential tourists based on the family as a unit.

Conclusion

The above analysis results are demonstrated from the demand side of the tourism market. The results after statistical processing of sample selection are quite different from the results of classical regression alone. This is because classical regression is an unbiased estimation based on the assumption of normal distribution generated by a random selection of variables. It ignores the subjective selection bias that may exist in the explained variables in the actual problem or the truncation problem that exists in the data itself, which leads to the fact that the samples do not satisfy the hypothesis of the overall normal distribution in the population estimation, thus resulting in the difficulty in satisfying the consistency of the statistical estimation. Through the statistical processing of the sample selection model, this paper finds that tourist satisfaction can be used as an indicator of the experience and perception of excellent tourism products and services, which is an indicator of consumer desire (expectation) of tourism consumption demand in the tourism market. It can provide tourism management authorities and enterprises (tourist scenic spots.) with specific strategies and development goals to promote the development of the local tourism industry.

First, the tourist satisfaction and the overall feeling and evaluation of tourism are reflected at the end of the tour, especially when the tour has just ended. Tourists will introduce their experiences and feelings of this trip to others in various ways. Positive feedback will form a good advertising effect and affect other potential tourists. Also, as far as tourists are concerned, a good travel experience will prompt them to travel again. Therefore, tourist satisfaction is not only the focus of the travel process but also the top priority after the end of the travel activity. The degree of tourism satisfaction depends on the tourists' expectations. When the actual travel experience is equal to the tourist's expectations, the tourist is satisfied. Tourists will be disappointed when the travel experience is lower than travel expectations. When the actual travel experience exceeds travel expectations, it may surprise tourists. Therefore, for the tourism supplier, the first thing to do is to objectively present the actual conditions of the tourist destination to visitors so that tourists can have more objective psychological expectations and avoid disappointment due to excessive expectations. It should be noted that deliberately lowering the expectations of tourists is not advisable. If the expectations are too low, tourists will abandon travel consumption behavior.

Second, a positive correlation exists between income growth and tourism perception or experience, indicating that tourism consumption power determines tourists' satisfaction. That is to say, the increase in income, the increase in the discretionary income that can be used for tourism consumption, and the increase in tourist satisfaction. Conversely, income declines, the discretionary income that can be used for tourism consumption decreases, and tourist satisfaction decreases. On the one hand, according to the basic market laws, the quality of tourism products is related to the price. If the tourism consumption power is low, the available products are cheap and of average quality. In this case, the tourism experience for tourists will be mediocre and will not bring them strong satisfaction.

On the contrary, if tourism consumption is strong, high-quality tourism products can be selected, giving tourists a strong sense of excitement and easily satisfy them. On the other hand, travel, transportation, and entrance fees are the most basic travel expenses. Before tourism activities, this part of the cost can be budgeted more accurately, which has little impact on tourism satisfaction. Ways to reduce basic tourism consumption, such as exempting high-speed fees and giving discounts on tickets, will not bring satisfaction to tourists but will attract tourists with weak tourism spending power. Third, the shopping and entertainment expenses in tourism are extremely flexible. This part of the expenses reflects tourists' consumption ability and greatly influences their satisfaction. Tourism suppliers can improve tourists' satisfaction by

strengthening the quality control of tourism commodities, creating a good shopping environment, and providing tourists with value-for-money tourism commodities. In this way, tourists can buy happily, use these products easily, and return with satisfaction. The Thai King Power Duty-Free Shop practice is worth learning now.

Third, it can be seen from the empirical analysis that there is a significant positive correlation between marital status and tourist satisfaction. Family tourism consumption will become the main development trend of the tourism market. Tourism suppliers should consider this consumer group and family tourists' perception and experience. They need to target families, optimize the existing tourism market, and broaden the development space for tourism consumption. By analyzing the population structure of the family, we can see that the focus of family tourism consumption at different stages is different. In the early days of establishing a family, family members are husband and wife, and family travel decisions during this period are often the result of joint discussions between the couple. Promoting the relationship between two persons is the primary consideration when choosing a tourist destination. After the birth of a child, family travel consumption has undergone tremendous changes compared to the past. When the children are young, family travel often involves short-term trips and outings. As the children grow up, their preferences and the educational significance of travel often become the key considerations for parents in making travel consumption decisions. When the children leave the family as adults, the main members of the family become husband and wife again. Safety and comfort in the travel process become important factors that influence the decision-making of travel consumption during this period. Therefore, although the tourism supplier wants to target families, subdividing family tourists is still necessary. They need to consider the main characteristics of family tourists in different periods, provide targeted tourism products and services, and improve the satisfaction of tourists.

In practical activities, the tertiary industry of the national economy often focuses on customer experience when providing services to customers. However, the microdata based on customer surveys can often not be directly analyzed by classical regression due to sample selection problems. This also determines that the sample selection problem from micro survey data becomes a necessary processing step. Based on the micro investigation of tourist satisfaction, this paper analyzes the results after processing the sample selection problem and finds that the results differ from those of classical regression. We find a decision basis that correctly reflects the problems and room for improvement in the products and services provided by tourism enterprises. These can provide a reference for tourism management departments to solve the problem of insufficient match between tourism enterprises, scenic spots, and tourism service provision and the needs of tourists.

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