The Recreational Value of Bama in China: One of the Five World's Longevity Townships

Yaping Liu
Department of Tourism Management, Business College, Guangxi University
No.100 College Rd., Nanning, Guangxi Zhuang Autonomous Region 530004, China
Tel: 86-159-9438-2258 Fax: 86-771-323-2880 E-mail: liuyaping888@163.com

Linlin Nie (Corresponding author)
Department of Tourism Management, Business College, Guangxi University
No.100 College Rd., Nanning, Guangxi Zhuang Autonomous Region 530004, China
E-mail: nie.linlin001@gmail.com

Bei Liao
Department of Tourism Management, Business College, Guangxi University
No.100 College Rd., Nanning, Guangxi Zhuang Autonomous Region530004, China
E-mail: mysunflower001@126.com

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Abstract

The recreational value of Bama Area in China is estimated to be 2.73 hundred millions dollars in 2009 via a revisionary travel cost method (TCM) in this paper. To make the estimation more applicable to the case of Bama, one of the five top longevity townships in the world, this paper adopts a new partition method and revises two calculation principles. Firstly, the conventional zonal travel cost method is amended to divide tourists by their travel cost instead of geographical or administrative zones. Secondly, the cost of tourists for different duration in Bama is calculated respectively. For short-term tourists, travel cost is estimated with the opportunity cost coefficient 1/3. The opportunity cost of the long-term tourists is replaced by their daily board and lodging cost in Bama. Thirdly, the total recreational value only covers special visits to Bama but excludes multi-destination visits. With the three modifications, it is plausible that the recreational value of Bama estimated in this paper reflects more objectively the resource characteristics and real value of the site.

Keywords: Recreational value estimation, Reversionary travel cost method, Bama Area in China

1. Introduction

Bama Yao Autonomous County is located in the mountainous area of Guangxi Zhuang Autonomous Region, China, along the Panyang River, covering an area of 1,971 square kilometres (shown in Figure 1, 2). Bama is a multi-ethnic autonomous county represented by 12 nationalities such as Zhuang, Yao and Han so on. Despite being a remote county in the western China, Bama attracts worldwide attention for its high life expectancy. The longevity township standard set by the United Union is seven centenarians among 100,000 people. In 2000 Bama had 74 centenarians among the population of 240,000, with a centenarian rate of 30.9/100,000, four times that of the UN standard.

Insert Figure 1 and Figure 2 here

In the year of 2003, Bama was awarded the certificate of The World's Fifth Longevity Township by the International Natural Medical Association. Since the early 1990's, medicinal researchers conducted many studies to explore its longevous mystery. Xiao *et al* (1991) conclude that the influential factors are the unique air, water, food and lifestyle in Bama. At that time, tourists came to Bama mainly for relaxation and recuperation in the hope of keeping healthy. However, their trips to Bama were spontaneous rather than being organised or guided by third parties. Those tourists tended to stay in Bama for a long time, several months or half a year so they were named "migratory bird people". In the 21th century, the local government and enterprises are committed to make Bama a tourism site by developing scenic spots, building hotels and enhancing infrastructures. As a result, with the rapid growth of tourists, the ecological environment in Bama has been damaged to some extent. That problem is partly attributed to the ambiguous market positioning. Therefore, the recreational value of Bama is estimated on paper by applying a revisionary version of the Travel Cost Method; the goal is to show the way for tourism industry development in Bama and provide economic justification for the government by placing a higher priority on the maintenance and development of this site.

2. The Travel Cost Method

The Travel Cost Method (TCM) is the basic theory in this study which is the most common indirect method used to estimate the recreational value of nonmarket resources or public goods. Harold Hotelling initially proposed the basic notion of Travel Cost Method (TCM) in a 1947 letter as a potential means of valuing national parks (Smith and Kaoru1990). Clawson and Knetsch developed Hotelling's approach and used the name Travel Cost Method (Clawson, 1959; Clawson and Knetsch, 1966). Since then, TCM has been further developed and become widely accepted in resource economics to estimate recreational values. Taking the forestry ecosystem for example, some studies focus on some service function and landscape value, such as the evaluation of non-timber forest products in the tropical rain forest (Peters *et al*, 1989), or of ecotourism value in the tropical rain forest (Tobias and Mendelsohn, 1991; Maille and Mendelsohn, 1993), etc. As to water resources, by using TCM, Ward (1987) estimates the value of water entertainment including fishing and rafting at $17/km^2-$25/km^2 on the River Chama in Mexico. Bowker *et al* (1996) assess the influence of water quality improvement on recreational and economic value of the River Chatooga and the River Nantahala in North Carolina. Cameron *et al* (1996) assess the leisure and recreational value when water level fluctuates in the Columbia River in America. Layman *et al* (1996) assess the value of recreational fishing in the Gulkana River in Alaska, etc. The basic assumption is that total expenditures incurred in getting to a site are taken as equivalent to the price tourists' are willingness to pay for the site. Another basic idea of the TCM is the number of trips to a recreational site will decrease with increases in travelling distance. A travel cost demand model reveals the relationship between the number of annual trips and its price. The approach assumes that the price of a trip is the sum of imputed opportunity time value and pecuniary travel costs (Becker, 1965).

TCM is generally applied in two forms: individual travel cost method (ITCM) and zonal travel cost method (ZTCM). The two approaches share the theoretical premises, but differ in the operational point of view (McKean, *et al*, 2005). ITCM predicts how many visits an individual might undertake per time period, customarily per annum. Developed by Brown and Nawas (1973) and Gum and Martin (1975), ITCM estimates the consumer surplus by analyzing the individual tourists' behaviour and the cost sustained for the recreational activity. However, ITCM measures relatively small sample sizes (Brainard *et al*, 1997), and it is limited in its ability to detect and measure consumer preferences that reduce the number of visits. It also breaks down when a site receives unusually high numbers of first-time or one-time visitors (Freeman, 1979; Bowes and Loomis, 1980) or it is subject to high visitation by a local population with very low travel cost, such as a people in a town within walking distance (Bishop, 1992).

In contrast to ITCM, ZTCM takes into account the tourists visit rate coming from different geographical or administrative zones with increasing travel cost (McKean, *et al*, 2005). Travel cost is calculated to generate the demand curve or Clawson-Knetsch Curve (Clawson and Knetsch, 1966), of which the integral part is the consumer surplus (CS) of tourists in each zone. Hellerstein (1992) thinks ZTCM works well in investigating group attributes, making it preferable to ITCM in examining the behaviour of non-visitors. However, its basic assumption that the travel cost of tourists within a certain zone is the same turns out to be impossible in reality. Some researchers revise the partition method to make the estimation closer to reality. Pearse (1968) puts forward a new partition method that divides tourists in light of income rather than geographical or administrative zones, assuming that tourists in the same income group behave similarly. Li and Li (2003) argue that differences still exist among tourists of similar income and then develop ZTCM further into a Travel Cost Interval Analysis (TCIA) method, partitioning tourists according to their travel cost directly. Xie *et al* (2008) evaluate the TCIA's rationality, and think it embodies the fundamental principle of the Lebesgue integral, which, in some degree, is superior to conventional ZTCM.

Though both Pearse and Li modify the partition method in terms of either income or cost which is unrelated to geography, yet they still share the same computing principles with conventional ZTCM. This paper adopts the partition method of TCIA and revises further the computing ways in view of the specific features of Bama.

3. Theoretical framework

3.1 Choosing a model

The key of assessing the recreational value is to choose a model for calculating the travel cost. There are two essential approaches in ZTCM. One is the traditional Clawson- Knetsch model (Clawson and Knetsch, 1966). The other one is the gravity model (Hanley and Spash, 1993), which is often used in geography and transport studies to model commuting decisions (Fleming, 2008). The methodology of the traditional Clawson- Knetsch model can be read in numerous books (Cicchetti *et al*, 1973; Cesario and Knetsch, 1976; Willis, 1990, 1991; Wang and Guo, 2000, etc). Based on the survey data of tourists' origin and consumption, this paper uses the first model to calculate actual travel cost and visit rate in each travel cost interval and gets a recreational demand curve: Clawson-Knetsch Curve. By integrating the demand curve, consumer surplus in each travel cost interval is calculated. Then the total recreational value of Bama will be obtained by aggregating total consumer surplus and total actual travel cost.

3.1.1 Excluding the multi-destinations trips

Multi-destination Trip, or MDT, is an insoluble problem of TCM. Kuosmanen *et al* (2003) point out three ways to deal with this issue:

(1) Ignoring MDT, by either excluding MDT visitors from the sample or by treating MDT visitors as if they were single-destination visitors.

(2) Correcting for MDT bias by using a proportion of the total cost attributable to the evaluated site as a proxy for the price of the trip.

(3) Modelling MDT and SDT (Single- destination Trips) as different commodities.

The third approach is suggested by Hotelling (Ward and Beal 2000) and has been developed by Mendelsohn *et al* (1992). This method was considered to resolve the problem of the multi-destination, and the gravity model (Fleming and Cook, 2008) can be used as the travel cost model of the multi-destination. However, it was a shame that, in this survey, most of multi-destination tourists failed to write down both the names of multi-destination and the number of destinations clearly, so the tourists of MDT has to be excluded from the sample to avoid possible bias.

3.1.2 Excluding the opportunity cost of long-term tourists

The opportunity cost is the cost of any activity measured in terms of the value of the next best alternative. It is a vital part in TCM. Unfortunately, there is little agreement on how it should be valued. Knetsch (1963) first proposes the approach to value opportunity cost by wage rate. Then some researchers take opportunity cost as equal to the wage rate (Centeno and Prieto, 2000) or 25% of the hourly wage rate (Buchli *et al*, 2003) or one third of the daily wage rate (Bockstael and Kling, 1988). However, opponents doubt its rationality for various reasons. Walsh, Sanders and McKean (1990) take travel for recreation as a benefit rather than a cost. McKean *et al* (2005) thinks work time and leisure time are intentionally pre-allocated by the consumer and thus there can be no substitution of time from consumption to work. Despite the dispute, this paper shares the same opinion of the former. One's pleasure from travelling do reduce the opportunity for work or business, that is to say, his working hours are substituted by his travel for entertainment. Therefore, he has to make choices between joy and work, which may lead to the opportunity cost. Just as Tuffour writes in 2012, the notion of opportunity cost means that visiting a site implies sacrificing not only cash but also the opportunity of using the time in an alternative manner.

In the survey, the tourists staying for not more 30 days in Bama are defined as short-term tourists, a half of whom stayed for 2-3 days (making up 54.66%, seen in Table 1). They would rather have the option to travel than to spend time working at their regular job. Since paid-leave holidays are not very popular in China, the opportunity cost of short-term tourists is calculated on their 1/3 daily income in this paper. Also, long-term tourists who stay for 30 or over 30 days in Bama are mainly retirees, so they don't have opportunity cost for alternative between work and travelling. Even so, they have to pay for their accommodation and food for staying for long time. Therefore in this finding the travel cost of long-term tourists (making up 16.09%, seen in Table 1) should cover additional boarding and lodging cost without effecting opportunity cost.

4. Investigation

The investigation was conducted in two phases: a pre-test survey and a final survey.

(1) In pre-test stage, 50 questionnaires were given out, with 21 questions and 150 items. Only 24 sheets were collected.

(2) The formal questionnaire was further improved based on pre-test questionnaire by removing irrelevant questions and items and adding MTD questions. The final survey, given in August 2009, consisted of three parts: demographic information, tourists' itinerary and expenditures in Bama and questions about Contingent Valuation Method (which is not discussed in this paper).

(3) Four hundred paper questionnaires were given out in Pona Town Self-drive Campsite, Longevity Village Bapan Town and other main scenic spots from August 27 to September 1, 2009. One hundred online questionnaires were collected between August 25, 2009 and March 12, 2010, all of which were put on Bama Jiaxun Forum, Tourism Forum on Space-time Web, Tianya Tourism Forum and other online tourism forums.

In the formal investigation, the total respond rate was 76.6% with 383 valid questionnaires re-collected. After removing three invalid sheets, the number of valid sheets was 380, among which multi-destination tourists and single-destination tourists were respectively 69 and 311, taking up 18.16% and 81.84% accordingly. As multi-destination answers are not included in our analysis, this paper only elaborates the other 311 sheets.

5. Data and Estimation

5.1 Tourists' Characteristics

The tourist construction of 311 respondents in the investigation is shown in Table 1. It is obvious that tourists in Bama take on obvious characteristics: Female tourists outnumber male tourists, making up 51.1%; tourists are mainly from Guangxi Zhuang Autonomous Region, making up 67.2%. 70.1% of the sample are individual tourists. 54.6% of tourists stay for three days while 23.5% of tourists stay for more than one week. It can be therefore inferred that a number of tourists settle in Bama for long-term leisure and recuperation. And there are quite a number of regular tourists, making up 26.05%.

Insert Table 1 here

5.2 Recreational value in Bama

5.2.1 Actual travel cost

Actual cost refers to the cost of travelling to Bama, especially covering transportation, board and lodging, access tickets and shopping. Table 2 shows the direct answers of respondents on actual cost in Bama.

Insert Table 2 here

With weighted sum method we get both total and average cost of 311 respondents, shown in Table 2. Let STC be the total actual cost, and then its average value is $E(STC)$ Since the respondents are mainly Chinese, the cost on the questionnaire was shown in Chinese Renmenbi (*yuan*). In consideration of accuracy, numbers in the tables as well as in the calculation process are also shown in *yuan*, but the final recreational value of Bama will be shown in US dollars with the average RMB exchange rate 6.8 in 2009.

$$E(STC) = \sum_k (TC_k \times R_k) = ¥1256.64 \tag{1}$$

$$STC = \sum TC_k \times L_k = ¥390850.00 \quad 1 \leq K \geq 13 \tag{2}$$

In the formula (1) and (2), the total actual travel cost is calculated as 390.85 thousand *yuan* and the average is 1256.64 *yuan* per capita.

5.2.2 Consumer surplus

As discussed above, travel cost is the sum of actual cost and opportunity cost. For short-term tourists, travel cost is estimated with the opportunity cost coefficient 1/3. While for long-term tourists, their travel cost is calculated with additional living cost in Bama. After the travel cost interval is set, a function can be modelled to estimate consumer surplus.

(1) Interval partition of travel cost

The travel cost of tourists who stay for less than 30 days:

$$\text{Opportunity cost} = \text{Daily income} \times 1/3 \times \text{Length of stay} \tag{3}$$

$$= \text{Monthly income}/30 \times 1/3 \times \text{Length of stay} \tag{4}$$

For example, the travel cost of one tourist who stays in Bama for three days is between 1000 *yuan* and 1200 *yuan*, and his or her monthly income is from 2000 to 2200 *yuan*. Then we know that,

$$\text{The tourist's opportunity cost} = (2000+2200)/(2\times 30)\times 3\times 1/3 = ¥70 \tag{5}$$

$$\text{The tourist's travel cost} = (1000+1200)/2+70 = ¥1170 \tag{6}$$

The travel cost of the tourists who stay for over 30 days (including 30 days):

Actual travel cost+ Additional board and lodging cost

It was known from the survey that rental in Bama is between 400 and 600 *yuan* per month with average value 500 *yuan*. If the cost of food is 15 *yuan* per day, to a tourist who spends the 700 *yuan* on other items, the total travel cost is 1650 *yuan*. In this way, the cost intervals of the 311 valid questionnaires show the following results.

Insert Table 3 here

$[TC_i, TC_{i+1}]$ is the i price interval of travel cost. Within $[TC_i, TC_{i+1}]$, N_i is the sample size. M_i is willing-to-travel sample size. When the travel cost ranges within $[TC_i, TC_{i+1}]$, there are not only N_i tourists willing to visit Bama but also those who pay more money are willing to visit Bama. So if the cost interval is i, the demand is: $M_i = \sum N_j (i \le j \le n)$. Assuming $P_i = \frac{M_i}{N}$, it's the proportion of the tourists in the N sample when the price is in i interval. It is set that $Q_i = P_i$, and Q_i is defined as $[TC_i, TC_{i+1}]$ price interval, and its average value ETC_i is the demand.

(2) Demand function of tourism consumer surplus

Since the WTP interval $[TC_i, TC_{i+1}]$ is a continuous function which is hard to show each WTP price, according to the travel cost interval $[TC_i, TC_{i+1}]$ and its demand Q_i in the Table 3, the regression model is set by taking ETC_i, where the average value of the interval is used to calculate, as the independent variable and Q_i as the dependent variable. Because the methodology of TCIA is to treat the behaviour of tourists in generalities by ignoring differences, which is one of aggregate travel cost models that is the same as ZTCM, the travel cost is used as the only one independent despite the possible existence of other independents in ITCM model. Perhaps, there can be bias, but no better way is available to resolve the issue at present. Therefore, the corresponding data shown in table 3 is input into SPSS16.0 to get some regression models, mainly covering linear, quadratic, logarithmic, power and exponential. Their results are shown in the Table 4.

Insert Table 4 here

Under the condition that the same independent variables and dependent variables are adopted, and when the testing values of regressions such as T-value and F-value can answer for statistical index in effect, it should be more reasonable to use the regression model with higher R^2. It is shown that R^2 value of logarithmic function is 0.922, which is the optimum degree statistically. Thereby the logarithmic function is adopted as the demand function model in this survey. That is

$$Q(x) = 2.358 - 0.262 \ln x \tag{7}$$

Among the formula (7), tourism demand $Q(x)$ is a logarithmic function with travel cost x as independent variable. Assuming that $Q(x)=0$, $\hat{x}$ =¥8104, that is to say, when travel cost is 8104 *yuan*, the tourism demand approaches zero. In the light of consumer surplus principle, the consumer surplus in every price interval equals the product of the tourism demand curve in the corresponding interval and the travel cost. A indefinite integral is made to the formula (8) and set $F(x_i) = \int Q(x_i)$, then

$$\begin{aligned} F(x_i) &= \int Q(x_i) = \int (2.358 - 0.262 \ln x_i) dx \\ &= x_i (2.62 - 0.262 \ln x_i) \end{aligned} \tag{8}$$

i=1, 2, 3……25.

When $\hat{x}$ =¥8104

$F_{\max}(\hat{x}) = \max_{x_1 \to x25} \{F(x_i)\} = ¥2123.25$

Based on tourism consumer surplus model, formula (8), SCS is assumed to be the *CS* of 311 respondents, formula (9) can be gotten.

$$SCS = \sum_{i=1}^{25} CS_i = \sum_{i=1}^{25} \int_{x_i}^{\hat{x}} Q(x_i)dx \times N_i = \sum_{i=1}^{25} \int_{ETC_i}^{8104} (2.358 - 0.262 \ln x_i)dx \times N_i$$
$$= \sum_{i=1}^{25} \left[F_{\max}(\hat{x}) - F(x_i)\right] \times N_i \tag{9}$$

So, the result is:

$$SCS = \sum_{i=1}^{25} \left[2123.25 - x_i(2.62 - 0.262 \ln x_i)\right] \times N_i = ¥360{,}326.72 \tag{10}$$

The consumer surplus of the 311 tourists in Bama is 360,326.72 *yuan* and the average consumer surplus is 1158.60 *yuan* per capita.

(3) The total recreational value estimation

The traditional method estimates the annual total recreational value by adding the annual total number of actual travel cost and consumer surplus, then multiplying the overall number of tourists for that year. However, in the investigation, 18.16% of the informants were multi-destination tourists, who are excluded due to incomplete data. 311 respondents are studied, which take up 81.84%. Obviously, when aggregating the total recreational value, the proportion of special trips to Bama, 81.84%, should be multiplied to make it more rational. Thus:

$$RV = \frac{(STC + SCS)}{SN} \times TN \times 81.84\% \tag{11}$$

In formula (11), RV is the total recreational value in Bama. STC is the sum of direct cost. SCS is the sum of consumer surplus. SN is the sample size. TN is the number of trips to Bama (9.381 hundred thousand in 2009) . The result is:

$$RV = \frac{390{,}850 + 360{,}326}{311} \times 938{,}100 \times 81.84\% \approx ¥1{,}854{,}000{,}000 \tag{12}$$

To sum up, the recreational value of the longevity resource in Bama is at least 1.854 billion *yuan* (2.73 hundred millions dollars). However, it must be admitted that an underestimation may exist because of the ignorance of MDT.

5.3 Analysis on the results

From the research results above, the total consumer surplus of the sample in Bama is 360,326 *yuan*. Although the visit rate and consumer surplus decreases as travel cost increases from 100-300 *yuan* to 8000-12000 *yuan* and approaches zero when travel cost comes to 8104 *yuan*. If travel cost exceeds 8104 *yuan*, consumer surplus should be negative (seen in Table 4). Why it's so? It is found that the formula (7) can be changed into an indefinite integral by another formula $F(x_i) = x_i(2.62 - 0.262\ln x_i)$ to test the results' reliability. Assuming $F(x_i)=0$, the largest predicted value of travel cost is estimated as 22026 *yuan*. To be more specific, when the travel cost goes up to 22026 *yuan*, visit rate approaches zero again. Table 4 shows the largest travel cost interval is ranging from 14001 to 16000 *yuan*, and the average is 15000 *yuan*, which is just within the estimated range, 22026 *yuan*. It can be concluded that this cost partition is more reliable. This result correlates with the quality of longevity resource in Bama and the actual statistics data in the survey. It can be explained as follows:

Firstly, the longevity resource is very suitable for leisure and recuperation. It is attractive to those who visit Bama for the purpose of experiencing local lifestyle, enjoying local fresh air and clean water to keep their health and longevity. Sightseeing of natural scenery is secondary. Therefore, the initial tourists are people who have lived in Bama for a long time. Secondly, according to the statistics results (seen in Table 2), those who spend 100 to 4000 *yuan* are mainly sightseeing tourists and they usually stay in Bama for less than 30 days. When the travel cost reaches 4000 *yuan*, the number of sightseers decreases sharply. Most are "migratory bird people" who stay for a long duration.

Insert Table 5 here

The results showed in Table 5 also prove the explanation mentioned above, which focus on relativity analysis. The results show that travel cost has a positive correlation with length of stay and age. In other words, the longer the duration is and the older the tourists are, the higher the travel cost is. The former two factors have tight relationship with leisure and recuperation. Thus it can be concluded that the attributes of recreational resource in Bama is more suitable for developing leisure tourism.

6. Conclusions

Though TCIA do not cope with the issue of limited sample space well (Xie *et al*, 2008), to some extent it indeed avoids some interpretations derived from unreasonable assumptions. In this paper the revisionary partition method of TCIA is applied, and calculating methods in two aspects are revised: excluding MDT and opportunity cost for long-term tourists. The real recreational value of Bama is estimated to be 2.73 hundred millions dollars. Also, it is proved that the optimal development mode for Bama is leisure tourism industry.

Bama, as the world's fifth township of high life expectancy, has shown a rapid growth of tourists in the recent decades. Many tourists flock to Bama, which results in unbalance between the large number of tourists and the status quo of facilities, management, and environmental capacity. To meet the needs of increasing number of tourists, local government and enterprises invest blindly in hotels, restaurants, scenic spots while investment in infrastructures, environmental protection and medical facilities are few. Moreover, they are not aware of either the recreational value of Bama or how much to invest and where to invest. An increasing number of sightseers reduce the quality of longevous resources in Bama which causes complaints among long-term tourists. Alarmingly, failing to control the number of tourists and the pursuit of the immediate interests has caused great damage to the natural environment in Bama, thus hampering its further development. Hence it can be suggested in this paper that government planners should set restrictions on sightseeing to reduce environmental damage and pay more emphasis on "migratory birds" by improving basic facilities and developing healthy items to strike a balance between environmental protection and economic profits.

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Table 1. Tourists' statistical characteristics on the bank of the Panyang River, Bama

Items	Frequency	Percentage
Origin		
Beijing	4	1.3
Guangdong	32	10.3
Gunagxi	209	67.2
4 Southwestern provinces	13	4.2
5 Eastern provinces	26	8.4
5 Central provinces	13	4.2
3 Northwestern province	4	1.3
3 Northeastern provinces	5	1.6
Foreign countries	5	1.6
Gender		
Male	152	48.90
Female	159	51.10
Ages		
Below 19	8	2.6
20-29	109	35
30-39	81	26
40-49	58	18.6
50-59	30	9.6
60-69	18	5.8
Above 70	7	2.3
Travel means		
Package tour	79	25.40
Half self-help tour	14	4.50
Self-service travel	218	70.10
Length of stay		
1 days	10	3.22
2 days	96	30.87
3 days	74	23.79
4 days	19	6.11
5 days	13	4.18
6 days	5	1.61
1 week	24	7.72
2-3 weeks	16	5.14
1 month	23	7.40
2-3 months	18	5.79
6 months	4	1.29
Above 1 year	5	1.61
Travel frequency		
1 time	230	73.95
2 times	53	17.04
3 times	9	2.89
5 or above times	3	0.96

Note. The tourists' origins involve 24 provinces in China as well as overseas regions like United States, Canada. Besides Beijing, Guangdong and Guangxi, the rest of the provinces are divided into five zones: Southwestern zone includes Chongqing, Yunnan, Guizhou and Sichuan; Eastern zone includes Fujian, Jiangsu, Shandong, Shanghai and Zhejiang; Central zone includes Anhui, Henan, Hunan, Hubei and Jiangxi; Northwestern zone includes Gansu, Inner Mongolia and Shanxi; Northeastern zone includes Heilongjiang, Liaoning and Jilin.

Table 2. Actual travel cost of tourists in Bama

Serial number	Actual cost partition			
k	Partition value	Mean value (TC_k)	L_k	R_k(%)
1	Under 200	200	7	2.25
2	200-400	300	31	9.97
3	400-600	500	60	19.29
4	600-800	700	57	18.33
5	800-1000	900	25	8.04
6	1000-1200	1100	19	6.11
7	1200-1400	1300	7	2.25
8	1400-1600	1500	10	3.22
9	1600-1800	1700	10	3.22
10	1800-2000	1900	15	4.82
11	2000-2500	2250	14	4.50
12	2500-3000	2750	9	2.89
13	3000 above	3000	47	15.11
	In total		311	100.00

Table 3. Results of consumer surplus based on different travel cost

i	[TC_i, TC_{i+1}] (yuan)	ETC_i(yuan)	N_i(people)	M_i (people)	P_i(%)	Q_i	CS_i(yuan)
1	100-300	200	7	311	100.00	1.0000	13138.16
2	301-400	350	25	304	97.75	0.9775	43585.51
3	401-600	500	58	279	89.71	0.8971	94386.98
4	601-800	700	54	221	71.06	0.7106	80498.67
5	801-1000	900	18	167	53.70	0.5370	24646.55
6	1001-1200	1100	19	149	47.91	0.4791	23931.10
7	1201-1400	1300	13	130	41.80	0.4180	15072.08
8	1401-1700	1550	10	117	37.62	0.3762	10454.63
9	1701-1800	1750	7	107	34.41	0.3441	6734.26
10	1801-2000	1900	8	100	32.15	0.3215	7227.55
11	2001-2200	2100	10	92	29.58	0.2958	8301.09
12	2201-2400	2300	4	82	26.37	0.2637	3047.09
13	2401-2600	2500	7	78	25.08	0.2508	4885.99
14	2601-3000	2800	5	71	22.83	0.2283	3050.53
15	3001-3200	3100	6	66	21.22	0.2122	3183.91
16	3201-3400	3300	3	60	19.29	0.1929	1445.88
17	3401-3600	3500	6	57	18.33	0.1833	2618.66
18	3601-3800	3700	8	51	16.40	0.1640	3151.39
19	3801-4000	3900	8	43	13.83	0.1383	2833.91
20	4001-5000	4500	6	35	11.25	0.1125	1504.79
21	5001-6000	5500	16	29	9.32	0.0932	1981.85
22	6001-8000	7000	4	13	4.18	0.0418	83.48
23	8001-12000	10000	1	9	2.89	0.0289	54.34
24	10001-14000	12000	1	8	2.57	0.0257	213.78
25	14001-16000&∞	15000	7	7	2.25	0.0225	4293.54
Total			311				360325.72

Table 4. Model Summary and Parameter Estimates

	Equation				
	Linear	Logarithmic	Quadratic	Power	Exponential
Model Summary					
R Square	.470	.922	.800	.913	.886
F	20.380	272.735	44.031	242.286	178.725
df1	1	1	2	1	1
df2	23	23	22	23	23
Sig	.000	.000	.000	.000	.000
Parameter Estimates					
Constant	.528 (7.555**)	2.358 (17.798**)	.778 (11.955**)	425.198 (1.441*)	.584 (6.665**)
b1	-5.330E-5 (-4.170**)	-.262(-15.348**)	.000 (-6.970**)	-.983 (-11.619**)	.000 (-11.656**)
b2			1.071E-8		

Note: 1. The figure in the brackets is t-value, ** is significant at the 0.01 level (2-tailed), * is significant at the 0.05 level (2-tailed)

2. Dependent Variable: travel person times. Independent variable: travel cost.

Table 5. Analysis on Correlations among travel cost, length of stay and ages

	Travel cost	Length of stay	Ages
Travel cost Pearson Correlation	1	0.932**	0.416**
Sig. (2-tailed)		0.000	0.000
N	311	311	311

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 1. The Location of Bama

Figure 2. The map of Bama