An Application of Travel Cost Method to Yuelu Mountain Park

in Changsha, China

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The objective of this thesis is to assess the recreational value (access value) provided by Yuelu Mountain Park in China applying travel cost method (TCM) which is commonly used to estimate non-market benefits. Also, a fee that would maximize the entrance fee income is tentatively calculated. The potential trips to be lost next year are estimated based on local respondents visiting intentions among different age groups. The travel cost demand function is estimated by using basic count data travel cost model-Poisson regression, and survey data collected on-site. Average access values per trip were estimated to be € 0.75 for local and € 64.52 for non-local individuals producing aggregate annual access value of € 20.43 million. Based on the travel cost demand function, an entrance fee of € 5.43 would maximize the revenue collected from the visitors. This would mean more than doubling of the present entrance fee. The result could potentially be utilized when deciding on the entrance fees. It is also suggested that the park management could further study visitors' intentions and reasons either to visit or not to visit the park in the future. Estimated consumer surpluses as well as suggested entrance fee must however, be considered with caution because truncation of the on-site survey data is not accounted for in the Poisson model estimations of this study.
Forward

This master thesis is conducted aiming to apply travel cost method to evaluate the recreational value of Yuelu Mountain Park in Changsha, China and to provide useful information on setting new entrance fee.

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1. Introduction

1.1 Non-market value application

Nowadays people attach more and more importance to leisure time, recreation, which increases the value of public recreational resources. People, for instance, enjoy themselves by choosing the way of beaches for sunbathing, mountains for climbing, and lakes for fishing. National parks, where people relax themselves, usually provide tourists and natives with many recreational opportunities, sightseeing, picnicking, and exercise as those of the public recreational resources. While people enjoy these public services, these national parks’ own economic values are reflected through providing all the recreational purposes or access to amenities. The value of parks can also be made use of by local government and officials to make efficient budget allocations. For instance, park managers can make a decision about how much to invest on the facilities and maintenance of the park or how much to spend on amenity improvement after getting an idea of how valuable the park is (Sohngen 2000). Furthermore, park managers could also consider charging a suitable entrance fee for the protection of these recreational resources based on the value of parks.

One should recognize that it is difficult to value national parks by using traditional economic measures because the scenic beauty of such amenities is not normally priced in markets. That is to say, they can not be marked with an appropriate price to indicate their economic value as other market goods (Straaten 2000). It is very likely that people sometimes think that these public goods have little value or they are irrelevant to the market value, so the environmental value could be ignored or even lost. Nevertheless these public resources which act as a drive stimulus for the economy and source of social welfare are very important to visitors. However, we cannot evaluate the non-market goods the same way as we evaluate market goods by analyzing the observed quantities and prices in the market. Hence, as important tools,
non-market valuation methods estimating the monetary value of public goods are widely used to alleviate this problem.

It is only in recent years that the evaluation of the non-market values have been recognized by Chinese economists and due to different factors, such as culture, population, habitat and religion, the application of non-market value have not been applied that successfully in China. It is common knowledge that lately the natural recreation places in different cities of China keep progressing in development at a rapid pace. Many natural scenery tourism resources, unique environments and key point of interests endowed by the nature and cultural accumulation for thousands of years make China a famous place with mass scenic spots. With the development of the theory of utility and environmental values derived in western countries, Chinese economists have paid more and more attention to the application of non-market value. Different methods of non-market valuation have been applied to many recreational resources in China, and these methods have up to now received great success. For example, in 2006 contingent valuation method was applied in Guangzhou of southern China to evaluate the recreation-amenity use of urban green spaces (Jim and Chen 2006). Contingent valuation, as a typical approach of stated preference method, is widely used to estimate people’s willingness to pay in measuring the benefits of a variety of public goods. In contrast with stated preference methods, revealed preference methods are based on consumers' use of public goods or service. Travel cost method and hedonic pricing method both belong to revealed preference methods. This paper will discuss travel cost method and illustrate how it is applied to the case of Yuelu Mountain Park in Changsha, China.

1.2 Background of the study

Certified by the People’s Government of Hunan Province as one of the first batch of provincial scenic spots, Yuelu Mountain is situated on the western bank of Xiang
River (one branch river of Yangzi River) in the old city of Changsha, covering a total area of 36 square kilometers and including Lushan, Tianmashan, Taohualing, Shijialing, the site of former Xinmin Learned Society and the earth wall of Nanjin Town. Lushan is the pick of scenic spots which occupies 6 square kilometers. In 1975, Lushan was named as Yuelu Mountain Park and later in 2000 it became one of the first national places of interest and awarded as national key point of interest by Chinese government in 2002 (The People’s Government of Yuelu District of Changsha Municipality 2008). Figure 1-1, Figure 1-2 and Figure 1-3 show the map of Changsha in China and the location of Yuelu Mountain Park within Changsha city.

Figure 1-1 Changsha Image (Wikimedia Commons 2006)
Figure 1-2 Location of Yuelu Mountain in Changsha (Holiday City 2008)

Figure 1-3 Location of Yuelu Mountain Park (South Gate) (Google Earth 2008)
We can see from these figures above, Changsha, as the capital of Hunan Province, lies in eastern Hunan in South central China. Yuelu Mountain Park locates quite close to the city centre right cross Xiang River. It is a conspicuous sightseeing place in Hunan capital with its various peaks, Xiang River flowing by, the beautiful Orange Island in its front and an old city looking at, which forms a mixed landscape of mountain, river, island and city. Yunlu peak, the highest peak of the park is 300.8 meters high above sea level. Yuelu Mountain Park, as the most important and popular scenic spot in Yuelu Mountain, is famous for its picturesque scenery all the time (see Appendix 2). It abounds with botanic resources. There is growing dense forest and old tall trees which the tourists admire. What’s more, a plenty of proto-evergreen broad-leaf secondary trees are seldom seen in cities. Yuelu Mountain Park with its long historical civilization is also a place where Confucianism, Buddhism and Taoism inhabit together. Yuelushan Academy, one of the four great academies of Dynasty Song with thousand years old in China, is located at the foot of Yuelu Mountain, which endows Yuelu Mountain Park special historical significance and attracts a large number of tourists every year. Besides that, there are lots of scenic spots in the park, such as Qingfeng Gorge, Aiwan Pavilion, Lushan Temple, Yunlu Palace, White Crane Spring and Flying Stone. Sheli Tower, Tombs of Huang Xing (Huang Hsing) and Cai E (Tsai E). Qingfeng Gorge lies in the low place. Between Yuelu Academy and Lushan Temple, Aiwan Pavilion, one of the four famous pavilions in ancient China, was built in year 1792 (Yuelu Mountain Park 2008).

As the only mountain park in Changsha, Yuelu Mountain Park possesses its unique value other than many recreational sites in Changsha. Due to its great scenic view, historical significance and its special geographical location which is close to the city centre, Yuelu Mountain Park easily becomes one of the most popular recreation places to the visitors from all over the world every year. People who plan to spend their leisure time do jogging, take exercise, climb, or go sightseeing there. The oxygen volume produced from Yuelu Mountain Park every year account for one
quarter of the total volume produced from the whole city. With average climate of 17°C it annually provides visitors with a delightful recreational environment especially in summer, holding a special attraction for more and more visitors at home and broad (Yuelu Mountain Park 2008).

The population of the tourists to Yuelu Mountain varies a lot during different tour times, such as Moon Festival, the Dragon Boat Festival within a year. During National Day vocation, Labors Day vocation (In China, people call these days golden week, lasting for 7 days) and the spring festival (It usually lasts for 10 days), the number of tourists can reach to over 70000 separately. During Labors Day vocation 2007, the total amount of visitors even arrived at 100 000, which was the historical record in population since the park was built up, said Zhou (personal communication, July 3, 2007) who is now director of development department of Yuelu Mountain Park. Since the natural recreation is regarded to be more and more important by public, Zhou said the average number of visitors during recent years was about 1 million per year. The visitors to the park are classified as local, national and international. Within recent years more and more foreign tourists came to visit Yuelu Mountain. Peng Hao, vice director of Yuelu Mountain administration committee said that the number of foreign tourists accounts for less than 5‰ of the total tourists population before March 2006, but the proportion has risen up to 6%-7% recently. Only from January to May in 2007, the number of international visitors was about 11 000 (Changsha Municipal Peoples Government 2007).

In the personal interview, Zhou (personal communication, July 3, 2007) also referred that since the recreational value of Yuelu Mountain Park gained more and more recognitions by people, there would be a big investment on the development of the Park in the near future. The total amount could be over € 14 million, out of which, about € 10 million would come from the entrance fee. The entrance fee contributes a lot to the expenses of park maintenance which accounts for about 70% of the total expenses. In year 2005, the total revenue from the entrance fee exceeded € 1 million,
compared to the high maintenance fee which reaches up to €2 million, the annual gap between the entrance fee and the maintenance expenses came to 1 million euro (The People’s Government of Changge City 2005).

An appropriate entrance fee plays a crucial role in its active influence to maintain and develop the park. The current entrance price is €1.5. Besides that, there are also other types of special tickets for local citizens who pay frequent visits: monthly ticket (€0.5), normal yearly ticket (€16) and yearly ticket for teachers and students (€5). Holding a monthly ticket, you can daily enter the park only before 7 am or after 6 pm during one month. You can also enter the park any time if you like with a yearly ticket, and there is no time limit. Social public vehicles are allowed to enter the park with an extra fee of €2 for each car. Any of tickets do not include other services within the park such as tourism bus, the entrance ticket to the Birds’ Garden and some scenic spots fee. The entrance price of Yuelu Mountain Park belongs to the price item of Provincial Price Bureau and its adjustment will be carried out through inviting citizens to attend different meetings of holding court in Changsha on behalf of Hunan Province Price Bureau. The meeting of holding court (MHC) is a kind of meeting, the requirement of which is to collect the opinions from different delegates who represent people from different classes of society. The tentative idea of price will come into being after a discuss at the meeting, and then the price-constitution proposal will be made by Changsha Price Bureau and sent to Hunan Provincial Price Bureau for final examination and approval (Changsha Development and Reform Commission 2007).

Liu Jianzu (personal communication, July 11, 2007), director of administration department of Yuelu Mountain Park said, from 1993 to the beginning of 1996, the price was only €0.2. In February of 1996, it was raised up to €0.5 and kept going up to €0.6 in August in the same year. The inflation rate in 1996 was 8.3% (National Bureau of Statistics of China 1997). It means €0.2 before 1996 equals to €0.217 in year 1996. Compared to €0.6 in the same year, the entrance price increased by 1.74
times. From September of 2001, Hunan Provincial Price Bureau set € 1.5 as the latest entrance price and it continues to be executive until now. According to the annual report of National Bureau of Statistics of China, the inflation rate in 2001 was only 0.7% higher compared to the previous year (National Bureau of Statistics of China 2002). The price in 2000 was € 0.6 with the real value of € 0.642 in 2001 rising by 1.34 times or so.

Many public disputes have been raised towards the appropriate entrance fee that is best for the development of Yuelu Mountain Park in the future. One MHC of the adjustment of the entrance price was held on 14th of April, 2005. Out of 24 delegates 22 agreed to raise the price. Some proposed that the price should be raised up to € 4 to offset the funding gap. One student delegate proposed to consider setting up a student price, and it would be between € 0.2 and € 0.5 during the golden weeks and on weekends. Most of the delegates denoted that there would be various channels to collect funding for Yuelu Mountain Park. (Changsha Price Bureau 2005)

What is the recreational value of Yuelu Mountain Park and how to estimate it, how to adjust the entrance fee of Yuelu Mountain Park, and what is the appropriate price for the development of the park to solve the funds problem are important questions that will be addressed in this study.

2. Objectives and implementation of the study

2.1 Objectives of the study

There are several objectives in this study. First aim is to assess amenity value provided by Yuelu Mountain Park in Changsha city, using travel cost valuation method that elicits consumer surplus and analyze the application of the access value. The second purpose is to calculate an entrance fee that would maximize the entrance
fee income and compare it with the current one. The third objective is to analyze the potential trips to be lost next year, which will be brought by local respondents without visiting intention among different age groups.

2.2 Structure of the study

The thesis will be organized as following structure:

In section 3, previous literature about travel cost valuation method is reviewed. Section 4 presents the theoretical framework of travel cost method for the purposes of this study. The theoretical framework will act as a basis for the questionnaire design to collect the primary data. Conducted survey and collected data are analyzed in section 5 to accomplish the objectives of the study. Section 6 and 7 will give the results, discussion and conclusion.

3. Literature Review

Non-market valuation is necessary and distinct from neoclassical price theory of market goods. Air, parks, lakes, streams and public lands are all examples of non-market goods. Travel cost method reveal people’s willingness to travel to enjoy the amenity value the public resources provide. The first travel cost technique originated in 1947 in a letter form written by Harold Hotelling to US National Park Service, the purpose of it was to show that the benefits brought from a park exceed the cost to the visitors (Farrow 2000 cited in Hotelling 1947). Harold Hotelling explained in his letter that the trip costs that visitors spent to a public site could be considered as a special “price” for its recreational value. Later in 1959 Clawson explicated this concept in more detail, which brought TCM in economic literature formally (Mathis 2003 cited in Clawson 1959). This basic approach was called
Clawson-Knetsch travel-cost model, used to estimate the consumer surplus for non-priced outdoor recreations. After decades of years, this technique has been applied and developed to evaluate a wide range of recreational activities and public resources. Parson (2003) elaborated two models of TCM: single-site model and random utility maximization model and their separate applications.

Travel cost method is commonly used to value recreational uses of the environment. Sohngen (2000) explored the recreational value of single-day trips to Lake Erie beaches by applying TCM. In his study, travel cost method was used to estimate the recreational value of two chosen beaches along Ohio’s Lake Erie coastline -Headlands and Maumee Bay State Park beaches.

Data in Sohngen (2000)’s study were collected during the summer of 1997 at each beach, by surveying beach visitors randomly. Respondents were asked to answer four parts in the survey: basic information on what the visitor was doing at the beach; expenditure and general travel information; demographic information; beach perceptions. The paper showed that the recreational value of single day visits to Maumee Bay Beach was estimated $ 6.1 million ¹, and Headlands Beach was worth $ 3.5 million. The results suggested that Lake Erie beaches are highly valuable assets for single day visitors.

Johnstone and Markandya (2006) have attempted to estimate the economic values for recreational use of three types of river by applying TCM. In addition, TCM have also been applied to evaluate the recreational benefits from national park. (Liston-Heyes and Heyes 1999).

¹ 1 US dollar approximately equals to 0.766 euro.
There are two types of demand functions for TCM: the individual model and the zonal model. Willis and Garrod (1991) compared the consumer surplus estimated by using these two methods and discussed their separate advantages.

When data are small, the zonal model can be usefully applied. This approach is mainly used as secondary data to value a site as a whole without characteristics of individuals as dependent variables. The data it collects are from each zone. The travelers are categorized based on their zone of origin or the natural breakdown of the surrounding area (Karasin 1998). Nill esen and Justus (2005) estimated the recreational use value of hiking in the Bellenden Ker National Park in Australia by using zonal travel cost model. Travel cost expenditures were calculated from each zone out of 18 zones of origin. The value of this national park for hiking and camping purposes was estimated to be $ AUS 250825 per year. The paper also suggested their estimates would be helpful to the park managers when taking new entrance fee into account.

Individual travel cost method is now regarded as the most defensible and widely applied method which can be found in many literatures (Parson 2003). Different from zonal model, the dependent variable in individual travel cost function is the number of trips taken by individuals but not by dwellers from different zones. Since single individual is the object unit, this approach can collect much more information and thus provides relatively closer travel-cost approximation of true consumer surplus than zonal model (Willis and Garrod 1991). Alberini et al. (2006) used TCM to estimate the recreational benefits from restoring fish stocks of the Lagoon of Venice. When 50% improvement in catch rate happened, the angler surplus is improved by $1100/year.

\[^{2}\text{1 $AUS is about 0.509 euro.}\]
TCM has also been applied in China to value the recreational benefits of a beach along the eastern coast of Xiamen Island by Chen et al. (2004). In this study the aggregate recreational value of the beach was estimated to be about € 5.35 million per year which implied that the eastern coast of Xiamen Island had a considerable economic value. Authors also gave some advice on implementing a user access fee to cover some expense of maintenance. All these studies estimate the non-market value by applying travel cost method and the active significance also provides appropriate references for this study.

4. Theoretical background

4.1 Travel cost model

The travel cost method is regarded as the earliest technique to evaluate the non-market goods. It is commonly used to estimate the consumer surplus associated with travelling to the recreational sites such as parks, beaches and heritage sites (Hailu et al. 2005). As an indirect method used to estimate non-market benefits it regards travel expenditure spent during the trip as a substitute price travellers pay for sites recreation or the service (Liston-Heyes and Heyes 1999). And it is commonly applied in benefit-cost analyses and in natural resource damage assessments where recreation values play a role. TCM is a demand-based model for use of a recreation site or sites. This approach tries to value the non-market goods or service through people’s travel consumption, the sum of the direct cost derived from consuming the environment service and the consumer surplus is regarded as the price of the non-market goods. They actually reflect visitors’ willingness to pay for the recreational site. The consumer surplus is brought out, based on an assumption that the benefits gained from the same public goods or services are equivalent for every visitor. Under such assumption, obviously, the costs which visitors pay on the trip are different because the distances travelling to the site differ. The further they travel, the more they pay. When travel cost exceeds the benefit, the travel behaviour won’t
happen. If we rank all the travellers according to their travel costs, the last one who spends the least on travelling is called the marginal traveller. The travel cost he or she spends is equal to the marginal benefit which means his or her consumer surplus is zero. Other travellers can all obtain the consumer surplus since their trip costs are less than their marginal benefits. If the travel cost has direct proportion with travel distance, we can conclude that the farther the distance is, the smaller the consumer surplus will be. In order to calculate the aggregated consumer surplus, it’s crucial to get the demand function of the evaluating site.

There are two most widely used travel cost models in the TCM, single-site model and random utility model (RUM). The RUM provides an individual with a full set of alternative sites to choose. It allows for different types of tastes in a great deal of ways (Murdock 2006). RUM is widely applied among many alternative sites with different quality characteristics (Ecosystem Valuation 2000). In this study, we only have to consider one recreation site, thus single-site model would be an appropriate choice.

Single-site model is often used in circumstances when one is interested in access value at only one site and the number of substitute sites is not large. This model is usually applied in estimating one targeted site or two comparable places. The access value is the total consumer surplus under the single-site demand function which is the difference between a person’s total willingness to pay for trips and the actual trip cost incurred over a certain amount of time. The cost here indicates not only the admission fee, but also the expenditure for travelling to the site and time cost. The linear single-site model is specified as:

$$ r = f(tc_r, tc_s, y, z) = b_{tr} tc_r + b_{ts} tc_s + b_y y + b_z z $$  \hspace{1cm} (1) \hspace{1cm} \text{(Parsons 2003)}
Where $r$ is the number of trips taken by an individual within a time period to the site, $tc_r$ is the total cost of a trip to the particular site, which includes a person’s travel expenses, access fees, equipment cost and time cost necessary to make the trip possible. $tc_s$ is a vector of trip costs for the substitute sites. Variable $y$ is individual income, and $z$ is a vector of demographic variables such as occupation, gender, education. The coefficients $b_i$ determine the impact of the explanatory variables on the number of trips.

In this study, as the only mountain park in Changsha, Yuelu Mountain Park gains its unique recreational value and becomes a special place different from other parks or recreational places. In addition with its importance in Changsha citizens’ daily life, the trip costs to other substitute sites are believed to have little influences on people’s decision to Yuelu Mountain Park. So the variable of trip costs to the substitute places is excluded from the basic model. On the other hand, visitors’ opinions towards the characteristics of the park when making a trip decision is considered as a vector of attitude variables included in the empirical model. So equation (1) is then modified:

$$r = f(tc_r, y, z, att) = \beta_{tc}tc_r + \beta_yy + \beta_zz + \beta_{att}att$$

(2)

$att$ is a vector of compositive attitude variables toward the characteristics of the park when making a trip decision.

Figure 4-1 illustrates the individual travel cost demand function for trips.
Figure 4-1 Access value and trip cost in linear travel cost model

In this figure, when current trip cost is $t_{c0}$, the corresponding trips individual takes is $r_0$. When trip cost increases to $t_{c}'$, no trips happen. $t_{c}'$ is the choke price at which when price increases to this price level, the number of trips will fall to zero. From figure 4-1 we can see that total willingness to pay consists of two parts: access value (consumer surplus) and total trip cost.

Consumer surplus is expressed as the difference between the willingness to pay and the actual pay:

$$CS = \text{Willingness to pay} - \text{actual pay} \quad (3)$$

To get the individual’s access value (consumer surplus), it is mathematically calculated by integrating trip cost from $t_{c0}$ to $t_{c}'$.

$$CS = \int_{t_{c0}}^{t_{c}'} f(t_{c}, y, z, att) dt_{c} \quad (4)$$
Consumer surplus will change along with trip cost varying. In figure 4-2, we can see when the trip cost is $tc_{r1}$, the corresponding consumer surplus is the green area. When trip cost decreases to $tc_{r2}$, the trips rise up from $r_1$ to $r_2$ with the consumer surplus also increasing. So the gray area is the amount of increased consumer surplus. Whereas when trip cost goes up, the consumer surplus will grow.

4.2 Estimation of travel cost demand functions

There are several steps needed to be considered in applying single-site TCM. First of all, one or two particular sites to be valued will have to be chosen. Consumers sometimes have to decide the scope of the area for some recreational purpose. Since different sites have their different recreational uses, so making clear of the recreational use of the target site is necessary. Before data collection, we have to define the population included in the data first. Systematic sampling, stratified random sample, quota sample are all the common examples. Furthermore, the way to collect the sample has to be decided, whether to use on-site sample or off-site sample. The empirical model can be modified based on the basic model according to the...
condition of the site. Different useful elements could be added into the empirical model if needed. It is very common that visitors plan their sites recreation as a multiple-purpose trip. Until now there is no logic way to solve the problem of multiple purpose trips. Appropriate treatments can be done for multiple-purpose problem. For instance, one could assume all the multiple purpose trips to be single-purpose. Secondly, each variable in the empirical model has to be included in the questionnaire design, making sure that information needed in the final estimation is available. Thirdly in implementing the survey, the exact location to conduct the survey, the specific ways to interview people, a face-to-face talk or telephone interviews, etc. are all the important factors that need to be carefully taken into account. After collecting the data, the following step would be the trip cost measurement. It includes several components: the travel cost from and to the site, other expenditures (food, equipments) related to the trip and the time cost. When every element in the model is prepared, TCM can be estimated finally and obtain the access value. (Parsons 2003)

In estimating the model, we use basic count data travel cost model-Poisson regression which is an appropriate regression to apply in the model where the dependent variable is a count. It is used to model the happening of small number of count or event (Parodi and Bottarelli 2008). For example, in this study Poisson process is applied because the number of trips (dependent variable) taken to the park that occur over the past one year is a count.

Suppose that we have n observations taken trips to a park within a period of time. The individual demand function is expressed as:

\[ r_m = g(x, \beta) \]  \hspace{1cm} (5)
\( r_m \) indicates the number of trips taken by individual \( m \) to the park, \( x \) is the independent variables believed to influence the trips and \( \beta \) is the corresponding parameters.

As mentioned above, the Poisson process is assumed to generate the total number of trips taken by individual within a certain period, so we call that the trips have the Poisson distribution. The probability of each individual to take \( r \) trips to the park is:

\[
g(r_m | \omega) = \frac{\exp(-\omega) \cdot \omega^{r_m}}{r_m!} \quad (6)
\]

(Parsons 2003)

Equation (5) is also called probability density function where \( \omega \) is a parameter vector which act as a condition to dependent variable \( r_m \).

In the Poisson model, \( \omega \) is a function of \( x \) and \( \beta \):

\[
\omega = \exp(x, \beta) \quad (7)
\]

(Creel and Loomis 1990)

The parameters are obtained by maximum likelihood estimation. The aggregate probability of observing \( n \) independent observations taken trips to the park is showed in (8) which is called likelihood function:

\[
g(r_1, r_2, \ldots, r_n | \omega) = \prod_{m=1}^{n} g(r_m | \omega) = L(\omega | r) \quad (8)
\]

(Greene 2003)
There should be an appropriate set of parameter $\omega$ maximizing the aggregate probability. The parameter estimation is called the maximum likelihood estimate.

Usually we use the log function of $L(\omega \mid r)$ instead of directly maximizing $L(\omega \mid r)$. As we all know, the logarithm is a monotonic function, when $L(\omega \mid r)$ reaches its maximum value, so did $\ln L(\omega \mid r)$. In that case, there is no difference between maximizing $L(\omega \mid r)$ and its log function.

$$\ln L(\omega \mid r) = \ln \left[ \prod_{m=1}^{n} f(r_{m} \mid \omega) \right] = \sum_{m=1}^{n} \ln f(r_{m} \mid \omega)$$  \hspace{1cm} (9)

Associated with (6), the log function can also be specified as:

$$\ln L(\omega \mid r) = \sum_{m=1}^{n} \ln \left( \frac{e^{\omega r_{m}}}{r_{m}!} \right)$$ \hspace{1cm} (10)

To maximize the $L(\omega \mid r)$, we take the derivative of it with respect of $\omega$

$$\frac{\partial \ln L(\omega \mid r)}{\partial \omega} = \partial \left[ \sum_{m=1}^{n} \ln \left( \frac{e^{\omega r_{m}}}{r_{m}!} \right) \right] / \partial \omega = -n + \frac{1}{\omega} \sum_{m=1}^{n} r_{m} = 0$$ \hspace{1cm} (11)

$$\omega = \frac{\sum_{m=1}^{n} r_{m}}{n} = \bar{r}$$ \hspace{1cm} (12)

Maximum likelihood estimation can be performed by using LIMDEP 7.0 software.

After getting the parameters, the consumer surplus or the access value of the site is estimated in (13):
\[ cs = R^* \frac{\omega / \beta_{r,c}}{\alpha} = \frac{R}{\beta_{r,c}} \]  

(Parsons 2003)

Where \( R \) is the total number of trips taken by visitors to the site during a certain time, \( \beta_{r,c} \) is the coefficient of the trips cost to the site.

In this study we use the actual number of trips taken by the individual in a given season and it can be obtained from the department of tourism resources of the park. Combining with the parameters of TCM being estimated, equation (13) is used to calculate the total access value.

4.3 Operationalization of the framework

Section 4.1 and 4.2 illustrated the theoretical framework of travel cost model in this study. The independent variables in the TCM demand function are trips costs, demographic factors, income and attitude variables.

- **Trip Cost**
  - Travel cost (round way)
  - Entrance fee to the park (including the fee for the vehicle entry)
  - Accommodation fee
  - Expenditure in the Park (food, equipment and entertainment)
  - Time cost

  (Parsons 2003)

- **Demographic Factors**

The shifters are factors other than trip cost believed to influence the number of trips taken during a year. Some common shifters include:
- Age
- Gender
- Occupation
- Level of education
- Time flexibility

(Parsons 2003)

• **Income**

The income variable is believed to have positive effect on the trips to the park. The more visitors earn, the more trips they will take to the park.

• **Attitude variable**

The attitude variable is the composite attitude the visitors towards the characteristic of Yuelu Mountain Park when making a trip decision. The composite attitude is the product combination of two different statements. One is respondents’ opinions of different characteristics in affecting their decisions to spend time in parks in general. The other is individual’s personal evaluation of Yuelu Mountain Park’s characteristics. It measures the park from following aspects:

- View
- History Significance
- Service (tour guider, tour information, route sign etc)
- Cleanliness and Maintenance
- Facility (parking lot in the park, restaurant, restroom, picnicking table etc)
- Park entrance fee
- Access to the park
5. Data

5.1 Questionnaire design

The questionnaire (see Appendix 1) used in the survey is designed to evaluate the recreational value of Yuelu Mountain Park by applying travel cost method. The questionnaire was first designed in the University of Helsinki during May-June 2007 and pre-tested in Finland in the middle of June 2007. It was pre-tested by email or face to face among 20 Chinese students studying in Finland. The testees returned the questionnaires one or two days later with their answers and opinions. Table 5-1 demonstrates the structure of the questionnaire.

Table 5-1 Structure of questionnaire

<table>
<thead>
<tr>
<th>Part</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General information</td>
</tr>
<tr>
<td>2</td>
<td>Travel cost questions</td>
</tr>
<tr>
<td>3</td>
<td>Household information</td>
</tr>
</tbody>
</table>

The questionnaire consists of three sections:

The first section includes general information which contains respondents’ original starting place, number of trips taken to the park during the past year and attitudinal questions towards the park. The second part of questionnaire is designed to know respondents’ travel expenditure including the accommodation fee, different travel vehicles they used, their weights on certain destinations and relative information. In the last section, it contains demographic and other background questions, such as age, gender, education and monthly income.

In the travel cost section, travel expenditure is not directly asked in this survey like other questionnaires since respondents come to the park using different vehicles and
it is not feasible for them to report the total costs themselves, especially in a multiple purpose trip. For respondents who take the multiple purpose trips, they are asked their weights of the destinations out of the whole trip. If the site is considered very important, the weight would be higher. Local visitors only report the weight of the park within one day trip in Changsha and non-locals also have to include the weight of Changsha within the whole multiple-trip as well as the weight of park. In this study, the weights on destinations are assumed as weights on travel cost and time cost. Because visitors are likely to spend more money and time on those destinations they consider relatively more important in their whole trips. Since the park recreation is included in the entire trip, the trip cost and time cost belonging to the park should be allocated by combing the weights. Furthermore, the park visiting is affected by the whole trip plan. For those people with multiple-purpose trips, Yuelu Mountain Park might be their side trip destination which means the park is on their way to relatives or friends. It is very likely that if there is any change to the whole trip, they might not visit the park. For instance, one plans to visit several cities including Changsha. Due to some reason, he/she has to shorten the trip in Changsha. In other words, the weight of Changsha in the whole trip decreases. In the original plan, Yuelu Mountain Park is the major site in Changsha. However, because of the changed plan, this person has to cut down the time for park recreation, which is to say, the weight on park also reduces. Therefore in this study, we should associate two parts of weights to calculate the trip and time costs for park recreation. Consequently the problem of multiple purpose trips can be well solved by allotting destination weights to the trip and time costs to get the cost proportion that belongs to the park. In the questionnaire design, respondents are asked to fill the vehicles they used during the trip from which we could check all types of ticket prices to get the total trip costs for each individual. And for the non-local visitors, they also need report the names of other destinations within the whole trip in order. So information required for travel cost calculation is collected through this way of question. Other expenditures except for travel cost such as the accommodation costs and expenditures in the park are asked directly in the questionnaire.
5.2 Data collection

The data were collected in front of the southern gate of Yuelu Mountain, Changsha city of China, during the weekends in July, 2007. A face-to-face interview was chosen to conduct the survey so that there was no data missing from the questionnaire and therefore ensured the completeness of the data.

The targeted population in the survey was Yuelu Mountain Park visitors. Since it was impossible to include all visitors, a population sample was needed. The total sample size was designed to question 200 respondents. In the sample frame, a single person was the unit of analysis in the structured questionnaire. Considering there are two types of visitors to this park, local and non-local visitors, their separate individual travel cost demand functions are different from each other, stratified random sampling was applied in this study which was to sample each subpopulation independently in order to improve the accuracy of estimation by dividing the 200 samples into two groups: (1) local visitors; (2) non-local visitors. Each of 100 respondents was chosen from local and non-local group separately as sub-sample. This method was to separate the population elements into non-overlapping groups. Each single sample was selected randomly from the two strata in order to make sure there was no bias. The random individual would be the first one seen after the previous interview. When visitors were questioned as a family, only the men or the women were randomly chosen instead of each member of the family’s being surveyed. The survey was complemented on-site. Each interview was about 10 to 15 minutes.

Some instructions were provided to respondents and their replies were collected as follows:
(1) Introductory materials: it introduces the respondents the purpose of the study and the time it would last for, make sure the personal information will be confidential and arouse the interviewees’ interest.

(2) The total number of trips taken to the park during the past one year.

(3) The destinations within the whole trip with different trip weights and corresponding vehicles connecting two destinations

(4) Respondents’ rate on seven characteristics related to the decision to spend time in parks in general and rate on the evaluation on the seven characteristics of this park in particular.

(5) Household questions: Age, gender, education level, job status and flexibility to arrange the time. The household questions also include the monthly income which is necessary for the time cost calculation.

In the data collection, it was impossible to avoid the unreliable information that respondents provided in the survey even if it was conducted face by face. Generally speaking, people always hesitate to report their real situation or even refuse to answer questions related to money, such as how much they earn. So the income question was set as a range form to minimize the possibility of collecting useless data. In that case, respondents can only give an approximate range which their salary fall into instead of reporting their exact earnings to avoid some awkward expressions. In this way, interviewees were more willing to accept and provide useful information.
5.3 Data analysis

In this section, different cost items will be analyzed. As we all know, the trip cost to the park (cost of the round trip) consists of five parts together: travel cost, accommodation fee, access fee, other expenditures and time cost. The expression is showed in the following equation:

\[
Tc_r = trc + ac + af + ex + tic
\]  

Where \( Tc_r \) is the total trip costs, \( trc \) is the travel cost, \( ac \) is accommodation costs, \( af \) is access fee to the park, \( ex \) is the expenditure within the park and \( tic \) is time cost.

Travel cost

Travel cost here includes all transit expenses. For non-local visitors, \( trc \) includes the cost they spend on traveling to and from Changsha and the traffic expense to and from the park within Changsha. Since Yuelu Mountain Park is not the only destination in the trip for most of visitors, that is to say, these people have multiple purpose trips. The solution in this study is to get the travel cost which belongs to the park. For non-local visitors, the travel cost allocated to Changsha has to be considered by multiplying the weight of Changsha within the entire trip by the total travel cost. The travel cost proportion for the park consists of two parts: the traffic expenses to and from the park in Changsha and the travel expenditure proportion allocated to the park. The later part is calculated through using the travel cost allocated to Changsha divided by the number of night in Changsha then multiplying the weight of the park during one day trip in Changsha.
For non-local visitors, the equation of the travel cost belong to the park is showed as follow:

\[
trc_p = (tpe \cdot w_c) \cdot \frac{w_p}{n_a} + trf
\]  

(15)

Where \( trc_p \) is the travel cost proportion for the park, \( tpc \) is the round-way travel cost on the transportation of the whole trip, \( w_c \) denotes the weight of Changsha out of the whole trip, \( w_p \) means the weight of the park in a day trip within Changsha, \( n_a \) is the number of nights stayed in Changsha and \( trf \) is the traffic expense to and from the park starting from the center of Changsha. For those who stay in Changsha for several nights, Yuelu Mountain Park is only one of all the destinations in Changsha during these days and the park recreation takes in one day time. In that case, the travel costs belonging to Changsha have to be divided by number of nights to get average one day cost in Changsha which includes the park visit.

For the local citizens, only traffic expense within Changsha needed to be considered in travel cost estimation. The measurements of the traffic expenses within Changsha are the same for local and non-local visitors. It is measured from the center of Changsha city to the south gate of Yuelu Mountain Park.

\[
trc_p = trf
\]  

(16)

In the survey, respondents were asked to report all the destinations within the entire trip and different vehicles they used which can be used to get the average price of transportations to measure the total travel cost. The ticket price for bus, train and plane can be found from national ticket inquiry (2008). Concerning that people might come to the park by different classes of trains, we take the ordinary seat ticket price for people from within Hunan Province and the sleeping carriage with hard
berths ticket price for those who come from other provinces to unify the price. As for the price of flight ticket, there are no differences for the normal flight ticket among Chinese airline companies, all the normal prices are set in uniform. Sometimes, passengers can get different discounts when choosing different airlines. Usually, passengers would prefer the lowest price within the possible choice. In that case, the lowest price within one month is chosen as the standard of flight tickets. The bus tickets vary a bit due to different bus classes, but there is not much difference between prices. So the average price is taken as the measurement for bus ticket.

Travel distance to the park within Changsha is measured as the linear distance from the center of Changsha city to the park using Google earth. The round way is 8km with one way distance of 4km. Six possible ways can be selected to access to the park: bus, private car, walk, bike, electric bike, or taxi. Here we only have to consider the expense on bus, private car and taxi. The average bus ticket from the city center to Yuelu Mountain Park is € 0.1 per person for single way, so the round-way price will be doubled. The taxi expense is charged as following way: € 0.3 for the first one kilometer, every € 0.1 per half kilometer is added for the following two kilometers, after the first 3 kilometers, every kilometer adds € 0.18. For those who own their private cars, their travel cost should be measured by petrol fee. The petrol consumption varies a lot among different types of cars. Usually it falls into the range from 0.06 to 0.1 liter/kilometer. From an average point, a car could consume about 0.08 liter petrol per kilometer. According the report from National Development and Reform Commission (2007), the average petrol price in 2007 is € 0.446/l. Hence the travel cost could be arrived by using per kilometer cost multiplying by the round trip distance.

Since traffic cost might be shared by several people, it is apportioned by the number of people to get the average cost for each individual:
Here, and denote the traffic cost by taxi, private car and bus separately. \( n_p \) is the number of people together with. The total amount of people sharing the cost would be \( n_p + 1 \).

**Accommodation cost**

Accommodation fee is included in the trip cost estimation for non-local visitors. For those to whom Yuelu Mountain Park was not the only destination during one day trip in Changsha, accommodation cost per day should be multiplied by the weight of the park to get the allocation part to the park.

\[
ac_p = \left(\frac{ac \cdot w_p}{n_p}\right) / n_p
\]

Where \( ac_p \) is the accommodation cost for the park, \( ac \) is the accommodation fee per night the respondent spends for all the people he/she takes responsibility of, \( n_p \) is the total number of people the respondent has to pay for lodging including him/herself.

**Access fee and other expenditures in the park**

Visitors have to pay an entrance fee to get into the park, so the access fee is also
included in the trip cost. In view of several types of entrance fee expect for the normal price- monthly ticket, normal yearly ticket, and yearly ticket for teachers and students, instead of accounting for discounts, in this study, special ticket prices are allotted into the fee for each time of visit. According to what Zhou said (personal communication, July 3, 2007), people with monthly ticket almost come everyday to take exercises and jogging, their visiting times are approximately 30 times per month. And for those who hold yearly tickets, generally speaking, they come to the park once a week during a year, which is to say almost 52 times per year. In that case, we could easily get the one time fee for monthly ticket users and yearly ticket users by allocating their entrance fee into each visiting time. The one-time fee allocated from monthly ticket was measured by using monthly price divided by 30 (days) and from yearly ticket was obtained by using yearly price divided by 52 (weeks) as expressed in equation (21) and (22):

\[ ef^m = \frac{ef_m}{30} \]  
\[ ef^y = \frac{ef_y}{52} \]

Where \( ef \) is the entrance fee allocated to a single visit, \( ef_m \) is the monthly ticket price, and \( ef_y \) is the yearly ticket price.

Furthermore, visitors also have to pay an extra fee with their own car driven into the park, and this is considered as part of the access fee. So the access fee to the park can be expressed as follow:

\[ af_p = ef + ef_c / \left( n_p + 1 \right) \]

\( af_p \) is the access fee to the park and \( ef_c \) denotes the entrance fee for car.
Except for the travel cost, accommodation fee and access fee, other expenses for visiting the park include the expenses on food, equipment etc within the park and outside the park for the purpose of visiting. Since these expenses could also be shared by several people, they should also be imputed into cost for each individual:

\[ ex_p = c_p / \left( n_p + 1 \right) \]  

(24)

Where \( ex_p \) is the individual expenditures other than the above costs for visiting the park, \( c_p \) here means the total other expenditures (e.g. food, equipment and entertainment) for visiting the park.

**Time cost**

Any recreation trip will consume time, part on traveling, and part on entertaining. In the trip cost, time cost consists of the time spent in traveling to and from the site and time consumed on the site (Parsons 2003). If someone gives up his/her working time for traveling, the opportunity cost of time is the wage rate. Cesario proposed that the appropriate time lost on travelling could be valued by one-third of the hourly wage rate (Stratten 2000 cited in Cesario 1976). The most common way to estimate time cost is wage-based method. This approach usually relates time to a person’s wage.

In this study, when computing the time lost for the park, hour was set to be the calculation unit. We have to separate those local visitors who have bought monthly tickets from others as an exception. Zhou, the director of development department of Yuelu Mountain Park estimated those local visitors with monthly ticket averagely stay in the park for about 2 hours (telephone interview, October 10, 2008). For monthly-ticket holders we assume 2 hours as the average recreation time in the park. The linear distance from the center of Changsha city to the park is 4km. Due to the time unpredictability, one hour was assumed to be the approximate time wasted on
travelling to and from the park for this group of people. In other words, 3 hours is spent on the park recreation for the local visitors with monthly tickets. As for other visitors, considering that the time spent for a day recreation might vary a lot from person to person, we assume 8 hours to be a normal day time for recreation which includes time spent on traveling and entertainment in this study. As mentioned above, the weights on different destinations are assumed as weights on time cost allocation. If visitors put more weight on Yuelu Mountain Park, they are very likely to spend more time on it. For local visitors who have bought other types of tickets other than monthly ticket, the time traveling to and from the park and time spent in the park is obtained by using 8 hours multiplying by the weight of the park out of all the destinations within one day in Changsha. And for non-local tourists, the total consumed time for recreation consists of two parts: one is the time traveling to and from the park within Changsha and recreation time which is the same as local visitors. The other is the time lost on whole trip travelling allocated proportion to the park. This part of time is calculated by using the total transit time to and from Changsha multiplied by the weight of Changsha and weight of the park. The travel time for the whole trip could also be founded from the website of national ticket inquiry.

The calculation of the time spent for the park part is the same as the travel cost. For local people who bought other types of entrance tickets other than monthly tickets, the time to the park is showed as follow:

\[ t_p = 8(\text{hours}) \times w_p \]  \hspace{2cm} (25)

The total time that local visitors with monthly tickets spent on the park recreation is expressed in (26):

\[ t_p = 3(\text{hours}) \]  \hspace{2cm} (26)
As for the non-local people, equation (25) is modified as:

\[ t_p = \left( t_c \cdot w_c \cdot w_p \right) / n_n + 8 \text{(hours)} \cdot w_p \quad (27) \]

\( t_p \) is the time lost on travelling and recreation in the park, \( n_n \) means the number of nights in Changsha and \( t_c \) is the total travel time of their whole trip.

According to the announcement issued by Ministry of Labor and Social Security PRC (2008), the legal working hours per month in China are 176(=22*8) hours. In that case, a fair time cost can be estimated by multiplying times traveling and on-site time by hourly wage which is obtained by using monthly income divided by 176. There are 6 levels of monthly income in the questionnaire which are in the range form. Mid point was taken as the average income for each level. In the questionnaires, 12 respondents out of 200 samples (6%) reported their monthly salaries beyond € 500 and 15 (7.5%) visitors earned less than € 100 per month. Since there is no upper limit set in the questionnaire when the salary exceeds € 400 per month and it is hardly to obtain the average salary at this income level in China, people with less than € 100 and more than € 400 monthly income are assumed to have a lower limit income of € 0 and upper limit income of € 500 separately. It produces € 50 and € 450 as the average monthly income to be the lowest and highest income classes respectively.

The expression of time cost to the park is showed in equation (28):

\[ tic_p = w_h \cdot t_p \quad (28) \]

\( tic_p \) is the time cost spent on travelling to and from the park and on park recreation, and \( w_h \) denotes hourly wage.
Attitude variables

The questionnaire contains two attitudinal statements. One is respondents’ opinions of different characteristics in affecting their decisions to spend time in parks in general. The other is respondents’ evaluation of Yuelu Mountain Park’s characteristics (see questions number 5 of part 1 in Appendix 1). Attitudes could be considered to explain people’s level of favor towards a thing or a concept (Pouta 2003 cited in Fishbein and Ajzen 1980). An attitude is formed as an overall evaluation which consists of two elements- belief (b) and evaluation (e) (Pouta 2003).

\[ A = b \times e \] (29)

A is the composite attitude, b is a person’s beliefs about the object, e is his evaluation on the object in some effect.

In the questionnaire, respondents are asked to rate the importance of the view in their decision to spend time in the park in general. This statement measures people’s evaluation on the view characteristic in the trip decision making. In the other question respondents need to offer their personal thoughts on the view of the specific park which should be the beliefs about the view aspect.

The composite attitude measures the attitude of respondents toward the characteristics of this particular park in making a trip decision to it. It actually explains the level of the attractiveness of the characteristics to respondents. The higher points they give to a certain aspect of this park, the more attractive it is when they make a trip decision. For instance, one might think the view of this park very good with 5 points of the highest score, but he doesn’t take this aspect so important when he makes a trip decision to parks in general. He gives only 1 point to the level of the view aspect that effects his visiting decision. In that case, his composite
attitude is in link with 5 points which indicates the view of this park is not attractive to him when making a trip decision. However, in the event that he considers the view of the park so important in making a trip decision that he also offers another 5 points, then his compositive attitude will be at 25 points highest level implying the view aspect is the most attractive to him when he makes a visiting decision.

The measurement and scale of required variables in TCM is explained in detail in Table 5-2.

**Table 5-2 Measurements and construction of variables**

<table>
<thead>
<tr>
<th>Statements and scale</th>
<th>variables</th>
<th>Mean Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of trips taken to the park during the past one year</td>
<td>trips</td>
<td>5.5125</td>
</tr>
<tr>
<td>Trip cost associated to the park (€)</td>
<td>trip cost</td>
<td>26.05</td>
</tr>
<tr>
<td>Hourly income (€)</td>
<td>income</td>
<td>0.96</td>
</tr>
<tr>
<td>Demographic variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Gender (male=0, female=1)</td>
<td>gender</td>
<td>0.445</td>
</tr>
<tr>
<td>(2) Age (years)</td>
<td>age</td>
<td>32.76</td>
</tr>
<tr>
<td>(3) Education (1-lower than high school-5-university)</td>
<td>education</td>
<td>3.98</td>
</tr>
<tr>
<td>(4) Job (dummy) (1=with job, 0=without job)</td>
<td>Job</td>
<td>0.645</td>
</tr>
<tr>
<td>(5) Flexibility to allocate your time (1=not flexible, 2= somewhat flexible, 3=flexible)</td>
<td>flexibility</td>
<td>2.22</td>
</tr>
<tr>
<td>Attitudes towards to the park in making a trip decision (1-not attractive-25-very attractive)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>View</td>
<td>view</td>
<td>14.8</td>
</tr>
<tr>
<td>History significance</td>
<td>history</td>
<td>15.13</td>
</tr>
<tr>
<td>Service</td>
<td>service</td>
<td>10.115</td>
</tr>
<tr>
<td>Cleanliness and maintenance</td>
<td>cleanliness and maintenance</td>
<td>12.115</td>
</tr>
<tr>
<td>Facility</td>
<td>facility</td>
<td>9.215</td>
</tr>
<tr>
<td>Entrance fee</td>
<td>entrance fee</td>
<td>9.38</td>
</tr>
<tr>
<td>Access</td>
<td>access</td>
<td>13.7</td>
</tr>
</tbody>
</table>
5.4 Descriptive Statistics

Respondents’ profile

This section describes the data in general level. Figure 5-3, 5-4, Table 5-5, 5-6 and 5-7 present the statistics expressing the respondents’ education, job status and several socioeconomic variables. In figure 5-3, almost half (45%) of the respondents are with high education level (university). About one fifth are graduated from Short-cycle College. The rest respondents are graduated from vocational colleges (14%), high schools (17%) and schools lower than high school (4%).

In figure 5-4, more than half (64%) of respondents have jobs, among whom, freelancers account for 9%, and those who are employed either by others or by themselves occupy a proportion of 55% out of 200 samples. The percentage of retired people with pension is 5%. Slightly less than one third (30%) of visitors are from school students, only 1% are under unemployment.

Figure 5-3 Education of respondents
Figure 5-4 Job status of respondents

Table 5-5, 5-6 and 5-7 describe the perceptual status of some variables between local and non-local visitors. In the sample, local and non-local visitors account for 50% of all separately. Non-local group includes people from other cities in China and international tourists. 3 out of 100 are from other countries, South Korea (N=2) and America (N=1).

Table 5-5 The perceptual description of the local data (N=100)

<table>
<thead>
<tr>
<th>Male</th>
<th>Flexible or somewhat flexible</th>
<th>Female</th>
<th>Flexible or somewhat flexible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>49%</td>
<td>51%</td>
<td>15%</td>
</tr>
<tr>
<td>First visit</td>
<td>85%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>Park is the only</td>
<td>2%</td>
<td>98%</td>
<td>98%</td>
</tr>
<tr>
<td>destination</td>
<td>66%</td>
<td>34%</td>
<td>34%</td>
</tr>
</tbody>
</table>

Table 5-6 The perceptual description of the non-local data (N=100)

<table>
<thead>
<tr>
<th>Male</th>
<th>Flexible or somewhat flexible</th>
<th>Female</th>
<th>Flexible or somewhat flexible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>62%</td>
<td>38%</td>
<td>15%</td>
</tr>
<tr>
<td>First visit</td>
<td>79%</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>Park is the only</td>
<td>65%</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>destination</td>
<td>41%</td>
<td>59%</td>
<td>59%</td>
</tr>
</tbody>
</table>
Table 5-7 The average description of the data (N=200)

<table>
<thead>
<tr>
<th></th>
<th>Local</th>
<th>Non-local</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>29.84</td>
<td>35.68</td>
<td>32.76</td>
</tr>
<tr>
<td>Monthly income(€)</td>
<td>133.5</td>
<td>205.5</td>
<td>169.5</td>
</tr>
<tr>
<td>Trip cost (€)</td>
<td>8.63</td>
<td>43.47</td>
<td>26.05</td>
</tr>
</tbody>
</table>

The ratio between men and women in non-local data is 62 (62%) to 38 (38%). According to Chinese population statistics, percentage of males is 51.5% out of Chinese population and women account for 48.5% by the end of year 2007 (National Bureau of Statistics of China 2008). Non-local ratio in the sample is a little over represented compared with the population statistics. There might be the reason that non-local visitors also include the tourists from other countries. Compared with the Changsha statistical ratio between men and women in Changsha city which is 51.92% to 48.08%, men in local data are slightly more than women with the ratio of 49 (49%) to 51 (51%) (Statistics Bureau of Changsha 2003). In local sample, over four fifths respondents (85%) could flexibly or somewhat flexibly arrange their time for recreation. It implies that if they plan to visit the park during working or studying hour, it is possible for them to arrange their work or other affairs to other time and leave the time for park recreation. Only 15% of them express that they don’t have flexible time for their own trip purposes namely they don’t have the initiative to arrange the time when there is a time conflict between the time work and recreation. Out of 100 non-local respondents, those who have flexible or somewhat flexible time for recreation account for 79% and the percentage of people with no flexible time is 21%. The average age of respondents in table 5-7 is 32.76 years old (local of 29.84, non-local of 35.68). Because the questionnaire samples include only Chinese who are above 18 years, among whom 46% are between 18 and 25 years old.

The average expenditure for visiting Yuelu Mountain Park is € 26.05 per person. It includes the actual spending and time costs. This figure is calculated according to the relevant travel cost information answered in the questionnaire. As for local people in the data set, their average expenditures for the trip to Yuelu Mountain Park is only €
8.63 per trip while non-local individual visitor spend 5 times more, about € 43.47 per trip. The reason behind this is respondents from other places outside of Changsha have to spend more on the long-distance travel and the accommodation which account for a big proportion in trip cost.

Average income per month for non-local visitors is relatively higher (€ 205.5) than that for local ones (€ 133.5). Comparatively, Changsha citizens’ median monthly income in 2007 was € 134.61 (Statistical Information of Changsha 2008). It is slightly over the one in the local sample. The annual income of Chinese citizens in city and town was € 1378.6 in year 2007 (National Bureau of Statistics of China 2008), which equals to €114.89 every month. This figure doesn’t include those who come from countryside. Compared with the monthly income of Chinese citizens with the average income per month of non-local respondents, the visitors in this sample seem to have much higher income than the general population in China. This, to some extent, indicates that higher income earners have more tendencies to join in this survey.

Visitors spend 15.46% of their monthly income on park recreation. Among non-local respondents, 21.15% of their income is budgeted for recreational expenditures. And for local visitors, they only spend 6.7% of their average income on park visit, which is three times less than non-local group.

98 out of 100 local interviewees answered in the questionnaire that they had been to this park once while only 2% of them had never visited it before. The 2% people might be those who just moved to this city or the fresh college students. Among local visitors, over third fifths (66%) chose Yuelu Mountain Park as their only destination within one day trip in Changsha and the rest (34%) had other destinations except the park. As for non-local respondents, 65% of them had visited the park before and 35% came to the park the first time. Those non-local visitors who took the park as their only destination in one day trip accounted for 41% of the 100 non-local sample,
and the percentage of those with multiple purposes was 59%.

6. Results

This paper applies travel cost method to estimate the recreational value of Yuelu Mountain Park by combining the access values from local and non-local visitors. Consumer surplus is estimated to determine the value of annual visits to the park. The recreational value is discussed in section 6.1. In section 6.2, new revenue maximizing entrance fee is analyzed. In Section 6.3, from age demographic aspect it analyzes the trips that might be lost to the park next year caused by local respondents with no visiting intention.

6.1 Access value

In this section consumer surplus is estimated to determine the value of annual visits to the park. Not all the variables in the original data will be included in the estimated model. Necessary independent variables have to be chosen from theoretical point of view to the final local and non-local models before the estimation. Likelihood Ratio Test (LRT) is used here to test whether any additional variables should be included in the model. Let’s take local group for example. \( M_0 \) is the model with restricted parameters. Five independent variables are chosen in \( M_0 \) which are average age, income, trip cost, history attitude and access attitude. \( M_1 \) is different from \( M_0 \) with five additional attitudinal variables.

\[
M_0: \quad \ln L_0 = -378.732
\]  

\[
M_1: \quad \ln L_1 = -377.575
\]
\(L_0\) and \(L_1\) are the maximum value of the likelihood of the data without and with additional parameters.

Likelihood Ratio Test is then to calculating the difference between \(\ln L_0\) and \(\ln L_1\) multiplying by 2.

\[
\text{LikelihoodRatio} = 2(\ln L_1 - \ln L_0) = 2(378.732 - 377.575) = 2.3134
\]  

Since this likelihood ratio test statistics approximately follows a chi-square distribution, we need refer to standard statistical tables. The critical value is 9.236 with 5 degrees of freedom (5 variables more than restricted model) at 0.1 level. In this case, the likelihood ratio statistics is smaller than the critical value which means that additional variables included in \(M_1\) does not improve the model, namely we shouldn’t include the five additional variables into the local model.

After extensive testing of model candidates the independent variables chosen in the local and non-local models are as follows:

\[
r_{loc} = constant + \beta_{\text{Age}_loc} \text{Age}_loc + \beta_{\text{y}_loc} \text{y}_loc + \beta_{\text{tc}_loc} \text{tc}_loc + \beta_{\text{attistory}_loc} \text{attistory}_loc + \beta_{\text{attaccess}_loc} \text{attaccess}_loc
\]  

\[
r_{nonl} = constant + \beta_{\text{Ed}_nonl} \text{Ed}_nonl + \beta_{\text{y}_nonl} \text{y}_nonl + \beta_{\text{tc}_{nonl}} \text{tc}_{nonl} + \beta_{\text{attfee}_{nonl}} \text{attfee}_{nonl} + \beta_{\text{attaccess}_{nonl}} \text{attaccess}_{nonl}
\]

The parameter estimates for the Poisson models for Yuelu Mountain Park are shown in Table 6-1.
Table 6-1 Parameters of Single-site Poisson Model for Yuelu Mountain Park (dependent variable is number of trips).

<table>
<thead>
<tr>
<th>variables</th>
<th>Parameter Estimates</th>
<th>local</th>
<th>non-local</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-6.1448</td>
<td>0.7694</td>
<td></td>
</tr>
<tr>
<td>Age (Age)</td>
<td>0.2896***</td>
<td>(0.1018)</td>
<td>0.3484***</td>
</tr>
<tr>
<td>Education (Edu)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income (y)</td>
<td>12.4487***</td>
<td>(3.0485)</td>
<td>0.4597**</td>
</tr>
<tr>
<td>Trip Costs (Tc_r)</td>
<td>-1.3382***</td>
<td>(0.3020)</td>
<td>-0.0155***</td>
</tr>
<tr>
<td>Attitude variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History (Att History)</td>
<td>0.3302*</td>
<td>(0.1752)</td>
<td>-0.0995***</td>
</tr>
<tr>
<td>Fee (Att Fee)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access (Att Access)</td>
<td>0.3123*</td>
<td>(0.1857)</td>
<td>0.0564**</td>
</tr>
<tr>
<td>Sample size</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Notes: The figures in brackets are standard error. ***) indicates the variable is statistically significant at 99% confidence level, **) indicates the variable is statistically significant at 95% confidence level, and *) indicates the variable is statistically significant at 90% confidence level.

In table 6-1, the coefficient on trip costs (Tc_r) is significant and negative in both group regressions, which means that trip cost changes reversely to trips, the higher the cost is made to the park, the less trips people would take to it. So the demand function is descending. The positive and significant coefficient of the income in both regressions shows the income is in positive correlation with dependent variable (trips). The higher income visitors earn, the more trips they will take to the park. For local visitors, the coefficient of age is positive and significant which demonstrates the older they are, the more trips they will take to the park. This because that many old people like to do exercising or go jogging in the park frequently, these retired citizens even come everyday. They buy monthly ticket for morning and evening
entry which is set up especially for them so that they can visit the park more often at a discount price. In non-local group regression the coefficient of education is a significant and positive factor which means the higher they are educated the more they visit the park. The attitude variables are based on respondents’ attitudes toward the characteristics of the park in making a trip decision. For local respondents, the coefficient of history attitude variable is positive and significant explaining that the more attractive history significance they think when making a trip decision, the more trips they would take when making a trip decision. Access characteristic measures the congestion level to the park, easiness to access to the park. The coefficients of the access characteristic in both regressions imply that the more attractive the access aspect is, the more times visitors would visit the park.

The coefficient of trip costs ($T_{cr}$) in table 6-1 is used to estimate the total access value (See chapter 4). In this study, the total consumer surplus consists of local and non-local parts. By computing their separate access values, the total access value can be obtained by simply summing them up.

The department of tourism resource of the park reported the total number of trips taken to the park during year 2006 was about 1054000. Out of which, 746000 were local people, and 308000 were non-local visitors (Tour Resource Department of Yuelu Mountain Park 2007). So the access value would be based on equation (13):

$$ V_{ac} = R^* \frac{\omega / \beta_{ac}}{\omega} = R \frac{\beta_{ac,loc}}{-\beta_{ac,loc}} + \frac{\beta_{ac,non}}{\beta_{ac,non}} $$

$$ \frac{N_{loc}}{-\beta_{ac,loc}} = \frac{746000}{1.3382} = 557465.25 $$

$$ \frac{N_{non}}{-\beta_{ac,non}} = \frac{308000}{0.0155} = 19870967.74 $$

43
\[ V_{ac} = 557465.25 + 19870967.74 = 20.43 \text{million } € \quad (38) \]

Where \( V_{ac} \) is the total access value, \( N_{loc} \) and \( N_{nonl} \) denote the numbers of trips taken by local and non-local visitors during year 2006. \( \beta_{tc,loc} \) and \( \beta_{tc,nonl} \) mean the coefficients of trip costs for local and non-local groups. We can see that the aggregate annual access value of Yuelu Mountain Park is € 20.43 million. Out of which, non-local visitors produce € 19.87 million which account for 97% of the total access value. Although the annual trips taken to the park by non-local visitors are less than half of locals, non-local group contribute a quite large proportion to the park’s recreational value.

We can also use the access value to calculate the net present value of the park. We firstly assume that the trips taken to the park don’t change in the future, so the consumer surplus remains stable. In China, national debt is considered to be the relatively low risky and high return investment. So in this study we take the interest rate of national debt as the appropriate interest rate in China. According to annual report of Ministry of Finance People’s Republic of China, the interest rate of national debt 2008 is 3.42% (Ministry of Finance People’s Republic of China 2008). So the net present value of this park would be the sum of a geometric progression by capitalizing the annual recreational value of the park.

\[
V_p = \frac{20.43}{1+3.42\%} + \frac{20.43}{(1+3.42\%)^2} + ... = \frac{20.43}{3.42\%} = 597.37
\]

The net present value related to recreational use of Yuelu Mountain Park is € 597.37 million. (Sohngen 2000)
6.2 Entrance Fee

In this subsection, a new entrance fee is calculated to maximize the income gained from the ticket.

According to figure 6-1, the demand function for local and non-local individuals can be expressed in following equations:

\[
\begin{align*}
r_{loc} &= -6.1448 + \beta_{age} Age_{loc} + \beta_{y} y_{loc} + \beta_{tc} t_{c,loc} \\
&\quad + \beta_{athistory} at_{history,loc} + \beta_{attaccess} at_{access,loc} \\
&\quad (40)
\end{align*}
\]

\[
\begin{align*}
r_{nonl} &= 0.7694 + \beta_{edu} Edu_{nonl} + \beta_{y} y_{nonl} + \beta_{tc} t_{c,nonl} \\
&\quad + \beta_{attfee} at_{fee,nonl} + \beta_{attaccess} at_{access,nonl} \\
&\quad (41)
\end{align*}
\]

\( r_{loc} \) and \( r_{nonl} \) are trips taken by local and non-local visitors, \( \beta_i \) denotes the parameters of different independent variables.

As we have known from Figure 4-1, the travel cost model demand function can be viewed as the linear relation between trips \( (r) \) and trip costs \( (tc_r) \). In that case, the other independent variables in (40) and (41) are considered to be known values which could be obtained by computing the average values of corresponding variables from the data. By using the corresponding coefficients of independent variables in table 6-1, we can get individual demand functions for local and non-local visitors:
Local:

\[ r_{loc} = -6.1448 + b \cdot \text{age}_{loc} + b \cdot y_{loc} + b \cdot \text{tc}_{rloc} \]
\[ + b \cdot \text{atthistory}_{loc} + b \cdot \text{attaccess}_{loc} \]
\[ = -6.1448 + 0.2896 \cdot \text{age}_{loc} + 12.4487 \cdot y_{loc} \]
\[ - 1.3382 \cdot \text{tc}_{rloc} + 0.3302 \cdot \text{atthistory}_{loc} + 0.3123 \cdot \text{attaccess}_{loc} \]
\[ = -6.1448 + 0.2896 \cdot 29.84 + 12.4487 \cdot 0.76 \]
\[ - 1.3382 \cdot \text{tc}_{rloc} + 0.3302 \cdot 13.31 + 0.3123 \cdot 14.56 \]
\[ = 20.90 - 1.3382 \cdot \text{tc}_{rloc} \]

Non-local:

\[ r_{nonl} = 0.7694 + \beta \cdot \text{Edu}_{nonl} + \beta \cdot y_{nonl} + \beta \cdot \text{tc}_{rnonl} \]
\[ + \beta \cdot \text{attfee}_{nonl} + \beta \cdot \text{attaccess}_{nonl} \]
\[ = 0.7694 + 0.3484 \cdot \text{Edu}_{nonl} + 0.4597 \cdot y_{nonl} \]
\[ - 0.0155 \cdot \text{tc}_{rnonl} - 0.0995 \cdot \text{attfee}_{nonl} + 0.0564 \cdot \text{attaccess}_{nonl} \]
\[ = 0.7694 + 0.3484 \cdot 3.85 + 0.4597 \cdot 1.17 \]
\[ - 0.0155 \cdot \text{tc}_{rnonl} - 0.0995 \cdot 10.09 + 0.0564 \cdot 12.84 \]
\[ = 2.37 - 0.0155 \cdot \text{tc}_{rnonl} \]

Before we calculate the maximum revenue gained from the entrance fee, let’s first look at one definition—price elasticity. Price elasticity is the sensitivity of quantity of the trips to changes in prices. It describes the amount of percentage trips will change if the price changes by 1%. In travel cost demand function, the price is the trip cost to the site. The elasticity of trip cost with respect to trips is expressed as in (44):
\[ E_{tc,r} = \left| \frac{\Delta r / r}{\Delta tc_r / tc_r} \right| = \left| \frac{\partial r_r}{\partial tc_r} \right| \quad (44) \]

where \( E_{tc,r} \) is trip-elasticity of trip cost

When the demand curve is linear like in this case, \( E_{tc,r} \) would vary from 0 to infinite. For instance, when elasticity changes between 0 and 1, we call it demand relatively inelastic. It demonstrates that \( r \) changes less when \( tc \) changes a certain amount of quantity.

The current price for normal entrance ticket is €1.5 (the other types of ticket were not considered here). According to the data in the sample, the current entrance fee accounts for 17.38% in average of the total trip costs spent by local visitors, and 3.45% out of average expenses of non-local visitors. In order to get a price to maximize the revenue from entrance fee, an assumption is given in this study that when entrance fee changes, the rest of trip costs remain the same which can be obtained from the sample. Under the current entrance fee, the separate trips for local and non-local can be expressed as follows:

Local:

\[ r_{loc} = 20.90 - 1.3382* (p + c_{loc}) \quad (45) \]

Non-local:

\[ r_{nonl} = 2.37 - 0.0155* (p + c_{nonl}) \quad (46) \]

Where \( p \) is the entrance price, \( r_{loc} \) represents the average trips taken by individual
local visitor and \( r_{\text{nonl}} \) is the average trips taken by individual non-local tourists. 

\( c_{\text{loc}} \) and \( c_{\text{nonl}} \) denote the average rest trip costs except entrance fee for local and non-local individuals.

Since the average rest trip costs are already known from sample data, the demand function turns out to be the function between entrance fee and trips to the park, so equation (44) is revised as:

\[
E_{p,r} = \frac{\Delta r / r}{\Delta p / p} = \frac{\partial r}{\partial p} \frac{p}{r}
\]

(47)

where \( E_{p,r} \) is trip-elasticity of entrance fee

From (45), (46) we can calculate the average trips taken by local and non-local individuals under the current entrance price €1.5 which are 9.08 and 1.70 separately. Associated with (47), the entrance fee elasticity of trip for local and non-local visitors are both between 0 and 1, which means the quantity of percentage change in trips (r), is smaller than that in entrance fee. Consequently when entrance fee increases, the total revenue gained from it will also be raised. The entrance fee elasticity of trip will keep on ascending while entrance fee goes up. Only when the elasticity rises up to 1, reaches the revenue to its maximum. In order to get an optimal entrance fee maximizing the revenue, we set “\( p^* \)” as the new price.

The Revenue obtained from the new entrance fee is expressed in (48):
\[ R = r_{\text{loc}}^* p^* N_{\text{loc}}^* + r_{\text{nonl}}^* p^* N_{\text{nonl}}^* \]  
\[ = \left[ 20.90 - 1.3382 \left( p^* + c_{\text{loc}} \right) \right] p^* N_{\text{loc}}^* + \left[ 2.37 - 0.0155 \left( p^* + c_{\text{nonl}} \right) \right] p^* N_{\text{nonl}}^* \]  
\[ = \left[ 20.90 - 1.3382 \left( p^* + 7.33 \right) \right] p^* N_{\text{loc}}^* + \left[ 2.37 - 0.0155 \left( p^* + 41.97 \right) \right] p^* N_{\text{nonl}}^* \]

In equation (48), \( R \) is the revenue from the new entrance fee, \( N_{\text{loc}}^* \) and \( N_{\text{nonl}}^* \) are the numbers of local and non-local visitors under the new entrance fee during one year.

In section 6.1, we have already known the total number of trips taken to the park during year 2006. Among which, 746000 are from local people, and 308000 from non-local visitors. In addition, the average trips taken by individual local and non-local visitor under the current price were calculated in previous paragraph. So we can easily get the number of visitors under the current price during the past year.

\[ N_{\text{loc}} = \frac{N_{\text{loc}}}{r_{\text{loc}}} = \frac{746000}{9.08} = 82159 \]  
\[ (49) \]

\[ N_{\text{nonl}} = \frac{N_{\text{nonl}}}{r_{\text{nonl}}} = \frac{308000}{1.70} = 181176 \]  
\[ (50) \]

As we know, the trips taken to the park would change if the entrance fee changes, but the ratio of number of local visitors to the number of non-local visitors hardly changes. Because during the recent years, Yuelu Mountain Park gradually became an important and indispensable part in Changsha citizens’ daily lives. They get used to taking recreation there. And for non-local tourists, most of them (77.5%) in the sample take Yuelu Mountain Park as their main or only destination within the trip to
Changsha which implied that this park was also a place where they attached great importance to. Under that circumstance, if the price fluctuates, they might increase or decrease their visiting frequency but they wouldn’t stop visiting when the price is raised up. Thus we can have an assumption that the ratio of $N_{loc}^*$ to $N_{nonl}^*$ is approximately equal to the ratio of $N_{loc}$ to $N_{nonl}$.

$$\frac{N_{loc}}{N_{nonl}} = \frac{N_{loc}^*}{N_{nonl}^*} = \frac{82159}{181176} = 0.45$$  \hspace{1cm} (51)

Mathematically, maximizing the revenue is to derivative (48)

$$\frac{\partial}{\partial p^*} \left\{ \left[ 20.90 - 1.3382 * 7.33 \right] * p^* * N_{loc}^* + \left[ 2.37 - 0.0155 * 41.97 \right] * p^* * N_{nonl}^* \right\} = 0$$  \hspace{1cm} (52)

Associated with equation (51), equation (52) can be modified as:

$$\frac{\partial}{\partial p^*} \left\{ \left[ 20.90 - 1.3382 * \left( p^* + 7.33 \right) \right] * p^* * 0.45N_{nonl}^* \right\} = 0$$  \hspace{1cm} (53)

As discussed above, the numbers of visitors won’t be much influenced by the change of entrance price. So $N_{nonl}^*$ is assumed to be unrelated to the new entrance price. Therefore, $N_{nonl}^*$ could be considered as a constant and $p^*$ turns out to be the only variable in equation (53).

We can get the optimal price maximizing the revenue $p^* = 5.43$ €.

Table 6-2 shows the different trips taken by local and non-local individuals during one year under two entrance fees.
Table 6-2 Annual trips under two entrance fees

<table>
<thead>
<tr>
<th></th>
<th>Local</th>
<th>Non-local</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current entrance fee (€)</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Average trips</td>
<td>9.08</td>
<td>1.70</td>
</tr>
<tr>
<td>New entrance fee (€)</td>
<td>5.90</td>
<td></td>
</tr>
<tr>
<td>Average trips</td>
<td>3.82</td>
<td>1.64</td>
</tr>
</tbody>
</table>

From Table 6-2 we can see that the new one increases by almost about 2.5 times compared to the current entrance fee. For local people, the average trips decrease from 9.08 to 3.82 times per person per year, on the other hand, for non-local visitors, the number decreases slightly from 1.70 to 1.64. The slope of the local’s demand function is steeper than the one of the non-local’s demand function which results that when the entrance price is raised by the same quantity, the number of trips taken by local individual is much bigger than the amount of visiting time taken by non-local individual to the park. For non-local visitors, entrance fee forms only a small part (3.45%) of their trips costs, which makes the sensitivity of the trips to the change of entrance fee small, too.

6.3 Lost trips within age categories

In this section, from age respect we analyze the trips to the park that might be lost next year by the reason of local respondents with no visiting intention. We could also apply the same analysis on non-local group. But most of non-local tourists in the sample who live far from Changsha might visit the park only once or several times due to the travel distance, travel time and other unknown factors. It is quite reasonable that they won’t visit the park next year. Therefore, the result for non-local group cannot be easily explained as locals. In that case, we only take local visitors as the target group in this subsection.
Table 6-3 Lost trips next year within different age categories in local group

<table>
<thead>
<tr>
<th>Unit</th>
<th>18-25</th>
<th>26-35</th>
<th>36-45</th>
<th>46-55</th>
<th>56-65</th>
<th>66-75</th>
<th>75 and over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never Come person</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Average trips in one year times</td>
<td>5.68</td>
<td>10.90</td>
<td>5.62</td>
<td>31.5</td>
<td>15.5</td>
<td>N/A</td>
<td>10</td>
</tr>
<tr>
<td>Total lost trips next year times</td>
<td>22.70</td>
<td>10.90</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 6-3 shows the total trips among different age classes in local group that might be lost due to visitors who don’t have the intention to visit the park again next year. The total potential lost trips are obtained by using the number of people who are not willing to come next year multiplying by average trips annually. It is expressed in (54).

\[ \text{Lost}_r = n \times \text{Ave}_r \]  \hspace{1cm} (54)

\( \text{Lost}_r \) is the total potential lost trips (“Total lost trips next year” in table 6-3), \( n \) is the number of visitors who are definitely not coming to the park next year (“Never Come” in table 6-3) and \( \text{Ave}_r \) is the average trips taken by individuals in one year (“Average trips in one year” in table 6-3).

Before comparing the total lost trips within different age groups, first of all, we need to know whether there are statistically differences among these trips. We firstly set a hypothesis that all the lost trips in six age classes are equal.

\[ \text{Lost}_{r1} = \text{Lost}_{r2} = \ldots = \text{Lost}_{r6} \]  \hspace{1cm} (55)
Since in equation (54), the lost trips \( \text{Lost}_T \) is the product of \( n \) and \( \text{Ave}_T \). In that case, the original hypothesis can be expressed in an alternative form:

\[
n_1 \cdot \text{Ave}_{r_1} = n_2 \cdot \text{Ave}_{r_2} = \ldots = n_6 \cdot \text{Ave}_{r_6}
\]

(56)

Where \( n_1, n_2 \ldots n_6 \) are number of respondents with no intention to come next year among six age groups, \( \text{Ave}_{r_1}, \text{Ave}_{r_2} \ldots \text{Ave}_{r_6} \) the corresponding annual average trips taken by individual.

Based on the alternative hypothesis (equation (56)), ratio between \( n_1, n_2 \ldots n_6 \) is expressed as follows:

\[
n_1 : n_2 : \ldots : n_6 = \frac{1}{\text{Ave}_{r_1}} : \frac{1}{\text{Ave}_{r_2}} : \ldots : \frac{1}{\text{Ave}_{r_6}}
\]

(57)

\[
= \frac{\text{Ave}_{r_2} \cdot \text{Ave}_{r_3} \cdot \ldots \cdot \text{Ave}_{r_6}}{\text{Ave}_{r_1}} : \frac{\text{Ave}_{r_1} \cdot \text{Ave}_{r_3} \cdot \ldots \cdot \text{Ave}_{r_6}}{\text{Ave}_{r_1}} : \ldots
\]

Therefore, instead of testing the equality of lost trips, we can alternatively test the ratio among numbers of different groups of respondents. The original hypothesis is then replaced by the one that the proportions of numbers of respondents with no visiting intention next year among six age groups out of total local respondents are

\[
\frac{\text{Ave}_{r_2} \cdot \text{Ave}_{r_3} \cdot \ldots \cdot \text{Ave}_{r_6}}{\text{Ave}_{r_1} \cdot \text{Ave}_{r_2} \cdot \ldots \cdot \text{Ave}_{r_6}} : \frac{\text{Ave}_{r_1} \cdot \text{Ave}_{r_3} \cdot \ldots \cdot \text{Ave}_{r_6}}{\text{Ave}_{r_1} \cdot \text{Ave}_{r_2} \cdot \ldots \cdot \text{Ave}_{r_6}} : \ldots
\]

respectively.

SPSS 13.0 is applied in this hypothesis test. Table 6-4 presents the test statistics.
Table 6-4 Chi-square test statistics

<table>
<thead>
<tr>
<th>Age (local)</th>
<th>Chi-square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (local)</td>
<td>62.198</td>
<td>5</td>
<td>.000</td>
</tr>
</tbody>
</table>

Small significance values (<0.05) indicate that the observed distribution does not conform to the hypothesized distribution. That is to say, the ratios between numbers of respondents with no intention to visit the park next year among six age groups don’t follow the hypothesized proportions. It finally proves lost trips in these age classes not equal, which implies that there are statistically differences among trips.

After knowing that the lost trips in different age classes are not equal, we can take a look back at table 6-3. In local group, people from age 18 to 25 are the ones who cause the most trips lost next year due to some of them with no visiting intention.

7. Discussion and Conclusion

7.1 Access Value

Consumer Surplus for visiting Yuelu Mountain Park in Changsha city is calculated to determine the access value of annual visits to the park. The estimated access value can provide useful information to policy makers in government, park managers and local officials. By using the total number of annual trips to Yuelu Mountain Park, we can calculate an annual recreational value of the park. It is estimated that there were 1054000 visitors to the park during the year 2006, 746000 of whom were from local people and 308000 of whom came from non-local visitors. Using the estimation of consumer surplus with € 0.75 per trip for local individual and € 64.52 per trip for non-local individual, the annual access value of Yuelu Mountain Park is calculated to be € 20.43 million. This estimation shows that the park has great economic benefits in providing its tour and recreation function as a public resource. The finding is very
important for the park managers to make decision on the allocation of resources for maintenance and upgrading the hardware facilities. For example, in table 6-1, we have known that for both local and non-local visitors, the more attractive the access characteristic that they think is when making a trip decision, the more trips they would take to the park. It indicates that park managers should put more importance on the access aspect of the park when making decisions on allocation of resources. For instance, they could build more parking lots in front of the park gates to relieve the traffic pressure reducing the congestion. In this way, it would be much easier for visitors to get access to the park and consequently increase the trips to the park. In addition, more road guides and information service points can be set outside of the park to facilitate visitors to get to the park. Besides, for local people, history significance also has a positive relation to trips. More human resource could be input to enhance its management and protect the historical significance from being damaged. Appropriate funds can be used in improving and maintaining this characteristic of the park.

Access value is worthy for them to do maintenance, improvements to Yuelu Mountain Park in the future. Any degradation of the quality of the park or recreational environment might cause less visits to the park directly leading the decrease of consumer surplus (loss in value). The potential possibility of the decrease in value should be taken into account into the management and development of the park (Chen et al. 2004).

The access value could also be used to calculate the value of one unit area of the park access (Sohngen 2000). The net present non-market value of Yuelu Mountain Park is € 597.37 million with its area of 6 km², so the unit value of per one square kilometer is € 99.5 million. In Changsha city, the land sales for business use by the end of 2006 ranged from € 63 million to € 547 million per squares kilometer depending on different classes of land (Changsha Land & Resource Bureau 2006). The average land price was € 305 million per square kilometer which was around 3
times as large as the unit present value of Yuelu Mountain Park. Furthermore, in the view of Chinese special situation, the fast growth of the population and the limit of the land resource would definitely result the price of the land increasing year by year. So the value of land as a business entity in year 2008 will be much higher than the present value of land as a public recreational site. Relatively lower non-market economic value doesn’t mean that we should change the land into business use. Instead, the local government should attach more importance to the public land and take more measures to enhance the protection and management of it to exert its best recreational value. Appropriate budget allocated is worthy and reasonable for the future development of the public site. Effective management and relevant policy should also be taken into consider to increase the recreational value of the park.

The economic value of environmental goods we mentioned usually comprises use and non-use value (Straaten 2000 cited Pearce 1993). Recreation is regarded as one form of use value. There are also non-use values that this study cannot capture which includes existence and heritage value (Straaten 2000). It is impossible to estimate the non-use value by applying revealed preference method such as travel cost method. So it is important to recognize that the non-market value estimated in this study is only the use value of the park.

7.2 Entrance fee

In table 6-1 we have concluded that the less attractive non-local visitors think the entrance fee of the park is when making a trip decision, the more trips they take to the park. Psychologically, overall wish of tourists for the entrance fee is that the less, the better. Especially in China, Chinese might tend to a relatively lower evaluation in the questionnaire even if they think the price is moderate which is very likely to result the above conclusion that the coefficient of the attitudinal variable of the entrance fee (Att Fee) to the trips (trips) is negative. On the other hand, the sign also
implies that there exists the possibility to raise the entrance fee.

This study puts forward a possible option to set up a new entrance fee that maximizes the revenue from the ticket. It was based on some assumptions. One of the important assumptions is the trip costs to the park except that the entrance fee doesn’t change under the new price. Since it is unable to predict the exact amount of local and non-local visitors under new price system, we assume the ratio between the numbers of two groups approximately remains the same as the current ratio. Compared to the current entrance price € 1.5, the new price is raised by about 2.5 times (€ 5.4). The estimation of new entrance fee is based on the average individual demand function for trips excluding the extreme situation that someone’s trip-elasticity of trip cost is extremely high, the slopes of his/her demand function incline to infinite which is to say when trip cost increases a little, the trips to the site would dramatically decrease even to zero. Under the new price, the trips taken by local individuals decrease from 9.08 to 3.82 per year while the times non-local individuals visit the park change from 1.70 to 1.64. When the entrance fee increases, the total trip costs to the park would also rise up resulting the trips taken to the park decreasing accordingly. When the price increases, the trips taken to the park by local and non-local visitors reduce by 57.93% and 3.53% respectively. The sensitivity of the trips to the change of the entrance fee taken by non-local individuals is much smaller than that of local individuals. In regard to this, the park managers could consider setting more types of discount tickets for local citizens according to different groups’ demand elasticity, to encourage them to visit the park more while raising the normal ticket price. It consequently to some extent offsets revenue loss from the decrease of the trips taken by local visitors due to the price increase.

The price’s rising up might cause the trips to the park to go down, especially for some group of people, such as visitors with limited ability of payment or with lower income. However, from the long-term point of view, it is beneficial for the whole park. The maximum revenue gained from the new entrance fee can be pursued which
would bring plenty of economic benefits to alleviate the fund shortage and the pressure of great costs of Yuelu Mountain Park. Besides that, the increase of the entrance fee can also control the flow of visitors to protect the environment against being damaged in diversification of ecology.

The result is also important in making the decision of funds allocation. In the budget on development of the park every year, almost 70% come from the entrance fee. So an appropriate entrance fee plays a great important role and contributes a lot to the development of Yuelu Mountain Park and resources allocation. In previous chapter, we mentioned that there exists a big gap between the entrance fee and the maintenance expenses of the park. The maximized revenue gained from the proper entrance ticket can well fix the gap. It provides sufficient funding to be allocated to the park from the improvement of the recreational environment, the maintenance of the hardware facilities, the development of the new facilities and services etc. How to optimize the revenue allocated to the park and enhance its recreational value is what the park managers should take into account.

Although the new entrance produced in this study is based on theoretical background and under some assumptions, but it provides useful information and standard foundation for policy makers in raising the entrance fee and setting up effective rules behind it. For instance, in the future they can maximize the total revenue gained from all the possible income not only the entrance ticket to get a new entrance fee, it is also worthy to consider charging two kinds of entrance prices towards local and non-local groups to attain their separate maximum revenue or applying different prices according to different tour times. Student ticket price could also be taken into account in the future of the policy to be formulated.
7.3 Lost trips within age categories

In the questionnaire, respondents were asked about their willingness to visit the park next year. Those who have no intention to visit again might bring some decreases on trips to the park. The reduction of trips could probably in the end cause the loss of park’s recreational value. Hence potential lost trips is analyzed within different age categories in local group in this study. Non-local group is excluded by the reason of its inexplicability.

Concluding from Section 6.3, we know that the trips to the park that might be lost next year are not equal in different age categories in local group. Local people who cause the most amount of trips lost due to their no visiting intention are from 18-25 age group. This result provides valuable information for the park. In the future, the park managers could carry on some pertinent surveys to the opinions on the park aiming at different age classes. Questions in the survey can be designed towards the reasons that cause visitors to be reluctant to visit the park next year or in the near future, including their visiting intention after any improvement etc. Any positive or negative thoughts about the park that might influence the visiting intention can be gathered through the surveys. Visitors who belong to 18-25 age category are set as the priority group and their opinions should be attached more importance to. Park managers can afterwards do corresponding improvements by analyzing the reason why they are not willing to visit the park. For instance, some visitors think the parking condition in the park not satisfying so that they might feel reluctant to come next year. The Park managers can consider allocating a proportion of fund to parking lot’s construction.

Although non-local group are not analyzed in this study, it is also possible for the park to do a similar research to find out what are the potential probable factors that lead some of them not willing to visit the park again. Besides the age category, we
could also analyze the lost trips in respect of education level, job type demographic factors, from which the park managers could obtained more comprehensive information from diverse aspects.

### 7.4 Limitation and uncertainty of the study

The respondents in this study well represent the visitors to this park from population structure. However, there are only 200 samples in the questionnaire conducted within 4 weekends in one month. The investigation data shows there are averagely 100000 visitors to come to the park for their happy tour per month. Since time is pressing and the sample survey in scope is not big enough, the accuracy of value estimation might be questioned. Furthermore, because the survey was carried out in front of the gate, it was completed on-site. People who failed to visit the park that day were missed out in the study. The survey was implemented during weekends in July, 2007, visitors with monthly or yearly ticket might visit the park more often than others who only come once or don’t come in July, and it is likely for some frequent respondents to form some bias in the estimation when they answer questionnaires.

However, Yuelu Mountain Park, as the only Mountain Park in Changsha city possesses its unique recreational value. Taken away from the basic TCM model to make the equation simpler, the trip costs to other substitute sites in Changsha are assumed to have little effect on the trips to Yuelu Mountain Park. In fact, the substitute sites factor will have more or less influence on the trips to the park despite its own particular value. The access value under such situation would probably be overestimated to some extent due to the omitting of the substitute site factor in this study.

In the new entrance fee estimation, due to the information limitation, this study didn’t include the situation of special ticket for local people (monthly ticket and
yearly ticket). One of the biggest limitations is the numbers of local and non-local visitors under the new ticket system. Because the relevant information which is not comprehensive enough is available, it is impossible to get different entrance prices for these two groups even if they have different demand function. The revenue is maximized by assuming all the visitors are charged with the same entrance fee. The revenue in this study is restrictedly defined as only the front gate income. As a matter of fact, the total revenue of the park not only includes the entrance fee (major part), but also some other incomes such as expenditures on food and entertainments in the park, sightseeing bus and sight spots in the park.

7.5 Conclusion

Awarded as national key point of interest and scenic beauty by Chinese government, Yuelu Mountain Park acts as one of the most important public recreational places in Changsha city. In virtue of its great scenic view, historical significance and its special location, including its special geographic location and city development advantage, the park possesses its considerable recreational value that will bring about great revenue. With the continuously increasing amount of trips in recent years, Yuelu Mountain Park is more and more recognized by visitors from different places. The purposes of this study are estimating the access value of Yuelu Mountain Park and a new entrance fee to maximize the revenue gained from the front gate ticket, and also exploring the trips that might be lost to the park by local visitors with no intention to visit the park next year in respect of age category. The size of the sample in the study was 200 individuals.

In the study, the access value (consumer surplus) of Yuelu Mountain Park is estimated with travel cost method. The aggregate annual access value of the park is €20.43 million, calculated based on the entire visitors within year 2006.
The accesses value should be recognized as the additional economic value that is beyond the actual expenditure on recreation. The value estimate provides the useful information for policy makers to help them get a general idea about how valuable the public site is in order to make relevant reservation policy. And it is also important for the park managers to optimize the resource allocation in the park development and comparing with other public sites.

The introduction of new entrance fee in this study is calculated by applying individual demand function which is based on the travel cost method-single site mode. Compared with the current fee (€ 1.5), the new one is raised by about 2.5 times (€ 5.4). The proposal is based on theoretical assumptions, but it can be utilized by the park managers in future ticket setting from the revenue maximizing point of view to gain enough funding to allocate to the development of the park and make better improvement to the recreational environment of the park.

Furthermore, park managers can take more comprehensive research on the reason behind the trips lost to the park because of the visitors who have no visiting intention. An effective survey could be conducted among visitors with the purpose of finding out what causes their intention to appear or this situation to happen. Appropriate measurements can be performed with well aiming at different groups of visitors, priority is given to the group who cause most trip lost to the park.

Nowadays, there have been more and more development projects implemented in Yuelu Mountain Park. According to the bulletin published by the management department of Yuelu Mountain Park, social public vehicles were forbidden into the park from 26th September 2007 except in important holidays, more environmental friendly tour bus would be provided within the park (Yuelu Mountain Park 2008). The exceptions for holidays will to some extent alleviate access pressure to the park caused by large amount of visitors. This policy well protects the historic sites from unnecessary damage, effectively protects the recreational environment and the view
in the park, consequently increasing the recreational value of Yuelu Mountain Park. In the near future, there will be big parking lots built up at the front gates until when social public vehicle forbiddance would be completely implemented with no time exceptions. By that time, the trips to the park by visitors will present great and rapid growth, which definitely brings a considerable increase on its recreational value.

In the future, the research on travel cost model would be extended to other parks in Changsha or other national parks of China by applying random utility model. Through random utility model, it is possible to include a board array of substitute sites. And we can better analyze the problem by taking some factors into consideration which couldn’t be covered in single-site model such as substitute effect to the trips. It is good for the researchers to consider the problem from a wider scope and gain more specific information from the substitute sites in access value estimation.
References:


Anderson, J. E. 2007. Poisson Regression [Internet site]. University of Minnesota Morris. Available online:
http://cda.morris.umn.edu/~anderson/math4601/notes/poisson.pdf [Cited 31 May 2008].

Becod 2008. Crane Spring [Internet site]. Available from:


Changsha Development and Reform Commission 2007. Yuelu Mountain Park requests for raising the entrance fee [Internet site]. Available in web:

Changsha Land & Resource Bureau 2006. Benchmark of Land Value Standard. [Internet site]. Available from:


Google Earth 2008. Location of Yuelu Mountain Park (South Gate). Eye Altitude: 10.82 km.


Appendix 1 Questionnaire

Date [Type in date] 
Time [Type in time] 
Group [Type in group] 

Part 1 General information

1. Where do you come from? [Type in answer] 

2. Is this the first time you have been to Yuelu Mountain Park?  
   □ Yes  □ No  
   
   If no- how many times have you visited Yuelu Mountain Park during the past 12 months?  
   □ 0-1  □ 2-5  □ 6-10  □ More than 10 

3. When was the most recent trip to this place?  
   □ Month [Type in month]  □ Year [Type in year] 

4. Will you come to this park again next year?  
   □ Definitely  □ Maybe  □ Never
5. Use the following scale to rate your answers:
(1)=Strongly Disagree (SD)  (2)=Disagree (D)  (3)=Neutral (N)  (4)=Agree (A)  (5)=Strongly Agree (SA)

The next 7 factors relate to your decision to spend time in the park in general

<table>
<thead>
<tr>
<th>Factor</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) The view</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b) The historical significance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c) The service provided in the park</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d) Park cleanliness and maintenance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e) The park facilities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>f) The entrance fee</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>g) Easy access</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

The next 7 questions relate to your thoughts about this park in particular

<table>
<thead>
<tr>
<th>Question</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) The view in the park is good</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b) The park has great historical significance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c) The park has good service</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d) The park is clean and well maintenance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e) The park has good facilities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>f) The entrance fee is reasonable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>g) It is easy to access to the park</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Part 2 Travel cost

1. Is Changsha your only city in this trip? (to be filled by tourists from other cities)
   □ Yes □ No

   If no-Changsha is
   □ Main destination □ General destination □ Minor destination

   Please fill this chart to show other cities and the transportation vehicles in this trip

   : cities
   : transportation vehicles, e.g. airplane, train etc.

   ![Diagram showing travel cost]

2. What type of trip you travel to Changsha?
   □ Day trip
   □ Short overnight trip
   □ Long overnight trip
   □ Side trip

   If not the day trip, please answer question 3, 4 and 5:
   If the day trip, please go directly to question 6:
3. How many nights did you stay in Changsha?
   Number of nights___

4. For how many people (including children) did you pay lodging expenses?
   Number of people___

5. How much did you spend on your accommodation for all the people you take responsibility of per night? ___

6. Is the park your only destination in Changsha?
   □ Yes  □ No

   If no-how many destinations will you go in Changsha ___

   This park is
   □ Main destination □ Secondary destination  □ General destination □ Minor destination

7. How do you travel to the park?
   □ By bus
   □ By private car
   □ On foot
   □ By bike
   □ By electric bike
   □ By taxi

8. If you travel to the park by private car, did you drive your car into the park?
   □ Yes  □ No

9. How many people travelled with you this time? ___
10. How much did you spend in the park? (including the food, excluding the entrance fee)___

11. What type of ticket did you buy?
   □ Normal ticket
   □ Monthly ticket (morning and evening)
   □ Normal yearly ticket
   □ Yearly ticket for teachers and students
   □ Free

12. How do you think about the entrance fee?
   □ Too high
   □ A little bit high
   □ Acceptable
   □ A little bit low
   □ Too low

Part 3 Household information

1. What is your age?
   □ 18-25 □ 26-35 □ 36-45 □ 46-55 □ 56-65 □ 66-75 □ 75 and over

2. What is your gender?
   □ Male □ Female
3. What is your level of education:
   □ Lower than high school
   □ High School completed
   □ Vocational College
   □ College
   □ University

4. What is your job status?
   □ Student  □ Employed  □ Freelancer  □ Unemployed  □ Pensioner

Would you describe your schedule time as being flexible? For example, on short notice do you usually have the flexibility to take an afternoon or day off from work to take a trip to a mountain or do something else you enjoy?
   □ Flexible
   □ Somewhat flexible
   □ Not flexible

5. What is your approximate monthly income (before taxes)?
   □ No income recently
   □ Less than 100€
   □ 100€-200€
   □ 200€-300€
   □ 300€-400€
   □ More than 400€

Thank you very much for your assistance to us in conducting this study. We hope you enjoy the questionnaire, and we look forward to receiving your answers.
Appendix 2 Main Scenic Spots in the Park

Figure 1 shows the South Gate of Yuelu Mountain Park.

Figure 1 South Gate of Yuelu Mountain Park (tibet 40 2008)

In figure 2, the view of Changsha city is brought into eyesight from the top of Yuelu Mountain Park.

Figure 2 The view from the top of Yuelu Mountain Park (9 tour 2007)
Figure 3 Liu Chao pine (Cnbc 2008)

Figure 3 is the picture of an ancient pine tree aged about 1700 years. People call it a “live fossil” in vegetable kingdom. It is an invaluable asset. Its old trunk is curved and still dense with many years’ test of wind and storm. It seems to stand telling long history of Yuelu Mountain Park to all tourists who come.
Figure 4 Aiwan Pavilion (Hunan Government 2008)

Figure 4 is Maple Leaf Pavilion (Aiwan Pavilion) with lush maples and green trees around it. It was built in Dynasty Qing (A.D.1792). Now it is a symbol pavilion of Yuelu Mountain Park and one of four famous pavilions in China.
In figure 5, it is the picture of Lushan Temple (Long-life Temple) with halfway up the mountain. It was built in early Dynast Jin (A.D.278), and the temple was almost destroyed in 1944 with only some walls and gates remained. It was the earliest temple to show that Buddhism was brought into Hunan province, twice repaired in 1955 and 1980.
Figure 6 Crane Spring (Becod 2008)

Figure 6 is the image of Crane Spring where clear and cool water comes out from underground year in year out. Tradition has it that a couple of canes once flew here to drink spring water every day. Later, a pavilion was built in 1877 for people passing by to drink tea with spring water.
Yunlu Palace built first in 1478 was many times repaired in ancient China. The palace, with many old and big trees around, is the famous place of interest where Changsha Daoist association is located.