A Consumer Surplus Estimate of Peace & Love festival in Borlänge

A Travel Cost Approach
Abstract

This thesis uses zonal travel cost method (ZTCM) to estimate consumer surplus of Peace & Love festival in Borlänge, Sweden. The study defines counties as zones of origin of the visitors. Visiting rates from each zone are estimated based on survey data. The study is novel due to the fact that mostly TCM has been applied in the environmental and recreational sector, not for short term events, like P&L festival. The analysis shows that travel cost has a significantly negative effect on visiting rate as expected. Even though income has previously shown to be significant in similar studies, it turns out to be insignificant in this study. A point estimate for the total consumer surplus of P&L festival is 35.6 million Swedish kronor. However, this point estimate is associated with high uncertainty since a 95 % confidence interval for it is (17.9, 53.2). It is also important to note that the estimated value only represents one part of the total economic value, the other values of the festival’s total economic value have not been estimated in this thesis.

Keywords: Peace & Love festival, Revealed preference methods, Non-market valuation, Travel cost method, Consumer surplus.
Acknowledgements

The process of writing this master thesis has been both educative as well as exciting and a time period which I have enjoyed to a great extent.

First of all I want to thank my supervisor, Reza Mortazavi, at the Department of Economics at Högskolan Dalarna in Borlänge for his support, guidance and constructive criticism. Thank You!

Secondly I would like to say special thanks to all the other Lecturers in the Department of Economics at Högskolan Dalarna for the skills they have impacted on me in the course of the Master Programme, as well as to the non-teaching staff for always being there to support me.

Also, I would like to thank Tobias Heldt for suggesting the thesis topic and providing the survey data on which this study is based. My great thanks goes to Patrik Arousell for providing the data used in this study.

Next, I would also like to thank Catia Cialani for support, advices and encouragement during all my studies here at Högskolan Dalarna, and Gunnar Isacsson for numerous and valuable comments which improved the thesis.

Many thanks as well to all my fellow class mates for their collaboration and friendship, especially Nikolaos for sharing the knowledge and devoting the time to study together both at the campus and via skype.

Last but not least, I would like to send thanks to my friends and family for their support and encouragement.
# Table of contents

1. *Introduction* ......................................................................................................................... 1

2. *Economic value and valuation methods* ............................................................................... 3
   2.1 Economic value .................................................................................................................. 3
   2.2 Economic valuation methods .............................................................................................. 7

3. *Travel cost method* .............................................................................................................. 9
   3.1 Fundamentals of travel cost method .................................................................................. 9
   3.2 Applying zonal travel cost method .................................................................................... 11
   3.2.1 Previous applications of travel cost method ................................................................. 13
   3.2.2 Cost components of zonal travel cost method ............................................................... 15

4. *Travel cost method applied to Peace & Love festival* ......................................................... 20
   4.1 Data .................................................................................................................................... 21
   4.2 Estimating zonal visiting rates ......................................................................................... 24
   4.3 Estimating consumer surplus ............................................................................................ 25

5. *Discussion and conclusions* ................................................................................................. 27

References ..................................................................................................................................... 29

Appendix ....................................................................................................................................... 36
Acronyms and Abbreviations

CS- Consumer Surplus
CM- Choice modelling Method
CVM- Contingent Valuation Method
EUR- Euro
HPM- Hedonic Pricing Method
ITCM- Individual Travel Cost Method
OLS- Ordinary Least Squares
P&L- Peace & Love Festival
PS- Producer Surplus
RP- Revealed Preference
SEK- Swedish Krona
SCB- Statistika centralbyrån (Statistics Sweden)
SP- Stated Preference
TCM- Travel Cost Method
TEV- Total Economic Value
TGF- Trip Generation Function
TTC- Total Travel Cost
TC- Travel Cost
ZTCM- Zonal Travel Cost Method
WTA- Willingness to Accept
WTP- Willingness to Pay
1. Introduction

Andersson et al. (2012, p.218) defines that “festivals can be regarded as activities or products which have intellectual, moral and artistic aspects of human life attached to them, which make them similar to cultural institutions in a more traditional sense.” In this thesis, we attempt to estimate consumer surplus for such an activity, i.e. a festival, using the travel cost method (TCM). Although TCM has been applied many times, for example, for estimation of the economic values of national parks, as far as we know, it has been used very seldom for evaluating a festival. An example is the work of Prayaga et al. (2006) who apply TCM to evaluate the Gemfest in central Queensland.

Since 1999 Sweden’s largest festival, Peace & Love, has taken place in Borlänge, a mid-sized town with approximately 50000 inhabitants situated around 200 kilometers northwest of Sweden’s capital Stockholm. The first festival was held in club Bolanche with 32 bands playing and around 900 visitors (Sundin et al., 2009). In the next coming years the festival expanded significantly and the events were held both indoors and outdoors in all over the central Borlänge. The number of visitors has risen from 900 in the first year to 25000 in year 2008 and nearly 50000 in 2011 and 2012. Eventually, it became the largest festival in Sweden. 2012 was the last year the P&L festival was held, due to the fact that the organizing company later went bankrupt.

As mentioned by Heldt (2013) the festival was established in 1999 as a movement to offset the increased violence that had escalated in the 1990s in the local area of Borlänge. When visitors, staff, artists, vendors, etc. are included, the total number of individuals visiting Borlänge during the festival week is estimated to be more than 60000.

The purpose of this study is to estimate the consumer surplus for the Peace & Love Festival. To achieve this goal, the zonal travel cost method is used. As the travel cost method is capable to capture only use values, other important but non-use values are not the subject of this paper. The study is based on the data of the visitors collected from an on-site survey carried out during the festival in June 2012. Additional data such as population and income at county level are taken from Statistics Sweden.
The remainder of the thesis is organized as follows. Chapter two is devoted to aspects of economic value and valuation methods. The third Chapter deals with theoretical framework of TCM and ZTCM particularly. Thereafter the relevant TCM literature review and the general TCM methodological background are presented. In Chapter four the data and the econometric analysis are presented. Lastly, the conclusions and discussions are presented in the Chapter five.
2. Economic value and valuation methods

2.1 Economic value

Economic value of a good or service is often defined as the amount of money one is willing to exchange for a good or service. (See, for example, Peterson and Loomis, 2000). The market model concept for demand and supply is the base for economic valuation of goods and services.

![Figure 1- Market equilibrium for a hypothetical good](Source: Varian (2010))

In a competitive market the interaction of supply and demand determines the market price. As an example, we see in Figure 1 that quantity demanded equals supply at $P_d = P_s$ and the equilibrium quantity is $q^*$. Also the consumer surplus associated with consuming $q^*$ units of the commodity is the area between the demand curve and the horizontal line at $P_s$. Consumer surplus is defined as the difference between what a consumer would be willing to pay (WTP) for a commodity and the price she actually pays.

Shaw and Rogers (2005, p.15) summarizes that “total value or benefit to society from a good is the sum of both producer’s and consumer’s surplus.” Ozdemiroglu et al. (2010, p.5) explain that “‘total’ in terms of TEV refers to the sum of all components of economic value
(i.e. direct and indirect use values and non-use values). Crucially, what is measured by economic valuation is the relative value of a change from one state to another”.

An alternative measure of value is the so called willingness to accept (WTA) which measures the minimum amount of money people are ready to accept to give up an object in their possession (Georgantzis and Navarro-Martínez, 2010). Philcox (2007, p.10) describes that “TEV can be assessed as WTP or WTA payment. WTP is the more common method, as more tools for estimating economic value are relevant to this approach. WTP can also be considered a conservative estimate in cases where WTA would be preferred, although this approach may underestimate values if WTA is the more appropriate method”. The differences between WTP and WTA are analysed in depth by Hanemann (1991).

It is common to separate TEV into two main categories of values: use and non-use (or passive use) values. The categorization is not straightforward. A summary is found in Table 1.
<table>
<thead>
<tr>
<th>Author/s</th>
<th>Suggested categories of values/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corcoran et al. (1999)</td>
<td>Use values include direct and indirect. Non-use values include option, vicarious use, bequest and existence values.</td>
</tr>
<tr>
<td>Kolstad (2000)</td>
<td>Use values are: current use, expected use and possible use values. Non-use values are: existence value, altruistic value and bequest value.</td>
</tr>
<tr>
<td>Ward and Beal (2000)</td>
<td>Non-use values are further divided into the following categories: option values, quasi-option values, vicarious use values, bequest values and existence values and stewardship values.</td>
</tr>
<tr>
<td>Pearce et al. (2006)</td>
<td>Use and non-use (or passive use) values. Use values relate to actual use of the good in question. Categories of use values are: planned use (a visit planned in the future) or possible use (option use). Non-use values are: existence value, altruistic value, and bequest value.</td>
</tr>
<tr>
<td>Jantzen (2006), Tesileanu (2008)</td>
<td>Use values are further divided into direct use, indirect use and optional use values. Non-use values are bequest and existence values.</td>
</tr>
<tr>
<td>Ozdemiroglu et al. (2010)</td>
<td>Use value can be separated into: direct, indirect and option value, non-use values are: existence, altruistic and bequest values.</td>
</tr>
<tr>
<td>Potts and Hastings (2011)</td>
<td>Direct use value can be spilt into consumptive and non-consumptive value. Direct use valuation is the most common approach and where most of the effort of valuation occurs.</td>
</tr>
<tr>
<td>Armbrecht (2012)</td>
<td>Use values are the primary source of value creation. Non-use values are: option value, bequest value and existence value.</td>
</tr>
<tr>
<td>Andersson et al. (2012)</td>
<td>Use values can be separated into direct use and indirect use values. Direct use value relates to experiences that arise during the festival (e.g. within the festival area) and represents the value of the core experience. Indirect use value refers to experiential values outside the festival area before, during and after the festival taking place.</td>
</tr>
</tbody>
</table>

In the context of measuring the value of culture, O’Brien (2010) mentions that use values appear in the market prices of cultural goods, for example entrance ticket prices. Because a lot of the cultural institutions has subsidised entrance ticket prices or are even for
free, market price does not reflect the true value. He demonstrates that cultural institutions differ from, for example, natural and environmental sectors because all except one category of values can be attributed to use values.

Similarly, the festivals like Peace & Love Festival has an entrance ticket fee, nevertheless, we cannot directly estimate the value of the festival, because the market price cannot be observed for a whole festival. In the sense of estimation of the value it is comparable to non-market goods.

Armbrecht (2012) explains that in cultural sector direct use values arise from the core cultural activity, like theatre play or visiting a museum. Indirect use values arise from the related experiences, for example spending time in the bar attached to the cultural institution. This is explicitly depicted in Figure 2.

![Figure 2 - Categories of value of cultural institutions](source: Armbrecht (2012))

Overall the categorization of the values among authors differ significantly, the main finding is that the most important value is direct use value. This disparity of categorization is mainly due to the nature of the sector where it has been applied. As it is shown in the further chapters of the paper, we are interested in the use value.


2.2 Economic valuation methods

If a particular good is not directly sold in the market, it does not mean it has no value. Riera et al. (2012, p.260) mention that “The field of non-market\(^1\) valuation originated in the discipline of economics as a tool to assist valuation practitioners estimate the value of goods and services that are not directly traded in markets”. For example, Kolstad (2000) points out that because of the absence of markets for environmental goods, measuring demand is not straightforward.

In the absence of the markets one cannot observe the price directly and it is necessary to use other methods of evaluation of prices for goods and services. Tietenberg and Lewis (2012) separate valuation methods into two broad categories: stated preference and revealed preference methods. Fujiwara and Campbell (2011, p.10) describes that ”SP techniques use surveys in which people make statements in relation to their WTP (WTA) for a good (“bad”). RP techniques infer people's WTP (WTA) for a good (“bad”) by examining their actual real-life behaviour in a related market (hedonic pricing) or in the consumption of the good itself (travel cost).” Sometimes stated preference methods are described as direct methods because of their nature, asking people directly about their willingness-to-pay, subsequently revealed preference methods are classified as indirect methods because individuals willingness to pay is derived (associated) from use of non-market resource.

O’Brien (2010) suggests that stated preference techniques aim to capture the total economic value of a good or a service. To achieve this, stated preference methods use specially constructed questionnaires to obtain estimates of the WTP or WTA for a particular outcome (Fujiwara and Campbell, 2011). In contrast “RP approaches determine the ways in which a non-marketed good influences actual markets for some other good (i.e. value is revealed through a complementary (surrogate or proxy) market)” (Pearce et al., 2002, p.16).

In Figure 3 we can see how the values for market and non-market goods are determined.

---
\(^1\) According to Pearce et al. (2002) non-marketed goods and services refer to those which may not be directly bought and sold in the market place.
There are two main categories of stated preference methods:

- Contingent valuation (CV) methods, which focus on the valuation of a non-market good as a whole;
  - Choice modelling (CM) methods, which focus on valuing specific attributes of a non-market good (Fujiwara and Campbell, 2011)

Ward and Beal (2000, p.12) articulate that a number of studies have found that the only way to ensure “total human benefits are maximized is to design institutions or frameworks that confront people with real cost that their actions inflict to other people.” Similarly, Fujiwara and Campbell (2011) comments that the RP methods uncover estimates of the value of non-market goods by using evidence of how people behave in the face of real choices.

The two most common revealed preference methods are:

- The Hedonic Pricing Method (HPM)\(^2\),
- The Travel Cost Method (TCM).

\(^2\) According to Fujiwara and Campbell (2011) HPM uses the relationship that non-market goods affect the price of market goods in other well-functioning markets. It has mostly been applied using data from housing and labour markets. As indicated by O’Brien (2010), HPM is rarely used within cultural sector, because property prices are often only spuriously related to goods and services within the cultural sector. For more details see Bateman (1993).
3. Travel cost method

3.1 Fundamentals of travel cost method

Ward and Beal (2000, p.32) mention that “TCM has developed from a suggestion made by Harold Hotelling in 1947. US National Park Service wanted to know how economic principles could be used to demonstrate economic values produced by national parks.” TCM exploits the negative empirical relationship between increase of the travel distance and decline of the visitation rates (Ibid). This relationship allows constructing a downward-sloping demand curve. Fujiwara and Campbell (2011) note that visitation rates might vary depending on factors such as age, gender, education level and others. The consumer surplus is given by the area under their demand curve between the price of their visits ($p_i$) and the price at which their visit frequency would fall to zero, known as their choke price ($p_{choke}$).

The travel cost method has predominantly been used to estimate the value of environmental and recreational sites (e.g. a park, a coral reef or a beach). Fujiwara and Campbell (2011) mention that it has also been used to value change in the characteristics of sites (e.g. ease of access).

Bellù and Cistulli (1997) refer that TCM provides an underestimation of the true travel cost. Authors like Ward and Loomis (1986) and Ward and Beal (2000) mention that because TCM is RP method, it is capable to capture only use values, not including any option values to future use nor any existence values. Furthermore Hanley et al. (2001) explain that this is since the TCM approach infers the values from expenditure. In general, as commented by Lipton et al. (1995) all indirect valuation methods can be applied if there is some easily observable behaviour that can be used to reveal the values.

O’Brien (2010) criticizes TCM due to the possibility of undervaluing people who have only short travel time. He names two main advantages of TCM: 1) it is based on market prices that directly reveal people’s preferences for a good or service and 2) it has been used to value a range of cultural goods and services and compare those values. Similarly Zandersen et al. (2011) point out that TCM is not able to estimate the values of people having travelled to the site in question by bike, by foot or other ‘free’ means of travel.
Prayaga et al. (2006) note that revealed preference methods like the TCM are suitable for estimating the economic value of festivals because the data used are based on actual observed behaviour. They mention the following advantages of choosing TCM for this type of study: 1) the data can easily be collected; 2) the method is relatively simple and inexpensive to use and the results are also relatively easy to interpret; 3) the TCM applies demand theory to estimate and explain the value of a recreation choice (value estimation is based on a simple assumption that the value of a recreation option depends on and is inversely related to the travel costs); and, finally, it is not data-intensive and involves the estimation of a single demand equation for the recreational activity. Additionally, it is possible to include other exogenous variables in the model.

There are essentially two types of travel cost models: zonal TCM (ZTCM) and individual TCM (ITCM). As noted by Ward and Beal (2000), first Clawson (1959), then Knetsch (1963) and later Clawson and Knetsch (1966) developed further TCM. They assume that recreationists would react to entry fee in the same way as increase in the travel costs. Clawson and Knetsch (1966) showed how ZTCM could be used to derive a demand curve for a site. They demonstrated the existence of a negative relationship between price and output, in accordance with demand theory. As the main advantage is mentioned that only data that has to be collected is a sample of visitors to the site in the question, identifying the origin of the trip. Identifying the zone of origin of visitors makes it possible estimate the number of visitors from each zone. Further, using the data of population of the particular zone we can calculate a visitation rate for zone. The visitation rate is explained by the two reasons: the travel costs form each origin zone to the site and the demographic characteristics e.g. income of the population of the origin zone. The researcher thereby is able to generate a set of data, one data point for each zone, including the visitation rate, travel cost, and the characteristics of the zone.

Anex (1995, p.190) reports that “in the Clawson–Knetsch approach, visitors to a recreational site are grouped by their zones of origin, and the average characteristics and recreational behaviour of these geographic zones are used to estimate the demand function.”

As main problems with ZTCM, Tuner et al (2004) name the assumption that cost of travel for all individuals within one zone is equal, which is often not the case. Ward and Beal (2000) refers to loss of information by aggregation into zones, definition into zones and zones
with zero visitations. Also a negative factor is that averages may differ only a little among the zones so that the coefficients of the socio-economic variables may be found to be not statistically distinguishable from zero. Loomis et al. (2009) mention that ZTCM model is also useful for sites where each individual visitor takes just one trip per year (or there are data only on the most recent trip).

According to Afandi et al. (2013) ITCM was developed by Brown and Nawas (1973) and further by Gum and Martin (1974). Anex (1995) refers that in ITCM, differences in the individual use rates are explained by variations in travel cost, income, education and other socio-economic characteristics of the individuals. Ward and Beal (2000) explains that ITCM is based on individual visitors, where the dependent variable, quantity consumed, is the number of trips taken per period by individuals or households. ITCM is possible to apply when individuals take more than one trip per period. Also, ITCM requires more data, which means it is more expensive. ITCM requires variation in the visitation rate (Prayaga et al., 2006). In the case of festivals and special events organized only once a year ITCM approach cannot be applied.

3.2 Applying zonal travel cost method

In this section we will discuss how the demand and consumer surplus can be estimated using ZTCM. Demand is determined by cost of travel including any possible entry fees and other independent relevant variables. There are different ways to estimate the consumer surplus. A common approach is a two-step procedure as applied and discussed by Ward and Beal (2000) and later by Prayaga et al. (2006). Firstly the “trip generation function” (TGF) is derived by OLS, based on average zonal travel costs and other variables. Ward and Beal (2000) define it as “demand function for the recreational experiences at the site”.

Lansdell and Gangadharan (2003) suggest the following specification TGF: \( v_i = f(TC_i, X_1, \ldots, X_n) \). The dependant variable “visits per year from zone \( i \) (\( v_i \))”, per population of that zone (or trips per capita) is regressed on independent variables “average travel cost from zone \( i \) (\( TC_i \)) and socio-economic variables (\( X_1, \ldots, X_n \)) (averaged for zones, might be included). The “entrance price (\( P \))” would be added to \( TC_i \) variable. Once the functional relationship has been estimated using survey data, it is used to estimate other points on the demand curve.
Prayaga et al. (2006) explain that in the second step “the visitation rates under new additional prices are predicted”. TGF is being used for prediction of the visitation rates. The price is increased (by adding some hypothetical additional entry fees) till it is so high that demand equals to zero. Subsequently the number of estimated visits \( Q \) is regressed against the hypothetical increase in entry fee \( P \) by OLS. As with the case of TGF, the most appropriate functional form has to be chosen for this regression. After choosing the functional form we can estimate the inverse demand curve. The last step is to estimate the Marshallian (uncompensated) consumer surplus, integrating the area between the original price and maximal price (the price where demand is equal to zero). The Marshallian consumer surplus is given by the area marked by “Consumer Surplus” in Figure 4. Number of Trips, \( X \), in the figure equals the visits to the site for a given travel cost (TC).

![Figure 4 - Consumer surplus](source: Ward and Beal (2000))

Nevertheless, there is also a more straightforward way for calculation of the CS. It is too based on the TGF estimates. The assumption behind the TCM is that people react to a price change as they do to a change in the travel cost. This suggests a more direct way to calculate the consumer surplus by considering \( Q = f(TC, P) \) (Chotikapanich and Griffiths, 1998). The demand function can more specifically be written as: \( Q = \sum_{i=1}^{m} N_i f(TC_i + P) \) where \( m = \) number of zones, \( N_i = \) population of zone \( i \), \( TC_i = \) Travel cost from zone \( i \) to the event, \( P = \) the entry fee and \( f(TC_i, P) = \) is the trip generating function. The following integral can then be
used to calculate the consumer surplus: \( CS = \int_{0}^{\infty} \sum_{i=1}^{m} N_i f(TC_i + P) dP \). The upper integration limit is infinity because as \( P \to \infty, Q \to 0 \). In practice the generating function must be specified. The simplest case would be a linear functional form. In the section 4.2 of this thesis different specifications are tested and a final model chosen. Based on that specification the integral is evaluated. For more detailed analysis of functional form specification see, for example, Chotikapanich and Griffiths (1996).

### 3.2.1 Previous applications of travel cost method

TCM has been applied to recreational activities like fishing (Shrestha et al., 2002), hunting (Balkan and Kahn, 1988), hiking and biking (Hesseln et al., 2003), estimating economic value of natural resources (Chen et al., 2003), camping and also cultural heritage sites, museums and concert halls (Ambrecht, 2012), and sports activities (Loomis et al., 2009).

Application of TCM in evaluation of festivals and events is novel. As far as we know, there are few scientific papers devoted to estimation of the value of a short term event like a festival which applies TCM. Prayaga et al. (2006) estimated the economic value of Gemfest in terms of consumer surplus through an application of the travel cost method. Gemfest is an annual festival usually held for four days in the sapphire Gemfields of Central Queensland, Australia. A survey was used to collect information on visits, travel costs, preferences and demographic details of the visitors. Zones were defined based on statistical divisions defined by Australian Bureau of Statistics. One of the conclusions is that at that time there appears to be little or no research that uses the TCM to estimate the consumer surplus for a short-term event like Gemfest. Most of the economic analysis of special events focuses on estimating expenditure levels, but estimates of expenditure are not a measures of economics value and so the application of the TCM offers a robust welfare measure of the net value of the event in question.

They mention the following factors that influence the estimations of economic value: number of visitors, origin of the visitors and entrance fee. Additionally, they identified the following difficulties: division of the travel zones, treatment of international or other distant visitors, dealing with multi-destination and multi-purpose trips, estimation of travel costs. They conclude that the decision to exclude accommodation costs, opportunity cost of time
and a measure of substitute sites will influence the final estimates. The estimates have to be evaluated carefully using various types of sensitivity tests.

Because TCM originally was applied in natural resource evaluation, it is necessary to mention the contribution made by Ward and Beal (2000) where they analyse the application of TCM in context of valuing nature. When estimating the costs, one of the suggestions is to look for what variables and how they should be included in the TC. For example, regarding food costs, only additional (compared to home) food consumption should be considered.

They further suggest phrasing the question about residence in terms of post code, because the number can be input as stated without having to be coded. They underline that a researcher has to be very careful with statements of the individuals regarding the travel costs which they faced, because they can contain a lot of error.

According to Ward and Beal (2000) one should be aware that high correlation might be between travel cost and travel time, when individual experiences are averaged to estimated zonal averages, hence when running a regression travel time has to be omitted.

Ward and Beal (2000) also point out the issue regarding size and distance of the zones. The smaller are the zones, the more likelihood of the internal homogeneity in relation to demand determinants. They suggest to separate “at least 25-30 zones, although some well-known analyses have been completed with 15-20 zones” (Ibid.,p.176). Omission of the zones with zero visitations can truncate the data set and bias the coefficient estimates and result in a more inelastic demand curve. Additional suggestion is to combine zones with zero visitation rates with nearby zones which have positive visitation rates. They also note there is evidence that with greater travel distance, it becomes less likely that each trip is made only for a single purpose.

Shaw and Rogers (2005) discuss non-market value estimation for festivals and events. They mention the problem with individuals living close to the site in question. TCM will likely not be effective for evaluation of the events attended by the locals because of zero or only a few miles of distance travelled, so there would not be enough variation in the travel costs.
TCM has mostly been applied in estimation of recreational and natural resources. Read et al (1999) have analysed application of TCM to estimate recreational use values for Victoria’s Parks in Melbourne and rural Victoria. They reject the apportionment of consumer surplus in proportion to travel costs since the consumer surplus estimated using TCM is by no means directly proportional to the travel costs of visitors. They point out three difficulties: 1) the allocation of consumer surplus between multiple destinations for those visitors who take multipurpose trips; 2) the choice of distance ranges for each postcode zone; and 3) the choice of functional form.

Armbrecht (2012) argues that zonal travel cost method is problematic when it comes to measuring the value of experiences that consist of more than just the core cultural experience. Assuming that the costs of travel are solely attributable to one single experience may be incorrect in most cases even though only visitors who mentioned the cultural experience to be the major attraction were included. The zonal travel cost method, as part of revealed preference techniques, is therefore often likely to overestimate the value of a cultural institution. Armbrecht (2012) also refers that estimation of value of festival shows that use values were significantly larger than non-use values.

As the most recent effort to estimate the value of a Swedish festival is one prepared by Andersson et al. (2012). As the main method they prefer CVM and apply it to evaluate Way-Out-West festival in Gothenburg. This method is used because the estimation is conducted for both use and non-use values, which TCM cannot capture. The results show that direct use value is slightly higher than indirect use value, whereas non-use value is very small. This suggests even if TCM would be applied the most of the value could be captured.

3.2.2 Cost components of zonal travel cost method

TCM is based on a number of assumptions. First of all it is necessary to define which variables are relevant and has to be included when estimating the TC. Table 2 summarizes the recommended relevant costs with a short explanation.
Table 2. Relevant costs in TCM

<table>
<thead>
<tr>
<th>Author/s</th>
<th>Recommended relevant costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ward and Beal (2000)</td>
<td>Taking into account previous studies, relevant costs are costs of fuel, accommodation and food costs. Tire and other vehicle repairs and the costs of unforeseen incidentals can be included. Consumers can only react to what they perceive to be the trip’s cost when they making the decision to undertake the journey. That narrows the costs that could be included as relevant costs. If during the journey something unexpected happens, for example, tires blow up, we could not define these as planned costs.</td>
</tr>
<tr>
<td>Day (2000)</td>
<td>Four types of costs to be included: 1) the economic cost of travel to the site; 2) the cost of time while travelling; 3) the cost of accommodation at the site; and, 4) the cost of time whilst on-site.</td>
</tr>
<tr>
<td>Pearce et al. (2006)</td>
<td>1) The monetary costs in return fares or petrol expenses, wear and tear and depreciation of the vehicle and so on; and 2) the cost of time spent travelling.</td>
</tr>
<tr>
<td>Fleming and Cook (2008)</td>
<td>Travel costs, entry fees, on-site expenditures and outlay on capital equipment.</td>
</tr>
<tr>
<td>Armbrecht (2012)</td>
<td>Vehicle costs, entrance fee costs and the opportunity cost of time.</td>
</tr>
</tbody>
</table>

**Opportunity cost of time**

Prayaga et al. (2006) mentions that the opportunity cost of time can be divided into time spent on travel from the point of origin to the site in question and on-site time. Shaw and Rogers (2005) indicate that failure to incorporate the opportunity cost of time typically allows one to assume that estimated consumer’s surplus is a lower bound of the true benefits.

The variation of travel time valuation, as shown in Table 3, is significant and no consensus regarding how time cost should be estimated has been reached yet.
<table>
<thead>
<tr>
<th>Author/s</th>
<th>Suggested value</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anex (1995)</td>
<td>Entire wage</td>
<td>Time is a scarce resource.</td>
</tr>
<tr>
<td>Bellù and Cistulli (1997)</td>
<td>Zero</td>
<td>People who are travelling are not giving up benefits to use the time for travelling.</td>
</tr>
<tr>
<td>Ward and Beal (2000)</td>
<td>1/3 to 3/5 of the wage rate</td>
<td>Time is a scarce resource which has a value. Travel to and from site may produce its own benefit that complements the trip destination, particularly when travel occurs through scenic or other desirable areas. Individuals can have some non-remunerated activities outside the working hours which are traded for attendance of the site in question, when the trade-off in monetary terms between work and leisure does not happen.</td>
</tr>
<tr>
<td>Day (2000)</td>
<td>150% of households wage rate</td>
<td>Opportunity cost of travel time is considerably lower than the wage rate-individuals enjoy traveling more than working. Most of the people cannot choose their working hours because of the fixed working time.</td>
</tr>
<tr>
<td>Kolstad (2000)</td>
<td>20 to 50% of their gross wage rate</td>
<td>Some individuals opportunity cost of travel time is zero (e.g. retired persons, unemployed and people with fixed working time.)</td>
</tr>
<tr>
<td>Hanley et al. (2001)</td>
<td>33 and 43% of individuals wage rate</td>
<td>Some individuals opportunity cost of travel time is zero (e.g. retired persons, unemployed and people with fixed working time.)</td>
</tr>
<tr>
<td>Pearce et al. (2006)</td>
<td>1/3 to ½ of the wage rate</td>
<td>Most of individuals work fixed hours, they have leisure time and paid vacations. Opportunity cost for individuals living close to the site in question is very low or even zero.</td>
</tr>
<tr>
<td>Prayaga et al. (2006)</td>
<td>Zero</td>
<td>Time is scarce commodity, therefore opportunity cost of time must be included and that failure to do so will increase the price elasticity of demand, reducing the estimated benefits of visiting the recreation site.</td>
</tr>
<tr>
<td>Fleming and Cook (2008)</td>
<td>¼ to ½ of wage rate</td>
<td>Consumer surplus will be underestimated if the opportunity cost of the traveling time is not taken into account.</td>
</tr>
<tr>
<td>Iorgulescu et al. (2011)</td>
<td>Fraction of wage, which has to be chosen arbitrarily</td>
<td>Some individuals value travelling as a valuable experience and some as a cost.</td>
</tr>
<tr>
<td>Armbrecht (2012)</td>
<td>1/3 of the hourly wage</td>
<td>Consumer surplus will be underestimated if the opportunity cost of the traveling time is not taken into account.</td>
</tr>
<tr>
<td>Tietenberg and Lewis (2012)</td>
<td>Wage rate</td>
<td></td>
</tr>
<tr>
<td>Fezzi et al. (2012)</td>
<td>80% of the wage rate</td>
<td></td>
</tr>
</tbody>
</table>
If travel time is considered as a relevant cost, then it is possible for us to communicate its value by using monetary values of travel time suggested by Trafikverket (2012) for transport planning in Sweden. Trafikverket separates the values of the travel time by two criteria: duration of the travel and the travel mode.

**On-site time valuation**

Day (2000) refers that on-site time is valued at 34% of the wage rate. As discussed by Ward and Beal (2000) some previous studies are in favour of relating on-site time to some proportion of the wage or even higher than the wage rate, in the cases where recreation can be traded for a work. Nevertheless the time which individuals spend on-site can provide visitors with benefits which are at least equal to the time costs, probably exceed it by a significant amount because visitors are willing to incur additional costs to travel.

Prayaga et al. (2006) remark that time spent on-site is exogenously determined and marginal utility derived from it would be equal to that derived from alternative activities. So time spent on-site has no impact on CS.

**Multipurpose trips**

ZTC approach generally restricts dealing with multipurpose trips, because it is assumed that all individuals from the same zone bear similar costs. Fleming and Cook (2008) refer that one of the major assumptions of the travel cost methodology is that only one site is visited per trip. If there is more than one site visited in the trip, they suggest excluding those individuals out of the observations. Additionally, they suggest excluding overseas visitors out of the survey.

When the trip is multi-purpose, it is particularly difficult to estimate the travel costs for each destination. Iorgulescu et al. (2011) mention several solutions: divide the cost of the trip to the number of visited sites, distribute the cost of the trip according to the time spent by the tourist at each site or use the travel cost from the previous visited site. However, none of these solutions seems to be standard practice.

**Division into zones**

Afandi et al. (2013) remark that separation into zones used by Clawson and Knetsch (1966) were a circular zoning system. In contrast later studies have used other types of zoning for
example geographical units, population census, local administrative agencies etc., to obtain more precise distance calculations.

**Substitute sites**

ZTC approach does not allow to use substitute sites as one of the regressors, due to assumption that all individuals from one zone bears similar costs.

**Duration of visit**

It is plausible to expect that the people travelling greater distances are intended to stay longer period of time than those living near the site in question, because of the high costs of getting there (Ward and Beal, 2000).
4. Travel cost method applied to Peace & Love festival

The basic methodology applied here is to use the information on the visitors’ origins from a survey (Heldt, 2012) of the festival attendants in 2012 and estimate how many visitors from different zones visited the festival. The number of visitors of the sample is shown in Table A4 in the Appendix. The zones were defined to be the 21 counties in Sweden. Using counties as zones gives the following advantages. Firstly, this allows using statistical values of population and income from each county. Secondly, this gives a reasonable number of zones. Thirdly, there are no zones with zero visitation rates. Therefore the number of zones is as suggested by previous studies (this is discussed in the section 3.2.1).

There are two explanatory variables normally used when ZTCM methodology is applied- travel cost and income. In this study two additional variables are included as control variables. This is explained more detailed below.

In this thesis there are no time costs included in the overall travel cost. Following Prayaga et al. (2006) travel time and on-site time are not considered as relevant variables in this study. Duration of the visit is considered as irrelevant - the absolute majority of the attendants to the P&L festival in Borlänge stay for the whole event. Moreover, on-site time is assumed to have zero value. Following Prayaga et al. (2006) it is assumed that the trips are only single purpose. As discussed in the section 3.2.2, ZTCM approach does not allow to use substitute sites as one of the regressors. Furthermore, in a given period of time and location there are no substitute sites for a unique event such as Peace & Love festival in Borlänge.

Visiting rate from each zone, i.e. county, is defined to be the estimated number of visitors from each county divided by the population of that county. Average travel costs from each county to Borlänge are then calculated. The average zonal travel costs are presented Table A4 in the Appendix .The trip generating function is a regression of the visiting rate per county on the travel cost and average after tax income for each county.
4.1 Data

The data from the survey conducted by Heldt (2012) originally contained 1005 observations. After dropping those observations where respondents stated the aim of the visit other than recreational (individuals working in the festival and volunteers), the sample size was reduced to 993 observations.

Based on the post code indicated by the visitors in the survey, municipality of origin for each visitor was determined using Postnummerservice Norden AB post code data base. In the model, each county is assumed as one zone. According to Postnummerservice Norden AB, in one zip code there are usually between 500 and 1000 households. It is worth mentioning that postal codes can cross county and municipal boundaries. During the analysis the cases where the same post code was found to be related to two municipalities were rare. As a solution, it was assumed that the postcode belongs to one of the two municipalities. Subsequently it had low impact on further calculations of the average values of the travel distance and train costs.

The total number of the entrance tickets sold were 48621, the majority of them (39673) were Festivalpass. It was assumed that 48621 individuals attended the festival. This value was used for calculation of the dependent variable which is the visitation rate from each zone, i.e. county, to the festival.

The visitation rate from each zone is calculated as follows: the total number of visitors in the sample from a particular zone \((V_i)\) were divided by the total number of visitors in the sample \((V_s)\) (individuals who attended the festival and were surveyed). This gives the proportion of festival visitors from each zone. This proportion was then multiplied by total number of visitors to the festival and further divided by the population (from Statistika centralbyråns (SCB)) of the zone \(i\). This is summarized below:

\[
\text{Visit rate}_i = \frac{V_i / V_s \times V}{N_i}
\]

The calculations of the travel cost include two components- the travel cost itself plus the entrance ticket price. The travel costs are based on the travel distance from each zone to Borlänge plus the entrance ticket price. The entrance ticket prices were the following: the standard ticket (5 day pass) 1760 SEK, festival + regular camping 1960 SEK, festival + quiet
camping deluxe 1960 SEK, festival + deluxe camping 2160 SEK. There were available also one-day and two-day tickets. As shown in Table 4, the majority of visitors choose to obtain the 5 day pass (Festivalpass).

Table 4. Number of tickets sold. Source: Heldt (2012)

<table>
<thead>
<tr>
<th>Type of ticket</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Festivalpass</td>
<td>39 673</td>
</tr>
<tr>
<td>1-day Tuesday</td>
<td>161</td>
</tr>
<tr>
<td>1-day Wednesday</td>
<td>2 538</td>
</tr>
<tr>
<td>1-day Thursday</td>
<td>773</td>
</tr>
<tr>
<td>1-day Friday</td>
<td>786</td>
</tr>
<tr>
<td>1-day Saturday</td>
<td>2 885</td>
</tr>
<tr>
<td>2-day Friday+Saturday</td>
<td>1 805</td>
</tr>
<tr>
<td>Total</td>
<td>48 621</td>
</tr>
</tbody>
</table>

The survey data indicated that most of the visitors were young individuals in age of 16-25 years old (See Figure A1 in the Appendix C1). Therefore the proportion of the age group of “7-17” and “18-24” years old from each zone (in this case- county) is included as an independent variable. The separation into age groups above is because of the available statistics from SCB data base. Further both age groups were merged into one, creating the age group of persons “7-24” years of age. This variable was included as a control variable. It was assumed that the higher proportion of young individuals is in a county, more visitors will attend the festival from the particular county.

To test if employment among young persons has any impact, another independent variable “youth employment” is also included. Employment data of 16-17 years old were obtained from the SCB data base. The assumption behind this was that individuals from the zones where more 16-17 years old people are employed more likely would attend the P&L festival. Running the regression by OLS both explanatory variables “population of 7-24 year old persons in the zone” and “16-17 years old employed” turned out to be insignificant. One of the explanations is that even there are differences between the counties in the age structure and youth employment level (and subsequently income), they are not that large and does not affect the decision to attend the festival. Consequently, these independent variables were excluded and are not discussed further.
For calculations of the travel costs the monetary values are chosen according to Swedish Tax Authority (Skatteverket) “for journeys to and from work using your own car, you may make deductions of SEK 18.50 per 10 km.” If the employers provided car has been used, expenses are calculated at SEK 6.50 per 10 km for diesel and SEK 9.50 per 10 km for other fuels (e.g., petrol or ethanol).

A reasonable assumption is that people travelling to the P&L festival do it outside the working hours. Hence they use their own vehicles to travel. If so, they bear the costs not only for petrol, but also wear and tear. Consequently the transportation costs by car per km are calculated as follows: 18.5/10 = 1.85 SEK/km

Because different people have different preferences and restrictions they can choose to travel by car or by other transport means. According to Heldt (2012) almost 60 % of visitors travelled by car and 23% travelled by train. The rest made a choice between the following means of transport: “organized bus”, “public transport”, “plane” (~1%) and “other” (~1%) (See Figure A2 in the Appendix C2). For simplicity, we assume that 60% of the visitors chose to travel by car and the rest were travelling by train. This assumption is done because “train” and “public transport” costs can be comparable, the prices for those using “plane”, “organized bus” and “other” are difficult to estimate. The survey used in this study does not include information regarding how many persons travelled per one car. Therefore the assumption is that each visitor of the festival, if travelled by car, was travelling alone.

When calculating the average travel cost we used the assumptions discussed above. This gives the following weight: 0.6 TC_{car} + 0.4 TC_{train}. Further we have the following travel cost from each zone: [18.5/10) * distance (km)]* 0.6 + (TC_{train})* 0.4. The travel costs are calculated the following: TC= p + [18.5/10) * distance (km)]* 0.6 + (TC_{train})* 0.4. Here p is the price of the ticket and distance is multiplied by costs per kilometre.³

Besides the travel cost, average zonal income was also used as an explanatory variable to explain the variation in the visiting rate. The income variable is defined by SCB as “Taxable income in SEK per wage earner. This measure can be described as a form of average income. Taxable income for individuals is used as a tax base for local government

³ The road distance travelled from all municipalities to Borlänge and also the train ticket costs from all municipalities of Sweden to Borlänge used in this study were kindly provided by Patrik Arousell.
income tax and national income tax on earned income above a certain income level. Taxable income consists of total income from employment and business reduced by general deductions, basic deductions and tax reductions for general pension fees.”

4.2 Estimating zonal visiting rates

To obtain the trip generation function (TGF) the visit rate (V/N) is regressed against the travel cost and income by OLS. There are four possible functional forms: linear, log-linear (dependent variable in log but not the independent variables), linear-log (dependent variable not in log but the independent variables are in log) and log-log form (both dependent and independent variables are in log). To choose the appropriate model firstly all the four forms have to be regressed by OLS and afterwards the results are compared. The number of observations used in these regressions is 21 as the number of zones is 21.

Table 5. OLS estimated coefficients using different functional forms

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Test statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant**</td>
<td>TC**</td>
</tr>
<tr>
<td>Linear</td>
<td>0.0561277</td>
<td>-9.82*10⁻⁶</td>
</tr>
<tr>
<td></td>
<td>(2.09)</td>
<td>(-3.05)</td>
</tr>
<tr>
<td>Log-linear</td>
<td>-2.277172</td>
<td>-0.0011678</td>
</tr>
<tr>
<td></td>
<td>(-0.86)</td>
<td>(-3.68)</td>
</tr>
<tr>
<td>Linear-log</td>
<td>0.5606367</td>
<td>-0.0312232</td>
</tr>
<tr>
<td></td>
<td>(1.83)</td>
<td>(-3.69)</td>
</tr>
<tr>
<td>Log-log</td>
<td>22.30975</td>
<td>-3.507055</td>
</tr>
<tr>
<td></td>
<td>(0.72)</td>
<td>(-4.10)</td>
</tr>
</tbody>
</table>

* These are calculated as generalized R² (squared correlation between predicted value for dependent variable and the actual value) so that they can be compared for the specifications when the dependent variable is in log form).
** T-value in the parenthesis.
*** P-value in the parenthesis.

As we can see in Table 5, the variable “income” is not significant in any of the models. This may depend on the fact that in Sweden the disparity of average income between the regions is not that high and hence there is not enough variation in this variable. For example,
Björklund and Jäntti (2011) mention that all Nordic countries are successful in income distributional sense.

Based to the results of the regressions run we have to choose the functional form of the model. Because of the differences between log and linear models, the $R^2$ is not a comparable indicator of fit between all four functional forms. Therefore generalized $R^2$ is calculated. The results suggest that the log-linear model has the highest $R^2$ and therefore is chosen as the preferred model. Standard regression diagnostics such as multicollinearity, functional form misspecification and heteroskedasticity are conducted for this model and presented in the Appendix A1; A2; B. Multicollinearity is not an issue, homoskedasticity cannot be rejected and the log-linear functional form is acceptable based on the Ramsey RESET test.

The log-linear model provides the following TGF for estimating the demand curve (t-values shown below the coefficient estimates):

$$\ln \text{Visitation rate} = -2.277 - 0.001 \text{TC} - 2.77 \times 10^{-8} \text{Income}$$

$$(-0.86) \quad (-3.68) \quad (0.00)$$

The coefficient of the travel cost variable has the expected negative sign and is significant while the coefficient of the variable income is not significantly different from zero. As mentioned before, this may be due to the fact that there is not enough variation in the average county level income.

4.3 Estimating consumer surplus

In section 3.2 a way to calculate consumer surplus was presented. The demand function can be written as: $Q = \sum_{i=1}^{m} N_i f(TC_i, P)$ where $m$ = number of zones, $N_i$ = population of zone $i$, $TC_i$=Travel cost from zone $i$ to the event, $P$ = the entry fee and $f(TC_i + P) = \text{is the trip generating function}$. The following integral can then be used to calculate the consumer surplus: $CS = \int_0^\infty \sum_{i=1}^{m} N_i f(TC_i + P) \, dP$. Since the log-linear estimated model in the previous section was the preferred model we use that as the trip generating function and evaluate the integral. The consumer surplus point estimate is then SEK 35572583.
If we divide this number by the total number of festival visitors, 48621, we get SEK 732 per visitor in consumer surplus.

We can also calculate an asymptotic standard error for the consumer surplus based on the so called delta method\(^4\). A 95 \% confidence interval for the estimated consumer surplus is [17937144, 53208022]. This relatively wide confidence interval shows that there is a high degree of uncertainty associated with our consumer surplus estimate.

---

\(^4\) The delta method approximates the expected value of the function by the expected value of the approximation to the function. For more details, see Oehlert (1992).
5. Discussion and conclusions

This thesis attempts to estimate consumer surplus of a festival, namely the Peace & Love festival held in Borlänge in the summer of 2012 by using travel cost method. While this method has been used very often to evaluate recreational sites, its use in economic valuation of events such as festivals is rare.

The point estimate of the total consumer surplus is 35572583 SEK. There is, however, a high amount of uncertainty of the true value of the consumer surplus due to a large standard error for this point estimate.

The estimated CS is calculated of 732 SEK per visitor. In comparison, for a similar event - WOW Festival in Göteborg - Andersson et al. (2012) estimates (by CVM) average total use value of EUR 282 (2673 SEK) per visitor\(^5\).

However, given that the analysis presented here measures only the use value to those visiting the festival, but is not able to measure any non-use values, the total economic value of Peace & Love Festival is likely to be a higher figure than those reported here. Moreover, the CS estimates has to be considered as conservative, since as the relevant costs were included only travel costs and entrance ticket fees.

The estimates found in this paper confirm that there is a substantial economic value of the festival. Given relatively high entrance ticket costs and location of the town of Borlänge, which is rather distant from areas with high population, the event is highly attended. In line with other previous studies (for example, see Shaw and Rogers, 2005), this study confirms that high attendance level is an indicator of creation of substantial value.

It should be underlined that the results obtained are based on simplifying assumptions and aggregation due to data limitation. Firstly, the average costs per km. The costs of vehicle itself and fuel costs can differ significantly from case to case. Secondly, in the survey there are two zones with only one visitor per zone. This is related to the next point. Namely, all visitors with unknown origin and international visitors (two persons indicated that they are

\(^5\) SEK-EUR exchange rate in August 2010 when the survey took a place was around 0,1055 SEK/EUR.
from Norway and one from Åland Islands) were treated as they are locals (no travel costs). So the estimates of CS should be treated with caution.

Finally, applying TCM in this paper suggests that travel costs are important when considering the decision to attend a festival. However, similar problems were encountered as discussed in the literature. The most challenging was the treatment of visitors with unknown travel origin. Improving the information regarding the visitors’ origins and travel mode would produce more accurate results.
References


34


Appendix

Testing for the presence of multicollinearity
Multicollinearity occurs when at least two of the independent explanatory variables are highly linearly correlated. In the above model only two explanatory variables are included. Nevertheless VIF (Variance Inflation Factor) is applied to test for multicollinearity. As a rule of thumb, a variable whose VIF values are greater than 10 may merit further investigation. The Variance Inflation test results in table A1 show that the model does not suffer from multicollinearity.

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>atc2</td>
<td>1.04</td>
<td>0.958992</td>
</tr>
<tr>
<td>income</td>
<td>1.04</td>
<td>0.958992</td>
</tr>
<tr>
<td>Mean VIF</td>
<td>1.04</td>
<td></td>
</tr>
</tbody>
</table>

Testing for functional form and omitted variables
A way of checking functional form misspecification or detecting omitted variables is to perform the Ramsey Regression Equation Specification Error Test (RESET). As shown in Table A2 p > 0.05, so the test indicates that we cannot reject the H₀ that the model is acceptable.

<table>
<thead>
<tr>
<th>Ho: model has no omitted variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>F(3, 15) = 2.16</td>
</tr>
<tr>
<td>Prob &gt; F = 0.1354</td>
</tr>
</tbody>
</table>

Homoskedasticity versus Heteroskedasticity
A formal way to check for presence of heteroskedasticity is to use the Breusch-Pagan test. It tests the null hypothesis that the variance of the residuals is constant. If the p-value is small relative to a predetermined significance level we would have to reject the null hypothesis that the error variance is constant. In this case p > 0.05 (See Table A3) hence, we cannot reject the H₀ that the variance is constant.
**Table A3.** B-P test for heteroskedasticity.

<table>
<thead>
<tr>
<th>Ho: Constant variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables: fitted values of lnvisitation rate</td>
</tr>
<tr>
<td>chi2(1) = 1.24</td>
</tr>
<tr>
<td>Prob &gt; chi2 = 0.2649</td>
</tr>
</tbody>
</table>

**Information on age structure and travel mode of the survey respondents**

As shown in Figure A1, the majority of the P&L festival attendants are below 30.

![Visitors age structure](image1)

**Figure A1.** Visitors age structure.

As shown in Figure A2, the majority of the P&L festival attendants travel by car or train.

![Visitors travel modes](image2)

**Figure A2.** Visitors chosen travel modes.
**Information of the number of the visitors in the survey and TC by zone**

*Table A4.* Number of visitors and average TC by zone in the survey

<table>
<thead>
<tr>
<th>Zone</th>
<th>Visits from the zone</th>
<th>Average TC* for visitor from zone, SEK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Stockholm</td>
<td>202</td>
<td>2410.687</td>
</tr>
<tr>
<td>2.Uppsala</td>
<td>66</td>
<td>2306.726</td>
</tr>
<tr>
<td>3.Södermanland</td>
<td>30</td>
<td>2407.104</td>
</tr>
<tr>
<td>4.Östergötland</td>
<td>41</td>
<td>2664.845</td>
</tr>
<tr>
<td>5.Jönköping</td>
<td>21</td>
<td>2952.413</td>
</tr>
<tr>
<td>6. Kronoberg</td>
<td>19</td>
<td>3151.096</td>
</tr>
<tr>
<td>7.Kalmar</td>
<td>13</td>
<td>3203.069</td>
</tr>
<tr>
<td>8.Gotland</td>
<td>5</td>
<td>3236.64</td>
</tr>
<tr>
<td>9.Blekinge</td>
<td>1</td>
<td>3608.2</td>
</tr>
<tr>
<td>10.Skåne</td>
<td>41</td>
<td>3647.509</td>
</tr>
<tr>
<td>11.Halland</td>
<td>9</td>
<td>3419.124</td>
</tr>
<tr>
<td>12.Västra</td>
<td>96</td>
<td>2964.534</td>
</tr>
<tr>
<td>Götaland</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.Värmland</td>
<td>24</td>
<td>2670.243</td>
</tr>
<tr>
<td>14.Örebro</td>
<td>29</td>
<td>2332.076</td>
</tr>
<tr>
<td>15.Västmanland</td>
<td>36</td>
<td>2163.252</td>
</tr>
<tr>
<td>16. Dalarna</td>
<td>268</td>
<td>1809.400</td>
</tr>
<tr>
<td>17.Gävleborg</td>
<td>45</td>
<td>2231.622</td>
</tr>
<tr>
<td>18.Västernorrland</td>
<td>13</td>
<td>2895.541</td>
</tr>
<tr>
<td>19.Jämtland</td>
<td>1</td>
<td>2945.18</td>
</tr>
<tr>
<td>20.Västerbotten</td>
<td>19</td>
<td>3555.906</td>
</tr>
<tr>
<td>21.Norrbotten</td>
<td>14</td>
<td>4144.47</td>
</tr>
</tbody>
</table>

* TC is calculated as entrance ticket price plus travel costs