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Essays on the Demand for Cultural Performances

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Julkaisun nimike
Esseitä kulttuuritapahtumien kysynnästä

Tiivistelmä
Esseissä tutkitaan eri kulttuuri- ja urheilutapahtumien kysyntää selittäviä tekijöitä ja niiden välisiä suhteita. Perinteisen kysyntäteorian mukaisesti selvitetään eri tapahtumien osalta, ovatko ne toisiaan korvaavia vai täydentäviä, jotta voidaan tehdä arvioita yhteiskunnan tarjoaman taloudellisen tuen kohtaannosta ja mahdollisesta syrjivästä vaikutuksesta. Tutkimuksessa tarkastellaan eri tapahtumien luonnetta kokemushyödykkeinä ja etsintähyödykkeinä. Keskeistä on sukupuolen ja koulutuksen merkitys kysynnän määräytymisessä ja ne voidaan erottaa kotitalouden tai henkilön tuloista.

Ensimmäisessä esseessä tarkastellaan elokuvissa käyntiä vuoden 2003 paneeliaineistolla. Kriitikoiden julkaistuilla arvoilla, kuten myös katsojien omaehtoisella mielipiteiden jakamisella, on vaikutus elokuvien kysyntään. Toisessa esseessä kohteena on jääkiekon miesten ylimmän sarjatason otteluiden katsojamäärä runkosarjassa kaudella 2007–2008. Joukkueiden menestystä mittaavat muuttujat kuten myös katsojien tulotaso ja otteluiden pääsylipun hinta vaikuttavat katsojamääriin. Lisäksi tarkastellaan sääolosuhteiden vaikutusta jääkiekon kysyntään.

Kolmannessa ja neljännessä esseessä tarkastellaan korkeakulttuurin (taidenäyttely, teatteri, ooppera), urheilutapahtumien sekä elokuvien katsojaprofiilia moniulotteisen logit-analyysin ja rinnakkaisprobit-analyysin avulla. Analyysit paljastavat huomattavia eroja korkeakulttuurin ja urheilutapahtumien katsojaprofiileissa. Huollettavien lasten lukumäärä, siviilisääty, asuinpaikka ja joissakin tapauksissa myös puolison koulutus vaikuttavat kulttuuritapahtumien kysyntään. Sukupuolen ja henkilön oman koulutuksen vaikutukset ovat huomattavat ja tällä on merkittävä vaikutus yhteiskunnan antaman taloudellisen tuen jakautumiseen.

Asiasanat
Kulttuuritapahtumat, elokuvat, jääkiekko, korkeakulttuuri, urheilutapahtumat, paneeliaineisto, moniulotteinen logit, rinnakkaisprobit

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Abstract
Factors to explain the demand for different cultural and sporting events and relations between them are studied in the essays. According to a traditional demand theory it is studied whether the goods are substitutes or complements which is important for the incidence of public subsidies. The character of different events as experience and search commodities has been examined. The significance of gender and education in the determination of the demand is important and the role of these can be separated from the household's or the person's income.

The first essay studies the demand for motion picture arts with a panel data of the year 2003. The published critics' review and the spontaneous opinions of the specatators have an effect on the demand for movies. The second essay the focus is male ice hockey matches of the highest series level in the regular season 2007–2008. Variables that measure the success of the teams, the incomes of the spectators and the price of the entrance ticket have an impact on the spectator number. Furthermore, the effect of weather conditions on the demand for the ice hockey is examined.

In the third and fourth essay the spectator profile of the highbrow art (an art exhibition, theatre, opera), sporting events and firms are examined using a multivariate logit and a bivariate probit analysis. There is a substantial difference in the spectator profile of the highbrow arts and sporting events. The number of children, marital status, the place of residence and the education of the spouse have an impact on the demand for the cultural events. The effects of gender and persons education are the most important factors explaining the demand and this has a significant effect on the incidence of the economic support given by the society.

Keywords
Cultural performances, motion picture arts, ice hockey, highbrow art, sporting events, panel data, multinomial logit, bivariate probit

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The work is dedicated to my deceased father.

Vantaa 10th September 2013

Seppo Suominen

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1 INTRODUCTION

1.1 The frame of the essays

A large amount of economic and sociological research has been undertaken to classify different cultural consumption patterns (e.g. Seaman 2006; Virtanen 2007 or Alderson, Junisbai and Heacock 2007). The economics of cultural consumption has traditionally focused on explaining attendance figures and studying the socio-economic characteristics of the audience. Audience and participation surveys often indicate that performing arts audiences consist of relatively wealthy citizens, whereas the audiences of sporting events and cinemas are different. However, cultural consumption is not just about attending art exhibitions, opera or theatrical performances. Some consumers prefer sporting events and films. Sporting events, particularly football and ice hockey matches, are favoured by middle-class males, whereas the cinema is favoured by young students, as shown in studies by Austin (1986), Chen and Goldthorpe (2005) and Kotimaisen elokuvan yleisöt (2010). Cultural consumption is connected to the leisure activities of consumers. This study analyses the price sensitivity of cultural consumption and the economic impact of time constraints related to (i) the place of residence and (ii) the amount of leisure time. In Finland, art institutions, opera houses and theatres are located in larger cities, although some theatre groups tour the countryside. A consumer's place of residence is still a very important factor in explaining cultural participation decisions.

The following two approaches are used to assess cultural capital: a value- or performance-based assessment and an expenditure-based assessment. Thorsby (2001: 46) defines cultural capital as either tangible, i.e., in the form of buildings, locations, sites and artwork such as paintings and artefacts, or intangible, i.e., in the form of immaterial or intellectual capital and art such as music and literature. This approach shows the value of performance-based assessment[1]. The cultural capital stock, which is valued in both economic and cultural terms as an asset, enables a flow of capital services to enter final consumption directly or to be combined with other inputs to produce additional goods and services. Tangible cultural capital, such as a historic buildings or paintings, may have economic value if consumers are willing to pay to see the building itself or the painting. Intangible capital, such as a piano composition or a drama play, must be combined with players, a stage

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[1] In organisations, the performance-based culture refers to profit-seeking (or performance) behaviour.

and an auditorium to produce an event that has economic value[2]. In Finland, tangible cultural capital has a very skewed distribution, with 37% of the cultural labour force and 33% of theatres subsidised by law and concentrated in the greater Helsinki area. In addition to welfare implications, this scenario also affects the location of economic activity. Firm owners, for example, may be more willing to be located in a region with cultural activities, particularly if personal ties are scarce.

The second method of measuring cultural capital is through expenditure-based assessment. Cultural consumption can be accumulated into cultural capital, which also may include advertising, that differs in value depending on the type of consumption. Stigler and Becker (1977) introduced the concept of cultural capital developed by the aggregation of the past consumption of cultural goods. The Stigler-Becker (S-B) definition of culture capital is thus different than the value definition above (Thorsby 2001) that focuses on artefacts and works of art. S-B applies expenditure-based evaluation, with depreciation allowed to vary by performance. The accumulation function in S-B can be considered similar to that of human capital, i.e., the accumulation of investments in formal education or experience-based measures of intangible capital such as the accumulation of investments in R&D. Human capital arises from the realisation that the embodiment of skills and experience in people represents a capital stock that is important in producing output in the economy. A portion of culture consumed can be considered as an investment in future cultural capital (S-B). In other words, not all cultural spending is consumed within a year; a portion can be consumed and accumulated over a longer period. The cultural capital accumulation approach (Stigler and Becker 1977) is also referred to as the rational addiction approach because the exposure to cultural goods increases the consumer's future capacity to appreciate cultural goods. The complementing learning by consuming approach (Lévi-Garboua and Montmarguette 1996) assumes that consumers are uncertain regarding their tastes and they discern their subjective preferences through a process of experiences. Consumers who engage in positive experiences are more likely to increase future consumption, whereas consumers who encounter negative experiences will consume less.

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[2] UNESCO classifies culture into eight categories as follows: 1) cultural heritage, 2) printed matter and literature, 3) music and the performing arts, 4) visual arts, 5) audiovisual media (cinema, photography and video, radio and TV), 6) socio-cultural activities, 7) sports and games and 8) environment and nature. All cultural goods and services have the following three distinguishing attributes: i) some input of human creativity in the production is needed, ii) they are vehicles for symbolic messages to consumers and iii) they contain some intellectual property (Thorsby 2010, 16).

Several studies have identified a substantial seasonal variation in leisure time use. Winter leisure is more sports-oriented, whereas summer leisure is more socially oriented (Niemi and Pääkkönen 1992). Men's ice hockey is the most popular sport in terms of total attendance. The regular season in the highest league in Finland begins in September and ends in March. After that, playoff matches occur in March and April. The movie attendance statistics depicted in the first essay show that summer is the weakest time with regard to attendance. Although the majority of citizens go on holiday during the summer, they do not appear to attend many cultural or sporting events even when there is plenty of leisure time. Sensitivity to weather may indicate that these activities are sensitive to prices. Attendance at live performances is a rather time-intensive activity if the time for round-trip travel is added to the performance time. During the summer, time does not limit attendance but attendance is still lower, indicating that live cultural performances and other leisure activities might be substitutes. The last two essays show that family size plays an important role in explaining cultural consumption. During the summer, the tangible cultural capital capacity utilisation rate is low, particularly because families spend their leisure time together. If cultural consumption is price sensitive, the owners of cultural capital could increase their revenue by lowering the entrance ticket price.

An often-used classification is based on the educational level of the audience. Several studies have verified the important role of education in explaining cultural consumption (Seaman 2006, 441). However, high levels of education and high incomes are often related and the distinction between their effects has usually been neglected. This study shows that the income effect and the education effect can be separated and that cultural consumption (attendance), regardless of the event, has a positive income elasticity. In addition, the socio-economic status of the consumer clearly has an effect on leisure activities. The unemployed have more leisure but less income. Ruuskanen (2004) has shown that both the net wage and the yearly income of the spouse have a negative effect on the joint time spent together, the number of children reduces the joint leisure time of spouses, and university education increases the time spent together in leisure. Both the age and the health situation of consumers have an impact on the leisure time and the activity level of the leisure pursuit (Piekkola and Ruuskanen 2006). Unemployed and employed older men are more active in leisure if they consider themselves to be healthy, whereas the relation is not as obvious for younger men. Older women are more active during their leisure than younger women. Taking care of small children is no longer restrictive to leisure. Teenage girls are more active in cultural activities with the exception of movies (Pääkkönen 2010: 234), although the overall amount of leisure is lower for girls than for boys.

Because limited leisure time is restrictive, cultural events are substitutes to some extent. However, are art exhibitions, operas or theatrical performances substitutes or complements? In the entrance halls of opera festivals, complementary goods such as records are sold. If the cultural events are complements, these recordings can be sold in the entrance halls of art exhibitions or sports centres. In the case of high substitutability, the pricing power is low for organisers of the event. As explained by Baumol's cost disease (Baumol and Bowen 1966), the cost efficiency of the organiser is weak. The labour productivity in the live arts remains static over time, i.e., Beethoven's string quartet still requires four players to perform today, as it did in Beethoven's time (Thorsby 2010: 69). The organiser of the event has a limited possibility of increasing the entrance price if the substitution possibilities are large, although the cost disease would force an increase in prices.

Cultural behaviour is thus determined by the consumer's budget, time, social life, physical constraints and formal education (Frey 2000). A central feature is also the variety of cultural consumption and its accumulation. People with higher education levels have on average fever leisure activities than those with lower education levels. At the same time, highly educated people have a larger variety of leisure activities and therefore more variety in cultural consumption (Ruuskanen 2004, 136). Budget constraints can limit participation so that consumers can only choose one cultural event; therefore, different events are substitutes. Conversely, some culturally oriented consumers can accumulate positive experiences that induce further consumption. In this case, cultural events are complements. Complementarity is also likely to vary depending on consumers' socio-economic class. Ruuskanen (2004) has shown that skilled workers are more engaged in several types of activities, whereas the time use of people with a low level of education is more monotone. The sociological aspects of cultural participation demonstrate that consumers can be classified into the following three groups: omnivore, paucivore and inactive (Alderson, Junisbai and Heacock 2007). Omnivores are active in all types of cultural consumption, from cinema to classical music. Paucivores participate in all types of cultural activities but less frequently than the omnivores. To the omnivores, cultural events are complements or substitutes but not independent activities.

Regardless of whether cultural events are complements or substitutes, the quality of the event is important from the viewpoint of enjoyment. Advertising provides direct information about the characteristics of products. In addition, products' main attributes can be determined by visual or tactile inspection (e.g., clothes) or by a test drive or trial (e.g. cars). Advertising may convey hard facts, vague claims or favourable impressions of a product. The informational content of advertising depends on whether consumers can determine the quality of that product

before making a purchase. If the consumer can place value on a product's quality by inspecting it before buying, the product has search qualities or the product is considered a search good. According to an economic study by Nelson (1974), a search good is a product or service with features and characteristics that are easily evaluated before purchase. If the truthfulness of advertising can be readily determined by consumers through an inspection of the goods and if the firms offering brand-name products must be careful not to contaminate the reputation, the advertising conveys accurate information (Vining and Weiner 1988: 287).

However, if the consumer must consume the product to determine its quality, the product has experience qualities or the product is considered an experience good (Nelson 1970). Experience goods must be consumed before their quality can be determined (e.g., processed foods, software programs, and gymnastic exercises). The quality of an experience good is difficult to observe in advance. When a consumer tries an experience good for the first time, she is taking a chance because the product might turn out to be of poor quality. The quality of some goods is difficult to observe even after consumption because the effects become apparent after a delay. These goods, which include medicine and vitamin supplements, are known as credence goods.

Nelson (1974) argues that the producers of high-quality experience goods can spend more money on advertising than the producers of low-quality goods because first-time consumers are more likely to be satisfied with the high quality and will make repeat purchases. Consumers are not dependent on the information received through producers' advertising when they buy search goods because they receive that information by inspection or trial. Therefore, the effects of advertising vary between search goods and experience goods, with the latter type requiring more intensive advertising. Conversely, Schmalensee (1978) argues that low-quality brands are more frequently purchased and low-quality producers advertise more intensively. The recent rise of social media has substantially changed the media's use of advertising campaigns. Consumers place more trust on recommendations from other consumers, e.g. word-of-mouth recommendations or blogs than on paid advertising (Viljakainen, Bäck and Lindqvist 2008 and Karjaluoto 2010).

Experience goods have a lower price elasticity than search goods because the number of close substitutes that a consumer can compare or the number of these experiments limits the brand's elasticity of demand for those who have finished experimenting (Nelson 1970: 316). The monopoly power of firms or organisations offering experience goods is higher than that of firms offering search goods.

Producers (distributors, importers) can use means other than advertising to signal the quality of their products, including product labelling or branding, reputation, guarantees and expert ratings. For example, the latest James Bond movie has an advantage over other action movies because of the long history of James Bond movies. Consumers therefore associate this brand with a trustworthy quality. A famous theatre house attracts plenty of spectators regardless of the name of the director. It is sometimes difficult to distinguish whether a play shown in a highly reputable venue could be classified as an experience good or a search good because the esteem of the theatre house influences the play even if the play is not familiar to spectators. Luxurious decorations and ornate signs may be used by theatre houses to inform customers about quality. Noninformative advertising indicates that the theatre house paid large costs and used highly paid celebrity endorsements to imply that a product has high quality. Expert ratings published in newspapers reveal the quality of a play or a movie before the spectator actually sees it.

If a large proportion of sales are generated by customers such as tourists who do not repeat their purchases, the reputation of a shop matters less because few customers are familiar with the shop's reputation (Carlton & Perloff 1990: 530). Conversely, consumers who repeat their purchases are willing to repurchase cultural goods and other goods if their past experiences are positive; in these cases, producers' signals have less importance. This scenario is particularly notable in a series of sporting events, such as a league. The question remains, however, regarding the role of public information in spectator attendance. In sport, this information is linked to the winning percentage of the team. Does this information have an impact on attendance figures?

The consumers of motion picture art typically do not repeat their purchases, whereas sport spectators typically do; therefore, the information asymmetry is different between these cultural performances. With regard to a search good, information is not asymmetric because the consumer can inspect the good before the purchase. However, with regard to an experience good, the information asymmetry is more valid.

Different terminologies have been used to rank tastes, including highbrow, middlebrow and lowbrow, or high – popular and legitimate – vulgar. This division has been used frequently in the sociology of cultural consumption. Using Swedish data, Bihagen and Katz-Gerro (2000) show that women are more active in highbrow consumption (opera, dance or theatrical performances), whereas men are active in in lowbrow consumption such as watching television (entertainment, sport). Highbrow television (documentary, culture, news) and lowbrow culture

(films) are less connected to gender and formal education, although Warde and Gayo-Gal (2009) show that these divisions are strongly related to age. The omnivore group that considers various cultural goods as complements is associated with legitimate taste that is aesthetically the most valuable. Omnivorousness increases with age up to approximately 50 years old and strongly diminishes among those over 70 years old in Britain (Warde and Gayo-Gal 2009: 142).

In Finland, the economics of culture have been studied by relatively few researchers. A few surveys have been conducted on cinema spectators (Suomalaisen elokuvan markkinat ja kilpailukyky 1999, Kotimaisen elokuvan yleisöt – tutkimus 2010), theatre and opera audiences (Kivekäs 1991, Suomalaisten teatterissa käynti 2007, Mikkonen and Pasanen 2009) and sporting event audiences (e.g. Kansallinen liikuntatutkimus 2010), whereas numerous sociological studies have been conducted on cultural consumption (e.g., recently Virtanen 2007 or Purhonen, Gronow and Rahkonen 2010). Although the majority of surveys present descriptive statistics of the audience, there are virtually no studies that use more advanced econometric methods. Using frequency and contingency tables, the analysis of variance and logistic regression methods by Virtanen (2007) showed that education, age and socio-economic status have important explanatory power in highbrow cultural consumption in the entire European Union area. However, these variables can explain only 10 to 15 per cent of the variation in consumption choices. Purhonen, Gronow and Rahkonen (2010) used logistic and Poisson regression analysis to show that regardless of the way in which omnivorousness is operationalised, different socio-economic variables are better to explain literature taste than musical taste. The socio-economic variables are gender, age group, education and the place of residence, whereas income level is not significant. The latter result is not supported in the two last essays of this study because the income elasticity of highbrow performing arts, sport attendance and movies-at-the-cinema consumption is significantly positive.

We also analyse regional differences in cultural consumption. Cultural capital can also be measured on the supply side. According to Statistics Finland, the economy of culture (value added per capital in 2007) is highly concentrated (Figure 1).

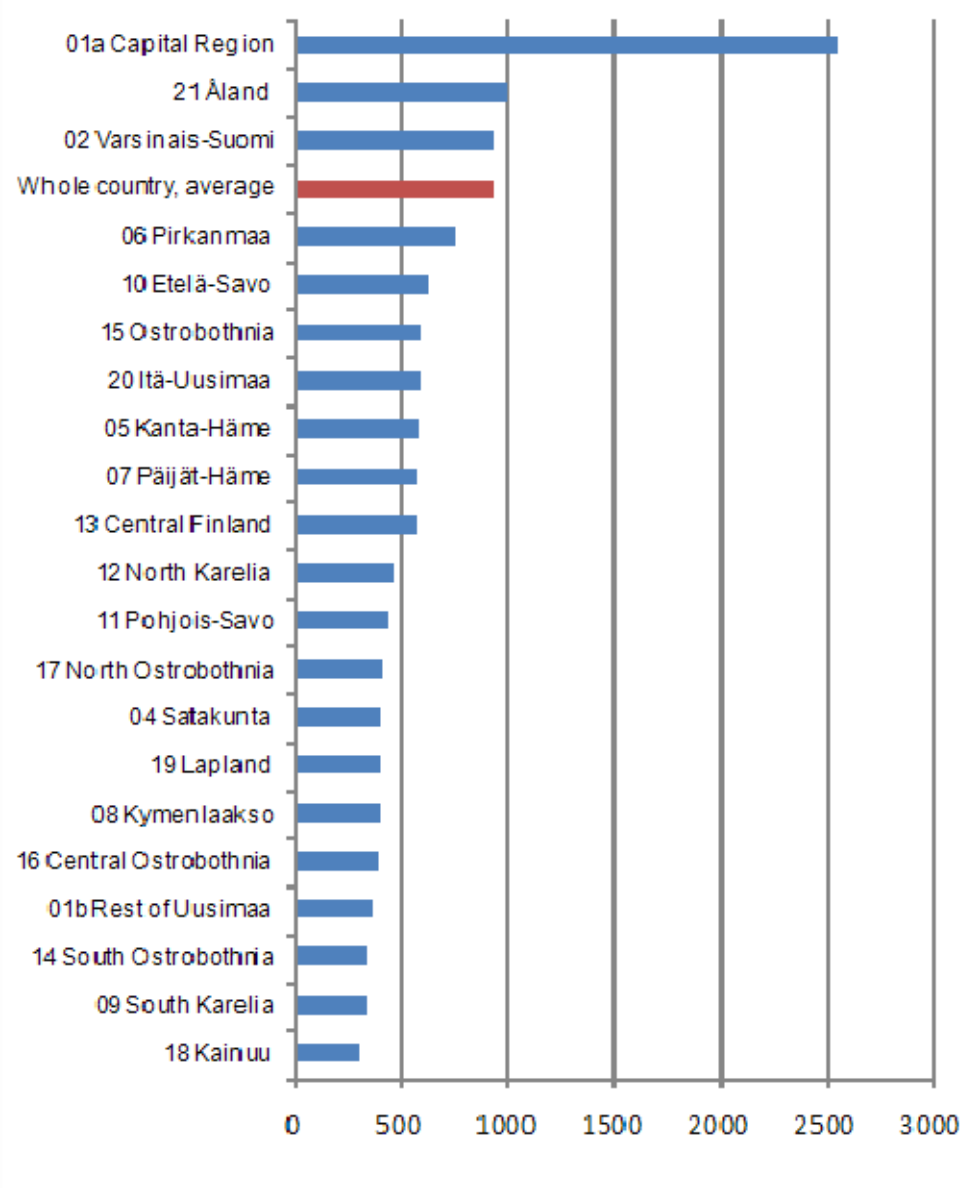

Figure 1. Value added of culture in 2007, EUR/capita in NUTS3 and capital regions in Finland (source: Statistics Finland).

The metropolitan area clearly has the highest value added of culture per capita and 52% of the culture labour is located there. Essay 2 shows that the size of the home and visitor town are significant in explaining ice hockey attendance in Finland. The last two essays show that regional differences exist, even when the incomes have been controlled, when explaining cultural participation choices.

1.2 The purpose of the essays

The purpose of this study is to use econometric methods to explain cultural consumption choices in Finland and to interpret the results in economic terms. If cultural goods are experience goods but public information is not revealed by distributors or producers (such as advertising), distributors can alter their distribution choices depending on the nature of this information. If positive critiques of films induce a larger audience, film distributors can increase the number of screens or increase the number of showings at short notice. The institutions can develop strategies to increase participation and revenues. However, limited information has a strong effect on the market dynamics of experience goods because bad products drive out good products[3]. If consumers know the difference in quality before making a purchase decision, they are willing to pay more for a better-quality product. If this quality assessment is not known and there is some natural variation in consumption (e.g., more spectators during weekends), the distributors should hold the premiere during the weekend. If opening night occurs on Monday or Tuesday, the possible bad information about the quality has enough time to circulate among the spectator group; therefore, spectator numbers on the following weekend will be low.

The study is a combination of four separate papers on cultural economics. The first (cinema) essay proposes that the consumption of motion picture art is an experience good, whereas the second es-say discusses ice hockey games as a search good. According to Nelson (1970), goods can be search goods or experience goods. The features of a search good can be evaluated before the purchase. An experience good is one whose features can be ascertained only upon consumption. The outcome of an ice hockey game is uncertain because both teams try to win; however, a game is more entertaining if the teams have an equal chance of winning the game. The teams' winning percentage therefore should have an impact on attendance. A similar history is not known in the case of motion picture art; therefore, the entertainment value of the movie is only known upon consumption. The aim of the two first essays is to investigate the search good and experience good characteristics of these cultural performances.

The attendance of a cinema audience is the topic of the first study. Conventionally, it is argued that the largest group in the cinema audience consists of young

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[3] The market for "lemons" by Akerlf (1970). He shows that when sellers have perfect information and consumers have limited information, a market may not exist or only the lowerst-quality products may be sold.

people age 15–24 (Suomalaisen elokuvan markkinat ja kilpailukyky 1999: 89). What is the role of public information on the decision to go to the cinema? Will consumers read critical reviews from the newspapers before deciding between different movies in the repertoire? If critical reviews affect attendance, the distributors can develop strategies to increase participation and revenues. They can increase the number of screens and/or the number of daily showings if the reviews are favourable. The second essay examines the audiences of ice hockey matches in the men's champion league (Sm-liiga). What is the role of the winning percentage of the home team and the visitor team on attendance? The typical audience member is a male who carefully reads the sport pages of newspapers in which the series statistics are published. This information might have an important effect on the attendance figures and hence on the ticket and side revenues.

As explained by Baumol's cost disease theory, most cultural events are subsidised. The venue is often owned by a local or central government, the rent is low or the personnel costs are somehow subsidised. Who will actually receive the subsidies? What is the incidence of the subsidies? The purpose of the third essay is to examine the audiences of cultural performances. The third and fourth essays examine the composition of the audiences of highbrow arts in relation to cinema and sports. Are these audiences different, and if so, how? In the case of omnivores, this type of consumer has a wider range of cultural activities in their consumption portfolio and the different cultural activities have more substitutes. Conversely, if consumers are univores, the producers of cultural activities have more monopoly power. The essays thus draw a picture of omnivore, paucivore and inactive consumers, particularly noting the sensitivity of the omnivore's consumption patterns with regard to various background variables such as age, education and gender.

These insights suggest that different persuasive strategies may be needed to increase the participa-tion of those who rarely participate in the arts, those who participate occasionally and those who participate frequently. The omnivores exhibit a wider range of cultural experiences and consumption. Organisations making price decisions regarding cultural goods must know the extent to which omnivores comprise the audience because these consumers have greater knowledge about different cultural goods; therefore, price setting is more limited with an omnivore audience than with paucivore or univore audiences. Arts institutions might emphasise season ticket sales to build audience loyalty if the audience is omnivore and different cultural events are substitutes.

The purpose of the last essay is to investigate whether different cultural events are substitutes or complements. Are highbrow and lowbrow culture complements,

inferring that all types of cultural consumption are complements, or are they substitutes requiring large advertising efforts and experience goods in nature? If cultural performances are complements and public subsidies are biased in favour of certain events or institutions, the bias is neither socially nor economically unfair. However, if the goods are substitutes, the reassessment of subsidies is justified.

1.3 The structure of the study

The essays on motion picture art and ice hockey apply panel data. The observations have a cross-section variation of movies or ice hockey games and variation over time. Panel data analysis enables regression analysis with both time-series and cross-sectional dimension. Panel data can have group effects (movies), time effects or both.

The last two essays examine performing arts audiences using dichotomous or polychotomous dependent variable techniques. The cross-section dataset is from an ISSP 2007 (International Social Survey Programme 2007) survey in which visitor density has been measured at different cultural events. The variable to be explained is described by the following three alternatives: "regularly", "occasionally" or "never". Different socio-economic variables are used to explain the visitor density of highbrow performing arts, movies or sporting events. Highbrow performing arts include concerts, theatre, art exhibitions, etc. Movies include movies seen at the cinema, whereas sporting events include ice hockey, football, athletics, motor racing, etc. Although the ISSP 2007 survey uses five categories ranging from "daily" to "never", the number of respondents in the "daily" or "several times a week" categories have few observations; thus, the first three choices have been unified into the term "regularly".

The last essay examines the different cultural performances' substitutes or complements using a bivariate probit model.

The omnivores are active in all cultural consumption, from cinema to classical music. The complementing omnivorousness or substituting omnivorousness problem can be studied by decomposing the gross effect of a price change using the Slutsky equation for a standard demand curve as follows:

(1–1) $$\varepsilon_{ij} = \varepsilon_{ij}^{*} - v_i \vartheta_{im}$$

in which ε_{ij} is the uncompensated (cross)-price elasticity, ε_{ij}^{*} is the compensated (cross)-price elasticity, v_i is the relative share of good i in total expenditure, and ϑ_{im} is the income elasticity. If the compensated price elasticity is negative and if

the second term in (1-3) is also negative because of positive income elasticity, the goods are complements because ε_{ij} is negative. Only if the income elasticity is negative can the goods be substitutes, given that the compensated cross-price elasticity is negative. However, we have no reason to assume that this is so. Hence, the crucial term to determine whether omnivorousness is complementing or substituting is the income elasticity. Omitting the income effect might result in biased results. Because the ISSP 2007 survey does not have any price information but the incomes are known, the substitutability problem can be studied indirectly using a bivariable probit model.

The bivariate probit model has shortcomings because only a set of two binary variables can be studied. Therefore, the choices "often" and "occasionally" have been merged into "yes". A model detailed description of the estimation methods is presented in each essay.

1.4 Essay 1: The consumption of motion picture art – The role of critics´ reviews and ticket prices in explaining movie admissions

The first essay considers movie attendance in Finland in 2003, explaining the number of spectators attending the 20 most popular films in each week. The total number of films in the distribution was 225, including only 177 premieres. The aggregate attendance in 2003 was approximately 7.7 million and the top 10 films received approximately 42 % of the spectators. Because both the weekly (time series) and movie specific (cross-section) variation is substantial, conventional regression methods are unsuitable. A panel data analysis enables a regression analysis with both time-series and cross-sectional dimensions.

In 2003, the average duration of movie runs in Finland was four months for the top 10 films and approximately one month for the median film. Hence, spectators had enough time to receive the necessary information on the quality of the film from various sources. The essay examines the role of word-of-mouth and critical reviews in explaining movie attendance. However, critical reviews are published primarily during the first week and hence can be considered exogenous in character. The exogeneity is important because many typical explanatory variables are controlled by the distributor and therefore partially endogeneous. Critical reviews are published in the weekly magazine supplement 'Nyt' for the newspaper with the largest circulation in Finland, Helsingin Sanomat. Word-of-mouth is measured by the previous week's attendance figure at the cinemas in Helsinki and by different alternative measures. Because more than one-fourth of young audience

members (age group: 15–24 years) are frequent cinema attendees and because they read fewer newspapers than older citizens in Finland, the role of critics' written reviews is probably lower than the role of word-of-mouth. Consumers generally rely more on word-of-mouth than on other forms of information (Viljakainen, Bäck and Lindqvist 2008: 25). The first essay verifies that when the word-of-mouth method is taken into account, critics' reviews still act as a significant variable in explaining movie attendance. Several experiments with different explanatory variables are presented. The experiments all reveal that the critical reviews do explain movie attendance, whereas reliable estimates on "word-of-mouth" effects are more sensitive to the endogeneity of the variable. Because admission figures are typically highest during a movie's first weeks, a variable "weeks since re-leased" is used to control this peak. The analysis shows that this variable is significant, as is the price variable.

An earlier version of the essay was published in The Finnish Journal of Business Economics 3/2011.

1.5 Essay 2: Demand for ice hockey – The factors explaining attendance at ice hockey games in Finland

The second essay studies the attendance at ice hockey matches during the regular 2007–2008 sea-son in Finland. The ice hockey league 'SM-liiga' is the most important live cultural event or series of cultural events in terms of attendance per event. Although yearly movie attendance is three times larger than yearly attendance at ice hockey matches, ice hockey is by far the most popular live event. The total hockey attendance was 1,964,626, i.e. 5,012 per match, excluding playoff matches in March and April as per this research. Notably, the International Social Survey Programme (ISSP 2007) of Finnish data reveals that nearly 40 % of the population never attends a sports activity (ice hockey, football, athletics, motor racing, etc.), less than 8 % attends several times a month and the remainder (i.e., more than 50 %) attends occasionally. The same survey also shows that physical exercise (active sport consumption) is more common than passive sport consumption.

Ice hockey matches also have large uncertain components compared with the opera and theatre, in which there is a manuscript to follow. The home team might win or lose the match depending on the quality of the team and its opponent. Potentially, the attendance at ice hockey games could be sensitive to the ticket prices as well as the seasonal variation and team performance.

The second essay ("Demand for ice hockey – The factors explaining the attendance at ice hockey games in Finland") focuses particularly on the effects of public information on ice hockey attendance. Because men typically read the sport pages of newspapers, the home team's performance is well known. The performance is operationalised as the points per game measure (success). The role of distance between the home and visitor teams is also studied. We assume that the geographical distance between the home town and the visitor's home represents a portion of the admittance cost. If the distance measure is ignored, the price variable is incorrect.

The results indicate that public information is important because the demand is not elastic with respect to the ticket price. The price variable is not the actual average price because these data were not available. The price variable used in the estimations is the ticket price for the best seats, in which we expect real variation in the number of available seats. As the season progresses and more games have been played, attendance appears to diminish but the estimated coefficient is low although significant. The team's success appears to attract a larger attendance, whereas the visitor's success has the opposite effect. Spectators are willing to see live games in the arena if they expect that the home team will win the game.

Our results show that teams could optimise their revenues by setting higher ticket prices for matches in which local teams play and also in which the likelihood of winning the game increases. This finding is further supported by the fact that loyal supporters who are likely to attend the match any-way have a season ticket. The success of the home team and the visitor have the following effects: the home team's success is associated with a positive coefficient and the visitor's success with a negative coefficient. The number of matches already played has a negative effect. A weekday effect is important; therefore, attendance is larger on Saturdays. Additionally, the temperature on game day has a small but still statistically significant effect as follows: the colder the temperature, the larger the attendance. The local unemployment rate and incomes also influence attendance because ice hockey attendance has a negative income elasticity. The third essay shows that a typical sport spectator is a young man with a rather low educational level. Older consumers who have a higher level of education typically choose performing arts ,such as the theatre or opera. In the interpretation of ice hockey as a consumption good, it is also important to note that the success factor of the past three games (the form guide) does not appear to explain the attendance as well as the success factor of all games played.

Because public information, e.g., the winning percentage or game uncertainty measured by the teams' equality in terms of winning percentage, affects attend-

ance and ice hockey is a more homogeneous consumption good that many other cultural goods, it can be argued that an ice hockey game as a good has search qualities; therefore, ice hockey has more search good characteristics than movies.

1.6 Essay 3: The spectators at cultural performances – The consumption of highbrow art, sporting events and movies

The third essay examines performing arts audiences using a multivariate logit analysis. The ISSP 2007 survey was conducted in Finland between 18th September and 11th December 2007 through a mail questionnaire. The following three institutions collaborated on the survey: the Finnish Social Science Data Archive, the Department of Social Research at the University of Tampere and the Interview and Survey Services of Statistics Finland. According to the statistics, approximately 5 per cent of Finnish citizens attend the performing arts (art exhibitions, operas or theatrical performances) diligently and approximately 80 per cent attend occasionally (ISSP 2007). Audience and participation surveys indicate that participation is segmented. Highbrow consumption is related to gender, age and formal education. Women are more active in highbrow art consumption, whereas men fa-vour sports. The purpose of the third essay is to analyse the differences in the visitor density in more detail. Can differences be observed among the regions when, for example, the effect of educational background is taken into account?

Essay 3 uses a multinomial logit model to study cultural participation decisions on whether to attend highbrow theatrical performances or lowbrow sports events. Using this method, the principal characteristics of the performing arts audiences and the sporting events audiences can be identified. The first step in the essay is to use the multivariate analysis of variance (MANOVA) to simply compare the variance between the sample means explained by explanatory variables. The multinomial logit model (MNL) is the second step to find out the direction of the explanatory variables on art consumption. The explanatory variables in MNL include the following: gender, classified age, education, household standardised incomes and the classified place of province.

This analysis has economic meaning regarding the allocation of state subsidies, the majority of which consist of subsidised ticket prices for the performing arts. The government may consider sub-sidysing arts since the public or voters will approve some public expenditure being allocated to arts support. However, since the variety of arts is so wide-ranging the allocation of subsidies is worth studying.

The results of the MNL show that people who "regularly" attend performing art performances or exhibitions have a tertiary education. Middle-age people (between ages 45 and 64) go most diligently. Gender is important, and women are more active than men. The categories of secondary or ter-tiary education are significant for separating the "never" group from other visitor density groups. Regional differences are significant; for example, the citizens of southern and western Finland are the most active. One conclusion from the MNL models is that the feature "at least secondary school" is crucial to classify patrons into the not-attending and attending groups. Furthermore, the feature that distinguishes the occasional and regular attendees is at least a bachelor's degree and 45 years of age. This factor suggests that beyond that age, leisure time increases because children are grown; additionally, higher incomes enable more omnivore characteristics of consumption. The essay further studies the roles of gender and other socio-economic variables in sporting event attendance.

The visitor density of sporting event attendance is investigated using an MNL model. Following the participating arts model, the sports events model identifies three groups as follows: "regularly", "occasionally" and "never". Gender separates the groups, with men significantly more active than women. This result is in line with the participation motive models (Wann 1995) and with the statis-tics of the most popular sporting events. Ice hockey and football, the most popular sports in terms of attendance, both could be classified as aggressive. A low education level (primary school) is typical for those that are the most active, as is an age of less than 45 years. The results are mainly contrary to the performing arts participation results. However, when the performing arts visitor density is added as an explanatory variable, it has a positive coefficient, meaning that these two cultural seg-ments have a common feature and are complements. Attendees who are active in highbrow art consumption are also active in sport event consumption. This finding is particularly true for those who are occasional attendees. High education appears to be the common feature. With regard to regional differences in sport consumption, people in eastern and western Finland are more active than those in the capital region. The findings are consistent with the time-use survey evidence that highly educated people perform more activities, including the consumption of cultural capital (Ruuskanen 2004).

1.7 Essay 4: Are performing arts spectators and movie spectators the same?

Although the fourth essay uses a framework similar to the third essay, the multinomial logit model estimates only one equation to explain cultural consumption. However, the model allows more than two categories ('regularly', 'occasionally' and 'never'), whereas the bivariate probit model assumes that there is a binary variable to be explained. The contribution to earlier studies is the assumption that the error terms of the two explanatory models are correlated. Because there is a common factor in both participating arts (art exhibitions, operas and theatrical performances) and sporting events consumption, the bivariate profit model must also be used to study the participation equations simultaneously. If the disturbances of the bivariate equations are correlated, both the direct marginal effects and the indirect marginal effects can be evaluated.

The marginal effects of each explanatory variable are more reasonable in the bivariate probit model because both the direct marginal effect and the indirect marginal effect can be estimated. Because education, for example, has an effect on both cultural segments (arts and sports), the indirect effect reveals whether these cultural segments are substitutes or complements. If the direct marginal effect of a master's degree education, for example, is positive for arts and the indirect marginal effect is negative, the arts and sports consumption are substitutes for this socio-economic group. The results of the bivariate probit model confirm the effects of gender, education and age. Women are active in highbrow consumption and men in sporting events consumption. The direct marginal effects of education are significant if the education level is equal to or higher than secondary. The threshold age is 45 years. People older than 45 years prefer arts and diminish sporting events consumption. The indirect marginal effects of secondary or tertiary education levels reveal that these citizens consider arts and sporting events as substitutes.

There are some differences in education between genders. Men are somewhat less educated than women. Because the income variable in the sample includes all social security contributions (e.g. child benefits), the number of children is used as an explanatory variable. The two different varia-bles are the number of children less than 6 years old and the number of children ages 7 to 17.

The results of the bivariate probit analysis when the age-cohort is 35–44 and when pupils are considered as reference values (i.e., the constant in the equation) show that the two spectator groups are not independent, because the correlation coefficient of the error terms $\rho = 0.634$. Hence, the hypothesis that spectators at

movies and arts events belong to independent groups can be rejected. There are common characteristics, including a common background, which could be described as an intrinsic culture orientation. If a person enjoys art exhibitions, operas and theatrical performances, she also enjoys seeing movies at the cinema and vice versa, given that the institutions in the region offer these events. People who are inactive and culture-oriented do not go to exhibitions, performances or the cinema. However, some particular effects are related to exhibitions and performances or to movies. The importance of gender is very strong; females are more active in both arts (highbrow) and movies. The direct marginal effect of gender (female) is positive, whereas the indirect marginal effect is negative. Both the direct and indirect marginal effects have been reported for highbrow art (art exhibition, operas and theatrical performances) and movies. The negative indirect effect in the highbrow model describes the preference of seeing a film at the cinema. Thus, these leisure time activities are to some extent substitutes. Marital status does not matter, although this factor is important when sport is studied.

The results indicate that age is not a relevant variable to classify highbrow art consumption into active and inactive groups because highbrow art and cinema are substitutes. However, education and income appear to be very important for classifying culture consumption structures. When the reference level is pupil, citizens with tertiary educations are significantly more active in highbrow art culture consumption. Omnivores have a higher level of education. The number of small children (less than 7 years) or older children (7–17 years) significantly reduces highbrow culture consumption, whereas the number of school-aged children increases movies-at-the-cinema consumption. Standardised household incomes significantly increase the consumption of both cultural segments. Without price information it is difficult to know whether performing arts and movies are substitutes or complements, although the bivariate probit results show that these events are substitutes. Because omnivores, i.e., highly educated and/or elder and/or females, seem to attend performing arts and movies, it could be argued that these cultural events are substitutes.

The age-cohort 35–64 is primarily omnivore, but this indication is unreliable to some extent. The results of the bivariate probit analysis confirm the importance of gender. Females more actively attend arts exhibitions, operas and/or theatrical performances. The marginal effects of the gender variable and of individuals show that females most often belong to the group ‘less often’ (occasionally). The only marital status variable used as classification into three groups is ‘married’. The age-cohort 15–24 is most passive in attending highbrow performing arts. Surprisingly the older age-cohorts (55–64 and 65 and older) are most active. The oldest surveyed appear to strongly classify into completely not going and actively

going groups, whereas the probability of belonging to the occasional group is the lowest but not significantly. Education is very important for classifying performing arts consumption. The novelty of the results here indicate that the educational level of the spouse also matters. The economic implications of our results are further considered in the concluding section of each essay.

1.8 Conclusions

Using standard methods, the essays provide additional information concerning the economics of culture in Finland. The role of public, non-advertising information on cultural consumption decisions has been underlined. Essay 1 provides evidence that critical reviews published in newspapers have an impact on movie admissions when word-of-mouth is taken into account. In the ice hockey case considered in the second essay, public information in the form of a series situation or the winning percentage of the team affects attendance, which verifies the findings in the first essay. Published information has an impact on attendance.

It is reasonable to assume that the marginal costs of the majority of cultural events are almost zero, and the producers or distributors should maximise revenues. Cinema ownership in Finland is very concentrated, which leads to strategic behaviour. Essay 1 shows that movie attendance has price elasticity of minus one or lower, which follows the optimal pricing rule of monopolies. Movies are the most homothetic product in cultural capital, at least with respect to the most popular movies, although the number of annual attendees varies to a significantly greater degree than in ice hockey or in highbrow culture. In the latter case, the policy is usually to satisfy all supply by means of special discounts, e.g., last-minute reservations.

Essay 1 also shows that a wide release with extensive advertising should be used with mainstream films. Because word-of-mouth is important, the bad experiences of low-quality films have a smaller effect on attendance. A hit-and-run strategy should be used with lower-quality films, whereas a platform release with a small number of initial screens should be favoured with high-quality films. This finding is compatible with the results of Schmalensee (1978), who argues that low-quality products should be advertised more intensively. The live opera performances from the New York Metropolitan Opera that could be seen in the largest towns' cinemas in Finland were launched using a platform release. During the first year, only live performances were offered, whereas during the second season, encore performances were also given several days later. Because performing art audienc-

es are highly educated, the ticket prices for these cinema opera performances are substantially higher than normal cinema tickets.

The audience composition can be studied using bivariate probit analysis. This analysis is an important method of classifying the audiences of different cultural events and simultaneously classifying consumers into omnivores and other groups. Essay 4 indicates that the time constraints on leisure activities are connected with the number of children in the family. Art attendees sometimes can be classified into two groups as follows: high-earners for whom the ticket price is not a constraint but leisure time is, and pensioners and students who have enough time but not enough money. Formal education is an important factor for the classification of consumers into different groups. Highly educated people are more active in highbrow consumption, whereas according to essay 3, they attend sporting events less frequently. However, omnivorousness increases with formal education. Highly educated people have higher average incomes and ticket prices do not limit attendance. Because performances (both highbrow performing arts and lowbrow sporting events) are experience goods, omnivorousness increases the ability to value the quality of the event. However, sporting events could be classified as search goods at least to some extent because public information has such a large role in attendance determination. Omnivorousness increases the number of experiments of experience good consumption; therefore, the personalised price elasticity increases. Univore consumption reduces the experiments that a consumer can compare; the number of close substitutes thus decreases and the culture good's price elasticity is thus lower. Univore consumption is associated with higher monopoly power. Highly educated people are more omnivorous in nature; therefore, the economic risk of wasting money and time on low-quality performance decreases because the omnivorousness increases the comparability of cultural events. For any good, the consumer must either search or experiment to obtain the relevant information about the good's quality (Nelson 1970). Overall, essays 1 through 4 reveal that gender differences are important in both performing art consumption and sport consumption. Omnivore consumption is related to consumers, whereas goods can be substitutes, complements or independent. Without price information it is difficult to interpret whether omnivores prefer consuming goods that are substitutes or complements. However, most cultural organisations use uniform pricing. The last two essays indicate that highbrow culture (opera and theatre) and sporting events are independent, whereas highbrow culture and movies at the cinema are not independent.

Essay 3 shows that sport consumption has similar types of characteristics although it is less elitist and typically favoured by men. Of the total population, 25% attend an ice hockey match at least once per year and the preferences are fairly

price inelastic. Fans are loyal to the local ice hockey team, and also to a large extent, loyal regardless of the team's success or failure. The latter results only in limited substitution of a less successful team with the one with better recent performance. Fans are still loyal to ice hockey and not to the team. This scenario offers opportunities for monopoly pricing, observed in recent years through a substantial increase in ticket prices.

Intellectual assets including cultural capital are highly agglomerated in the greater Helsinki area (Helsinki, Espoo and Vantaa), with 52% of cultural capital and 48% of intangible capital located in the capital region with a population share of 30% (Piekkola 2011). These areas also have on average more educated inhabitants with human capital. Cultural capital has been shown to be sensitive to the human capital of the attendees. In essays 3 and 4, highly skilled people are typically more active than low- educated people and are engaged in several types of activities including cultural events.

The highbrow culture consumption increases at approximately age 45, a result that aligns with consumer research studies (e.g. Riihelä 2006). The expenditure on durable goods such as domestic appliances and clothing diminishes, and consumers appear to change the consumption pattern. Ruuskanen (2004) shows that incomes decrease the absolute time in leisure; this study shows that incomes increase highbrow consumption; therefore, it can be argued that the quantity of leisure is substituted with the quality of leisure.

One can also categorise cultural capital in terms of the degree of experience consumption. Movies stand out again as the cultural capital with the most surprise content and hence close to experience consumption. The surprise content is lower with ice hockey games; although ice hockey is a search good, the substitutability is low because most spectators are loyal to their home team. Highbrow cultural capital is less frequent and includes the largest unknown element, although in certain dimensions, sports are the most unpredictable.

All of these findings are of large importance in the evaluation of cultural policy and subsidies for cultural consumption. The inelastic portion is quite insensitive to subsidies and it is expected that the rather high share of subsidies in the form of cultural spending vouchers (kulttuuriseteli) benefit price elastic cultural activities such as theatre. Both the state and local authorities subsidise the production of highbrow cultural events, but the authorities should reallocate the policy towards consumption in terms of cultural spending voucher subsidies and diminish direct production-related subsidies. The institutions should also offer last-minute opportunities to low-income students by providing reasonable discounts. Notably, price elasticity is likely to be lower for highly educated people who can better afford to

allocate their time to several activities. Conversely, highly educated people are more time-constrained and perform more voluntary work. Price elasticity is also lower for experience goods than for search goods. The theoretical claim is supported in this study.

The study also shows clear substitutability between highbrow cultural capital and movies. Cultural capital is highly concentrated in the greater Helsinki area and there is every reason to believe that a fairer regional distribution will lead to much greater demand for highbrow cultural capital. Cultural capital policy is important regionally also because it has been shown that older people consume it less; hence, the demand for cultural capital can be subject to dramatic changes in the rapidly ageing areas, many of which are located in rural areas in eastern and northern Finland. The substitutability between highbrow cultural consumption and sporting events attendance is less low, which explains why sporting event demand falls into a more inelastic portion, whereas movie attendance has a price elasticity that is closer to minus one.

Is cultural capital enjoyment or long-term investment? This study identifies low price elasticity in many respects and hence the importance of non-monetary reasons for cultural capital consumption. Price mechanisms clearly have only a limited role or can easily lead to monopoly pricing rules, wherein our price elasticities show some evidence in movie attendance. Notably, the price elasticity in Finnish movie consumption has been found to be lower than that observed in Great Britain or the United States (Davis 2002, 2006b).

2 THE CONSUMPTION OF MOTION PICTURE ART – THE ROLE OF CRITICS´ REVIEWS AND TICKET PRICES IN EXPLAINING MOVIE ADMISSIONS

2.1 Introduction

Critics and their opinions or critical reviews have been shown to have an impact on movie admis-sions. Critics are typically invited to an early screening of the film and write reviews before the film opens to the public. This information is important for many experience goods including restaurants, theatres and books. It can be argued that a movie is also an experience good because the quality of the film is known after but not before actual consumption. Experience goods must be consumed before the quality of the product can be determined. Other information is also available after the first night. Word-of-mouth has been recognised as one of the primary resources of information transmission. It is natural that critical reviews have an impact on premiere weekend's movie admis-sions, whereas word-of-mouth is more important to explain overall (long-run) admissions (Basuroy, Desai and Talukdar 2006).

In the previous movie admission and movie box office literature, the importance of word-of-mouth has been well documented. Word-of-mouth has a positive effect on movie admissions (Elberse and Eliashberg 2003, Basuroy, Desai and Talukdar 2006, Liu 2006, Moul 2007, Duan, Gu and Whinston 2008). However, the endogenous nature of word-of-mouth is not appropriately controlled. Reverse causality may explain the reason why firms with large audiences also receive a large amount of positive publicity. The evidence on the impact of critical reviews on movie admissions is mixed although the variable itself is more exogenous in character. Critics are usually available before the performance goes public. In the main analysis, we also exclude the first week of play from the anal-ysis. Eliashberg and Shugan (1997) argue that critics could indeed act as influencers on immediate attendance or predictors for long-term success. Influencers can predict opening box office revenue, whereas predictors can classify films either as successful or not-successful films in terms of revenue in the longer term. Hence, the impact of critical reviews is not uniform. Some predict better short-term revenue and some better long-term revenue. Not only the existence of reviews but also the variation or consensus of critics can have an impact on admission (Basuroy, Desai and Talukdar 2006). The impact is also different depending on genre (Gemser, van Oostrum and Leenders 2007), country of origin (d'Astous, Colbert and No-

bert 2007, King 2007) and cultural dimension (d'Astous, Carú, Koll and Sigué 2005). Critical reviews may be biased towards a distributor's iden-tity (Ravid, Wald and Basuroy 2006).

Actors' star power, director reputation and awards or nominations for awards are movie-related characteristics that have been shown to affect movie admissions (Hennig-Thurau, Houston and Walsh 2007). Production budgets appear to correlate with opening weekend screens, whereas post-filming actions such as advertising have been found to contribute to success in theatrical box office revenue (Hennig-Thurau, Houston and Walsh 2006). Conventional economics postulates that price affects demand. In the movie admission or movie box office literature, the effect of price has been mainly neglected although Davis (2002) has shown that movie demand is price elastic. Orbach and Einav (2007) argue that one possible explanation for this shortage of studies is that theatres often use uniform pricing. The uniform pricing creates a methodological problem and may bias price elasticity estimates.

There are several possible explanations for the uniform pricing and experience good characteristics of movie attendance. Experience good studies originating from Nelson (1970) indicate typically large search costs relative to the expected purchase price, and the distribution of price and quality combinations is fairly heterogeneous. Finally, the frequency of purchase is relatively low relative to the rate of change in the distribution of price and quality combinations. Demand uncertainty might thus result in uniform pricing. Consumers might assume that prices reflect quality, i.e., low prices for low- quality movies and high prices for high-quality movies. To avoid this signalling, distributors choose uniform prices.

Another explanation is that selling packages of several tickets would require monitoring mechanisms to prevent using low-price tickets and watching high-priced movies. Therefore, uniform pricing is often used. In Finland, however, movie theatre tickets are not totally uniform. Typically the ticket price for children and conscripts is lower and prices during the weekdays might be lower than on weekends. A single ticket is cheaper within a package of several tickets; therefore, the actual average price of a display is not uniform. However, a large portion of distributors' profits come from adjunct sales (e.g. popcorn, confectionery), and the price setting has minor importance (Chen 2009). It is also true that during the last decade, the role of video (DVD, Blu-ray) rental has increased the share of film producers' profits.

The objective is to study the relevance of critical reviews and word-of-mouth in explaining movie admissions. If critical reviews are important and if the price elasticity is low, then movie attendance has important experience good qualities

that also have implications on optimal pricing. The results of this study indicate that even after accounting for word-of-mouth, critical reviews significantly explain weekly movie admissions. Finnish weekly panel data are used to evaluate the role of critical reviews in weekly movie admissions. Conventional regression analysis cannot be used because the results might be biased. The benefits of using the panel data include the following: (1) individual heterogeneity can be controlled, (2) estimated parameters are more efficient, and (3) the dynamics of adjustment can be better studied (Baltagi 2008: 6–7). The panel data suggest that individuals or movies are heterogeneous. Time-series and cross-section studies that do not control heterogeneity might yield biased results.

The variables in the panel data of this study are partially conventional and partially new. Critical reviews published in newspapers and word-of-mouth measured as the previous week's admission in Helsinki theatres are among the conventional variables. Weekly ticket price measured as the ratio of box office revenue to admissions is a new candidate to explain weekly admissions. Because admission figures are typically highest during the first weeks, a variable "weeks since released" is used to control for this peak. The analysis shows that it is significant, as is the price variable. The panel data analysis also indicates that the random effects model is the most suitable for explaining weekly movie admissions in Finland in 2003.

The article continues with a literature review in Section 2.2 and the presentation of the empirical model and variables in Section 2.3. This portion is followed by an analysis of why panel data models have been used. Section 2.4 presents estimation results, and Section 2.5 concludes.

2.2 Literature review

The influence of film reviews is supported in many studies, including that of Eliashberg and Shugan (1997). These researchers argue that critics' reviews could act as opinion leaders (influencers) be-cause the reviewers are considered more experienced and more knowledgeable regarding the quality of movies. Conversely, critics could act merely as predictors without any impact on early box office revenue. Influencers have an effect on early box office revenues, whereas predictors have an impact on overall box office revenues. The impact of critics' reviews has been found positive in many studies, including Elberse and Eliashberg (2003), Basuroy, Desai and Talukdar (2006) or Boat-wright, Basuroy and Kamakura (2007). Elberse and Eliashberg show that critical reviews have a significant and positive impact on premiere week demand in the USA and UK but a negative

impact on first week supply. Reinstein and Snyder (2005) do not find a significant impact of critics on movie admissions when such reviews are revealed in television talk shows (national, USA).

Using Dutch data, Gemser, Van Oostrum and Leenders (2007) show that the number and size of film reviews influence art house premier week revenue and also overall box office revenue, whereas the impact for mainstream movies is greater for long-run overall box office revenue. Conversely, Hennig-Thurau, Houston and Walsh (2006) present results that indicate the positive impact of criti-cal reviews on short-term theatrical box office revenue but not on long-term box office revenue or video rental revenues of movies released during 1999-2001 in the USA. Elliott and Simmons (2008) showed that higher average positive critic ratings are associated with greater box office revenues and increased advertising in the UK. These researchers also note that advertising is greater for films with higher US opening revenues and higher budgets.

A study by d'Astous, Carú, Koll and Sigué (2005) indicates that the influence depends strongly on cultural dimension. Hofstede's (1984) used a theoretical framework to predict consumers' movie attendance, weighting the critical reviews by distances measured in squared miles between Austria, Canada, Colombia and Italy. The results show that Austrian and Canadian moviegoers are more susceptible to value-expressive social influence than Colombian or Italian audiences. In addition, d'Astous, Colbert and Nobert (2007) propose that moviegoers may be influenced by the movie's country of origin when they search for information about new movies. It is also true that critical reviews might be biased. Ravid, Wald and Basuroy (2006) propose that several critics are significantly affected by the film distributor's identity. High-budget firms appear to receive more reviews, although these reviews are worse than average. Conversely, firms with star actors tend to get more positive reviews.

The following hypothesis (H1) can therefore be proposed as a summary: Positive critic reviews have a positive effect on admissions.

Word-of-mouth (WOM) has been shown to have a powerful effect on movie admissions. Basuroy, Desai and Talukdar (2006) measure WOM as the cumulative number of screens since its release, finding a positive effect. WOM incorporates the following three effects: ranking (positive, neutral, negative), the awareness of a new movie and the consensus of WOM generated. Neelamegham and Chingagunta (1999), however, find no significant results between weekly revenue and WOM meas-ured as cumulative viewership. These researchers argue that cumulative viewership is not a good proxy for WOM. Elberse and Eliashberg (2003) used the previous week's average revenue per screen as a proxy for WOM and

find significant positive results. Liu (2006) proposes that the volume of WOM (from the Yahoo Movies website) offers significant explanatory power for both weekly and overall box office revenue, although the ranking (measured as the percentages of positive and negative messages) is not significant. WOM is more trustworthy than advertising or critical reviews because it comes from other moviegoers. Duan, Gu and Whinston (2008) show that the box office revenue of a movie and online WOM valence[4] measured on a daily basis from the three website sources Variety.com, Yahoo!Movies and BoxOfficeMojo.com) have a significant impact on WOM volume, which in turn leads to higher box office revenues. Moul (2007) proposes that WOM accounts for 10% of the variation in the consumer expectations of movies, whereas the majority of observed variation is explained by the following distribution related effects: the number of screens, release time and movie fixed effects such as star power and production budget.

The second hypothesis (H2) is therefore proposed as follows: Word-of-mouth has a positive effect on admissions.

The information flow through WOM affects supply. The number of screens must adapt as demand develops dynamically. The prior screen decisions made before the actual release must be adjusted as the attendance number is known during the first weeks after a premiere. De Vany and Walls (1996) show that the demand-supply dynamics in the movie industry are subject to high uncertainty, whereas DeVany and Lee (2001) argue that WOM can be a credible means to share information about good and bad movies.

Movie-related elements such as star actors (Bagella and Becchetti 1999, Neelamegham and Chinta-gunta 1999, Walls 2005, Elberse 2007 or Meiseberg, Erhmann and Dormann 2008), well-known directors (Bagella and Becchetti 1999 or Jansen 2005) or awards/nominations (Deuchert, Adjamah & Pauly 2005) appear to correlate with higher box office revenue or movie admission, although the evidence more mixed outside the USA and for awards and nominations (see e.g. Elberse and Eli-ashberg (2003), Hennig-Thurau, Houston and Walsh (2006) or McKenzie 2009). Bagella and Becchetti (1999) show that star actors and directors have a positive impact on admission in Italy. Conversely, McKenzie (2009) reports this factor to be insignificant in Australia. These mixed results provide an argument regarding the uncertainty in the firm industry and the effects of advertising spending on attendance.

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[4] daily rating given by viewers

The characteristics of films (star actors, large budgets) are observable private signals that a potential audience may observe. Deuchert, Adjamah and Pauly (2005) prove that nominations generate extra income, whereas awards do not have this effect. However, Lee (2009) identified a negative relation-ship between drama awards and box office revenues as the cultural distance grows between the USA and the country in which the movie is shown.

There is also strong evidence of a relationship between weekly revenues, opening week revenues or cumulative revenues and the number of screens (Elberse and Eliashberg 2003). Sequels also seem to collect a greater admission figure than contemporaneous non-sequels (Basuroy and Chatterjee 2008), a finding that is in line with the second hypothesis.

Einav (2007) proposes that approximately two-thirds of the seasonal variation can be explained by underlying demand[5] . The remaining third is associated with the number and quality of movies. Wide release begins with a large number of screens with extensive national advertising. However, few widely released films are successful enough to run for many weeks (DeVany and Walls 1997). Platform release begins with a small number of initial screens and expands to additional screens and also to rural areas. Typically the movies with platform release cannot be classified as mainstream movies or the actors are not well-known stars. The production budget of a movie or prior advertising also appear to correlate with the number of premiere-week screens (Elberse and Eliashberg 2003).

Only few studies have considered the role of the ticket price. Davis (2002) estimates that the theatre price elasticities of demand are approximately -3. The six theatres in the sample displayed different numbers of movies ranging from two to nine during a six-week period. Davis (2006) also presents similar consumer price sensitivity results. In a study by Dewenter and Westermann (2005), the price elasticity is approximately -2½ using German long-term (1950–2002) annual data.

2.3 Empirical model and variables

The following equation summarises the theoretical and previous empirical literature:

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[5] Movie distributors seem to release more hits (blockbusters) during high season, such as the beginning of summer and during the Christmas holiday season. Collins, Hand and Snell (2002) show that action, adventure, horror or romantic comedy movies are more often blockbusters than other genres of movies.

(2–1) admission = f(critic reviews, WOM, Z)

in which Z includes the other explanatory variables. The main focus is the role of critical reviews and word-of-mouth (WOM).

The empirical study focuses on assessing the effects of various factors on weekly movie admissions in Finland in 2003. The Finnish Film Foundation (FFF) collects data from various distributors and importers. In 2003, the total number of films in distribution was 225 with only 177 premieres. Only 14 premieres were domestic, although the share of domestic movies in the total admission was approximately 22%[6] . The median weekly admission was 138,361 and the median screen number was 368 in 2003. Table 1 presents an overview of the top 10 films of 2003 in Finland. The sample in this study has 1,060 observations, and includes 53 weeks with the 20 largest admission movies.

In this study, critics' reviews have been published weekly on Fridays in "Nyt", which is a supplement to Helsingin Sanomat, the largest circulation newspaper in Finland. In 2003, the subscription number was approximately 420,000, i.e., approximately every twelfth Finnish citizen receives this newspaper through home delivery. There are five reviewers who independently judge films in newspapers other than Nyt, which simply collects and republishes these reviews. Three reviewers are Finnish and their critiques are published in different newspapers and magazines[7] . Their judgement (the number of stars) is published weekly and films are in descending order with stars ranging from 5 (superior) to 1 (loss of time)[8]. Each week 10 movies are valued. For 43 movies, the stars indicator is shown only once but there are movies for which the stars indicator is published in more than ten succeeding Nyt[9]. In 2003, 133 movies were critically reviewed in Nyt. The critical reviews are published before theatres release the movie; therefore, the

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6 The domestic film "Bad Boys – A True Story" obtained the largest admission number of 614,097 with roughly € 4.4 M in total box office revenue. The ultimate week was the last week (53rd, i.e. Friday 26th December 2003 to Thursday 1st January 2004) when the top 20 movies recorded 296,495 admissions. The lowest figure was 48,135 at the end of June. During the ultimate week, "Lord of the Rings: Return of the King" had 165,502 admissions on 68 screens and "Underworld" was the last on the top 20 list with an audience of 606 on 2 screens.

7 Helena Ylänen (Helsingin Sanomat), Antti Lindqvist (TV-maailma), and Tapani Maskula (Turun Sanomat). Helena Lindblad publishes her critical reviews in Sweden (Dagens Nyheter) and Derek Malcolm in the UK (Guardian). Ylänen reviewed 65, Lindqvist 118, Maskula 105, Lindblad 77 and Malcolm 75. However, in the panel sample (20 top movies, 53 weeks, i.e. 1,060 observations), there are, e.g., 211 non-zero observations of Ylänen's critical reviews.

8 The most-liked film is on the top of the table and the least-liked film is on the bottom.

9 Descriptive statistics for critical reviews are given in the appendix (Table 9). The table reveals that the critics of many "lower quality" are published only once or twice because the mean of critical review rank is decreasing in time (weeks).

reviews can be largely considered as an exogenous variable. Of the movies that were most seen in cinemas (top 100), 72 per cent were critically reviewed and the average rating changed over time only for 26.

Word-of-mouth is also based on tables printed in Nyt. The previous week's top 10 admission figures at theatres in Helsinki are listed on the same page as critical reviews. Typically the share of theatres in Helsinki in total admissions is about 35–40%[10]. The film with the largest admission in Helsinki theatres is ranked as number 1, and so on. The actual number of admissions in Helsinki is also shown.

Several different methods have been used to study the relationship between box office revenue or movie admission and the explanatory variables, including correlation analysis (Eliashberg and Shugan (1997)) and partial least squares (OLS) (Hennig-Thurau, Houston and Walsh (2006)). Elberse and Eliashberg (2003) used OLS, 2SLS and 3SLS to explain[11] the supply of movies (screens as dependent variable) or demand for movies (revenues as dependent variable) with various predic-tors (budget, stars, director, advertising expenditure, reviews, etc.). Elliott and Simmons (2008) also use the 3SLS method to estimate simultaneously supply (opening screens), advertising and demand (total revenue).

Einav (2007) estimated a nested logit demand model for weekly market shares for movies. Nested logit is a suitable method to assort two or more choice problems. Using this model, Einav distinguishes seasonality (first level: to go to a movie) and the quality of a movie (second level: to choose between different movies). Therefore, the second level endogeneous variable is the market share of each movie. Ainslie, Drèze and Zufryden (2005) also have estimated the market share of a movie using a random effects logit model with a gamma diffusion pattern. As consumers make the decision to see a movie, the time to decide and the time to act is derived from gamma distribution. These researchers show that the impact of screens on movie sales may be lower than previously thought because screens act as a proxy for seasonality[12].

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[10] In 2005 three important cities, Helsinki, Tampere and Turku, had a 56% share of total admissions and a 57 % share of gross box revenue. Source: European Cinema Yearbook 2006.

[11] Both 2SLS and 3SLS take into account the endogeneity and simultaneity of screens and revenues. OLS is inconsistent because the endogeneous variable screens used as an explaining variable in the revenues equation is correlated with the error term of the same equation. Such correlation may occur when the dependent variable causes at least one of the regressors ("reverse" causation), when there are relevant explanatory variables that are omitted from the model or when the covariates are subject to measurement error. Because the error terms across equations may be correlated, a 3SLS method is more efficient than 2SLS.

[12] Another interesting model is presented by Neelamegham and Chintagunta (1999). These researchers use a Poisson count data model with the number of screens, the distribution strategy,

Davis (2002) uses the error components model (ECM) with unbalanced panel data. The data consist of sales, price and theatre characteristics for six movie theatres and for a six-week period. A multinomial logit of demand for theatres is estimated and both own and cross price elasticities are report-ed. Theatre demand is rather price sensitive and cross-price elasticity between theatres not in the same group is practically zero, but within the group, cross-price elasticities are positive and rather large. Davis (2006) showed using the generalised method of moments (GMM) and a multinomial logit (MNL) demand model that low cross-price elasticities between theatres are associated with (high) travel costs.

Previous empirical evidence (good surveys: Hennig-Thurau, Walsh and Wruck 2001 and Eliashberg, Elberse and Leenders 2006) has shown that the demand for movies is determined by several factors. On the supply side, the number of screens is probably the most important factor. Once movie production has been completed it is ready for distribution. The launch stage includes both the physical distribution of the prints to the theatres and the marketing activities.

Following Neelamegham and Chintagunta (1999) and Elberse and Eliashberg (2003), the number of screens is assumed to be positively associated with movie admissions. Weekly movie admissions and the number of screens ("prints this week") were collected by FFF, which is the source of the data. Prints this week can include several showings during that week; typically, there are some showings during the weekends, e.g., one at 3 p.m., the second at 6 p.m. and the last at 9 p.m. Hence, the number of screens underestimates the actual showings.

When critical reviews influence consumers in their selection process, this phenomenon is known as the influence effect. When reviews forecast whether a film becomes a success, this effect is termed the prediction effect of critical reviews (Eliashberg and Shugan 1997). In this study, the prediction effect is not separated from the influence effect. In the previous literature, different proxies have been used to measure WOM. The average value of critical reviews is used as an explaining variable in the estimations.

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the genre of a movie and the stars to explain movie admissions. They find that the number of screens is the most important factor in admissions. An interesting model to predict box office success with neural networks is presented by Sharda and Delen (2006). Their neural network approach is suitable for the classification of movies into nine different categories ranging from flop (box office revenues of less than USD 1 million) to blockbuster (revenue of more than USD 200 million).

Table 1. Overview of top 10 films in 2003 in Finland (source: Finnish Film Foundation).

Original title of the film	Release date	Screens	Total gross box office	Admissions	Country of Origin	Distributor
Bad Boys – A True Story (local)	17.1.2003	55	4413507	614097	Finland	BVI
Lord of the Rings: The Two Towers	18.12.2002	58	3610000	467644	USA	SF/FS
Lord of The Rings: Return of the King	17.12.2003	68	3060269	355739	USA	SF
The Matrix – Reloaded	21.5.2003	55	2364215	334206	USA	SMD
Bruce Almighty	25.7.2003	32	2103080	279485	USA	SF
Johnny English	11.4.2003	45	1912100	260643	UK	UIP
Sibelius	12.9.2003	50	1885625	257031	Finland	BVI
Pirates of the Caribbean	29.8.2003	44	1865774	245252	USA	BVI
Piglet's BIG Movie	29.8.2003	48	1398415	228421	USA	BVI
Helmiä ja sikoja (local)	29.8.2003	40	1586939	213385	Finland	Nordisk Film

The proxy for word-of-mouth in this study (previous week's attendance in Helsinki) has a connetion to those that have been used elsewhere, including the cumulative number of screens since the movie's release (Basuroy, Desai and Talukdar 2006), cumulative viewership (Neelamegham and Chingagunta 1999), and the previous week's average revenue per screen (Elberse and Eliashberg 2003). Herr, Kardes & Kim (1991) or Grewal, Cline & Davies (2003) show that anecdotal information presented in a face-to-face manner (vivid WOM) has a greater impact on product judgments than the same information presented in printed form (e.g., advertising, critical reviews)[13]. In this study, it is assumed that the previous week's attendance in Helsinki theatres is a suitable measure for vivid WOM.

[13] On the importance of WOM vs. public information, see Hidalgo, Castro & Rodriguez-Sickert (2006).

Seasonal variation is very important because many blockbusters are released during the high season. The highest movie admission month in Finland has been January during a five-year period from 2003 to 2007, whereas June has been the lowest[14].

A proxy variable for seasonal variation is the number of all screens for all movies that week (all screens) or alternatively a monthly dummy. The Figure 2 in the appendix shows that the Christmas season and the end of May (the school year end) and late July/early August (the summer holiday end) are the peaks in movie admission. Admission is highest typically during the first weeks for blockbusters (e.g. Ainslie, Drèze and Zufryden 2006). The life cycle of sleeper movies is different because demand peaks later; weeks 4 and 5 from the release demand are highest. The mean duration of a movie run is typically 7 to 10 weeks in Western countries (Neelamegham and Chintagunta 1999, table 1). A control variable to take the life cycle effect into account is needed, i.e., weeks since released. The median duration run of films with the largest admission number in Finland is 17 weeks for the ultimate top 10 (1st to 10th) and approximately 10 weeks for the following 3 quantiles (from 11th to 40th)[15].

Descriptive statistics and the hypothesis (expected signs) are summarised in Table 2. The sample consists of 53 weeks with 20 top movies each week. The price variable is simply box office revenue/admission, which takes into account both the difference between the price of using packages of several tickets and normal tickets as well as children/conscripts' lower prices compared with normal prices[16]. Fewer than 10 films have missing revenue data, in which case price variables are approximated. Either the previous week's revenue was used or the revenue was set lower than the lowest reported revenue. Because all the films in the sample have not been critically evaluated or listed on the Helsinki top 10, there are numerous zero observations. For the entire sample, a dummy variable "not critically reviewed" (NOTCR) or "not top 10" (NOTHK) is used. Otherwise, the logarithmic values of the variables are used; therefore, the estimated parameters are elasticities.

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[14] See appendix (Figure 2) for admission by season.

[15] See appendix Table 11.

[16] The percentiles (min, 10^{th}, 20^{th}, .., med, 60^{th}, 70^{th}, … max) in the price variable are: 1 – 5,95 – 6,52 – 6,83 – 7,07 – 7,27 (med) – 7,42 – 7,56 – 7,66 – 7,79 – 10,47 (max).

Table 2. Descriptive statistics and sources of variables.

Variable	Mean	Median	sd	min	max	valid observations	source	expected sign
Weekly Admission	6783,97	2240	14003,4	65	165502	1060	FFF	
Screens (SCR)	17,10	10	15,33	1	70	1060	FFF	+
All Screens (ALLSCR)	341,94	368	72,92	176	471	1060	FFF	+
Box office revenue (BOR)	50005	15825	109700	390	1165814	1060	FFF	
Price = BOR/Admission (PRICE)	7,04	7,27	0,88	1,00	10,47	1060		-
Critics reviews, average (CA)	2,83	3	0,90	1	5	133*	Nyt	+
Critics reviews, average (CA)	0,96	0	1,48	0	4,7	1060	Nyt	+
Critics reviews, average (CA)	2,98	3	0,87	1	4,7	340**	Nyt	+
WOM (previous week's admission in Helsinki) (HKIADM1)	2391,12	1500	2606,40	239	21271	520**	Nyt	+
WOM (previous week's admission in Helsinki) (HKIADM1)	1173	0	2181,63	0	21271	1060	Nyt	+
WOM (previous week's admission in Helsinki, rank) (TOP10)	5,44	5	2,86	1	10	520**	Nyt	-
WOM (previous week's admission in Helsinki, rank) (TOP10)	2,67	0	3,38	0	10	1060	Nyt	-
Weeks since released (WEEKSREL)	8,25	5	8,73	0	56	1060	FFF	-
* weekly, ** non-zero observations -								

2.4 Estimation and results

Panel data analysis enables regression analysis with both time-series and cross-sectional dimension. Panel data can have group effects (movies), time effects or both. Panel data models estimate fixed and/or random effects models using dummy variables. The core difference between the fixed and random effect models lies in the role of dummies. If dummies are considered as a part of the inter-cept, it is a fixed effect model. In a random effect model, the dummies act as an error term[17]. The fixed effect model examines movie differences in intercepts, assuming the same slopes and constant variance across the movies. Fixed effect models use least square dummy variables (LSDV), within effect, and between effect estimation methods. Thus, ordinary least squares (OLS) regressions with more dummies here would be equivalent to fixed effects estimation. The random effect model, by contrast, estimates variance components for groups and error, assuming the same intercept and slopes. The difference among groups (or time periods) lies in the variance of the error term. Fixed effects are tested by the F test, whereas random effects are examined by the Lagrange multiplier (LM) test (Breusch and Pagan 1980). If the null hypothesis is not rejected, the pooled OLS regression is favoured. The Hausman specification test (Hausman 1978) compares fixed effect and random effect models. Table 3 (Park 2008) compares the fixed effect and random effect models.

Table 3. Fixed Effect and Random Effect Models (Park 2008).

	Fixed Effect Model	Random Effect Model
Functional form assuming $\nu_{it} \sim IID(0,\sigma_v^2)$	$y_{it} = (\alpha+\mu_i)+X_{it}'\beta + \nu_{it}$	$y_{it} = \alpha+ X_{it}'\beta +(\mu_i+ \nu_{it})$
Intercepts	Varying across groups (movies) and/or times (weeks)	Constant
Error variances	Constant	Varying across groups and/or times
Slopes	Constant	Constant
Hypothesis test	Incremental F test	Breusch-Pagan LM test

[17] Hun Myoung Park: Linear Regression Models for Panel Data Using SAS, STATA, LIMDEP, and SPSS. http://www.indiana.edu/~statmath/stat/all/panel/panel.pdf accessed 5th February 2008.

The least square dummy variable (LSDV) model, however, becomes problematic when there are numerous groups or subjects in the panel data. If the total number of periods is fixed and the total number of observations is vast, only the coefficients of regressors are consistent. The coefficients of dummy variables are not consistent because the number of these parameters increases as N increases (Greene 2008: 197). This phenomenon is the so-called incidental parameter problem. An excess of dummy variables may weaken the model for adequately powerful statistical tests. Under this circumstance, LSDV is useless and another method might be used (the within effect model) that does not use dummy variables but instead uses deviations from group means.

The estimation results for the sample assuming the previous week in Helsinki theatres with three different models are presented in Table 4, including conventional regression (OLS) analysis, the fixed effects model and the random effects model with all relevant and suitable explanatory variables including dummies for months. The sample takes into account the attendance figures from the second week. Film distributors seem to increase the supply by increasing the number of screens for the top films for the second week[18]. In the Helsinki top 10 list, the movie with the largest previous week's admissions is numbered as 1, the movie with the second largest admission is numbered as 2, and so on up to 10. Hence, TOP10 variable should have a negative coefficient.

The results show that critical reviews have a positive impact on admissions. Although the supply is controlled with the number of screens variable, several monthly dummies are significant. The Hausman test would indicate that the fixed effects model is favoured. However, the fixed effects model is problematic if there is little variation in the explanatory variables over time. The reviews (measured in log of critics' reviews) are not shown in the newspaper in each week and there were only a few additions to the information. Therefore, the last column in Table 4 shows the results of the fixed effects model without the critics variable. All variation from critics emerges from the en-trance of new critics; therefore, this variable has been ignored for robustness reasons in the fixed effects model. In the fixed effects model, the number of screens, weeks since released and the WOM measure (Top10) are significant and correctly signed variables to explain weekly movie ad-missions. The random effects model shows that critical reviews are significant and correctly signed (the critiques are redundant and not shown in the fixed effects model). The attendance is price inelastic because the price coefficient is roughly -0.5. In the Table 5, the monthly dummies are replaced with an all screens variable and the top10 variable is replaced with a cumulative screens lagged variable.

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[18] See Table 11 in the appendix.

Table 4. Estimation results, all movies with previous admission in Helsinki including monthly dummies.

Model	OLS without group dummy variables	Random effects model	Fixed effects model
Screens	0.695	0.747	0.678
	(0.031)***	(0.031)***	(0.042)***
Ticket Price	-0.646	-0.505	-0.502
	(0.240)**	(0.169)*	(0.184)**
Weeks since released	-0.240	-0.754	-1.011
	(0.043)***	(0.041)***	(0.059)***
Top10	-0.666	-0.356	-0.261
	(0.056)***	(0.039)***	(0.041)***
Critics review	0.191	0.135	
	(0.036)***	(0.030)***	
No Critics	-0.097	0.027	
	(0.087)	(0.060)	
January	0.607	0.769	1.001
	(0.110)***	(0.123)***	(0.376)**
February	0.591	0.608	0.777
	(0.100)***	(0.116)***	(0.347)*
March	0.518	0.353	0.502
	(0.112)***	(0.119)***	(0.314)
April	0.271	0.253	0.440
	(0.098)**	(0.110)*	(0.287)
May	-0.021	0.019	0.261
	(0.092)	(0.107)	(0.259)
June	-0.161	-0.017	0.262
	(0.110)	(0.110)	(0.237)
July	-0.187	0.022	0.335
	(0.097)*	(0.103)	(0.215)
August	0.089	0.281	0.510
	(0.092)	(0.098)**	(0.186)**
September	0.299	0.169	0.285
	(0.095)***	(0.093)	(0.148)*
October	0.421	0.219	0.320
	(0.095)***	(0.086)**	(0.118)**
November	0.164	0.142	0.193
	(0.090)	(0.070)*	(0.084)*
Constant	9.088	8.827	
	(0.551)***	(0.385)***	
All variables except No Critics review in logs. Depending variable is log of weekly admissions, n = 520. Heteroskedasticity corrected standard deviations in parenthesis, (White)			
Adjusted R-sq	0.836	0.950	0.783
F-test	157.12***	81.19***	82.34***
Diagnostic LL	958.81***	1703.86***	1700.26***
Test statistics for the Classical Model			
Constant term only (1)	Log Likelihood = -787.71	LM test vs. Model (3) 247.82***	LM test vs. Model (3) 251.18***
	Group effects only (2)	LL = -565.38	
	X– variables only (3)	LL = -308.30	
	X-and group effects (4)	LL = 64.22	
	Hypothesis tests		
	(2) vs. (1)	LR test 444.66***	F test 5.20***
	(3) vs. (1)	958.81***	157.12***
	(4) vs. (1)	1703.86***	81.19***
	(4) vs. (2)	1259.20***	238.47***
	(4) vs. (3)	745.05***	11.78***

The correlation matrix of the variables is presented in the appendix. Screens and TOP10 are correlated.

The results in Table 5 indicate that critical valuation is important if the reviews have been made. The weekly increase in attendance figures is significant.

Table 5. Estimation results, all movies with previous admission in Helsinki and excluding monthly dummies and including cumulative screens lagged.

Model	OLS without group dummy variables	Random effects model	Fixed effects model
All Screens	1.079	0.545	0.190
	(0.181)***	(0.144)***	(0.156)
Ticket Price	-1.390	-0.508	-0.315
	(0.405)***	(0.221)*	(0.229)
Weeks since release	-0.899	-1.408	-1.653
	(0.088)***	(0.061)***	(0.058)***
Cumulative screens	0.259	0.004	-0.014
lagged	(0.024)***	(0.017)	(0.018)
Critical review	0.470	0.278	
	(0.064)***	(0.046)***	
No critical review	0.770	0.331	0.125
	(0.120)***	(0.082)***	(0.083)
Constant	5.127	7.954	
	(1.197)***	(0.818)***	
All variables except No Critics review in logs. Depending variable is log of weekly admissions, n = 520.			
Heteroskedasticity corrected standard deviations in parenthesis, (White)			
Adjusted R-sq	0.349	0.000	0.884
F-test	47.43***		36.19***
Diagnostic LL	229.49***		1244.91***
Test statistics for the Classical Model			
Constant term only (1)	Log Likelihood = -787.71	LM test vs. Model (3) 286.51***	LM test vs. Model (3) 246.43***
Group effects only (2)	LL = -565.38		
X– variables only (3)	LL = -672.96		
X-and group effects (4)	LL = -156.85		
Hypothesis tests			
(2) vs. (1)	LR test 444.66***	F test 5,20***	
(3) vs. (1)	229.49***	47.43***	
(4) vs. (1)	1261.72***	37.07***	
(4) vs. (2)	817.06***	258.00***	
(4) vs. (3)	1032.23***	23.83***	

2.5 Robust checking

The robustness of the findings above is checked in multiple ways. The estimation is made with alternative WOM measures and different sample sizes. Because there are two alternative variables (previous week's attendance in Helsinki and TOP10) published in the newspaper Nyt that measure WOM, the other is used to check the robustness of estimation. The WOM variables (previous week's attendance in Helsinki and TOP 10) are correlated (-0.832) and these cannot be used simul-taneously. The results are in Table 6 below, with critics' reviews only in OLS and random effects estimation. The robustness check is to drop the previous week's attendance in Helsinki because it is correlated with the overall attendance in Finland. Because of collinearity problems, the OLS estimates are not efficient.

Each movie has a different intercept in the fixed effects model (not shown). The number of screens, the time variable (weeks since release) and the critical reviews obtain similar results as in Table 5. However, the price variable is not significant and the seasonal variable (all screens) is significant in the random effects model. Because these variables are moderately positively correlated (0.252), the results indicate that during high season (other than summertime) either the average prices are higher or more probably firm attendees go to see a firm during the weekend when the prices in general are higher than during the weekdays. During the low season (summertime, see figure 1 in the appendix), film attendees might prefer more weekday evenings than during the high season and the admission tickets on average are cheaper.

Following the idea of Basuroy, Desai and Talukdar (2006), the following third alternative variable for WOM is used: the cumulative number of screens since its release, excluding the week in question. The results are shown below in Table 7. The results are in line with the previous results in which the WOM is TOP10. Using this specification but excluding the seasonal variable all screens and including monthly dummies, the results are otherwise similar (Table 5) to Table 7 although the price variable shows somewhat higher elasticity.

Table 6. Estimation results, all movies with previous admission in Helsinki and TOP10 as word-of-mouth.

Model	OLS without group dummy variables	Random effects model	Fixed effects model
Screens	0.687	0.738	0.696
	0.048)***	(0.032)***	(0.062)***
All Screens	0.630	0.248	-0.013
	(0.138)***	(0.096)*	(0.104)
Ticket Price	-0.514	-0.187	-0.133
	(0.158)***	(0.151)	(0.150)
Weeks since release	-0.238	-0.765	-1.042
	(0.064)***	(0.041)***	(0.058)***
TOP10	-0.664	-0.403	-0.312
	(0.088)***	(0.040)***	(0.040)***
Critical Review	0.241	0.149	
	(0.035)***	(0.031)***	
No Critical Review	0.212	0.078	-0.034
	(0.052)***	(0.056)	(0.048)
Constant	5.31	7.11	
	(0.688)***	(0.537)***	
Depending variable is log of weekly admissions, n = 520.			
Heteroskedasticity corrected standard deviations in parenthesis (White)			
Adjusted R-sq	0.817	0.754	0.946
F-test	332,40***		81.46***
Diagnostic LL	890.65***		1645.46***
Test statistics for the Classical Model			
Constant term only (1)	Log Likelihood = -787.71	LM test vs. Model (3)	LM test vs. Model (3)
		306.59***	270.36***
Group effects only (2)	LL = -565,38		
X– variables only (3)	LL = -342.38		
X-and group effects (4)	LL = 35.95		
Hypothesis tests			
(2) vs. (1)	LR test	F test	
	444,66***	5,20***	
(3) vs. (1)	890.66***	332,39***	
(4) vs. (1)	1647.32***	80.85***	
(4) vs. (2)	1202.66***	526.66***	
(4) vs. (3)	756.67***	12.43***	

In the appendix, further results are shown with the sample excluding the first week but consisting only of films that have been critically reviewed and published in the newspaper. The sample size is 205. These films are top-rated movies targeted for large audiences. The results are in line with pre-vious findings except for the results indicating that the attendance is unit elastic with respect to price and critical reviews regardless of the WOM variable used. As before, the fixed effects model favoured by the Hausman test shows no significance for the critical reviews variable. Second, the full sample (n=1060) results include the first week. Regardless of the WOM variable used, the critical reviews have a positive and significant effect on film admission. The dummy variable for the films not reviewed is with this sample always significant and negative, indicating that any review published in the newspaper from the lowest ("waste of time") to the highest ("superior") has a positive impact on attendance and is correlated with the unobservable WOM that explains the film being reviewed.

The price variable is not significant with the full sample.

In all samples (n = 1060, n = 520 or n = 205), the number of screens and the time variable (weeks since released) are always significant and the parameter estimates are reasonable. If the first week is excluded (n = 520 or n = 205), the absolute value of parameter estimate for the time variable appears to be lower than it is in the full sample, indicating that after the second week the admission figures diminish faster than they do in the first two weeks.

In the fixed effects model, the critical review variable is not significant if the first week is excluded. Although there is some variation in the variable within each firm, the variation is mostly captured in the individual constant variables. Therefore, the fixed effects model is not suitable for studying the effects of critical reviews on film admission.

Test statistics for the classical model indicate that conventional regression analysis (OLS) without group dummy variables is not suitable for explaining weekly movie admissions. The t-statistics for critical reviews variable that illustrates significance is misleading because of a misspecified model.

Based on the Finnish data, movie admission is inelastic with respect to the number of screens. The screen variable does not take into account the number of actual seats in the hall. Blockbusters with a vast admission are shown in larger auditoriums and with more daily showings than arts movies. Increasing the number of screens is not as flexible as increasing daily showings if the movie turns out be a blockbuster. If the number of screens is still increased, these are probably with lower numbers of actual seats; therefore, the relative admission increase is lower, which might explain the inelasticity.

Table 7. Estimation results, all movies with previous admission in Helsinki and cumulative screens lagged as word-of-mouth.

Model	OLS without group dummy variables	LSDV, Fixed effects model	Random effects model
Screens	0,993	0.821	0.909
	(0.034)***	(0.059)***	(0,032)***
All Screens	0.302	-0.058	0.165
	(0.117)**	(0.106)	(0.102)*
Ticket Price	-0.214	-0.190	-0.211
	(0.197)	(0.163)	(0,160)
Weeks since release	-0.335	-1.191	-0.898
	(0.047)***	(0.050)***	(0,046)***
Cumulative screens lagged	-0.060	-0.025	-0.045
	(0.013)***	(0.010)**	(0,012)***
Critical review	0.334		0.191
	(0.037)***		(0,033)***
No critical review	0.130	-0.064	0.045
	(0.063)*	(0.055)	(0,059)
Constant	5.01		6.81
	(0.730)***		(0,575)***
Depending variable is log of weekly admissions, n = 520			
Heteroskedasticity corrected standard deviations in parenthesis, (White)			
Adjusted R-sq	0.777	0.939	0.704
F-test	258.83***	71.83***	
Diagnostic LL	786.56***	1582.97***	
Test statistics for the Classical Model			
Constant term only (1)	Log Likelihood = -787.71	LM test vs. Model (3) 337.54***	
Group effects only (2)	LL = -565,38		
X– variables only (3)	LL = -392.42		
X-and group effects (4)	LL = 6.50		
Hypothesis tests			
(2) vs. (1)	LR test	F test	
	444,66***	5,20***	
(3) vs. (1)	786.56***	258.83***	
(4) vs. (1)	1588.42***	71.81***	
(4) vs. (2)	1143.76***	464.06***	
(4) vs. (3)	801.85***	13.91***	

2.6 Conclusions

This study proposes that positive critical reviews should have a positive impact on movie attend-ance, and the results indicate that this is true. The audience seeks information from different sources because movies are experience goods. When the audience watches a movie at a cinema, they enter into a purchase agreement with little knowledge of the particular movie unless they read critical reviews or obtain word-or-mouth information. The form of a movie is familiar but the content of a particular movie is not; therefore, the audience seeks additional information to avoid the risks of wasting money (Chang and Ki 2005).

Using weekly Finnish data and panel data estimation methods, this study shows that critical reviews and word-of-mouth have a significant impact on movie admissions. The critical review variable is the average value of five independent reviews published in the newspaper Nyt.

The role of theatre ticket price has been mainly missing in international movie admission literature. Although the variation in prices is rather small, this study shows that movie admission is price sensitive after the first week. Davis (2002) showed that the theatre demand is elastic with respect to price (approximately -2,3 to -4,1). In the Finnish data, movie demand price elasticity is in the range -0.5 to -1 after the first week. Conversely, conventional regression (OLS) analysis did not bring about significant and reasonable price elasticity estimates. Only panel data methods, particularly random effects models, are suitable for producing proper estimates.

The price inelasticity of movie admissions and the other results above indicate that movie attend-ance is an experience good. An important implication for movie distributors in Finland is that they should use a wide release strategy when the expected WOM is negative. In many cases, the release weekend is later than it is in larger, English-speaking countries. Hence, there is some knowledge about the WOM in other countries. With the wide release strategy, this negative WOM has less in-fluence because the strategy places more weight on the first week and the WOM has less circulation time. On the contrary, if the expected WOM is positive, movie distributors should use platform release with a small number of initial screens and an expansion later. As shown in the appendix (Table 11) the top firms by the number of overall spectators have a narrower release since the number of screens increases during the second week.

Actors' star power, director reputation and awards or nominations for awards have not been tested with the Finnish data because the share of domestic films in 2003 was only 14 % in premieres or 22 % in total admissions. The largest admis-

sion film in 2003 was domestic, and several main actors had received the Jussi Award, the most important Finnish award, several years before. It remains an open question whether these awards or well-known actors have had any impact on admissions or box office revenue, as is found to be the case for international awards such as Oscars.

Appendices

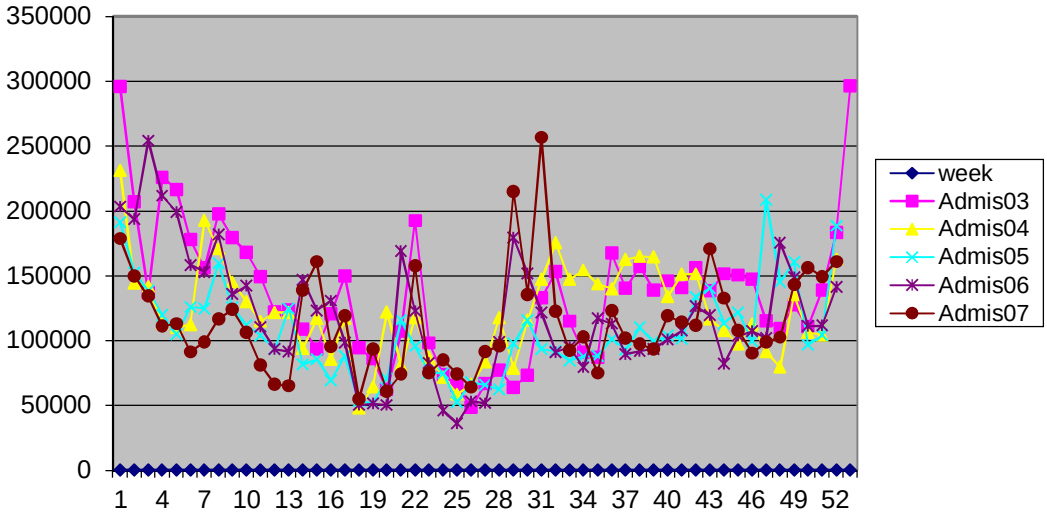

Figure 2. Weekly Total Admission, Years 2003 to 2007.

Table 8. Distributors' premieres in 2001–2003.

Distributor	2001	2002	2003	examples in 2003 (or late 2002)
Columbia Tristar Egmo	27	27	28	Terminator 3, Charlie's Angels, Bad Boys 2
FS Film	28	28	26	Lord of the Rings: The Two Towers, Lord of the Rings: Return of the King
Buena Vista	12	20	24	Bad Boys – A True Story, Sibelius, Pirates of the Caribbean
Scanbox	6	16	19	The Hours, The Human Stain, A la Folie
Sandrew Metronome	26	25	19	The Matrix Reloaded, The Matrix Revolutions, Harry Potter and The Chamber…
Cinema Mondo	19	17	16	The Pianist, Spirited Away, Stupeur & Treblements
Kamras Film Group	10	15	12	Good Bye Lenin, Nirgendwo in Africa, Cidade de Deus
UIP	20	17	12	Johnny English, Ring, Catch Me If You Can
Future Film	9	9	11	Swimming Pool, Evil Dead, Les vacances M Hulot
Senso Films	9	11	4	L'Ultimo bacio, Movern Callar, Last Orders
Rest; Kinoscreen, Rapid Eye Movie, Finnkino	5	7	6	Bella Martha aka Mostly Martha, Lejontämjaren, Pure
All premieres	171	192	177	

Table 9. Descriptive statistics for critical review rank (scale 1 – "top" to 10 – "lowest").

Variable	Mean	Median	sd	min	max	valid observationms	source	notes
Critical review, rank, 1st occurrence, display	6,92	8	2,57	1	10	133	Nyt	43 films are reviewed only once
Critical review, rank, 2nd display	6,11	6,5	2,50	1	10	90	Nyt	Critical reviews (index: 1 to 5) is shown twice for 27 films
Critical review, rank, 3rd display	5,75	6	2,66	1	10	63	Nyt	
Critical review, rank, 4th display	5,33	5	2,96	1	10	51	Nyt	
Critical review, rank, 5th display	5,14	4	2,93	1	10	37	Nyt	
Critical review, rank, 6th display	4,67	4	2,90	1	10	27	Nyt	
Critical review, rank, 7th display	3,90	3	2,85	1	10	19	Nyt	
Critical review, rank, 7th display	3,88	3	2,87	1	10	16	Nyt	
Critical review, rank, 8th display	2,75	2	1,93	1	7	12	Nyt	
Critical review, rank, 9th display	3,4	2	2,46	1	8	10	Nyt	
Critical review, rank, 10th display	3	3	1,58	1	5	9	Nyt	11 weeks: 1 film, 12 weeks: 2 films 14 weeks: 3 films, 15 weeks: 1 film 18 weeks: 1 film, 20 weeks: 1 film

Table 10. Correlations of variables.

n = 520	Screens	All screens	Price	Weeks since release	Previous week's attendance in Helsinki	Top 10	Critical reviews	Cumulative screens lagged
Attendance	0,818	0.296	0.032	-0.227	0.829	-0,729	0..197	0..203
Screens	1	0.249	-0.082	0.027	0.649	-0.577	-0.034	0.484
All screens		1	0.252	-0.101	0.343	0.002	-0.043	-0.028
Price			1	-0.347	0.182	-0.109	0.151	-0.184
Weeks since release				1	-0.357	0.342	-0.193	0.491
Previous week's attendance in Helsinki					1	-0.832	0.263	0.122
Top10						1	-0.271	-0.129
Critical reviews							1	-0.122
Cumulative screens lagged								1

Table 11. Duration of movie run, quantiles.

Variable	Mean	Median	Screens, five first weeks, mean	Screens, first week, mean	Screens, second week, mean	Screens, third week, mean
Top 10, duration of movie run, weeks	17.3	17	44.5	29.8	46.1	49.3
Films 11–20, duration of movie run, weeks	13.8	10.5	39.0	31.6	43.2	45.5
Films 21–30, duration of movie run, weeks	13.9	10.5	30.1	28.7	34.1	33.2
Films 31–40, duration of movie run, weeks	10.9	9	28.3	25.6	31.2	30.2
Films 41–50, duration of movie run, weeks	7.8	7.5	21.8	17.4	24.2	27.7
Films 51-60, duration of movie run, weeks	10	10.5	12.3	9.9	13.6	13.4
Films 61-70, duration of movie run, weeks	6.6	6.5	8.2	8.9	9.3	7.9
Films 71-80, duration of movie run, weeks	5.6	5	8.2	10.0	11.7	8.9
Films 81-90, duration of movie run, weeks	5.3	5	3.6	4.7	4.8	3.4
Films 91-100, duration of movie run, weeks	3.4	3.5	4.0	6.1	5.1	4.7
Films 101-110, duration of movie run, weeks	4	4.5	4.5	5.8	5.4	5.0
Films 111-120, duration of movie run, weeks	3	3.5	2.0	3.4	2.9	1.8
Films 121-130, duration of movie run, weeks	1.5	2	2.3	6.3	4.9	0.5

Table 12. Estimation results, n = 205.

Model	OLS without group dummy variables	LSDV, Fixed effects model (FEM)	Random effects model (REM)	LSDV, Fixed effects model (FEM)
Screens	0.818	0.777	0.937	0.789
	((0.091)***	(0.090)***	(0.055)***	(0.089)***
All Screens	0.406	0.153	0.210	0.143
	(0.237)	(0.161)	(0.145)	(0.165)
Ticket Price	0.332	-0.968	-0.944	-0.966
	(0.578)	(0.304)***	(0.335)**	(0.307)**
Weeks since	-0.475	-1.180	-1.036	-1.187
release	(0.121)***	(0.063)***	(0.054)***	(0.063)***
TOP10	-0.509	-0.148	-0.193	-0.142
	(0.168)**	(0.051)**	(0.053)***	(0.052)***
Critical review	0.664	0.523	1.031	
	(0.171)***	(0.669)	(0.277)***	
Constant	4.139		7.362	
	(1.16)**		(0.943)***	
Depending variable is log of weekly admissions, n = 201				
Standard deviations in parenthesis, heteroskedasticity corrected (White)				
Adjusted R-sq	0.816	0.969		0.970
F-test	149.70***	97.68***		99.58***
Diagnostic LL	347.34***	782.71***		782.04***
	Test statistics for the Classical Model			
	Constant term only (1)	Log Likelihood = -321.16	LM test vs Model (3) 113.89***	LM test vs Model (3) 34.84***
	Group effects only (2)	LL = -141.12	Hausman test (FEM vs REM): 40.36***	
	X– variables only (3)	LL = -147.49		
	X-and group effects (4)	LL = 70.20		
	Hypothesis tests			
	(2) vs (1)	LR test 360.08***	F test 11.66***	
	(3) vs (1)	347.34***	147.70***	
	(4) vs (1)	782.71***	97.68***	
	(4) vs (2)	422.63***	160.53***	
	(4) vs (3)	435.37***	17.25***	

Table 13. Estimation results, n = 205.

Model	OLS without group dummy variables	LSDV, Fixed effects model (FEM)		Random effects model (REM)	LSDV, Fixed effects model (FEM)
Screens	1.240	0.891		1.074	0.894
	(0.083)***	(0.091)***		(0.054)***	(0.090)***
All Screens	0.044	0.189		0.212	0.184
	(0.185)	(0.162)		(0.149)	(0.162)
Ticket Price	0.458	-1.016		-0.916	-1.014
	(0.538)	(0.308)**		(0.343)**	(0.309)**
Weeks since release	-0.460	-1.199		-1.033	-1.200
	(0.098)*	(0.063)***		(0.066)***	(0.063)***
Cumulative screens	-0.174	-0.027		-0.052	-0.028
lagged	(0.059)**	(0.006)***		(0.025)*	(0.006)***
Critical review	0.671	0.200		0.955	
	(0.173)***	(0.721)		(0.284)***	
Constant	4.655			6.898	
	(1.22)**			(0.958)***	
Depending variable is log of weekly admissions, n = 201					
Standard deviations in parenthesis, heteroskedasticity corrected (White)					
Adjusted R-sq	0.810	0.968			0.969
F-test	143.18***	93.55***			95.65***
Diagnostic LL	340.01***	774.21***			774.12***
	Test statistics for the Classical Model				
	Constant term only (1)	Log Likelihood = -321.16		LM test vs Model (3) 125.89***	LM test vs Model (3) 129.40***
	Group effects only (2)	LL = -141.12		Hausman test (FEM vs REM): 35.55***	
	X– variables only (3)	LL = -151.15			
	X-and group effects (4)	LL = 65.94			
	Hypothesis tests				
	(2) vs (1)	LR test 360.08***	F test 11.66***		
	(3) vs (1)	340.01***	143.18***		
	(4) vs (1)	774.21***	93.55***		
	(4) vs (2)	414.12***	152.95***		
	(4) vs (3)	434.20***	17.14***		

Table 14. Robustness checks: estimation results, full sample, n = 1060.

	OLS			FEM			REM		
Screens	0,865***	0,910***	0,943***	0,974***	1,011***	1,012***	0,929***	0,964***	0,977***
All screens	0,178*	0,109	0,083	0,069	0,024	0,029	0,128	0,079	0,079
Ticket price	-0,045	0,082	0,156	-0,08	-0,049	-0,046	-0,032	0,017	0,042
Weeks since release	-0,407***	-0,407***	-0,334***	-0,724***	-0,707**	-0,694***	-0,629***	-0,619***	-0,569***
Previous week's attendance in Helsinki	0,028***			0,016***			0,016***		
TOP10		-0,002			-0,012			-0,016	
Cumulative screens lagged			-0,025**			-0,004			-0,013*
Critical review	0,356***	0,359***	0,348***	0,232***	0,246***	0,249***	0,308***	0,317***	0,323***
No previ-ous week attendance	-0,047	-0,106	-0,130*	-0,147*	-0,143*	-0,141*	-0,042	-0,054	-0,023
No critical review	-0,312***	-0,440***	-0,440***	-0,142*	-0,243***	-0,228***	-0,202***	-0,307***	-0,290***

With the full sample using Top 10 and monthly dummies, the price variable is not significant but the critical review has similar coefficients, as shown in the table above.

Table 15. Estimation results, all movies critically reviewed and with previous week's Helsinki admission, n = 205.

Model	OLS without group dummy variables	LSDV, Fixed effects model (FEM)		Random effects model (REM)
Screens	0,642	0,740		0,866
	(0,050)***	(0,103)***		(0,052)***
Ticket Price	0,052	-0,976		-0,880
	(0,529)	(0,313)**		(0,301)**
Weeks since release	-0,284	-1,150		-0,959
	(0,076)***	(0,059)***		(0,054)***
Previous week's attendance	0,545	0,125		0,184
in Helsinki	(0,060)***	(0,034)***		(0,033)***
Constant	3,129			8,167
	(1,117)*			(0,665)***
Depending variable is log of weekly admissions, n = 205				
Standard deviations in parenthesis				
Adjusted R-sq	0,841	0,971		0,777
F-test	268,51***	74,02***		
Diagnostic LL	376,61***	792,65***		
	Test statistics for the Classical Model			
	Constant term only (1)	Log Likelihood = -322,30		LM test vs Model (3) 72,04***
	Group effects only (2)	LL = -141,72		Hausman test (FEM vs REM): 70,56***
	X– variables only (3)	LL = -133,99		
	X-and group effects (4)	LL = 74,02		
	Hypothesis tests			
	(2) vs (1)	LR test	F test	
		361,16***	11,69***	
	(3) vs (1)	376,60***	268,51***	
	(4) vs (1)	792,65***	106,18***	
	(4) vs (2)	431,48***	255,71***	
	(4) vs (3)	416,04***	15,62***	

With the full sample using Top 10 and monthly dummies, the price variable is not significant but the critical review has similar coefficients, as shown in the table above.

3 DEMAND FOR ICE HOCKEY – THE FACTORS EXPLAINING ATTENDANCE AT ICE HOCKEY GAMES IN FINLAND

3.1 Introduction

This paper uses regular season 2007–2008 Finnish ice hockey attendance figures to examine the sport's consumption and its search and experience good characteristics following Nelson (1970). The role of asymmetric information is analysed to evaluate optimal pricing policy. Simple economic theory suggests that the demand for attendance should depend on the ticket price of the game and travel costs, the incomes of spectators, the prices of substitute goods, and market size (Simmons 2006). There is a wide range of literature on attendance at sports events but none using Finnish ice hockey data. Because Finland is sparsely populated, the market size measured by the population of the home towns of the teams is rather small and the distances between teams' home towns are long. Do these factors have an impact on attendance figures? The regular series begins in the autumn when the temperature is still rather warm compared to the winter time and hence, large variations in the climate conditions might have an impact on attendance figures. Does this factor affect the way in which attendance at an ice hockey game demonstrates a search good characteristic? Are attend-ance and climate conditions correlated but with no causal relationship? In addition to these considerations, the previous literature on sporting events attendance has used several other explanatory variables, such as the unemployment rate as a proxy for income effects or the winning percentage as related to information costs and asymmetry. What is the role of these variables and what is the price elasticity? Is ice hockey an experience good because of the nature of the game? The quality of an experience good is difficult to observe in advance. Because the outcome of the game is not known before the game, we do not know whether the home team wins or loses the game and the surprise content of the game has an impact on attendance. However, because ice hockey is played as a series of games, the previous outcome, i.e., the winning percentage, is known and that signal can be used to evaluate the performance of the home team before the actual game. Hence, ice hockey also has some search good characteristics with no information asymmetry. However, the outcome of the game is more uncertain when the teams demonstrate similar previous performances.

A recent sport attendance survey[19] covers both active consumption (participation in sport competi-tions or being a member of a sport or gymnastic club) and passive consumption (attendance). The survey reveals that the most popular sports by attendance were ice hockey (25.5%), football (16.9%), athletics (10.6%), skiing (6.5%) and Finnish-rule baseball (5%). In this survey, 44% re-sponded that they had not attended any sports event between February 2005 and January 2006. This paper shows that both the market size (town population) of the home and the visiting teams have an impact on attendance and that the price elasticity is fairly low. The majority of studies indeed reveal that sporting events are priced in the inelastic range (Krautmann & Berri 2007), a finding that is also verified here.

Several studies have compared the attendance of sport activities between men's and women's games or between genders. The majority of studies show that there are more male than female spec-tators (see Vuolle, Telama & Laakso 1986, Gantz & Wenner 1991, Zhang, Pease, Hui & Michaud 1995, White & Wilson 1999 or Thrane 2001). Women appear to favour women's games, whereas men favour men's games (Kahle, Duncan, Dalakas & Aiken 2001). The sociology of sport con-sumption has revealed that the motives for attending women's games and men's games differ. Typically, the aesthetics of the game or competition is more important for women's team spectators and for female spectators (Ridinger & Funk 2006), while, e.g., tracking statistics is more important for men (Fink, Trail & Anderson 2002). The relationship between gender and active sport consumption, i.e., participation in sport competitions or being a member of a sport or gymnastic club, reveals only minor differences in Finland. Both genders are as active, but women seem to favour clubs with commercial purposes (e.g. gyms with aerobics), whereas men are more often members of sports associations that play games (Kansallinen liikuntatutkimus 2005–2006). Gymnastics at home and within a gymnastic association have been typically female, whereas fishing and hunting have been male sport activities (Marin 1988).

The relationship between gender and passive sport consumption, i.e., attendance at games, has been less frequently studied. Because men use more time to track statistics and read about sports in daily newspapers (Dietz-Uhler, Harrick, End & Jacquemotte 2000), a team's winning percentage or other previous performance measure of the team should be less important to explain women's teams' attendance figures. There are also differences between the importance of ticket pricing, friend influ-ence and family involvement in women's and men's (basketball in the USA) games (Fink, Trail & Anderson 2002); hence, the price elasticity of

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[19] Liikuntatutkimus 2005–2006, Sport Survey: Adult Population.

demand should differ. Women's games should be more ticket-price sensitive. Because in this study the men's games are examined, their price sensitivity should be rather low.[20] The third essay reveals that the typical sport spectator has a rather low educational level and the gender is more often male. This finding may cause reverse causality problems in using proxies for income as explanatory variables. In other words, attendance at ice hockey games is explained by low income, whereas for any single attendant the relationship between personal income and attendance at ice hockey games may be positive. The low-income spectator group is also more often univore (Chan and Goldthorpe 2005). A person is classified as univore if he/she is active in one sector of leisure activities or culture but not active in other fields of the culture. Omnivores have a higher probability of participating in everything from unpopular activities (e.g. opera, classical music) to popular ones (e.g. cinema, sport).

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[20] The sensitivity of attendance at ice hockey games and to its pricing also depends on the motivation. The sociology of sport consumption has revealed that there are substantial motive differences between genders. A well-known classification is the sport fan motivation scale (SFMS) by Wann (1995). The eight motives are as follows: eustress (i.e. the need for positive stress), self-esteem (i.e. the desire to maintain a positive self-concept through team success), escape (i.e. sport as diversion from boring everyday life), entertainment, economic (i.e. gamble on the events), aesthetic (i.e. sport as an art), group affiliation (i.e. need to belong), and family (i.e. opportunities to spend time with family). Wann conducted a quantitative examination with a 23-item Likert scale questionnaire. Using confirmatory factor analysis, the above-mentioned eight internally consistent, reliable and criterion valid motives were found. The original sample consisted primarily of university college students. Several studies, however, confirmed the results (e.g. Wann, Schrader & Wilson 1999, Wann, Royalty & Rochelle 2002, Wann, Robinson, Dick & Gillentine 2003, Ridinger & Funk 2006, Wann, Grieve, Zapalac & Pease 2008 or Koo & Hardin 2008). Eustress, self-esteem and group affiliation motives were more associated with team and aggressive sport types (e.g. football, ice hockey) rather than individual and nonaggressive sport types. Conversely, aesthetic motive was associated with individual and nonaggressive sport types (e.g., figure skating, tennis). Wann, Schrader & Wilson (1999) also classify sport spectators as intrinsically or extrinsically oriented. Fans who enjoy sport because of its aesthetics and artistic movement (intrinsic) may not be bothered by their favourite team's or individual's poor performance because the aesthetic performance of the event is present regardless of the outcome. However, extrinsic fans (self-esteem, economic motives) could find it unpleasant to watch their favourite team's games unless the team is victorious. Self-respect and self-fulfillment are more associated with women's team spectators (Kahle, Duncan, Dalakas & Aiken 2001), whereas self-indulgence is considered more of a men's team spectators' attribute. The opportunity to spend time with family and the sense of belonging or socialisation are attributes associated with women's sport spectators (Kahle, Duncan, Dalakas & Aiken 2001 or Ridinger & Funk 2006). Females appear to be sport fans more for social reasons (Dietz-Uhler, Harrick, End & Jacquemotte 2000), whereas males are more likely to be fans because they play sports and want to acquire sport information (e.g., read sport pages in newspapers).

Table 16. Sports consumption in Finland 2007 (source: ISSP 2007, observations n = 1354, using own calculations).

	Daily	Several times a week	Several times a month	Occasionally	Never	Total, n
Passive sports						
How often do you attend a sports activity?	4 (0.3%)	17 (1.3%)	82 (6.2%)	691 (52.3%)	526 (39.8%)	1320 (100%)
How often do you attend a sports activity? (Female)	1 (0.1%)	5 (0.7%)	38 (5.1%)	327 (44.2%)	369 (49.9%)	740 100%)
How often do you attend a sports activity? (Male)	3 (0.5%)	12 (2.1%)	43 (7.6%)	358 (63.3%)	150 (26.5%)	566 100%)
Active sports						
How often do you exercise sports?	301 (22.6%)	546 (41.0%)	272 (20.5%)	183 (13.8%)	28 (2.1%)	1330 100%)
How often do you exercise sports? (Female)	189 (25.5%)	308 (41.5%)	144 (19.4%)	92 (12.4%)	9 (1.2%)	742 100%)
How often do you exercise sports? (Male)	106 (18.5%)	230 (40.1%)	127 (22.2%)	91 (15.9%)	19 (3.3%)	573 100%)

Men attend a sports activity approximately 30% more than women, whereas in ice hockey, 75% of spectators are men. Active and passive (attendance) sports consumption are slightly positively correlated (Kendall's $\tau = 0.054$, n = 1314, sig. = 0.028). There is also a negative relationship between age and passive sports consumption (Spearman's $\rho = -0.182$, n = 1265, sig. = 0.000). For females, the negative relationship is somewhat stronger (Spearman's $\rho = -0.193$, n = 724, sig. = 0.000) than for males (Spearman's $\rho = -0.179$, n = 540, sig. = 0.000)[21] .

Another survey (Liikuntatutkimus 2005-2006, Sport Survey: Adult Population) on adult population sport consumption, both active and passive, in Finland was conducted[22] using a sample size of 5,510. In the survey, 44% of respondents said they had not attended any sports event between February 2005 and January 2006.

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[21] There is a significant difference between genders wherein males are more involved in passive sport consumption (attendance, Mann-Whitley U-test, z= -8,430, sig. = 0,000), whereas females are more active exercisers (Mann-Whitney U-test, z=-3,858, sig=0,000).

[22] Recent (February – March 2007) Eurobarometer 67.1 reports that nearly 56 % in the sample (n = 1054 in Finland) had not attended any sport event during the previous 12-month period. The figure was lower for males (44%) than for females (65%).

The results are roughly in line with the ISSP 2007 survey. The most popular sports in terms of attendance were ice hockey (25.5%), football (16.9%), athletics (10.6%), skiing (6.5%) and Finnish-rule baseball (5%). The largest positive correlation is between ice hockey and football attendance. Attendance and income level (8 categories from the lowest to the highest) are not correlated (not reported here).

Table 17. Attendance popularity and correlation with adult population in Finland, 2005–2006.

	Popularity	Ice Hockey	Football	Athletics	Skiing	F Rule Baseball
Ice Hockey	25.5% F: 14.6% M: 36.4%	1				
Football	16.9% F: 11.0% M: 22.8%	0.323 (0.000) F: 0.353 (0.000) M:0.193(0.000)	1			
Athletics	10.6% F: 9.9% M: 11.3%	0.093 (0.000) F: 0.133 (0.000) M: 0.031 (0.108)	0.123 (0.000) F: 0.156 (0.000) M:0.074 (0.000)	1		
Skiing	6.5% F: 6.3% M: 6.6%	0.009 (0.517) F: 0.002 (0.909) M: 0.015 (0.431)	0.022 (0.110) F:0.019 (0.315) M: 0.024 (0.216)	0.147 (0.000) F:0.150 (0.000) M: 0.143 (0.000)	1	
F Rule Baseball	5.0% F: 3.9% M: 6.1%	0.098 (0.000) F: 0.085 (0.000) M: 0.096 (0.000)	0.056 (0.000) F: 0.050 (0.009) M: 0.049 (0.010)	0.056 (0.000) F: 0.053 (0.006) M: 0.058 (0.002)	0.014 (0.295) F: 0.024 (0.212) M: 0.001 (0.942)	1
Source: Liikuntatutkimus 2005-2006, observations 5510. Significance in parenthesis. Legend: F = female n = 2754, M = male n = 2756						

3.2 Literature

There is an extensive body of literature explaining attendance at sporting events, especially in the USA, beginning with Demmert (1973) and Noll (1974). Conventional economic theory assumes that the demand base, measured as the incomes of the relevant market population and market size (population), should have an impact on attendance. Teams from larger cities should have larger attendance if the venue capacity allows it. Many teams are local monopolies with almost zero marginal costs of attendance. Hence, maximising profits equals maximising revenues, and the outcome should be to set ticket prices high enough to ensure unitary price elasticity. However, sporting events are usually priced in the inelastic range so that higher prices would increase profits (Krautmann & Berri 2007). Coates and Harrison (2005) studied major league baseball (MLB) attendance using a panel of data for the years 1969–1996. The team's home town population and winning percentage are positively significant variables for explaining attendance, whereas attendance is price inelastic irrespective of the price measure used. The

alternative ticket prices include "gate", measured as the ratio of total box-office income to total attendance, or "seat", measured as the weighted average of different categories of seat prices. Incomes in the home town do not appear to be statistically significant. Coates and Humphreys (2007) show similar results. Elsewhere, Depken (2000) shows that attendance at MLB baseball games is positively significant with the incomes of the home town and the team's payroll. Kahane and Shmanske (1997) report similar results and additionally show that changes in team structure (scorecard) have a negative effect on attendance. Relatively large scorecard changes between seasons diminish attendance.

Price inelasticity extends to other sports such as football (NFL, Depken 2001), basketball (NBA, Coates and Humphreys 2007), Australian-rule football (Borland and Lye 1992), English rugby football (Carmichael, Millington and Simmons 1999) and Spanish football (Garcia and Rodriguez 2002). Teams appear to reduce ticket prices to the inelastic range of demand to increase non-ticket revenues such as refreshment sales or broadcasting revenues (Fort 2004 or Krautmann & Berri 2007).

Conversely, there is some evidence of both price elastic and price inelastic demand in British football (Simmons 1996). Simmons argues that there is a remarkable difference between season ticket holders and occasional spectators who buy the ticket at the gate. Season ticket holders have lower price sensitivity than occasional spectators. Negative income elasticity or the positive effect of unemployment rates on attendance has been found in several studies, including Baimbridge, Cameron and Dawson (1996) with British football; Borland and Lye (1992) with Australian football; Falter and Perignon (2000) with French football. A positive coefficient has been found with home town incomes in some sports, including U.S. basketball (NBA, Coates and Humpreys 2007), U.S. baseball (MLB, Depken 2000 or Coates and Harrison 2005) or U.S. football (NFL, Depken 2001).

In addition to economic factors (ticket price, the cost of travel, the incomes of spectators, unemployment), Borland and MacDonald (2003) classify factors that determine attendance at a sport event into the following categories: 1) consumer preferences, 2) economic factors, 3) quality factors (venue facilities, weather conditions, weekday, advance ticket sales), 4) event characteristics (team success, outcome uncertainty, game significance), and 5) supply scarcity (stadium capacity). Consumer preferences or motivation factors have been outlined in the previous chapter.

Consumer preferences and quality factors are important in analysing the distance between the home town and the visiting team's town, which has a significant negative effect on attendance in MLB baseball (Knowles, Sherony and Haupert

1992). The farther a visitor travels, the fewer spectators the game attracts. During weekends, there are more spectators than during weekdays. With regard to MLB baseball, McDonald and Rascher (2000) show that sales promotions have a positive but diminishing effect on attendance. Although sales promotions result in larger attendance, excessive promotions are probably too expensive in terms of profitability. The competitive balance of the league is important for attendance (Schmidt and Berri 2001). If some teams "always" win and some "always" lose the games, spectators' motivation to attend decreases. Occasional strikes or lockouts in baseball have not had any significant and long-term effect on attendance (Schmidt and Berri 2002). During the 1994–1995 season, even a six-month strike did not have any long-term effects on attendance. Fans returned after the pause. This result is valid not only in baseball but also in football (NFL) and ice hockey (NHL), as shown by Schmidt and Berri (2004).

Quality factors such as games played outdoors or indoors and temperature or weather conditions might have different effects on attendance. Weather conditions particularly have been shown to affect outdoor sports attendance. Baimbridge, Cameron and Dawson (1995) and Jones, Schofield and Giles (2000) have shown that high temperatures and rain-free conditions have a positive effect on rugby football attendance in the UK. Spanish football attracts a larger audience when the weather is favourable (Garcia and Rodriguez 2002), a finding that is also valid for Australian football (Borland and Lye 1992) and Finnish football (Iho and Heikkilä 2008). During the spring, attendance is larger at football matches in France (Falter and Perignon 2000). When it is raining or snowing, attendance is lower at National College Athletic Association (NCAA) football games (DeSchriver and Jensen 2002). Conversely, Carmichael, Millington and Simmons (1999) show that low temperatures are associated with higher attendance in rugby football. Baimbridge, Cameron and Dawson (1996) find no statistical association between weather conditions and British football. Wilson and Sim (1995) show that attendance at Malaysian football games is higher at the beginning of the season than later in the year.

Event characteristics such as winning probability or team success have a positive impact on attendance (Boyd and Boyd 1998, Burdekin and Idson 1991, Coates and Harrison 2005, Coates and Humphreys 2007, Depken 2000, Depken 2001, Kahane and Shmanske 1997, McDonald and Rascher 2000, Simmons 1996), although the relation may not be linear and hence the inverse relationship also has been found (Baimbridge, Cameron and Dawson 1995). There is less excitement in the game if the results are known in advance. Uncertainty is often measured by the difference in league rank. (Borland and MacDonald 2003). Borland and MacDonald (2003), however, find the uncertainty to be a poor predictor of attendance

in Australian-rule football. The competitive balance has some importance (Schmidt and Berri 2001). The difference in the league rank is important at the tail end of the season because the playoff positions are determined at that time.

Wakefield and Sloan (1995) show that parking space, the quality of seats and general transportation possibilities to the stadium are more important for female attendees than for males. Appealing side services, such as the quality of parking space, the cleanliness of the stadium, adequate entrance hall space and eating possibilities during intermediate times appear to increase attendance (Wakefield and Sloan 1995). In this paper, the venue characteristics are not the focus because the spectator group has a masculine majority, wherein these factors are less important than they are for women. Bauer, Sauer and Exler 2005 show that men appear to be fans of only one team, their favourite, to which they are rather loyal. Peer group acceptance is important and men appear to have an emotional attitude towards the team. Supporters wear fan shirts and scarves. Admiration is associated with strong and enjoyable feelings (Heinonen 2005). Unreasonableness and superfluity are essential. The brand equity of a team has a significant positive impact on attendance in German football (Bauer, Sauer and Schmitt 2004). Mustonen, Arms and Russell (1996) show that the opportunity to view proficient ice hockey and to support the team are among the most important reasons to attend, whereas getting together and game violence, in particular, may be less important motives in Finland than in Canada.

None of the studies has analysed ice hockey admissions in view of the search good and experience good characteristics of hockey teams. The results appear to indicate price inelasticity in the short run, although they usually have been unable to separate the pricing of seasonal tickets from the rest. This study proposes several hypothesis by which the search good and experience good characteristics of ice hockey attendance can be evaluated using appropriate data.

3.3 A model explaining attendance

Based on the literature survey, consider a consumer whose preferences are represented by utility function U, which has ice hockey games x, the subjective quality expected before the actual consumption decision s, and other goods consumption y as arguments. The subjective quality of each game for each consumer depends on previous personal consumption experiences and public information. This public information can be a prognosis about the evening temperature, about weather conditions in general and about the earlier success of the home team.

(3–1) $U = U(sx,y)$

The wealth (labour and non-labour incomes) constraint is written as follows:

(3–2) $px + y = W$

where the other consumption prices are normalised to one and the price of the ice hockey game is p. The Lagrangian of the maximisation of the consumer utility, subject to the wealth constraint is shown by:

(3–3) $L = U(sx,y) + \lambda(px + y - W)$

The interior solution is then:

(3–4) $U_x = \lambda p$

(3–5) $U_y = \lambda$

in addition to the wealth constraint. The solution indicates that the ratio of the marginal utilities of ice hockey game consumption and other consumption is equal to the price ratio.

Based on Bauer, Sauer and Schmitt (2004) and Coates and Harrison (2005), it is plausible to assume that interest (i.e. the expected utility) towards the game is higher when the home team has won the previous games (note, however, that the reverse may occur if the outcome of the game becomes too certain). Both points per game from the beginning of the season and points from the last three games are suitable empirical measures for the winning ratio. Lévy-Garboua and Montmatquette (1996) model the expectations s are individual and based on past experience: $s_{it}^{t-1} = E_{t-1}(s_{i\tau})$ for the forthcoming period τ (τ=t, …T) conditional on the knowledge in t-1 (recent team success).

In the learning-by-consuming approach, a general constant marginal utility for wealth demand functions can be derived from the solution of the optimisation model:

(3–6) $s_{it}^{t-1}x_{it} = F_i(p,y_i,\lambda,\delta_i)$.

Because larger wealth (incomes) allows larger consumption, it is reasonable to also assume that ice hockey attendance increases with higher wealth. This result is verified in several studies (Kahane and Shmanske 1997, Depken 2000, Coates and Harrison 2005, Coates and Humphreys 2007). However, a negative income elasticity has been found in several studies as outlined in the previous survey. The literature on ice hockey game attendance has shown that the consumption

varies according to team or game specific factors and time specific factors, which are connected to spectator expectations, $s_{i\tau}^{t-1}$.

Lévy-Garboua and Montmatquette also acknowledge that the new consumption experience of the game x reveals a more accurate assessment of quality:

(3–7) $$s_{it}^{t} = s_{it}^{t-1} + \varepsilon_{it}$$

regardless of whether the spectator has been carefully watching the game or not because the public information also sharpens the assessment. Based on this knowledge, the spectator revises his expectations in an adaptive manner depending on success in the last and previous game with weight m_i and puts more weight on recent knowledge by forgetting at a constant rate $\delta_i > 0$:

(3–8) $$s_{i,t+1}^{t} = (1- \delta_i)[(1-m_i)s_{it}^{t-1} + m_i\, s_{it}^{t}] = (1- \delta_i)[s_{it}^{t-1} + m_i\, \varepsilon_{it}]$$

where $0 < m_i < 1$ is the weight given to the change in performance of the latest experience. Applying (3–7) to (3–8) by recurrence, the expectations in t-1 for all forthcoming periods are then:

(3–9) $$s_{i\tau}^{t-1}=(1- \delta_i)^{\tau-t}s_{it}^{t-1} \quad \tau =(t, \ldots, T)$$

The subjective qualities depend on all previous experiences and public information although the recent knowledge has more weight. Thus, based on the learning-by-consuming approach (Lévi-Garboua and Montmarguette 1996), current consumption does not have any direct impact on the utility coming from future consumption because experience only reveals the subjective preferences of the consumer. The rational addiction approach (Stigler and Becker 1977) is consistent with forward-looking behaviour because consumers are willing to sacrifice current utility to obtain larger utility in the future based on larger cultural capital (S-B definition) accumulation. The learning-by-consuming approach is compatible with the heterogeneity of tastes and the independence of individual choices and allows for the differentiation of cultural goods (Seaman 2006: 444). In this paper, the success of the last three games variable is compatible with the learning-by-consuming approach. The learning-by-consuming approach is related to the search characteristics of a good, regardless of how many previous games are taken into account when a decision is made regarding whether to attend a game.

The solution to the general utility maximisation model postulates that the demand for an ice hockey game; therefore, attendance depends on the price of the event (p), wealth (W), forgetting related variable (δ) as well as game and time specific variables. Consider a model to be estimated to explain ice hockey game attendance (ATT):

(3–10) $$ATT_{it} = \beta p_i + \varphi_i z_{it} + \gamma_i x_{it} + u_{it}$$

Where z_{it} is a vector of control variables (population, wealth, i.e. local unemployment rate, incomes, consumer confidence index), x_{it} is a vector of time and game-specific variables that are related to quality or spectators' expectations (distance, winning percentage, forgetting, played games, temperature, weekday), and u_{it} is the disturbance.

3.4 Data and variables

There are 14 teams playing at the men's highest level in the Finnish ice hockey league. The regular season in 2007–2008 was a four-fold series, i.e., 52 games per team, and teams located in Helsinki (HIFK and Jokerit) played an extra four mutual games, including two at their home stadium and two at a visitor's stadium. In addition, the remaining 12 teams played an extra four games in the subdivisions of three teams. The subdivisions were as follows: 1) Blues (home city: Espoo), Pelicans (Lahti), and SaiPa (Lappeenranta); 2) HPK (Hämeenlinna), Ilves (Tampere), and Tappara (Tampere); 3) JYP (Jyväskylä), KalPa (Kuopio), and Kärpät (Oulu); and 4) Lukko (Rauma), TPS (Turku), and Ässät (Pori)[23]. Altogether each team played 28 home games and 28 games as the visitor (Jääkiekkokirja 2008–2009: 55). The first regular season games were played in September 2007 and the last in March 2008. After that, some teams continued their games in the playoffs, and the champion (Kärpät) was determined in mid-April.

Jokerit from Helsinki posted the largest average attendance (8,591 per game), whereas the lowest figure was for HPK (3,281 per game). Jokerit has the largest stadium (Hartwall Areena) in terms of capacity, with 13,506 seats, while in Hämeenlinna (HPK) the number of seats was only 3,214 but with an additional 1,786 standing places, for a total of 5,000 spaces. Table 18 summarises the statistics for the average attendance of each team during the regular season 2007–2008. The stadium capacity was filled for 25 games during the season.[24]

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[23] The distance between the cities in these subdivisions are 1) Espoo – 114 km – Lahti – 152,5 km – Lappeenranta – 235,5 km – Espoo, 2) Hämeenlinna – 79,8 km – Tampere, 3) Jyväskylä – 148,9 km – Kuopio – 289,2 km – Oulu – 341,2 km – Jyväskylä, and 4) Rauma – 87,4 km – Turku – 135,9 km – Pori – 50 km – Rauma.

[24] 25/392 = 6.4 % of all games. Eight teams sometimes had a full house during the regular season, most often in Jyväskylä.

Larger cities such as Helsinki, Espoo, Tampere or Turku naturally have a larger attendance potential, but this factor does not fully explain the variation in attendance. Based on the coefficient of variation, the attendance variation is much higher for Jokerit and KalPa than for Kärpät, JYP, HPK or Pelicans. Altogether in the regular season, the number of games was 14 x 28 = 392 and the total attendance was 1.965 million, i.e., 5,012 per game. Other cultural events, such as the theatre, gathered a larger admission in 2007 of approximately 2.7 million but with a larger number of total presentations (about 13,000), which equals 207 per presentation. The Finnish national opera sold 162,555 tickets to 198 presentations (about 820 per presentation). In the highest football league, Veikkausliiga games, the admission number was 541,612 with 182 games (2,976 per game). Hence, in terms of cultural events attendance at live performances, ice hockey was second in the total number of cultural events but largest when compared to any single cultural activity. In non-live events, the movies exceed these figures four-fold, having approximately 6.5 million attendees (Statistical Year Book 2008 Finland and www.veikkausliiga.fi).

Table 18. Regular season 2007–2008 average attendance and capacity statistics.

Team and city (inhabitants 31.12.2007)	Home game average attendance (in relation to capacity) Capacity full (%)	Variation of attendance in home games: min – max (std) Coefficient of variation	Stadium capacity, seats (sitting, standing, others)
Blues, Espoo (238078)	4837 (70%) 0%	3706 – 6530 (693,5) V = 0,143	6914 (5633/230/1051 boxes)
HIFK, Helsinki (568458)	6573 (80%) 10.7%	5219 – 8200 (1023,4) V = 0,155	8200
HPK, Hämeenlinna (48429)	3281 (65%) 0%	2780 – 4395 (384,8) V = 0,117	5000 (3214/1786)
Ilves, Tampere (207802)	5914 (76%) 7.1%	4584 – 7800 (1026,0) V = 0,173	7800 (6635/1165)
Jokerit, Helsinki (568458)	8591 (64%) 0%	6203 – 13464 (1890,4) V = 0,220	13506
JYP, Jyväskylä (85360)	4054 (90%) 28.6%	3347 – 4500 (343,8) V = 0,084	4500 (2352/2148)
KalPa, Kuopio (91358)	3388 (65%) 0%	2512 – 4911 (722,3) V = 0,213	5225 (2767/2458)
Kärpät, Oulu (131611)	6054 (92%) 17.9%	5062 – 6614 (485,2) V = 0,080	6614 (4760/1854)
Lukko, Rauma (36794)	3733 (69%) 7.1%	2901 – 5400 (658,8) V = 0,174	5400 (3386/2014)
Pelicans, Lahti (99355)	4252 (87%) 0%	3505 – 4910 (485,2) V = 0,114	4910 (3410/1500)
SaiPa, Lappeenranta (59310)	3557 (73%) 3.6%	2881 – 4847 (533,4) V = 0,149	4847 (2810/2025/12 wheelchair)
Tappara, Tampere (207802)	5712 (73%) 7.1%	4193 – 7800 (1074,1) V = 0,187	7800 (6635/1165)
TPS, Turku (175335)	5978 (51%) 0%	3919 – 8394 (1155,0) V = 0,193	11820 (9042/2778)
Ässät, Pori (76277)	4234 (65%) 3.6%	3287 – 6472 (828,8) V = 0,195	6472 (3972/2500)

Source: Jääkiekkokirja 2007-2008 and Jääkiekkokirja 2008–2009.

Figure 3 shows that the attendance variation between teams and across the season is notable, which is also seen in the statistics in Table 18. According to statistical surveys conducted by national sports associations (SLU, Suomen Liikunta ja Urheilu, published in Statistical Year Book 2008, Finland), exercising through ice hockey is not as usual as football. However, the aim of this study is not to compare different sports but to explain ice hockey game attendance and its economic implications. The data are mainly from official sources (Statistics Finland, the Population Register Centre, the Finnish Meteorogial Institute, the Finnish Ice Hockey Association). Team performance information is revealed three times a week during the regular ice hockey season in both newspapers and sport news on television, confirming the search qualities of ice hockey games.

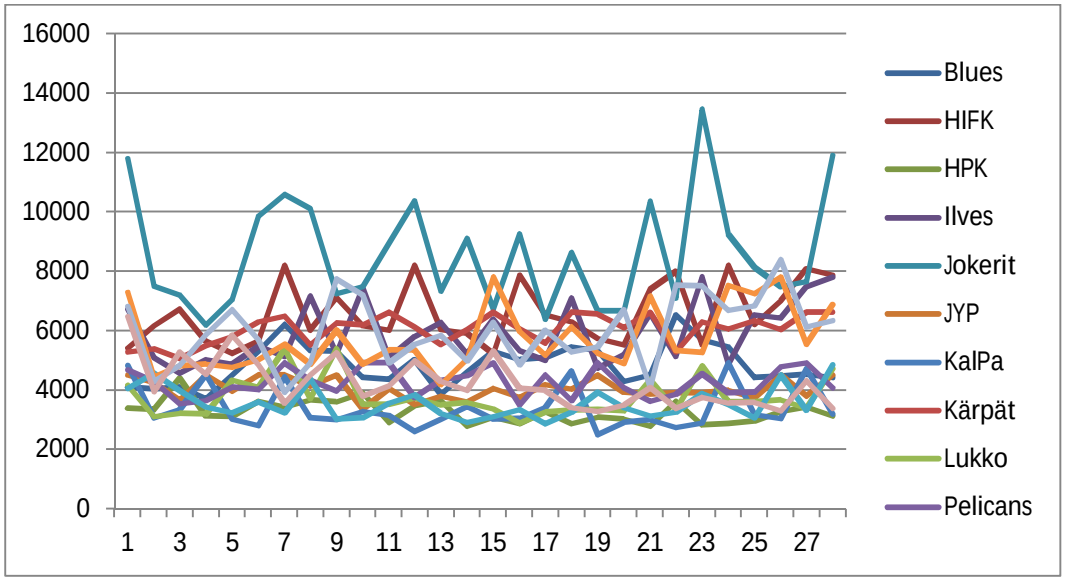

Figure 3. Attendance by teams and by game round in 2007–2008 season.

The forgetting related variable is associated with winning percentage. If spectators forget, the last games (form guide) are more relevant than the entire season success. This finding may increase asymmetric information between the spectators and the ice hockey teams that better know their current abilities also over a longer term. This result can be expected to increase the experience good character of the game. If forgetting is lower, the performance is also evaluated over a longer period among the spectators, in which case the randomness of the outcome decreases. This study measures forgetting by considering both: 1) winning percentage from the beginning of the season (points per game) and 2) points from the last three games. In addition, the Lévy-Garboua and Montmatquette forgetting model could have been applied.

A complete listing of non-modified (i.e. not logarithmic) variables is given in Table 19. Variables, except for the temperature and the weekday, are in logarithmic form in the estimations; thus, the parameter coefficients in estimation results are elasticities.

The game-specific factors in x_{it} are related to the winning ratio, the population of the home town and visitor's town and the distance between the towns. The regular season games yield points according to the following scheme: a win within normal playtime (60 min) yields 3 points, a win within extension time (60 min +) or a penalty shot win yields 2 points, a loss within extension time or after penalty shots yields 1 point, and a loss within normal playtime yields 0. Interest towards a game is larger when the home town population or visitor's town population is higher (Coates and Harrison 2005), whereas a larger distance between the home

town and the visitor's town should decrease interest towards the game (Knowles, Sherony and Haupert 1992). It is often the case that local games such as HIFK – Jokerit (both from Helsinki) or Ilves – Tappara (both from Tampere) produce a full house. A high unemployment rate in the region might reduce attendance because of lower average incomes; however, particularly in France, attendance at football games and unemployment rates are positively correlated. Both the regional unemployment level and average incomes are used to control for the wealth of the spectators. The incomes are measured annually and because the income variable is too rough, an additional monthly variable for more detailed changes in household income or expectations is used to reduce the possible bias. This approach may reduce the reverse causality because low-income men may be the main group of attendees. The proxies for business cycle are the consumer confidence index (CCI) separately for men (CCIM) and for women (CCIM) and the regional (Nuts-4 level) unemployment ratio.

In early autumn when the season begins, games obtain high interest because the team has new players and the lines are new (Wilson and Sim 1995). As time goes on, this interest might diminish and hence attendance also decreases. The number of games played since the beginning of the season is one of the empirical measures in this study for the time-specific factor.

Stadiums or halls have different price categories. For example, the ticket price at Blues' (Espoo) home games on club seats (201–206) was normally €27, on the second long side (207–211) €24, standing places (terraces) (212) €10, gable seats lower (101–102) €18, normal seat upper (401–406) €14, disabled persons €14, conscripts and students €10 (not Blues – HIFK, nor Blues – Jokerit). In addition, box owners pay €14 and children under 7 years are free when sitting on a parent's lap. Because Espoo and Helsinki are neighbouring towns, the ticket prices for games against HIFK or Jokerit (both from Helsinki) were €2 higher. HIFK also uses a €2 premium when the visitor is also from Helsinki, i.e., Jokerit. These prices were valid only when the ticket was bought in advance. When bought an the entrance, there was additional €1 charge. For empirical purposes, the variation is very challenging and because there was no data concerning the true distribution of seats taken, the ticket price of the best seat including local game excess fees are used as the price variable. For the Blues, this price is €27 or €29 with HIFK or Jokerit as visiting team throughout the regular season and not varying over time. Hence, all price variation is from ticket price variation between teams for local and non-local games. Between the seasons, the price shifts in the most expensive seats reflect the price shifts in all seats.

Time varying variables include the number of games played since the beginning of the season, the weather conditions and partially the weekday. The weekday effect takes into account the fact that during weekends there is usually a larger attendance. Garcia and Rodriguez 2002 note that in Spanish football, sunny weather prompts larger attendance than rainy weather. However, ice hockey is played indoors and in this case, weather (the temperature outside) might have an opposite effect. The maximum daily temperature relative to the average temperature over the years in the nearest meteorological observation site is used to measure the temperature[25]. The relative weather compared to the average in that time of year is an important choice because during the season, the weather cools over time from September until February.

The following hypotheses can be made based on earlier studies and the simple utility maximisation model above.

H1: Ice hockey is a search good.

H2: Home town and visitor's town population should have a positive impact on attendance, but because of geographical distance that proxies for travel expenses, the impact of the home town population should be larger than that of the visitor's and all these affect the search good characteristics of ice hockey admittance. Similar teams in terms of size and distance increase the randomness of outcomes and therefore also the experience good characteristics The asymmetric information increases with the randomness of outcomes that underline the experience good characteristics.

H3: Home (visitor) team's success or winning percentage has a positive (negative) impact on attendance, but the effect occurs over a longer period and hence has lower surprise contents than generally expected.

H4: Responding to the outside temperature indicates the search good characteristics of the ice hockey game.

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[25] For teams other than the Blues, HIFK, HPK and Jokerit, the observation site for temperature is usually the airport of the home town. The airport in Oulu (team: Kärpät) is located in the neighboring town, Oulunsalo, and the temperature for Blues (Espoo), HIFK and Jokerit (Helsinki) is measured at Helsinki-Vantaa Airport, which is located in the neighboring town of Vantaa. The temperature for the team of Hämeenlinna, HPK, is measured in Jokioinen, which is about 50 km from Hämeenlinna. For robustness tests, the maximum day temperature is also used, with similar results.

We select important controls for estimating price and income elasticities. To begin with, the real costs related to the travel expenses are separately controlled. Because a portion of the travel expenses can be measured by the geographical distance between the home team and the visitor, the distance measure should be negative. This measure reduces the bias in the price elasticity. The inclusion of a weather condition variable also reduces the bias in the price elasticity. Because the income variable is approximate and subject to reverse causality concerns, an additional monthly variable for more detailed changes in household income or expectations is used to reduce the possible bias.

The following Table 19 shows the source of the data.

Approximately 31 % of the games were played on Saturdays, approximately 27 % on Thursdays and approximately 25 % on Tuesdays. In addition, a few games were played on Mondays (< 3 %), Wednesdays (< 5 %), Fridays (> 6 %) and Sundays (> 3 %). Somewhat more frequently there were Monday games in larger towns (r = 0,109) against teams from far away (r = 0,106). There appear to have been more games on Fridays in larger towns (r = 0,121), which appear to have reduced the number of Saturday games (r = -0,128). Otherwise, the weekday variables do not seem to correlate with other variables.

Table 19. Variables, measurement, source and expected sign.

Variable	Measure	Source	expected sign
Population	home town population, monthly and visitor's town population, monthly	Population Register Centre	+
Distance	distance between home town and visitor's town	Stadium address http://www.sm-liiga.fi distance: http://kartat.eniro.fi	-
Team's success	home team's points per game (logHPoin): if zero, then replaced by 0.01	own calculations based on Jääkiekkokirja 2007–2008	+
Team's success	visitor's points per game (logVPoin): if zero, then replaced by 0.01	own calculations based on Jääkiekkokirja 2007–2008	?
Team's success	home team's points from 3 last games (logHLast): if zero, then replaced by 0.01	own calculations based on Jääkiekkokirja 2007–2008	+
Team's success	visitor's points from 3 last games (logVLast): if zero, then replaced by 0.01	own calculations based on Jääkiekkokirja 2007–2008	?
Certainty or predictability of outcome	Absolute value of the difference in home team's points per game and visitor's points per game, uncertainty is the reverse!	own calculations based on Jääkiekkokirja 2007–2008	-
Incomes	Regional household's annual incomes, years 2007 (for Fall season) and 2008 (spring season), NUTS4	Statistics Finland	?
Consumer Confidence Index	Consumer Confidence index (CCI), monthly, CCIM = CCI for men, CCIW = CCI for women	Statistics Finland	?
Unemployment	regional (NUTS4) unemployment rate (Unempl)	http://www.tem.fi	?
Games played	played games because the beginning of the season (logHGame) if zero, then replaced by 0.01	own calculations based on Jääkiekkokirja 2007–2008	-
Ticket price	*ticket price* (logPrice)	Jääkiekkokirja 2007–2008	-
Weather conditions	temperature at nearest observation site (temp)	http://www.tutiempo.net/	?
Temperature difference	Daily average temperature at the nearest observation station, years 1960–1990	Tilastoja Suomen ilmastosta 1961–1990 – Climatological statistics in Finland 1961–1990	?
Weekday	weekday, two dummies TU (Tuesday) TH Thursday)		TU – TH –

The descriptive statistics and correlation of the variables (before taking logarithms) are shown in the Appendix.

The correlation matrix shown in the appendix reveals that ticket prices are higher in larger towns and appear to have a positive relation with attendance and incomes (households' annual average incomes in the NUTS4-region). The income expectations are additionally controlled by the monthly consumer confidence index (CCI). There are three alternatives as follows: CCI and CCI for men and for women. CCI for men should have a larger impact on attendance than the other

two alternatives[26]. The number of home team games and the number of visitor's games were (naturally) highly positively correlated (not shown). Points per game from the beginning of the season and points from the last three games were positively correlated with a correlation coefficient of 0.64 and therefore used as alternative measures. The regional unemployment rate appears to have been higher in areas with smaller towns. The temperature appears to have been lower when the number of games increased, likely with a relation of inverse U or inverse J. According to long-term statistics (1900–2000), the temperature in Helsinki (Kaisaniemi observation site) has been +11,1 Celsius in September, +6,2 Celsius in October, +1,5 Celsius in November, -2,1 Celsius in December, -4,7 Celsius in January, -5,7 Celsius in February and -2,2 in March (Ilmatieteen laitos 2009). Because of a possible bias in interpretation, the temperature differences (TempDiff) are measured as deviations from these long-run averages.

The certainty or the predictability of outcome is measured by the absolute difference of teams' success. A smaller difference relates to equal strength of the teams and hence the outcome of the game is more uncertain. The uncertainty measure is measured as the absolute difference in teams' points per game, and hence a lower value of the variable means that the uncertainty increases. When there is a larger change of evenness in a game within a season, a greater share of games will be significant and the higher is the attendance (Borland and MacDonald 2003).

3.5 Estimation

Conventional regression analysis is assumed to produce the most reliable results (although biased because of heterogeneity). Time-series and cross-section studies that do not control heterogeneity might yield biased results. An alternative for conventional regression analysis is the panel data method. The benefits of using panel data include the following points: (1) individual heterogeneity can be controlled, (2) estimated parameters are more efficient and (3) the dynamics of adjustment can be better studied (Baltagi 2008: 6–7). There are a large number of different approaches for the panel data. With pooled regression, the heterogeneity effect contains only a constant term and the OLS provides consistent and efficient estimates of the slope coefficients. If the heterogeneity is unobserved but correlated with observable variables, the OLS is biased because of omitted variables,

[26] The CCI is based on a telephone survey by Statistics Finland during the first two or three weeks of the month. The target area is the entire country, representing the 15- to 84-year-old population. The results are presented according to age, gender, the province of domicile and native language.

whereas a fixed effects approach estimates the group-specific (cross-section dimension) constant term $\acute{\alpha}_i$. If the individual heterogeneity is uncorrelated with the included variables, the random effects approach specifies that there is a group-specific random element (Greene 2008: 183). However, the main method is a pooled regression. Results are adjusted for heteroskedasticity, which is tested using the White test.

The favourite model 1 include controls for the distance and regional unemployment rate. The model uses the price of the ticket, the population in the home town and visitor's town, the round, the teams' success or winning ratio and the difference between the long-run average of the maximum temperature in the day and dummies for Tuesday and Thursday. All parameter estimates except the temperature difference, game round and the price variable in the pooled estimation are statistically significant, have the right sign and are plausible. The attendance is more sensitive to ticket price, whereas the value would be only -0.19 if the distance measure and regional unemployment are dropped from the model. The home town population coefficient parameter is positive as expected. The population of the visitor variable also yields a positive coefficient, although the magnitude is approximately one-eighth that of the home town. The distance between the home town and the visitor's town appears to be significant because the longer the distance, the less the attendance. As the distance increases from 50 km to 100 km, attendance diminishes by 2½ percent. Game round has a diminishing effect on attendance, which was also found by Wilson and Sim (1995) with Malaysian football[27]. Finally, the Saturday effect is substantial; the audience is approximately 10–11 percent larger than on Tuesdays or Thursdays. Other weekday dummies are not significant (not reported here).

The predictability of outcome of the certainty measure parameter coefficient in the estimations is negative and significant so that more uncertainty increases attendance (recall that a smaller difference in the winning percentage increases the uncertainty). The uncertainty variable verifies the hypothesis that the uncertainty of the outcome of the game increases attendance and related asymmetry in information increases the experience-good content of the ice hockey game.

The stadium capacity is invariable over the year and the fixed effects model cannot be estimated. It is also seen that including this factor as explanatory decreases

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27 With otherwise similar estimation but using the maximum temperature instead of the temperature deviation from the long-run averages, the parameter coefficients are in line with those shown in Tables 20. The temperature variable is significant.

the price inelasticity. Hence, teams with the largest stadiums such as Jokerit and HIFK in Helsinki also have the audience that is most sensitive to the price of tickets. Recall that the largest portion of price variation is explained by between-team effects.

Table 20. Model 1 estimation results without and with the uncertainty variable.

	OLS	Fixed	Fixed	Random	OLS	OLS	Fixed	Fixed	Random
Ticket Price	-0.288 (0.105)**	0.692 (0.172)***		0.518 (0.169)***	-0.065 (0.098)	-0.281 (0.109)**	0.682 (0.173)***		0.514 (0.167**
HomePopulation	0.370 (0.029)***	8.70 (6.63)		0.163 (0.064)***	0.231 (0.029)***	0.366 (0.027)***	8.351 (6.301)		0.147 (0.063)*
Visitor Population	0.048 (0.012)***	0.020 (0.010)**	0.033 (0.009)***	0.025 (0.009)***	0.047 (0.010)***	0.049 (0.011)***	0.021 (0.009)**	0.034 (0.009)***	0.026 (0.009)***
Stadium Capacity					0.480 (0.043)***				
Distance	-0.037 (0.009)***	-0.038 (0.007)***	-0.046 (0.007)***	-0.039 (0.007)***	-0.031 (0.007)***	-0.034 (0.009)***	-0.037 (0.007)***	-0.044 (0.007)***	-0.037 (0.007)***
Home Game	-0.010 (0.010)	0.009 (0.010)	0.014 (0.009)	0.008 (0.008)	-0.019 (0.007)*	-0.008 (0.010)	0.010 (0.010)	0.016 (0.009)	0.009 (0.008)
Home Points	0.075 (0.016)***	-0.005 (0.015)	-0.007 (0.016)	0.002 (0.015)	0.094 (0.023)***	0.077 (0.017)***	0.002 (0.013)	0.000 (0.016)	0.008 (0.015)
Visitor Points	-0.065 (0.016)**	-0.013 (0.013)	-0.014 (0.013)	-0.018 (0.013)	-0.074 (0.020)***	-0.073 (0.016)***	-0.022 (0.011)*	-0.024 (0.013)	-0.027 (0.013)*
Uncertainty					-0.055 (0.028)*	-0.058 (0.019)***	-0.044 (0.012)***	-0.045 (0.015)**	-0.043 (0.015)**
Unemployment	0.126 (0.062)*	-0.399 (0.200)*	-0.422 (0.201)*	-0.157 (0.149)	0.326 (0.051)***	0.127 (0.060)*	-0.496 (0.206)*	-0.522 (0.201)**	-0.208 (0.148)
Tuesday	-0.110 (0.022)***	-0.120 (0.015)***	-0.118 (0.017)***	-0.115 (0.017)***	-0.104 (0.019)***	-0.114 (0.023)***	-0.124 (0.015)***	-0.122 (0.017)***	-0.118 (0.017)***
Thursday	-0.120 (0.022)***	-0.114 (0.015)***	-0.121 (0.017)***	-0.115 (0.013)***	-0.108 (0.018)***	-0.120 (0.021)***	-0.115 (0.014)***	-0.121 (0.016)***	-0.115 (0.016)***
TempDiff	-0.004 (0.002)	-0.002 (0.002)	-0.001 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.004 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.002 (0.002)
Constant	4.52 (0.410)***			5.16 (0.954)***	0.789 (0.430)	4.531 (0.393)			5.467 (0.950)***
Standard deviations in parenthesis, heteroskedasticity corrected, White. All variables except weekdays and temperature difference in logarithm. n = 392									
Adjusted R-sq	**0.676**	**0.828**	**0.822**		**0.761**	**0.682**	**0.830**	**0.825**	
F-test	**75.05*** **	**79.62*** **	**82.97*** **		**96.77*** **	**71.02*** **	**80.30*** **	**81.52*** **	
Diagnostic LL (χ^2)	**452.57*** **	**715.65*** **	**698.86*** **		**574.32*** **	**461.87*** **	**718.46*** **	**708.53*** **	
Breush-Pagan LM (χ^2)	**14.19**				**39.83*** **				
	Test statistics for the classical model								
	Constant term only (1)	**LL = -106.32**	**LM test vs Model (3): 736.02*** **			**LL = -106.32**		**LM test vs Model (3): 732.28*** **	
	Group effects only (2)	**LL = 176.21**	**Hausman test (FEM vs. REM): 23.17***			**LL = 176.21**		**Hausman test (FEM vs. REM): 24.34***	
	X-variables only (3)	**LL = 119.96**				**LL = 124.61**			
	X- and group effects (4)	**LL = 251.50**				**LL = 256.22**			
	Hypothesis tests								
	(2) vs. (1)	**565.06*** **	**93.83*** **			**93.83*** **			
	(3) vs. (1)	**452.57*** **	**75.05*** **			**71.02*** **			
	(4) vs. (1)	**715.65*** **	**79.62*** **			**78.44*** **			
	(4) vs. (2)	**150.59*** **	**15.63*** **			**15.38*** **			
	(4) vs. (3)	**263.08*** **	**27.00*** **			**26.95*** **			

Because of limited variation in home town population and ticket price, the fixed effects model is also estimated excluding these variables. The home town population is measured monthly and therefore the variation is relatively small.

Three of our hypothesis are supported. Price elasticity is not very low and hence search good content is higher for ice hockey admission (hypothesis H1). Earlier a low price elasticity has been explained by the fact that side revenues such as refreshment sales are important. Here, the explanation is that ice hockey is a search good; therefore, past experiences accumulate information about the quality of the home team. Because frequent purchasers are more experienced searchers, search costs decrease; therefore, larger sizes, i.e. loyalty for the home team are more optimal. The substitute for ice hockey attendance is passive leisure because the spectators are not omnivores and consider other active leisure activities as substitutes. Conversely, the uncertainty of the outcome also indicates experience good characteristics. Similarly, the price elasticity is lower if the share of season ticket holders increases. Overall, similar teams in terms of size and distance increase the randomness of outcomes and therefore are closest to experience good characteristics (hypothesis H2). Home (visitor) team's success or winning percentage has a positive (negative) impact on attendance, but the effect occurs over a longer period and hence has lower surprise contents than is generally expected (hypothesis H3) Weather conditions, measured as the outside temperature, have no significant impact on attendance and thus do not support the search good characteristics of the ice hockey game (hypothesis H4). Conversely, ice hockey is an indoor sport and bad weather may lead those active in sports generally to shift from active outdoor sports to indoor sports.

3.6 Robustness tests

In this section, a wide range of robustness checks are performed. Rather than the regional unemployment rate, households incomes (regional, NUTS4-level) are used to control for spectators' incomes in specifications 3 and 4. For the fall season from September to December 2007, the annual household incomes for the year 2007 are used, whereas for the spring season from January to March 2008, the annual household incomes for the year 2008 are used. Because of the coarse nature of annual incomes, a more detailed effect of incomes is obtained by using a monthly variable measuring consumer confidence (CCI). The specifications 3 to 6 in Table 21 reveal that the incomes have a negative impact on attendance. This result is in line with several studies (Borland and Lye 1992, Baimbridge, Cameron and Dawson 1996, Falter and Perignon 2000). Finally, the gender effect is studied by using a consumer confidence index separately for men and women in

specifications 7 and 8. Attendance is more sensitive for men's consumer confidence than for women's confidence. The temperature has interesting effects on attendance because low temperatures appear to attract a larger audience. The different specifications confirm the impact of temperature; however, this impact is not very large: a temperature of one degree Celsius lower results in approximately 0.5 percent higher attendance. Because the average attendance is about 5,000, this means 25 spectators. Ice hockey is a game played indoors and thus the effect of temperature is different than in football or other outdoor sports.

Table 21. Robustness tests.

Pooled regression, OLS	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ticket Price	-0.273	-0.288	-0.324	-0.342	-0.271	-0.273	-0.355	-0.332	-0.331
	(0.105)**	(0.105)**	(0.111)***	(0.112)**	(0.109)*	(0.109)*	(0.106)***	(0.111)***	(0.109)**
Home Population	0.355	0.370	0.376	0.384	0.369	0.372	*0.894*	*0.860*	0.379
	(0.028)***	(0.029)***	(0.031)***	(0.031)***	(0.030)***	(0.029)***	*(0.070)***	*(0.069)***	(0.030)***
Visitor Population	0.047	0.048	0.048	0.049	.0.047	0.046	*0.113*	*0.109*	0.042
	(0.012)***	(0.012)***	(0.012)***	(0.012)***	(0.011)***	(0.011)***	*(0.026)***	*(0.069)***	(0.012)***
Distance	-0.037	-0.037	-0.039	-0.039	-0.038	-0.038	-0.039	-0.039	-0.037
	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.009)***
Home Game	-0.032	-0.010	-0.031	-0.009	-0.060	-0.052	-0.059	-0.044	-0.037
	(0.012)**	(0.010)	(0.013)**	(0.010)	(0.014)**	(0.013)***	(0.014)**	(0.013)**	(0.011)***
Home Points	0.083	0.075	0.088	0.081	0.101	0.100	0.095	0.098	
	(0.016)***	(0.016)***	(0.016)***	(0.016)***	(0.017)***	(0.017)***	(0.017)***	(0.017)***	
Visitor Points	-0.058	-0.065	-0.062	-0.068	-0.053	-0.055	-0.053	-0.058	
	(0.016)***	(0.016)***	(0.016)***	(0.016)***	(0.016)***	(0.016)***	(0.015)***	(0.016)***	
Home3Last									0.017
									(0.005)***
Visitor3Last									-0.001
									(0.005)
Unemployment	0.084	0.126							
	(0.061)	(0.062)*							
Incomes			-0.963	-1.071	-0.090	-0.026	-1.135	-1.023	0.057
			(0.370)***	(0.371)***	(0.413)	(0.404)	(0364)***	(0.363)***	(0.406)
CCI					-0.616	-0.700			-0.604
					(0.146)***	(0.140)***			(0.143)***
CCI Men							-1.008		
							(0.202)***		
CCI Women								-0.486	
								(0.135)***	
Tuesday	-0.111	-0.110	-0.116	-0.116	-0.123	-0.121	-0.119	-0.117	-0.113
	(0.022)***	(0.022)***	(0.022)***	(0.022)***	(0.021)***	(0.021)***	(0.021)***	(0.021)***	(0.022)***
Thursday	-0.122	-0.120	-0.123	-0.122	-0.127	-0.127	-0.127	-0.125	-0.118
	(0.022)***	(0.022)***	(0.021)***	(0.022)***	(0.021)***	(0.021)***	(0.021)***	(0.021)***	(0.021)**
Temperature	-0.005		-0.005		-0.002				
	(0.002)*		(0.002)*		(0.002)				
Temperature Difference		-0.004		-0.003		-0.005	-0.005	-0.005	-0.006
		(0.002)		(0.002)		(0.002)*	(0.002)*	(0.002)*	(0.002)**
Constant	4.79	4.52	9.25	9.64	6.00	5.78	11.59	10.46	5.40
	(0.411)***	(0.410)***	(1.57)***	(1.58)***	(1.70)***	(1.67)***	(1.60)***	(1.59)***	(1.67)**
Adjusted R-sq	0.676	0.676	0.681	0.679	0.695	0.699	0.699	0.686	0.680
F	75.33***	75.05***	78.72***	76.20***	75.25***	76.70***	76.68***	72.38***	70.21***
Breush-Pagan LM	11.66	14.19	11.09	13.73	14.67	14.52	13.36	11.59	15.06

Heteroskedasticity corrected (White) standard deviations in parenthesis. N = 392
In specifications 8 and 9 the population variable is either the male population (8) or female population (9), therefore the variable coefficients are different than in other specifications

The robustness is also tested excluding the teams that have most frequently had full capacity (JYP and Kärpät). The results (not shown) are in line with those shown above in Table 21. The ticket price elasticity is somewhat lower (-0.156) and the weekday dummies also are somewhat lower (Tuesday -0.149 and Thurs-

day -0.147), indicating that the two teams excluded have a more restrictive capacity; in other words, their stadiums are too small.

The home team's success or winning ratio (home points or Home3Last) appears to attract more spectators because these variables yield a positive coefficient regardless of the model. Conversely, the visitor's success appears to decrease attendance (visitor points), whereas the recent success in terms of the last three games (Vis3Last) does not appear to be significant, as outlined in specification 10. The low degree of forgetting supports the search good characteristics of ice hockey attendance, thus supporting hypothesis H3. If the home team falls into a losing circle, the attendance also decreases. In these models, visitor's last three game points (Vis3Last) do not appear to significantly explain the attendance of the game, whereas the home team's last three game points seem to explain attendance[28].

The majority of the hypotheses are verified. The price and distance variable parameters are negative as proposed. The home town population has a larger positive coefficient than the visitor's town population. The previous performances of the teams help to explain attendance, as suggested in hypothesis 3. The weather conditions have a small but significant impact on attendance.

The specifications for the top teams (Table 22) show that uncertainty has either a negative impact or no impact at all on attendance, indicating that top teams' fans do not favour the uncertainty of the outcome. However, because the uncertainty measure (inverse) for the top teams is often large and by definition always positive[29], the measure may capture the role of winning percentage. The specifications for the weakest teams verify that explanation because the uncertainty measure is not significant in any estimation in the Table 23.

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[28] An alternative to the success variables shown in Table 21 (either points per game or the 3 last games' success) outlined earlier is the first-quarter success. The results (not shown) are similar. In addition, the uncertainty variable is fairly robust, ranging from -0.045 to -0.058, always negative as expected.

[29] It is always positive because it is the absolute difference in points per game.

Table 22. Ice hockey attendance, top teams.

Pooled regression, OLS	(11)	(12)	(13)	(14)	(15)	(16)
	Top teams	Top teams	Top teams	Top teams	Top teams	Top teams
Ticket Price	-1.116	-0.727	-1.110	-0.735	-1.125	-0.758
	(0.139)***	(0.149)***	(0.137)***	(0.150)***	(0.154)***	(0.165)***
Home Population	0.651	0.290	0.660	0.296	0.657	0.300
	(0.049)***	(0.010)**	(0.051)***	(0.108)***	(0.050)***	(0.106)***
Visitor Population	0.082	0.063	0.083	0.064	0.095	0.077
	(0.017)***	(0.014)***	(0.017)***	(0.015)***	(0.18)***	(0.015)***
Distance	-0.021	-0.025	-0.009	-0.014	-0.013	-0.017
	(0.015)	(0.014)	(0.016)	(0.014)	(0.016)	(0.014)
Stadium capacity		0.528		0.530		0.518
		(0.134)***		(0.137)***		(0.137)***
Home Game	0.033	0.028	0.010	0.001	0.027	0.020
	(0.024)	(0.023)	(0.018)	(0.017)	(0.020)	(0.020)
Home Points	-0.242	-0.153				
	(0.238)	(0.223)				
Visitor Points	0.611	0.594				
	(0.155)***	(0.161)***				
Uncertainty	0.547	0.533	-0.058	-0.047	0.066	0.078
	(0.162)***	(0.172)***	(0.037)	(0.034)	(0.096)	(0.088)
Home3Last			0.020	0.022		
			(0.011)	(0.011)*		
Visitor3Last			0.013	0.016		
			(0.011)	(0.011)		
Home14first					0.017	0.032
					(0.168)	(0.151)
Visitor14first					0.168	0.176
					(0.090)	(0.083)*
Incomes	-3.681	-2.537	-3.745	-2.583	-3682	-2.500
	(0.739)***	(0.667)***	(0.766)***	(0.770)**	(0.790)***	(0.770)**
CCI	-0.184	-0.213	-0.273	-0.315	-0.175	-0.214
	(0.221)	(0.192)	(0.230)	(0.203)	(0.240)	(0.207)
Tuesday	-0.070	-0.077	-0.096	-0.106	-0.081	-0.088
	(0.032)*	(0.029)**	(0.036)**	(0.032)**	(0.033)**	(0.029)**
Thursday	-0.078	-0.078	-0.098	-0.100	-0.088	-0.088
	(0.028)**	(0.026)**	(0.028)***	(0.026)***	(0.028)**	(0.026)**
Temperature Differ-	-0.001	-0.001	-0.001	-0.000	-0.000	0.000
ence	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Constant	20.230	13.679	20.740	14.233	20.158	13.589
	(2.833)***	(2.846)	(2.991)***	(3.262)***	(3.184)***	(3.374)***
	n = 100	n = 100	n = 100	n = 100	n = 100	n = 100
Adjusted R-sq	0.786	0.822	0.768	0.804	0.769	0.804
F	28.90***	33.65***	26.17***	30.05***	26.35***	30.00***
Breush-Pagan LM	8.77	11.94	12.26	15.09	11.74	16.61
Heteroskedasticity corrected (White) standard deviations in parenthesis, n = 100						

Table 23. Ice hockey attendance, weakest teams.

Pooled regression. OLS	(11)	(12)	(13)	(14)	(15)	(16)
	Weakest teams	Weakest teams	Weakest teams	Weakest teams	Weakest teams	Weakest teams
Ticket Price	0.422	0.374	0.481	0.380	0.442	0.389
	(0.303)	(0.273)	(0.329)	(0.277)	(0.301)	(0.269)
Home Population	0.172	-0.035	0.131	-0.079	0.174	-0.039
	(0.090)*	(0.090)	(0.099)	(0.083)	(0.089)*	(0.091)
Visitor Population	0.054	0.037	0.049	0.029	0.051	0.034
	(0.019)**	(0.016)*	(0.020)**	(0.016)	(0.019)**	(0.017)*
Distance	-0.065	-0.048	-0.060	-0.045	-0.063	-0.046
	(0.025)**	(0.019)*	(0.025)*	(0.018)*	(0.025)**	(0.019)*
Stadium capacity		0.578		0.633		0.586
		(0.102)***		(0.100)***		(0.102)***
Home Game	-0.046	-0.058	-0.038	-0.062	-0.045	-0.056
	(0.016)**	(0.012)***	(0.013)**	(0.010)***	(0.016)**	(0.012)***
Home Points	0.063	0.035				
	(0.019)***	(0.019)				
Visitor Points	-0.044	-0.027				
	(0.017)**	(0.018)				
Uncertainty	-0.014	-0.001	-0.009	0.003	-0.013	-0.000
	(0.016)	(0.018)	(0.031)	(0.028)	(0.016)	(0.019)
Home3Last			-0.003	-0.001		
			(0.007)	(0.005)		
Visitor3Last			0.000	0.006		
			(0.010)	(0.008)		
Home14first					0.058	0.029
					(0.018)**	(0.020)
Visitor14first					-0.041	-0.024
					(0.017)*	(0.019)
Incomes	-0.131	0.414	0.525	0.862	-0.170	0.443
	(1.487)	(1.132)	(1.576)	(1.067)	(1.491)	(1.137)
CCI	-0.076	-0.407	-0.072	-0.475	-0.080	-0.408
	(0.199)	(0.184)*	(0.209)	(0.188)*	(0.203)	(0.186)*
Tuesday	-0.139	-0.150	-0.145	-0.157	-0.139	-0.150
	(0.041)***	(0.031)***	(0.043)***	(0.031)***	(0.042)***	(0.031***)
Thursday	-0.148	-0.149	-0.141	-0.149	-0.148	-0.149
	(0.037)***	(0.030)***	(0.039)***	(0.032)***	(0.037)***	(0.030)***
Temperature Difference	-0.005	-0.002	-0.007	-0.004	-0.005	-0.003
	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)
Constant	5.599	1.086	2.887	-0.791	5715	0.903
	(6.713)	(5.053)	(7.092)	(4.762)	(6.731)	(5.068)
Adjusted R-sq	0.657	0.754	0.624	0.745	0.652	0.751
F	15.31***	22.27***	13.37***	21.29***	14.99***	21.94***
Breush-Pagan LM	15.91	17.91	18.89	18.86	16.60	17.83
Heteroskedasticity corrected (White) standard deviations in parenthesis, n = 98						

The ticket price elasticity is higher for the top teams. The game round variable is significant only for the weakest teams, hence the interest towards the games weakens as the season approaches the end and the team cannot continue in the playoff games.

The uncertainty variable insignificance for the weakest teams and the significance for the full sample indicate that ice hockey is a search good. The uncertainty of the outcome matters and the quality of the game is revealed only after the game.

The pooled regression, fixed effects and random effects estimation results of the different specifications are shown in the appendix. The important explanatory variables, e.g. price, contain some uncertainty or measurement error. Therefore is it possible that ordinary least squares estimations are most suitable.

3.7 Conclusions and suggestions

Is ice hockey an experience good or a search good? It can argued that the search costs are low; therefore, ice hockey is more of a search good and not an experience good (c.f. Vining and Weimer 1988: 287). These researchers argue that information asymmetry is not high for search goods, whereas it is greater for experience goods. However, because of the uncertain nature of the games between equal teams, the experience nature of the game is also notable. In this study, the price variable is not the actual average price because these data were not available as in the other studies. The price variable used in the estimations is the ticket price for the best seats, which can be better approximated than those used in the earlier literature. A higher price inelasticity is observed for the top-performing teams that also have the largest stadiums.

One explanation is that the role of winning percentage shown in the newspapers has a large role in explaining attendance (using as proxy the points gained thus far). The newspapers offer experience before the game and lower asymmetric information. In the case of ice hockey, previous success measured as points per game from the beginning of the season is better for explaining attendance than points per game from the three last games (the form guide). The surprise content is hence lower than one expects because performance is evaluated over a longer period in which random outcomes play a more limited role. The obvious reason is that all scores matter in the eligibility for playoff games. Conversely, it is clear that the revealed experience of a home team win is higher if the outcome of the game is uncertain because of similar team quality and past success. This feature should attract more spectators and lower price elasticity. Loyal spectators with a season ticket come always and therefore the ticket price elasticity is low indicating that they are willing to pay more, however, should the season ticket be more expensive per game than a single ticket bought at the door the loyal customers would prefer single tickets. Moreover the season tickets are bought in advance which has a positive impact on the early and certain cash flow.

There is also a rather wide variation in ice hockey game attendance among different days of the week. On Saturdays, the attendance is approximately 10–11 percent higher than during other conventional days of play, i.e., Tuesdays and Thurs-

days. In addition, there is also a large variation across teams; Jokerit from Helsinki attracted the largest attendance, whereas HPK from Hämeenlinna had the lowest average attendance. It is natural that home town population partially explains this result, because the elasticity of attendance with respect to home town population is positive (about 0.336), whereas the elasticity with respect to the visitor's town population is also positive (about 0.048). However, the home town population variable is insignificant for the weakest teams if the stadium capacity is taken into account. The visitor's fans will attend the team's away games but distance matters. The larger the distance, the lower the attendance.

It is argued that asymmetric information is lower than usually expected. The reason is that attendance is based on performance over a longer period, when the uncertainty component is lower. Game uncertainty has a positive effect on attendance, but the most recent uncertainty is relatively unimportant. We have also shown other indirect evidence for the search good characteristics of ice hockey attendance, postulated in four hypotheses. These results somewhat verify the results in earlier literature finding attendance to be price inelastic, but with rather problematic ways to measure this finding.

As the season progresses and more games have been played, attendance appears to diminish, whereas the estimated coefficient is low, although significant. Ice hockey games have a negative income elasticity. More importantly, attendance is sensitive to temperature, suggesting that ice hockey attendance is sensitive to passive leisure because bad weather (high temperatures here) is predictable only in the short term when alternative active leisure activities are difficult to find.

Both ice hockey and movie attendance as studied in Chapter 2 possess experience good characteristics but they also exhibit search good characteristics. Consumers can obtain relevant information regarding the home team's performance by attending a game. The audience is seeking information from different sources, including brand-related factors, objective features and information (Chang and Ki 2005). The ice hockey game is a search good relative to movie attendance because most consumers attend ice hockey matches regularly but a particular movie only once. The surprise content of a game between equally talented teams is high, and in this way, ice hockey also is an experience good. Asymmetric information may still be more important in movie attendance because critical reviews affect movie attendance, which suggests that movies exhibit more experience good characteristics.

One important finding is that the temperature also matters and that consumers' incomes have a negative effect on attendance. However, the temperature may not be a cause to attend an ice hockey game but rather a correlating variable. The re-

sults also reveal the attendance impact of the consumer confidence index (CCI) measuring monthly expectations of individual incomes. The CCI is important because the income variable is too rough because of annual measuring.

However, the experience good characteristics are higher when the audience knows in advance the importance of a tight game; therefore, the attendance is larger.

The effect of mass media, e.g. television, has been neglected in this study. Some of the games were viewed through cable television (Pay-tv) and some through open commercial channels. There is some evidence that television broadcasting has a negative effect on live attendance (Baimbridge, Cameron and Dawson 1995 or Carmichael, Millington and Simmons 1999). Moreover, other activities such as the premieres of blockbuster movies or concerts by famous orchestras or rock bands might lower attendance. However, these factors have not been taken into account.

The estimation results reveal that the models can still explain approximately two-thirds of actual attendance based on the coefficient of determination. Our results show that ice hockey teams could optimise their revenues by setting higher ticket prices for matches in which local teams play and in which the likelihood of winning the game increases. This suggestion is further supported by the fact that loyal supporters who are likely to attend the match anyway have a season ticket. The models do not explain whether fans are loyal to their teams. Will fans abandon the team if success is not good enough? Our findings on the search good characteristics of ice hockey attendance suggest that loyalty is lower than perhaps is usually expected. Low forgetting should be interpreted not as loyalty but as rational behaviour because teams earn a place in the finals based on long-term performance. Performance in the long run is the relevant decision variable. If revenues and ticket prices are to be increased by shifting ice hockey to be more like an experience good, the surprising content should be increased by increasing the weight given to last matches and in a way that losing teams have an opportunity to become winners. Separate finals satisfy the latter aim, but at the cost significance of any single game before the finals.

Appendices

Table 24. Variables, means, standard deviations and correlation matrix.

Var	mean	std	ATT	Price	Dist	Temp	TempDiff	Inc	CCI	CCIM	CCIW	Unempl	HomeP	VisP	HomeG	HPoints	VPoints	H3Last	V3Last
ATT	5014	1712	1	0.620	-0.074	-0.013	-0.037	0.576	0.295	-0.067	-0.044	-0.601	0.730	0.138	0.052	0.313	0.022	0.292	0.034
Price	25.4	4.28		1	-0.212	0.045	0.014	0.619	0.421	-0.028	-0.024	-0.681	0.833	0.109	0.023	0.125	-0.001	0.200	0.063
Dist	245	154			1	-0.081	0.015	-0.123	-0.123	-0.044	-0.049	0.204	-0.156	-0.154	0.027	0.065	0.071	0.012	0.054
Temp	4.51	5.56				1	0.166	0.087	0.581	0.697	0.709	-0.175	0.046	-0.001	-0.714	-0.113	-0.107	-0.089	-0.117
TempDiff	6.31	4.15					1	-0.013	-0.287	-0.358	-0.399	0.132	0.003	-0.011	0.422	0.088	0.054	0.098	0.064
Inc	35105	3334						1	0.615	-0.005	-0.000	-0.849	0.838	-0.016	-0.014	0.266	-0.005	0.282	0.002
CCI	14.7	3.59							1	0.698	0.707	-0.625	0534	-0.011	-0.691	0.083	-0.066	0.098	-0.076
CCIM	15.5	2.40								1	0.892	-0.100	-0.020	-0.004	-0.904	-0.143	-0.122	-0.125	-0.133
CCIW	13.5	2.99									1	-0.103	-0.021	-0.008	-0.926	-0.092	-0.090	-0.078	-0.086
Unempl	8.34	2.03										1	-0.788	0.014	0.117	-0.164	0.040	-0.190	0.036
HomeP	185356	168315											1	-0.012	0.010	0.192	-0.010	0.228	0.012
VisP	185121	168074												1	0.003	0.009	0.171	0.026	0.223
HomeG	27.5	16.2													1	0.120	0.119	0.106	0.131
HPoints	1.46	0.511														1	0.224	0.644	0.086
VPoints	1.48	0.530															1	0.151	0.643
H3Last	4.24	2.51																1	0.099
V3Last	4.42	2.52																	1

ATT = attendance, Price (€), Dist = distance between home team's and visitor's stadiums along road (km), Temp = max temperature, TempDiff = Av. Temp – max temp, Inc = incomes, CCI = consumer confidence index, CCIM = CCI of men, CCIW = CCI of women, Unempl = monthly regional unemployment rate(%), HomeP= home town population, VisP = visitor's town population, HomeG = number of games, home team, before the game, HPoints = points per game, home team, before the game VPoint = visitor's points per game, before the game, , VisiG = number of games, visitor, before the game , Last3H = points from 3 last games, home team, Last3V = points from 3 last games, visitor. The number of observations = 392

Table 25. Model 1, including consumer confidence index but excluding incomes.

	Model 11	Fixed	Random	Model 11	Fixed	Random
Ticket Price	**-0.266** (0.102)**	**0.725** (0.168)***	**0.524** (0.166)**	**-0,271** (0.101)**	**0.740** (0.168)***	**0.533** (0.165)***
Home Population	**0.366** (0.023)***	**-0.778** (6.35))	**0.223** (0.049)*	**0.371** (0.023)***	**1.61** (6.39)	**0.229** (0.048)***
Visitor Pop	**0.046** (0.011)***	**0.021** (0.009))***	**0.025** (0.009)**	**0.046** (0.011)***	**0.020** (0.008)*	**0.025** (0.009)***
Distance	**-0.038** (0.009)***	**-0.036** (0.007)***	**-0.037** (0.007)***	**-0.038** (0.009)***	**-0.037** (0.007)***	**-0.038** (0.007)***
Home Game	**-0.061** (0.013)***	**-0.035** (0.012)**	**-0.038** (0.011)***	**-0.052** (0.012)**	**-0.024** (0.012)*	**-0.026** (0.010)*
Home Points	**0.101** ((0.017)***	**0.019** (0.013)	**0.025** (0.016)	**0.100** (0.017)***	**0.014** (0.013)	**0.021** (0.015)
Visitor Points	**-0.052** (0.016)***	**-0.007** ((0.011)	**-0.009** (0.013)	**-0.055** (0.016)***	**-0.008** (0.011)	**-0.012** (0.013)
CCI	**-0.630** (0.126)***	**-0.352** (0.118)**	**-0.366** (0.114)***	**-0.705** **(0.122))***	**-0.468** (0.114)***	**-0.486** (0.110)***
Tuesday	**-0.123** (0.022)***	**-0.117** (0.015)***	**-0.116** (0.017)***	**-0.121** ((0.021)***	**-0.117** (0.015)***	**-0.116** (0.016)***
Thursday	**-0.127** (0.021)***	**-0.116** (0.014)***	**-0.117** (0.016)**	**-0.127** (0.021)***	**-0.116** (0.014)***	**-0.117** (0.016)***
Saturday						
Temperature	**-0.002** (0.002)	**-0.003** (0.002)*	**-0.003** (0.002)			
Temperature Difference				**-0.006** (0.002)*	**-0.005** (0.002)**	**-0.005** (0.002)**
constant	**5.63** (0.268)***		**4.65** (0.527)***	**5.67** 0.267)***		**4.69** (0.523)***
Standard deviations in parenthesis ((het-eroskedasticity corrected White))						
Adjusted R-sq	**0.696**	**0.832**		**0.700**	**0.834**	
F-test	**82.29*** **	**81.55*** **		**83.89*** **	**82.88*** **	
Diagnostic LL (χ^2)	**477.66*** **	**723.52*** **		**482.99*** **	**728.89*** **	
Breush-Pagan LM (χ^2)	**11.55**			**11.43**		

Test statistics for the classical model

Constant term only (1)	**LL = -106.32**	**LM test vs Model (3): 648.96*** **		**LL = -106.32**	**LM test vs Model (3): 632.68*** **
Group effects only (2)	**LL = 176.21**	**Hausman test (FEM vs. REM): 19.84***		**LL = 176.21**	**Hausman test (FEM vs. REM): 20.12***
X-variables only (3)	**LL = 132.51**			**LL = 135.17**	
X- and group effects (4)	**LL = 255.44**			**LL = 258.12**	
Hypothesis tests	**LR test**	**F test**			
(2) vs. (1)	**565.06*** **	**93.83*** **	**565.06*** **		**93.83*** **
(3) vs. (1)	**477.66*** **	**82.29*** **	**482.99*** **		**83.89*** **
(4) vs. (1)	**723.52*** **	**81.55*** **	**728.89*** **		**82.88*** **
(4) vs. (2)	**158.47*** **	**16.62*** **	**163.83*** **		**17.31*** **
(4) vs. (3)	**245.87*** **	**24.63*** **	**245.90*** **		**24.63*** **

Table 26. Specification 4 estimation results.

	Model 4	Fixed	Random	Model 4	Fixed	Random
Ticket Price	**-0.324**	**0.718**	**0.518**	**-0.342**	**0.715**	**0.508**
	(0.111)**((0.111))***	(0.182)***((0.174)***	(0.169)**	(0.111)***((0.112))**	(0.183)***((0.174))***	(0.170)***
Home Population	**0.376**	**-3.92**	**0.235**	**0.384**	**0.984**	**0.247**
	(0.028)***((0.031))***	(7.86)((7.06))	(0.070)***	(0.027)***((0.031))***	(7.75)((7.32))	(0.070)***
Visitor Pop	**0.048**	**0.021**	**0.026**	**0.049**	**0.021**	**0.026**
	(0.012)***((0.012))***	(0.009)*((0.009))***	(0.009)**	(0.012)***((0.012))***	(0.009)*((0.010)*	(0.009)***
Distance	**-0.039**	**-0.036**	**-0.037**	**-0.039**	**-0.037**	**-0.038**
	(0.009)***((0.009))***	(0.007)***((0.007)***	(0.007)***	(0.009)***((0.009))***	(0.007)***((0.007)***	(0.007)***
Home Game	**-0.031**	**-0.018**	**-0.020**	**-0.009**	**0.002**	**0.004**
	(0.013)*((0.013)**	(0.010)((0.010)	(0.010)*	(0.010)((0.010)	(0.009)((0.010))	(0.008)
Home Points	**0.088**	**0.007**	**0.014**	**0.081**	**-0.003**	**0.003**
	(0.017)***((0.016)***	(0.016)((0.012))	(0.015)	(0.017)***((0.016)***	(0.015)((0.013))	(0.015)
Visitor Points	**-0.062**	**-0.008**	**-0.013**	**-0.068**	**-0.012**	**-0.018**
	(0.016)***((0.016)***	(0.013)((0.011))	(0.013)	(0.016)***((0.016)***	(0.013)((0.012))	(0.013)
Incomes	**-0.963**	**-7.05**	**-0.817**	**-1.071**	**-7.03**	**-1.065**
	(0.370)**((0.370))***	(4.22)((4.18)	(1.23)***	**(0.369)**((0.371))***	(4.24)((4.17)	(1.23)
Tuesday	**-0.116**	**-0.113**	**-0.112**	**-0.116**	**-0.114**	**-0.113**
	(0.022)***((0.022))***	(0.017)***((0.015)***	(0.017)***	(0.023)***((0.022))***	(0.017)***((0.015)***	(0.017)***
Thursday	**-0.123**	**-0.113**	**-0.115**	**-0.122**	**-0.111**	**-0.114**
	(0.022)***((0.021))***	(0.016)***((0.014))***	(0.016)**	(0.022)***((0.022))***	(0.016)***((0.015)***	(0.016)***
Temperature	-0.005	**-0.005**	**-0.005**			
	(0.002)*((0.002))*	(0.002)**((0.002)**	(0.002)**			
Temperature Difference				**-0.003**	**-0.004**	**-0.004**
				(0.002)((0.002))	(0.002)*((0.002)*	(0.002)*
constant	**9.25**		**7.76**	**9.64**		**8.73**
	(1.57)***((1.57))***		(5.11	(1.57)***((1.58))***		(5.11)
Standard deviations in parenthesis ((heteroskedasticity corrected White))						
Adjusted R-sq	**0.681**	**0.828**		**0.679**	**0.827**	
F-test	**78.72*** **	**79.94*** **		**76.20*** **	**79.28*** **	
Diagnostic LL (χ^2)	**458.51*** **	**716.95*** **		**456.66*** **	**714.26*** **	
Breush-Pagan LM (χ^2)	**11.09**			**13.73**		
	Test statistics for the classical model					
	Constant term only (1)	**LL = -106.32**	**LM test vs Model (3):718.49*** **		**LL = -106.32**	**LM test vs Model (3): 690.06*** **
	Group effects only (2)	**LL = 176.21**	**Hausman test (FEM vs. REM): 23.43***		**LL = 176.21**	**Hausman test (FEM vs. REM): 23.31***
	X-variables only (3)	**LL = 122.93**			**LL = 122.01**	
	X- and group effects (4)	**LL = 252.16**			**LL = 250.81**	
	Hypothesis tests	**LR test**	**F test**			
	(2) vs. (1)	**565.06*** **	**93.83*** **		**565.06*** **	**93.83*** **
	(3) vs. (1)	**458.51*** **	**76.72*** **		**456.66*** **	**76.20*** **
	(4) vs. (1)	**716.96*** **	**79.94*** **		**714.26*** **	**79.28*** **
	(4) vs. (2)	**151.90*** **	**15.79*** **		**149.20*** **	**15.45*** **
	(4) vs. (3)	**258.45*** **	**26.35*** **		**257.60*** **	**26.23*** **

Table 27. Specification 8 estimation results.

	Model 8	Fixed	Random	Model 8	Fixed	Random
Ticket Price	-0.338 (0.109)***((0.108))***	0.687 (0.178)***((0.168))***	0.495 (0.165)**	-0.348 (0.108)***((0.107))***	0.695 (0.177)***((0.177))***	0.499 (0.164)***
Home Population	0.377 (0.027)***((0.030))***	-11.18 (7.84)((6.80))	0.232 (0.068)***	0.381 (0.027)***((0.030))***	-9.17 (7.71)((7.71))	0.236 (0.067)***
Visitor Population	0.049 (0.012)***((0.011))***	0.022 (0.009)*((0.009))***	0.027 (0.009)**	0.049 (0.012)***((0.011))***	0.022 (0.009)*((0.009)*	0.026 (0.009)***
Distance	-0.038 (0.009)***((0.009))***	-0.036 (0.007)***((0.007)***	-0.037 (0.007)***	-0.039 (0.009)***((0.009))***	-0.036 (0.007)***((0.007)***	-0.038 (0.007)***
Home Game	-0.068 (0.015)***((0.015)**	-0.046 (0.012)***((0.012)***	-0.049 (0.012)***	-0.061 (0.014)***((0.014)**	-0.035 (0.011)((0.011))	-0.039 (0.011)***
Home Points	0.099 (0.017)***((0.017))***	0.021 (0.016)((0.013))	0.028 (0.015)	0.098 (0.017)***((0.017)***	0.016 (0.015)((0.015))	0.023 (0.015)
Visitor Points	-0.051 (0.016)***((0.015)***	-0.005 (0.013)((0.011))	-0.007 (0.01))3)	-0.053 (0.016)***((0.015)***	-0.006 (0.013)((0.013))	-0.009 (0.013)
Inc	-1.018 (0.362)**((0.362))***	-7.69 (4.13)((4.18)	-0.720 (1.21)	-1.081 (0.358)***((0.361))***	-7.82 (4.09)((4.09)	-0.854 (1.20)
CCI Men	-0.904 (0.214)**((0.208))***	-0.713 (0.162)***((0.163)***	-0.696 (0.158)***	-1.029 (0.206)***((0.202))***	-0.845 (0.158)((0.158)	-0.834 (0.152)***
Tuesday	-0.121 (0.022)***((0.021))***	-0.117 (0.016)***((0.015)***	-0.116 (0.016)***	-0.119 (0.022)***((0.021))***	-0.116 (0.016)***((0.016)***	-0.115 (0.016)***
Thursday	-0.128 (0.022)***((0.021))***	-0.117 (0.016)***((0.014))***	-0.119 (0.016)**	-0.128 (0.021)***((0.021))***	-0.117 (0.016)***((0.016)***	-0.119 (0.016)***
Temperature	-0.002 (0.002)((0.002))	-0.003 (0.002)((0.002)	-0.003 (0.002)			
Temperature Difference				-0.005 (0.002)*((0.002))*	-0.005 (0.002)**((0.002)**	-0.005 (0.002)**
constant	10.69 (1.58)***((1.57))***		8.32 (5.01)	11.1 (1.55)***((1.57))***		9.03 (4.98)***
Standard deviations in parenthesis ((heteroskedasticity corrected White))						
Adjusted R-sq	0.694	0.837		0.698	0.840	
F-test	74.96***	81.33***		76.35***	82.96***	
Diagnostic LL (χ^2)	476.63***	737.06***		481.72***	743.69***	
Breush-Pagan LM (χ^2)	12.26			12.80		
	Test statistics for the classical model					
	Constant term only (1)	LL = -106.32	LM test vs Model (3):729.92***		LL = -106.32	LM test vs Model (3): 717.31***
	Group effects only (2)	LL = 176.21	Hausman test (FEM vs. REM): 24.30*		LL = 176.21	Hausman test (FEM vs. REM): 24.58*
	X-variables only (3)	LL = 131.99			LL = 134.54	
	X- and group effects (4)	LL = 262.21			LL = 265.52	
	Hypothesis tests	LR test	F test			
	(2) vs. (1)	565.06***	93.83***		565.06***	93.83***
	(3) vs. (1)	476.63***	74.96***		481.72***	76.35***
	(4) vs. (1)	737.06***	81.33***		743.69***	82.96***
	(4) vs. (2)	172.00***	16.80***		178.63***	17.61***
	(4) vs. (3)	260.43***	26.56***		261.96***	26.77***

Table 28. Specifications 8 (CCI for Men) and 9 (CCI for Women) estimation results.

	Model 8 Men	Fixed	Random	Model 9 Female	Fixed	Random
Ticket Price	-0.355 (0.108)***((0.106))***	0.695 (0.177)***((0.166))***	0.495 (0.164)**	-0.332 (0.110)***((0.111))***	0.729 (0.180)***((0.172))***	0.5333 (0.167)***
Home Population	0.894 (0.063)***((0.070))***	0.154 (15.20)((12.58))	0.556 (0.158)***	0.860 (0.062)***((0.069))***	-43.38 (18.93)*((18.55))*	0.543 (0.158)***
Visitor Pop	0.113 (0.027)***((0.026))***	0.050 (0.021)*((0.020))***	0.061 (0.021)**	0.109 (0.027)***((0.026))***	0.045 (0.021)*((0.021)*	0.056 (0.021)**
Distance	-0.039 (0.009)***((0.009))***	-0.036 (0.007)***((0.007)***	-0.038 (0.007)***	-0.039 (0.009)***((0.009))***	-0.038 (0.007)***((0.007)***	-0.039 (0.007)***
Home Game	-0.059 (0.014)***((0.014)**	-0.037 (0.011)***((0.012)***	-0.039 (0.011)***	-0.044 (0.014)***((0.013)**	-0.015 (0.011)((0.011))	-0.021 (0.010)*
Home Points	0.095 (0.017)***((0.017))***	0.016 (0.015)((0.012))	0.023 (0.015)	0.098 (0.017)***((0.017)***	0.008 (0.016)((0.013))	0.018 (0.016)
Visitor Points	-0.053 (0.016)***((0.015)***	-0.005 (0.013)((0.010))	-0.009 (0.013)	-0.058 (0.016)***((0.016)***	-0.009 (0.013)((0.012))	-0.012 (0.013)
Incomes	-1.135 (0.359)***((0.364))***	-5.27 (4.03)((4.03)	-0.898 (1.20)	-1.023 (0.362)***((0.363))***	-9.18 (4.14)*((4.25)*	-0.698 (1.22)
CCI Men (model 8) / Women (model 9)	-1.008 (0.205)***((0.202))***	-0.798 (0.163)***((0.162)***	-0.832 (0.153)***	-0.486 (0.136)***((0.135))***	-0.365 (0.104)***((0.108)***	-0.360 (0.101)***
Tuesday	-0.119 (0.022)***((0.021))***	-0.117 (0.016)***((0.014)***	-0.115 (0.016)***	-0.117 (0.022)***((0.021))***	-0.114 (0.016)***((0.015)***	-0.114 (0.016)***
Thursday	-0.127 (0.022)***((0.021))***	-0.117 (0.016)***((0.014))***	-0.119 (0.016)**	-0.125 (0.021)***((0.021))***	-0.115 (0.016)***((0.014)***	-0.117 (0.016)***
Temperature Difference	-0.005 (0.002)*((0.002)*			-0.005 (0.002)*((0.002))*	-0.005 (0.002)**((0.002)***	-0.005 (0.002)**
constant	11.59 (1.56)***((1.60))***		9.38 (5.00)	10.46 (1.56)***((1.59))***		7.93 (5.10)***
Standard deviations in parenthesis ((heteroskedasticity corrected White))						
Adjusted R-sq	0.699	0.839		0.686	0.834	
F-test	76.68***	82.62***		72.38***	79.69***	
Diagnostic LL (χ^2)	482.90***	742.29***		467.05***	730.32***	
Breush-Pagan LM (χ^2)	13.36			11.59		
Test statistics for the classical model						
Constant term only (1)	LL = -106.32	LM test vs Model (3):720.41***			LL = -106.32	LM test vs Model (3): 690.32***
Group effects only (2)	LL = 176.21	Hausman test (FEM vs. REM): 23.14*			LL = 176.21	Hausman test (FEM vs. REM): 27.67**
X-variables only (3)	LL = 135.13				LL = 127.20	
X- and group effects (4)	LL = 264.82				LL = 258.84	
Hypothesis tests	LR test	F test				
(2) vs. (1)	565.06***	93.83***			565.06***	93.83***
(3) vs. (1)	482.91***	76.68***			467.05***	72.38***
(4) vs. (1)	742.29***	82.62***			730.32***	79.69***
(4) vs. (2)	177.23***	17.44***			165.27***	15.99***
(4) vs. (3)	259.38***	26.41***			263.28***	26.96***

4 THE SPECTATORS AT CULTURAL PERFORMANCES – THE CONSUMPTION OF HIGHBROW ART, SPORTING EVENTS AND MOVIES

4.1 Introduction

Approximately 5 to 6 per cent of Finnish people attend performing arts events or art exhibitions several times per month and one-sixth do not attend any. The purpose of this study is to identify the characteristics of cultural consumption to discern the allocation effects of cultural subsidies. Why are females and ageing citizens more likely to be frequent attendees of performing arts events (art exhibitions, operas and theatrical performances) and how does this finding interact with attendance at sporting events? The majority of Finnish people occasionally attend performing arts events. What are the regional differences and when is the effect of a person's education taken into account? This analysis has economic meaning regarding the allocation of state subsidies, the majority of which consist of subsidised ticket prices for the performing arts. The state subsidies of the performing arts are substantial and have been increasing since 1993 in Finland. If performing arts and sporting events are complements, these state subsidies of the performing arts may also be compensated by supporting sporting events. Arts may suffer, as explained by Baumol's cost disease (Baumol and Bowen 1966). Labour productivity in cultural sectors, particularly at the theatre, is low because live performing arts are labour intensive – the pianist plays, the actor acts, the singer sings – and there is no way to increase output per hour. The venue or the auditorium size will limit the revenue, explaining the cost drawback linked to Baumol's disease. This situation is particularly true in speech theatre, whereas opera performances are suitable for increasing the size of the audience via online performance transmissions to cinema theatres around the world.

The theatre and orchestra law (705/92) that came into force in 1993 brought considerable changes to theatre financing in Finland. State subsidies of the dramatic arts had been discretionary until 1993 and mainly financed by the profit funds of pools and money lotteries. Since the beginning of 1993, the Ministry of Education has made theatre-specific decisions on state subsidies. The basic principle in the state subsidy system (VOS)[30] is that a theatre receives subsidies on the grounds of

[30] VOS = (in Finnish) valtionosuuslainsäädäännön piiriin kuuluva ~ theatres subsidied by law.

unit cost based on full-time equivalent (FTE) person years. A change in the FTE person years as the criteria for state and the true (verified) person years has not been equivalent over the years since 1993. During the past two decades, the share of state subsidies from all subsidies (including municipal subsidies) has increased after the law's implementation in 1993 (Kangas and Kivistö 2011: 17). State aid has increased by approximately 50 per cent, and correspondingly, the municipal aid has decreased. Finally, the unit cost standard was substantially changed a few years ago, and the state aid has increased by more than 15 per cent annually during the years 2008 to 2010 (Tinfo, statistics). The increase in the unit cost returned its real value to the 1993 level (Kangas and Kivistö 2011: 11). As a rule, the state subsidy in 2011 was 37 per cent of the price of the person year with certain exceptions[31].

The Finnish Film Foundation supports the films in many ways. The Foundation's goal is to promote high-quality, versatile and original domestic film production[32]. The Foundation get is support allowance from the Finnish lottery, Veikkaus, which contributes its total proceeed to the Ministry of Education and Culture that distributes them further to Finnish arts, sports, science and youth work.

Although numerous reliable reports have been drawn up regarding the audiences of cultural events in Finland, the majority of the results have been presented as descriptive statistics and virtually no studies have used multivariate analysis. The Finnish spectator profile of performing arts is remarkably similar to the audience profiles in western economies (cf. Seaman 2006: 419–422). The use of multivariable regression-based models in this study is important because according to Seaman (2006: 439), these international studies have not generally verified the result that education is likely the most important single variable in explaining variations in performing arts attendance.

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[31] During the years 1993 and 1995, state aid was determined by the financial classification of the location municipality of the theatre and varied between 25 and 40 per cent. State aid to Tampereen työväen teatteri (the only professional workers' theatre in Finland) and to Svenska Teatern i Helsingfors (the largest Swedish-speaking theatre) is 60 per cent (Report from a committee on the system of statutory state aid granted to theatres, 2003: 18)

[32] The Foundation supports various stages including scriptwriting, development, production, post-release marketing and distribution. In 2012 the support allowances of the foundation were about 27 million euros.

Table 29. Suomen Teatterit (Taloustutkimus), survey on visits to theatre, opera or ballet during the past 12 months, 2007 in %.

Has visited during the past 12 months, n = 999	Once	Occasionally (2–5 times)	Regularly (6 or more)	Has visited = total
All	21 %	22 %	4 %	47 %
women	22 %	28 %	4 %	54 %
men	19 %	14 %	3 %	36 %
15–24 year old	17 %	11 %	1 %	29 %
25–44 year old	22 %	19 %	3 %	44 %
45–64 year old	25 %	27 %	4 %	56 %
65–79 year old	14 %	26 %	5 %	45 %
Basic or primary education	18 %	16 %	2 %	36 %
Secondary education	17 %	17 %	2 %	36 %
Upper secondary education	25 %	15 %	1 %	41 %
Tertiary lower education	23 %	36 %	3 %	62 %
Tertiary higher education	29 %	23 %	10 %	62 %
Southern Finland	23 %	27 %	5 %	55 %
Central Finland:	18 %	14 %	1 %	33 %
Northern Finland:	14 %	11 %	1 %	26 %

Table 29 shows that women attend the theatre, opera or ballet more often than men and that the difference is largest among those who visit occasionally. Notably, the share of occasional visitors who visit 2–5 times per year has gradually declined throughout the years 1985–2007 as shown in the tables in the appendix[33].

Additional insights and confirmation of the results can be gained from culture and sport surveys in 1991 and 1999 (Statistics Finland 2001) reported in Table 42 in the appendix and from the Kulttuuripuntari 1999 survey reported in Table 44 in the appendix. In all surveys, women attend more often than men, highly educated people are more active and the differences among provinces are substantial.

[33] The most often-mentioned reasons for not going were the lack of interest (56 %) or the lack of time (26 %). Furthermore, 12 % indicated that there is no theatre in the locality.

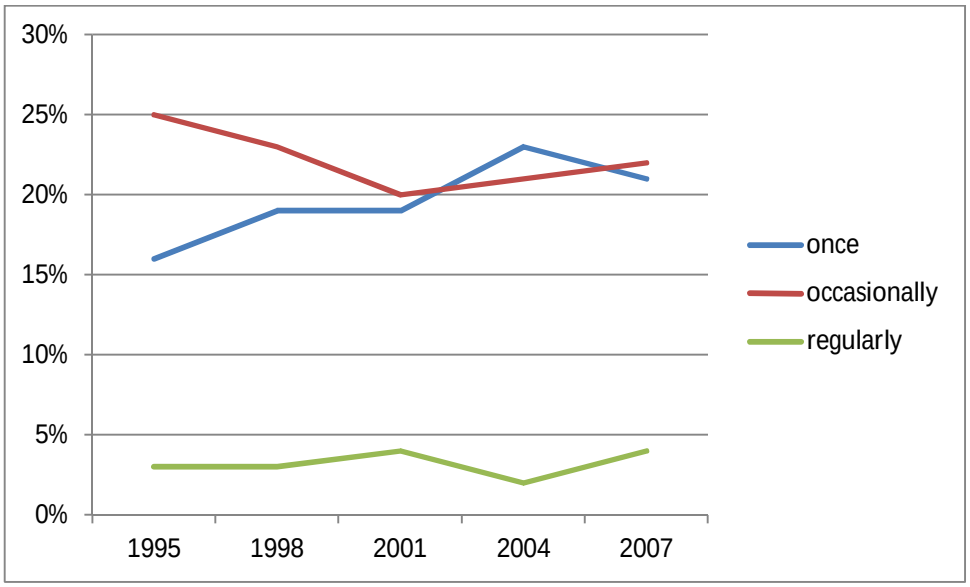

Figure 4. Visits to theatre, opera or ballet during the past 12 months, years 1995, 1998, 2001, 2004 and 2007 (source: Suomen Teatterit).

Figure 29 also confirms that the highbrow art (theatre, opera or ballet) visitor density did not change substantially during the past two decades if the temporary decrease related to an economic recession in the early 1990s is not considered[34]. The increase in attendances has primarily occurred in the 2000s, which can be partly explained by changes in the supply of cultural capital in the 1990s. The new opera house that was opened in 1995 is likely to explain the increase in attendance to opera and concert performances in the Uusimaa region (both the Helsinki metropolitan area and eastern Uusimaa province). The increase took place particularly among the cohorts for 25–44 and 45–64 year olds. In comparison, the spectator frequency at sporting events and competitions decreased. Tables in the appendix also show that the visitor density of dance performances is approximately half of the visitor density of theatres, and visits to opera are correspondingly half of the dance, although these three forms of performing arts cannot be separated in our analysis.

34 See Table 43 in appendix.

4.2 A model explaining cultural consumption

Following Lévy-Garboua and Montmarquette (1996) a simple model explaining the demand for cultural events can be formulated[35]. In the framework defined by Stigler and Becker (1977), culture capital is a combination of initial culture capital and past cultural goods consumption. The model assumes that the cultivation of taste is developed with the earlier consumption experiences, i.e., a model with learning by consuming. There are two goods, n_1 and n_2. The first one (n_1) presents the consumption of performing arts and the second (n_2) the consumption of sporting events. The arguments of the intertemporal utility function are the periodic partial utilities, which take the form $u(s_{1t}n_{1t}, s_{2t}n_{2t})$ in which $n_{it} \geq 0$ and s_{it} signifies the subjective qualities anticipated before the actual consumption decision. The subjective quality of each good and for each consumer depends on previous personal consumption experiences. The expectations are individual: $s_{i\tau}^{t-1} = E_{t-1}(s_{i\tau})$ represents the subjective quality of good i expected by the consumer for the forthcoming period τ ($\tau = t, \ldots, T$) conditional on the knowledge in t-1.

A new consumption experience of the good $n_{it} > 0$ reveals a more delicate assessment of quality:

(4–1) $$s_{it} = s_{it}^{t-1} + \varepsilon_{it}$$

where pleasant or unpleasant surprises ε_{it} are normally distributed with zero expectations: $E_{t-1}(\varepsilon_{it}) = 0$. Every new experience of a given cultural event (performing art or sporting event) reveals to the consumer an unexpected positive or negative revision in her taste for the event. After this experience, the consumer assesses her expectations in an adaptive manner, assuming a loss of knowledge by forgetting at a constant rate $\delta_i > 0$:

(4–2) $$s_{i,t+1}^{t} = (1-\delta_i)[(1-m_i)s_{it}^{t-1} + m_i s_{it}] = (1-\delta_i)[s_{it}^{t-1} + m_i \varepsilon_{it}]$$

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[35] The reasons for attending arts performance have been classified into the following six motives (Swanson, Davis and Zhao 2008: 1) aesthetics (live performance is a form of art to obtain pleasure; the beauty and grace found through artistic expression), 2) education (individuals seek to educate themselves; museums and galleries particularly offer educational experience), 3) escape (the desire to find a diversion or escape from daily routines), 4) recreation (to be enterained), 5) self-esteem enhancement (to attain and maintain a positive social indentity) and 6) social interaction. Some useful frameworks have been developed, including the rational addiction and learing-by-consuming models and the omnivore/univore theory (Lévy-Garboua and Montmarquette 2002, Peterson 1992).

where $0 < m_i < 1$ is the likelihood attached to the results of the latest experience. Expectations in *(t-1)* for a forthcoming period τ is then:

(4–3) $s_{i\tau}^{t-I} = (1- \delta_i)^{\tau-t} s_{it}^{t-1}$.

The consumption decisions taken in *t* are based on the present value of additive utility function over time t, …, T

(4–4) $E_{t-1}U = \sum_{\tau=t}^{T} r^{\tau-t}\, u[(1-\delta)^{\tau-t} s_{1t}^{t-1} n_{1\tau}, (1-\delta)^{\tau-t} s_{2t}^{t-1} n_{2\tau}, c_i]$

where $(1-\delta)^{\tau-t} s_t^{t-1} n_\tau$ represents the expected consumption quantities, n_τ is the consumption of performing arts (or sports), and r is the discount factor. The consumer maximises expected long-range utility subject to

(4–5) $W_{t+1} = (1 + r)(W_t + Y_t - p_1 n_1 - p_2 n_2 - p_i c_i)$

where W_t represents wealth (and other than cultural consumption) at t, Y_t is the labour income at t, p_i is the price of the good i, and n_i stands for the quantity demanded for a cultural event (n_1) or sport event (n_2), and c_i represents the quantity demanded for the consumption of other goods. Under the assumption that the consumer can borrow and lend freely, the intertemporal optimality conditions for expected utility maximisation are:

(4–6) $U_t'(n_{it}) = \lambda_t p_{it}$ and $\lambda_t = E_t\{(1+r)\lambda_{t+1}\}$

where $U_t'(n_{it})$ is the marginal utility of the *i*th good at time t, and λ_t is the expected value of marginal utility of wealth at t. The solution gives the Frisch demand (constant marginal utility for wealth) demand functions for n_1 and n_2:

(4–7) $n_{it} = f_{it}(p_{1t}, p_{2t}, p_{ct}, \lambda_t)$.

If the marginal utility for wealth is invariable over time, it could be linked to socio-economic variables, such as gender, age and education. Given a decreasing marginal utility of wealth, the consumption of art is more likely to be a luxury the lower the level of wealth. The Frisch demand is convenient because under the assumption of additivity in utility function, the quantities purchased are proportional to goods' prices relative to the price of utility (Browning, Deaton and Irish 1985). Such demands should be distinguished from the usual Marshallian (uncompensated) demands that relate quantities demanded to prices and expenditure or form the Hicksian (compensated) demands that relate quantities demanded to prices and utility. The Frisch demand functions are suitable to explain cultural

consumption because consumers who interrelate attendance with high quality will have a low personalised price (Seaman 2006: 445). Here the individual qualities depend on the consumer's previous experiences. However, the assumption of additive utility function is restrictive because the goods can be only substitutes and not complements, which may not be a reasonable assumption. We have no reason to suppose a priori that performing arts and sports are substitutes[36]. Following Browning, Deaton and Irish (1985), the above analysis can be extended to blocks in which the subutility functions are defined over groups of goods and not single goods. The demands in the group depend on prices in the group relative to the price of utility.

Following Kracman (1996), the initial culture capital is acquired through early socialisation experiences in the family and through education provided by the school. The taste for cultural and sporting events is generated by culture-specific capital. Individuals differ widely in their taste for specific art forms. Some enjoy performing arts, whereas others prefer sporting events. Bihagen and Katz-Gerro (2000) and Ruuskanen (2004) show that gender differences are unchanged even when controlling for education, age and income among other factors. Women are more active in highbrow culture than men. If there is no learning process, the accumulated experience remains constant and there is no dynamic formulation. The model above is strongly based on the assumption that accumulated experience, including the initial culture capital, determines future consumption, however, even people with the same utility function and the same wealth may have different culture consumption behaviour if they have different experiences. The accumulation function is connected to human specific variables, such as formal education. The Frisch demand is suitable here because over the life-cycle, consumers have different socio-economic backgrounds. The intertemporal additivity assumption allows for decentralisation over time or age. Each period of time is regarded as a slice of life and lifetime utility is the sum of all slices.

The Eurobarometer 56.0 survey (Table 30) shows a reverse relationship in cultural consumption with age. Older people appear to favour classical concerts, whereas younger people are more often sport lovers.

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[36] Any pair of goods in the Marchallian (ordinary) demand system can be (gross) substitutes or (gross) complements. It is possible that compensated cross effects (Hicks-Allen) are still positive (substitutes) even when goods are gross complements.

Table 30. Eurobarometer 56.0: August–September 2001, n = 1024.

Visited, %	Ballet/Dance	Theatre	Concert	*Concert: classical*	*Concert: opera*	*Concert: rock/pop*	Sport event
Women	17,8	49,5	41,2	*30,4*	*15,4*	*27,5*	30,4
Men	10,4	30,4	32,8	*16,9*	*7,7*	*45,8*	59,9
Age							
age: 15-24	14,8	36,3	50,8	*12,6*	*2,1*	*68,8*	57,8
age: 25-34	12,2	36,6	39,7	*13,5*	*7,7*	*48,0*	55,7
age: 35-44	21,6	41,7	43,2	*25,7*	*13,5*	*41,9*	45,6
age: 45-54	16,9	44,7	32,6	*35,3*	*14,7*	*11,8*	38,9
age: 55-64	13,2	47,8	34,8	*29,2*	*20,8*	*6,3*	40,0
age: 65-	8,3	41,2	25,5	*44,7*	*25,5*	*0,0*	23,0
Region:							
Uusimaa	17,5	43,6	36,9	*24,7*	*18,0*	*37,0*	46,0
Rest southern F	15,0	44,9	40,6	*23,1*	*13,4*	*34,8*	39,9
Eastern F	11,2	35,3	34,1	*25,6*	*7,0*	*32,6*	45,2
Central F	11,6	43,8	35,4	*30,4*	*8,7*	*43,5*	49,3
Northern F	12,2	28,0	34,3	*27,0*	*5,4*	*16,2*	37,4
				n = 382	*n = 379*	*n = 382*	
				If Concert = 1, then			

Source: http://www.fsd.uta.fi/aineistot/luettelo/FSD0099/meF0099.html

With a decreasing marginal utility of wealth, the consumption of highbrow art is a luxury at lower levels of wealth, which is in line with the Eurobarometer survey. Older consumers appear to favour classical concerts and opera. On the basis of preliminary statistical examination and based on earlier studies, a hypothesis can be proposed as follows:

H1: The cultural consumption of performance art and sport is heavily dependent on gender, age and education. Furthermore, the regional supply has an effect.

The prices of the cultural events are not used as explanatory variables because the prices are not known. Because incomes may interrelate with gender, age and education (e.g. Asplund 2008) and the income variable in the sample includes all social security contributions (e.g. child benefit), the income variable must be standardised and household incomes are more proper than personal incomes.

The Helsinki metropolitan area has more visitors than elsewhere. Women go more often than men. The audience composition of the theatrical or opera performances and classical music concerts is different than that of the sporting events. Moreover, the composition of sport spectators also depends on gender, age and education but in contrast to the performing arts audiences. The second hypothesis is proposed as follows:

H2: The sporting events and performance arts are substitutes or have complementary properties.

The second hypothesis is important because cross-price elasticity evidence on performing arts consumption is weak (Seaman 2006, 449), partially because it is not known what events are substitutes based on the nature of the event and partially because of travel expenses. Based on Finnish data, it is not known whether performing art events and sports are substitutes at all and whether the audience is different in these events.

The cross-price elasticity evidence is important because the allocation of state subsidies as a way to increase the total consumption of cultural capital should be targeted toward areas with poor supplies of both performance arts and sports. In addition, the consumption of movies at the cinema is studied here although the subsidy system is different. It can be argued that subsidies to the performance arts predominantly increase the cultural consumption of older women.

4.3 Method and sample

The International Social Survey Programme (ISSP 2007), the most recent data, is based on a mail survey conducted by Statistics Finland in autumn 2007 (18th September – 11th December 2007). The sample unit is a person between the ages of 15 and 74. The sample method was a systematic random sample from the population register. The sample size was 2,500 but only 1,354 answers were returned for a response rate of 54.2%. The key words in the ISSP 2007 are the following: the use of time, physical condition, hobbies, organisations, board games, physical education, holiday, games, social relations, sports and leisure. As background information, the data collected included the following: gender, the year of birth, the size of the household, education, participation in working life, profession, the source of livelihood or branch, regular weekly working hours, professional status, employer (private or public sector), membership in a trade union, voting behaviour, religiousness, income and some information concerning the place of residence. All the variables of ISSP 2007 are not used in this study; only those that are related to the concerts, theatre and exhibitions are used, according to the purpose of the study. The questionnaire includes the following question: "How often during the past 12 months on your leisure did you go to concerts, theatrical performances, art exhibitions, etc.?" In the appendix, descriptive statistics related to the question above are shown. It is most reasonable to divide from the point of further analysis the visit activity into the following three classes: regularly (daily,

several times per week, several times per month), occasionally (less often) and never.

There are at least three suitable statistical methods that can be used with that data: 1) the analysis of variance (ANOVA), the multivariate analysis of variance (MANOVA) or the covariance analysis (MANCOVA), 2) the multinomial logit or multinomial probit and 3) the bivariate probit. The analysis of variance is a suitable method for comparing the difference of the means of two groups (e.g., the heavy users and the rest). The results of the multivariate analysis of variance are shown in the appendix.

On the basis of the MANOVA results, it is clear that the first hypothesis is supported: performing arts visitor density depends on a person's gender, age and education. Moreover, the regional supply has an effect. The variance analysis shows that every explanatory variable (gender, the year of birth, the place of province, and education) would alone separate into the classes of regularly, occasionally and never. The joint effect of the explanatory variables is nearly always significant if the education variable is present. In Table 47, different genders have been examined separately. Both for women and men, education appears to be the crucially important variable.

The second possible statistical method is logistic regression analysis or multinomial logit or probit. An equation explaining the visitor density of performing arts must be formulated to discern the impact of each explanatory variable. Furthermore, it is possible to predict behaviour because the effect and direction of explanatory variables are identified. The variable to be explained is either a binary variable (binary logistic) or multinomial but rather often also an ordered variable (multinomial logistic). In the ISSP 2007 data the question is: "How often during the past 12 months on your leisure did you go to concerts, theatrical performances, art exhibitions, etc.?" The answer alternatives were: 1 = daily, 2 = several times per week, 3 = several times per month, 4 = less often and 5 = never. When a binary logistic method is used, the alternatives could be reclassified, for example, so that one alternative is a combination of 1, 2 and 3 and the second alternative is a combination of 4 and 5. If the probability of the first choice is p and the probability of the second is 1-p, then

$$(4–8) \qquad logit(p) = log\frac{p}{1-p} = \log(p) - \log(1-p) = X\beta + u$$

where X includes all explanatory variables, β is the vector of coefficients, and u is the error term. The statistical significance of β can be evaluated with a suitable test. Usually it is assumed that the error term is distributed according to logistic

distribution or to normal distribution. In the last case, the model is probit. Both the logit and probit models provide more information compared with the analysis of variance because both the coefficients of the explanatory variables and the direction of the effect are identified as positive or negative and its statistical significance. Usually the hypothesis testing (single variable) is based on usual t-tests using the standard errors. A common test, which is similar to the F-test that all slope parameters in a regression are zero, is the likelihood ratio test that all the slope coefficients in the probit or logit model are zero.

The normal distribution for the binary choice (no = 0 / yes = 1) has been used, frequently generating the probit model.

(4–9) $$Prob(Y = 1|x) = \int_{-\infty}^{x'\beta} \emptyset(t)dt = \Phi(x'\beta)$$

The function $\Phi(x'\beta)$ is the commonly used notation for the standard normal distribution (Greene 2008, 773), x is a vector of explanatory variables and β is the corresponding vector of parameters. The logistic distribution, which is mathematically convenient, has been very popular.

(4–10) $$Prob(Y = 1|x) = \frac{e^{x'\beta}}{1+e^{x'\beta}} = \Lambda(x'\beta)$$

The function $\Lambda(x'\beta)$ is the logistic cumulative distribution function. If the responses are coded 0, 1, 2, 3 or 4 (‘ every day’, ‘several times a week’, ‘several times a month’, ‘less often’ or ‘never in the past twelve months’) the ordered probit or logit models have been very common. The models begin with $y^* = x'\beta + \varepsilon$ in which y^* is unobserved, and ε is random error. The discrete choices y are observed as follows:

(4–11) $y = 0$, if $y^* \leq 0$
$y = 1$, if $0 < y^* \leq \mu_1$
$y = 2$, if $\mu_1 < y^* \leq \mu_2$
$y = 3$, if $\mu_2 < y^* \leq \mu_3$
$y = 4$, if $\mu_3 \leq y^*$

The μ variables are unknown parameters to be estimated with β. If ε is normally distributed with zero mean and variance is equal to one [ε~N(0,1)], the following probabilities ensue (Greene 2008: 831–832):

(4–12)
$$Prob(y = 0|x) = \Phi(-x'\beta)$$
$$Prob(y = 1|x) = \Phi(\mu_1 - x'\beta) - \Phi(-x'\beta)$$
$$Prob(y = 2|x) = \Phi(\mu_2 - x'\beta) - \Phi(\mu_1 - x'\beta)$$
$$Prob(y = 3|x) = \Phi(\mu_3 - x'\beta) - \Phi(\mu_2 - x'\beta)$$
$$Prob(y = 4|x) = 1 - \Phi(\mu_3 - x'\beta)$$

The parameters of the multivariate probit model, the β variables, are not necessarily the marginal effects that describe the effects of the explanatory variables on cultural participation because the model is not linear.

The marginal effects in the multivariate probit[37] are

(4–13)
$$\frac{\partial Prob(y=0|x)}{\partial x} = -\phi(x'\beta)\beta$$
$$\frac{\partial Prob(y = 1|x)}{\partial x} = [\phi(-x'\beta) - \phi(\mu_1 - x'\beta)]\beta$$
$$\frac{\partial Prob(y = 2|x)}{\partial x} = [\phi(\mu_2 - x'\beta) - \phi(\mu_1 - x'\beta)]\beta$$
$$\frac{\partial Prob(y = 3|x)}{\partial x} = [\phi(\mu_3 - x'\beta) - \phi(\mu_2 - x'\beta)]\beta$$
$$\frac{\partial Prob(y = 4|x)}{\partial x} = [\phi(\mu_3 - x'\beta)]\beta$$

One step forward is to simultaneously study the visitor density of different leisure activities, e.g., "performing arts", "at the movies" or "physical exercise activity". Letting y_1*=the unobserved person's preference for performing arts and y_2*=the preference for movies, the explanation models are $y_1^* = X\beta + u_1$ and $y_2^* = X\beta + u_2$ where the error terms u_1 and u_2 are jointly bivariate distributed N(0,1). Under the null hypothesis that the error terms are not correlated, ρ equals zero, the model consists of two independent probit equations (Greene 2008, 820). If the correlation coefficient equals zero, the performing arts consumption and movies-at-the-cinema consumption are unrelated (Prieto-Rodriguez and Fernandez-Blanco 2000). The estimation of the equations could be based on classification y_1 = ("dai-

[37] The marginal effects in the logit model are:
$\frac{\partial Prob(y=k|x)}{\partial x} = Prob(y = k)\left[\beta_k - \sum_{j=0}^{K} Prob(y = j)\beta_j\right]$. Hence, the marginal effect of x on alternative k involves not only the parameters of k but also the parameters of all other alternatives.

ly" or "several times per week" or "several times per month") = 1 if $y_1^* > 0$ and y_2 = ("less often" or "never") = 0, if $y_1^* \leq 0$. In the above example, a differentiation is made between "several times per month" and "less often" but this separation point could be another. Using the probit model, the marginal effects of each variable could be evaluated (Greene 2008, 821). The marginal effects must be assessed in relation to the zero alternative (such as "northern Finland" or "pupil"). The coefficients in the probit model are difficult to interpret because they present the effect of the variables on the unobserved dependent variable y^*_1. However, the marginal effects of the explanatory variables are on the observed variable y_1. The total marginal effect could be separated into two portions as follows: the direct marginal effect and the indirect marginal effect. The latter portion is formed through the correlation coefficient of the error terms. The bivariate probability for joint y_1 and y_2 is

(4–14) $$Prob(y_1 = 1, y_2 = 1|x) = \Phi_2(x'\gamma_1, x'\gamma_2, \rho)$$

where $\gamma_1 \; and \; \gamma_2$ contain all the nonzero elements β_1 and β_2 and possibly some zeros in the places of variables in x that appear only in the other equation. The marginal effects of changes in x on this probability are given by:

(4–15) $$\frac{\partial \Phi_2}{\partial x} = g_1\gamma_1 + g_2\gamma_2$$

where $g_{i1} = \phi(w_{i1})\Phi\left[\frac{w_{i2}-\rho_{i*}w_{i1}}{\sqrt{1-\rho_{i*}^2}}\right]$

where $\rho_{i*} = (2y_{i1}-1)(2y_{i2}-1)\rho$ and $w_{ij} = q_{ij}z_{ij} = (2y_{ij} - 1)x_{ij}\beta_j$ (Greene 2008, 818-820). If $y_{i1} = 1$ ("daily" or "several times per week" or "several times per month"), $2y_{i1}-1 = 1$, and if $y_{i1} = 0$ ("less often" or "never"), then $2y_{i1}-1 = -1$ for j = 1 (arts) and 2 (movies). The bivariate profit is used in the last essay

4.4 Estimation: logit

Next, the multinomial logit model and ordered logit results will be presented. It is assumed in the binary logit model that the dependent variable has two classes, whose probabilities are p and (1-p). In this case, the equation to be estimated is: $logit(p) = log\frac{p}{1-p} = \log(p) - \log(1-p) = X\beta + u$ where X contains the explanatory variables and β is a vector of coefficients. In the multinomial logit, there are more than two alternatives or classes, e.g., "regularly", "occasionally" and "never". The probability of the choice "often" is $Prob(Y_i = 'often' | w_i) = P_{i'often'} = \frac{\exp(w_i \beta_i)}{1+\sum_{k=1}^{j} exp(w_k \beta_k)}$ where "i" stands for the person's i choice between different alternatives k (1,…,) on the condition w_i. These conditions are characteristics that have an effect on the person's choice, including gender, the year of birth or education. In the multinomial logit model, one alternative is the zero alternative and the other alternatives are compared in relation to zero. The variable that describes age has been recoded more approximately based on a more rational way of presenting the results: age15_24, age25_34, age35_44, age45-54, age55_64, age64_. Unfortunately, the place of residence (province) cannot be used because the number of observations in some provinces is too small; therefore, a more approximate area of classification is used: southern Finland (NUTS: FI18), western Finland (FI19) and eastern Finland (FI13), whereas northern Finland (FI1A) and Ahvenanmaa – the southwestern archipelago (FI20) are considered as reference values.

The observation unit in the ISSP 2007 survey is a person 15–74 years old and for the purpose of this study, persons have been classified into six subsets: 15–24 years old, 25–34 years old, etc., with the last consisting of persons 65–74 years old. Table 31 presents the descriptive statistics of more detailed age groups and education. The descriptive statistics show that the further analysis conducted using 6 subsets of age does not distort the data because the subsequent 5-year age cohorts within the 10-year subset have similar education.

Table 31. Descriptive statistics of age-group and education variables.

		edu1	edu2	edu3	edu4	edu5	edu6	edu7	edu8	edu9
		5.5%	10.6%	7.9%	22.1%	7.2%	24.6%	8.1%	4.1%	9.9%
age15_19	6.2%	84.0%				12.1%				
age20_24	5.4%	11.6%				26.4%				
age25_29	7.4%	4.3%						28.4%		13.6%
age30_34	6.0%							13.7%		
age35_39	8.0%						12.9%	17.7%		14.4%
age40_44	8.7%						13.5%			17.6%
age45_49	10.0%				11.6%	12.1%	15.2%		15.4%	
age50_54	8.7%			20.2%						
age55_59	11.0%			19.2%	11.6%				13.5%	
age60_64	11.2%		23.9%	15.1%	14.7%				13.5%	
age65_69	6.4%		24.6%							
age70_74	6.1%		23.9%							
	100%	Three largest age groups according to the education, e.g., 84% of the youngest are pupils/students, and 23.9% of the oldest have only elementary school background.								

edu1 = pupil or student (comprehensive, upper secondary, vocational school or course, college: 5.5% in the sample are pupils or students
edu2 = elementary school
edu3 = comprehensive school
edu4 = vocational school or course
edu5 = upper secondary, secondary school graduate
edu6 = college
edu7 = bachelor's degree(polytechnic or university of applied sciences)
edu8 = bachelor (university)
edu9 = master's degree

The descriptive statistics of the explanatory variables reveal that age (age group) and education are related. The majority of the youngest people in the sample were pupils or students (at a comprehensive, an upper secondary, a vocational school, or at a college) and correspondingly the oldest had a rather low education (elementary or comprehensive school). A college-level education was mainly replaced by a bachelor's degree education in the early 1990s and therefore persons having a bachelor's degree from a polytechnic (university of applied sciences) are somewhat younger than persons having a college diploma. Persons less than 50 years old on average have a (better and) longer education than persons older than 50. Age and education are related to household or personal incomes. Middle-age and highly educated persons appear to have the highest standardised incomes (including all social security contributions, e.g. child benefits may explain why the age group 25–34 has the highest incomes, see Table 32). Some differences in education exist between genders; for example, men are somewhat less educated than women.

Because the income variable in the sample includes all social security contributions (e.g. child benefits), the number of children is used as an explanatory variable. The household incomes have been adjusted for family size: 1st adult = 1, oth-

er adults = 0.7, children = 0.5. The income variable is thus the average monthly standardised gross incomes.

Table 32. Average monthly standardised gross incomes.

Group	Standardised income = household income adjusted for family size (1st adult = 1, other adults = 0.7, children = 0.5)
Age15_24, n = 148	1028
Age25_34, n = 170	2647
Age35_44, n = 213	2446
Age45_54, n = 238	2646
Age55_64, n = 282	2075
Age65_, n = 159	1572
Pupil, n = 67	1129
Primary school, n = 230	1280
Secondary school, n = 669	2163
Tertiary school, n = 274	3084
including taxes and social security contributions by age and by education groups	

The sample contains more females (57%) than males (43%). The majority of respondents are married (50%) and the two other large groups according to the marital status are single (20%) and common-law marriage (17%). Married and common-law marriage have been combined in further analysis. Separated or widowed respondents are considered as the reference group (constant) in further analysis as well as in northern Finland and Ahvenanmaa.

Table 33. Descriptive statistics of some explanatory variables.

	female: 57 %	male: 43 %	n = 1232
marital status: single	18.3%	23.0%	20,3%
married or registered pair relation	48.6%	51.9%	50.0%
common-law marriage	17.0%	17.3%	17.1%
judicial separation*	0.3%	0.7%	0.5%
separated*	11.0%	5.2%	8.4%
widow(er)*	4.9%	1.9%	3.6%
Province: Southern Finland	53.0%	49.3%	51.4%
Western Finland	25.9%	25.7%	25.8%
Eastern Finland	12.2%	13.6%	12.8%
Rest of Finland*:	8.8%	11.5%	10.0%

* = reference groups (constant) in probit or logit analysis

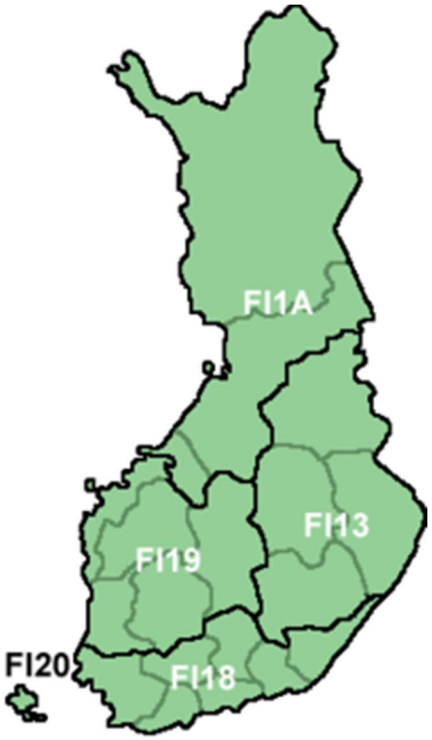

Figure 5. Nuts areas.

Area1 = FI18 (southern Finland), Area2 = FI19 (western Finland), and Area3 = FI13 (eastern Finland). FI1A (northern Finland) + FI20 (Ahvenanmaa –the southwestern archipelago) are considered a reference value.

In Table 34, the multinomial logit and ordered logit results are presented[38]. The following table presents the marginal effects of variables assuming that the zero alternative is as follows: education is level 1, i.e. pupil, the age is 35–44 years old and area is northern Finland. By marital status, approximately 50 % in the sample are married or in registered pair relation. The common-law marriage and the above have been combined in further analysis ("married"). By marital status, the rest (juridical separation or separated or widowed) is used as the reference value.

[38] The ordered probit model results (not shown) are similar.

Table 34. Logit and ordered logit models analysis of visitor density in highbrow performing arts.

Variables	Multinomial logit Occasionally	Regularly	Ordered logit 1 = occ, 2 = reg
Female	0.812 (0.154)***	1.213 (0.302)***	0.735 (0.135)***
Marital status: single	0.236 (0.296)	0.511 (0.540)	0.263 (0.271)
Marital status: married	0.143 (0.441)	-0.477 (0.994)	-0.060 (0.414)
Age 15–24	-0.324 (0.334)	0.154 (0.622)	-0.121 (0.299)
Age 25–34	-0.222 (0.312)	-0.829 (0.689)	-0.309 (0.254)
Age 45–54	-0.044 (0.266)	-0.043 (0.540)	0.008 (0.224)
Age 55–64	-0.098 (0.275)	0.875 (0.509)(*)	0.297 (0.235)
Age 65–	-0.252 (0.318)	0.848 (0.578)	0.231 (0.281)
Primary school	-0.530 (0.336)	-0.111 (0.926)	-0.427 (0.319)
Secondary school	0.409 (0.304)	1.633 (0.834)*	0.661 (0.288)*
Tertiary school	0.856 (0.389)**	2.836 (0.893)***	1.203 (0.337)***
Spouse: Primary school	0.285 (0.465)	0.717 (1.082)	0.319 (0.437)
Spouse: Secondary school	0.296 (0.442)	0.577 (1.020)	0.304 (0.410)
Spouse: Tertiary school	0.840(0.499)(*)	1.469 (1.043)	0.733 (0.435)(*)
Southern Finland	0.725 (0.235)**	1.370 (0.576)*	0.748 (0.217)***
Western Finland	0.736 (0.260)**	1.116 (0.618)(*)	0.651 (0.236)**
Eastern Finland	0.375 (0.288)	0.430 (0.708)	0.312 (0.269)
Children < 7	-0.337 (0.184)(*)	-2.041 (0.990)*	-0.378 (0.158)*
Children 7–17	-0.216 (0.102)*	-0.212 (0.237)	-0.170 (0.092)(*)
Log(Std incomes)	0.093 (0.025)***	0.055 (0.047)	0.076 (0.024)**
constant	-1.132 (0.474)*	-6.238 (1.241)***	-1.133 (0.440)**
			μ= 4.937 (0.164)***
	Pseudo-R^2 (McFadden) = 0.110		Pseudo-R^2 (McFadden) = 0.089

Observations, n = 1270, reference group: school1 = pupil or student, age 35-44, northern Finland, separated), zero alternative is "never". ***,**,*,(*) significant at 0.1, 1, 5, and 10 per cent level.

Table 35. Marginal effects of variables: Visitor density, concerts, theatrical performances, art exhibitions.

Marginal effects of attendance in cultural events

	Multinomial logit			Ordered logit (sum = 0)		
	Never	Occasionally	Regularly	Never	Occasionally	Regularly
Female	-0.103***	0.085***	0.017(*)	-0.092	0.064	0.028
Single	-0.031	0.020	0.010	-0.031	0.020	0.011
Married	-0.015	0.034	-0.020	0.008	-0.005	-0.002
Age 15–24	0.038	-0.052	0.014	0.016	-0.011	-0.005
Age 25–34	0.030	-0.009	-0.021	0.042	-0.031	-0.011
Age 45–54	0.005	-0.005	-0.000	-0.001	0.001	0.000
Age 55–64	0.007	-0.039	0.032*	-0.035	0.023	0.012
Age 65–	0.026	-0.061	0.035*	-0.027	0.018	0.010
Primary school	0.064	-0.075	0.011	0.059	-0.044	-0.015
Secondary s	-0.057	0.014	0.042(*)	-0.084	0.059	0.025
Tertiary s	-0.116*	0.046	0.069*	-0.119	0.054	0.066
Sp: Primary s	-0.037	0.022	0.016	-0.037	0.023	0.014
Sp: Secondary s	-0.038	0.027	0.011	-0.037	0.025	0.012
Sp: Tertiary s	-0.107(*)	0.082	0.025	-0.077	0.041	0.036
Southern F	-0.093***	0.068*	0.025	-0.094	0.065	0.029
Western F	-0.093*	0.077*	0.016	-0.073	0.044	0.029
Eastern F	-0.047	0.043	0.004	-0.036	0.023	0.013
Children < 7	0.050*	0.008	-0.058*	0.048	-0.033	-0.015
Children 7–17	0.027*	-0.026(*)	-0.001	0.021	-0.015	-0.007
Log(Std inc)	-0.011***	0.012***	-0.001	-0.009	0.007	0.003

The significance of the marginal effects can be evaluated in the multinomial logit model: ***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level. The statistical errors of the marginal effects in ordered logit are not shown in the statistical programme, NLOGIT. n = 1270

The marginal effects reveal that the education is an important classifying variable. The regularly visiting group has more often graduated from a university of applied sciences (bachelor's degree) or from a university (bachelor's or master's degree[39]). Others with different educational background do not significantly belong to the group "regularly". The spouses' high education also matters. The marginal effects (Table 35) of the education level on the visitor density shows that only women with the highest education are the most active. The age cohorts 55–64 and 65– are the most active. The results are in line with the earlier studies from Finland (Kivekäs 1991) and support the first hypothesis as follows: the person's education, gender and age have a significant effect on the performing arts visiting density[40]. A further estimation with a more detailed schooling classification reveals that the upper secondary education (matriculation examination) is the separating borderline between occasional goers and those who do not go (not shown). An important finding is that household standardised incomes have a positive impact on attendance. However, the income variable is not significant in classifying occasional visitors and frequent visitors. The number of young children is important in classifying the most-active goers and not goers, whereas the number of school-aged children classifies occasional goers from those who never go.

The first hypothesis is verified by the results of the logit analysis: the consumption of cultural events depends on a person's gender, age and education and there are substantial differences across regions. The effect of gender is clear between all the groups: "regularly", "occasionally" and "never". Women are more active. In a comparison of the groups "occasionally" and "never", the effect of the person's education is significant when the education is high (tertiary). In a comparison of the previous groups and the "regularly" group, the effect of education is significant when the education is at least secondary. The impact of the region is as follows: southern Finland and western Finland are different than other areas in Finland among those that "never" or "occasionally" attend cultural events. The null area (in constant) in the estimations is northern Finland. To conclude, it can be argued that the crucial educational level is upper secondary school. All education after upper secondary school appears to increase cultural consumption. The separating points between the groups "occasionally" and "often" appears to be a university degree and regionally southern Finland or western Finland. The ordered logit analysis confirms the multinomial logit results (Table 34).

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[39] In the sample the highest education is classified as master's level.

[40] The results in Kivekäs (1991) are descriptive: frequencies and proportions but any multivariate analysis is not used.

One must keep in mind that not all persons with a university degree have attended cultural events. Approximately 4 per cent of those who have completed a university degree (either a bachelor's or a master's degree) have not participated at all. Approximately 13 per cent of the respondents belong to the group "regularly".

The second hypothesis proposes that cultural events and sporting events are substitutes. Montgomery and Robinson (2006) show using American data (USA 2004) that these events are exclusionary and have a separate public. Descriptive statistics of the sport audiences is presented in Table 36.

Table 36. ISSP 2007, "How often on your leisure do you go to see sporting events at the location (ice hockey, football, athletics, motor racing, etc.)? n = 1355.

	Daily	Several times per week	Several times per month	Less often	Never	Missing
Frequency	4	17	82	691	526	35
%	0,3	1,3	6,1	51,0	38,8	2,6
% of responses	0,3	1,3	6,2	52,3	39,8	
Women, %	0,1	0,7	5,0	43,4	49,0	1,7
Men, %	0,5	2,1	7,6	63,3	26,5	3,4
Women, %						
15 < age < 24	0	0	9,1	48,5	42,4	0
25 < age < 34	0	3,1	6,9	46,6	43,5	0
35 < age < 44	0	0,8	6,1	42,7	49,6	0,8
45 < age < 54	0,6	0	2,4	40,5	54,8	1,8
55 < age < 64	0	0	1,9	28,7	63,0	6,5
65 < age	0	0	5,2	54,3	38,8	1,7
Men, %						
15 < age < 24	0	1,6	8,1	67,7	21,0	1,6
25 < age < 34	0	4,2	9,4	69,8	16,7	0
35 < age < 44	0,8	0,8	9,2	68,9	17,6	2,5
45 < age < 54	0	0,8	6,8	56,4	30,8	5,3
55 < age < 64	1,5	1,5	1,5	45,5	43,9	6,1
65 < age	0,9	3,6	7,3	56,4	27,3	4,5

Because the number of respondents who visit "daily" or "several times per week" is so small, these groups and "several times per month" are combined. Hence, there are three groups: "regularly", "occasionally" and "never", as above, in connection with the cultural events. The correlation of the three values' ("regularly", "occasionally", and "never") participation in cultural events and participation in sports events is 0.09.

Sporting events consumption is classified into the following three groups: "regularly", "occasionally" and "never" in the logit models (Table 37). Gender classifies into groups so that men are more active. The most active sports events consumers are those with elementary school or comprehensive school education and

men younger than 25. The results are converse to the visitor density of cultural events. Because the spectator groups appear to be exclusionary, a robustness check is performed to include the cultural attendance ("regularly", "occasionally" or "never") as a covariate. The results of the marginal effects are shown in Table 38.

Table 37. Multinomial logit and Ordered logit model results: Visitor density, sporting events.

	Multinomial logit		Ordered logit
Variables	Occasionally	Regularly	1 = occ, 2 = reg
Female	-0.869 (0.126)***	-1.149 (0.201)***	-0.827 (0.110)***
Marital status: single	0.396 (0.248)(*)	1.060 (0.440)*	0.583 (0.224)**
Marital status: married	0.523 (0.388)	1.304 (0.636)*	0.675 (0.347)(*)
Age 15–24	0.565 (0.275)*	-0.097 (0.456)	0.255 (0.240)
Age 25–34	0.341 (0.235)	0.276 (0.369)	0.249 (0.200)
Age 45–54	0.235 (0.206)	-0.083 (0.321)	0.061 (0.181)
Age 55–64	0.022 (0.211)	-0.291 (0.349)	-0.090 (0.188)
Age 65–	-0.403 (0.255)	-0.427 (0.414)	-0.437 (0.230)(*)
Primary school	0.314 (0.316)	1.367 (0.530)**	0.681 (0.288)*
Secondary school	0.513 (0.280)(*)	0.720 (0.491)	0.496 (0.252)*
Tertiary school	0.519 (0.312)(*)	0.155 (0.560)	0.336 (0.279)
Spouse: Primary school	-0.257 (0.412)	-0.822 (0.642)	-0.364 (0.370)
Spouse: Secondary school	-0.142 (0.386)	-0.632 (0.609)	-0.225 (0.342)
Spouse: Tertiary school	-0.051 (0.405)	0.081 (0.632)	0.040 (0.357)
Southern Finland	0.456 (0.203)*	0.228 (0.331)	0.278 (0.184)
Western Finland	0.650 (0.222)**	0.345 (0.362)	0.394 (0.199)*
Eastern Finland	0.252 (0.259)	0.775 (0.378)*	0.480 (0.232)*
Children < 7	0.202 (0.154)	0.140 (0.247)	0.142 (0.130)
Children 7–17	0.058 (0.089)	0.401 (0.127)***	0.192 (0.077)**
Log(Std incomes)	0.063 (0.022)**	0.007 (0.035)	0.041 (0.020)*
constant	-0.095 (0.428)	-1.512 (0.723)*	0.209 (0.388)
			μ= 2.793 (0.102)****
	Pseudo-R^2 (McFadden) = 0.073		Pseudo-R^2 (McFadden) = 0.050

Multinomial logit analysis and ordered logit, depending variable = "How often on your leisure do you go to see sporting events at the location (ice hockey, football, athletics, motor racing, etc.)? Null (constant) is: education = pupil or student, age = age35_44, region = northern Finland. n = 1270

The marital status matters; i.e., single or married persons more often attend sporting events than separated or widowed persons, a result that is not found with cultural event participation. Eastern Finland has a positive marginal effect in the sport participation model, which is not found in the highbrow cultural participation model.

Table 38. Marginal effects of variables: Visitor density, sporting events.

	Multinomial logit			Ordered logit (sum = 0)		
	Never	Occasionally	Regularly	Never	Occasionally	Regularly
Female	0.216***	-0.162***	-0.054***	0.195	-0.127	-0.068
Single	-0.117*	0.048	0.069*	-0.131	0.076	0.055
Married	-0.152(*)	0.068	0.083(*)	-0.161	0.110	0.052
Age 15–24	-0.110(*)	0.146*	-0.035	-0.059	0.036	0.023
Age 25–34	-0.079	0.072	0.007	-0.057	0.035	0.022
Age 45–54	-0.044	0.063	-0.018	-0.014	0.009	0.005
Age 55–64	0.006	0.020	-0.025	0.021	-0.014	-0.007
Age 65–	0.096(*)	-0.080	-0.016	0.106	-0.075	-0.032
Primary school	-0.112	0.013	0.099*	-0.150	0.083	0.067
Secondary s	-0.129*	0.094	0.035	-0.117	0.076	0.041
Tertiary s	-0.110	0.122(*)	-0.012	-0.077	0.047	0.030
Sp: Primary s	0.081	-0.025	-0.056	0.088	-0.061	-0.027
Sp: Secondary s	0.051	-0.005	-0.046	0.053	-0.035	-0.018
Sp: Tertiary s	0.007	-0.017	0.009	-0.009	0.006	0.003
Southern F	-0.100*	0.103*	-0.003	-0.065	0.043	0.023
Western F	-0.143**	0.145**	-0.002	-0.090	0.055	0.035
Eastern F	-0.078	0.026	0.052(*)	-0.107	0.022	0.012
Children < 7	-0.046	0.044	0.002	-0.034	0.022	0.012
Children 7–17	-0.026	-0.005	0.031***	-0.045	0.030	0.016
Log(Std inc)	-0.013**	0.015***	-0.002	-0.010	0.006	0.003

The significance of the marginal effects can be evaluated in the multinomial logit model: ***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level. The statistical errors of the marginal effects in ordered logit are not shown in the statistical programme, NLOGIT.

A robustness check for the result that the participation groups for highbrow cultural events and sporting events are separate is performed by including the highbrow participation variable as a covariate in the sport participation model. The marginal effects are shown in Table 39. The marginal effects excluding (Table 38) and including (Table 39) indicate that the highbrow variables are similar but significant. Hence, the proposition that highbrow and sporting events are somewhat interrelated is verified. Notably, the marginal effect of highbrow participation for those who are most active in sport participation is negative, indicating that the events are substitutes. This effect holds true only for heavy users because the marginal effect for the occasional group is positive, indicating that the events are complements.

A robustness check for the marginal effects is conducted using an inverse model. The variable to be explained is the highbrow art consumption. The gender, schooling, age and area variables as well as the sport consumption variable are the explanatory variables. The marginal effects are shown below in Table 40.

Table 39. Marginal effects of variables: Visitor density, sporting events, including the cultural attendance variable.

	Multinomial logit		
	Never	Occasionally	Regularly
Female	0.242***	-0.194***	-0.048***
Single	-0.109(*)	0.040	0.070*
Married	-0.154(*)	0.073	0.081(*)
Age 15–24	-0.116(*)	0.155*	-0.039
Age 25–34	-0.089(*)	0.084	0.005
Age 45–54	-0.043	0.063	-0.020
Age 55–64	0.018	0.008	-0.027
Age 65–	0.111(*)	-0.094	-0.017
Primary school	-0.125(*)	0.030	0.095*
Secondary s	-0.112(*)	0.072	0.039
Tertiary s	-0.078	0.083	-0.005
Sp: Primary s	0.087	-0.037	-0.050
Sp: Secondary s	0.057	-0.017	-0.040
Sp: Tertiary s	0.023	-0.042	0.019
Southern F	-0.079(*)	0.077	0.002
Western F	-0.126**	0.125*	0.001
Eastern F	-0.069	0.014	0.054(*)
Children < 7	-0.056	0.058(*)	-0.002
Children 7–17	-0.029	0.001	0.028***
Log(Std inc)	-0.011*	0.013**	-0.002
Cultural attendance	-0.162***	0.202***	-0.040*

***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level.

Table 40. Marginal effects of variables: Visitor density, concerts, theatrical performances, art exhibitions, including the sport attendance variable.

	Multinomial logit		
	Never	Occasionally	Regularly
Female	-0.114***	0.095***	0.018*
Single	-0.020	0.010	0.010
Married	-0.004	0.025	-0.022
Age 15–24	0.040	-0.054	0.014
Age 25–34	0.033	-0.012	-0.021
Age 45–54	0.008	-0.008	-0.000
Age 55–64	0.008	-0.040	0.032*
Age 65–	0.023	-0.058	0.036*
Primary school	0.071(*)	-0.082(*)	0.011
Secondary s	-0.052	0.010	0.042
Tertiary s	-0.114*	0.045	0.069**
Sp: Primary s	-0.043	0.026	0.017
Sp: Secondary s	-0.042	0.030	0.012
Sp: Tertiary s	-0.106(*)	0.080	0.026
Southern F	-0.090***	0.065*	0.024
Western F	-0.089**	0.074*	0.016
Eastern F	-0.038	0.035	0.003
Children < 7	0.053*	0.051	-0.058*
Children 7–17	0.029*	-0.027*	-0.001
Log(Std inc)	-0.011***	0.012***	-0.001
Sport attendance	-0.040*	0.035*	0.005

***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level.

When a spectator favours sport and attends sporting events, the attitude towards highbrow performing arts is positive, as indicated by the marginal effects in Table 40. The marginal effect of sport preference is negative for those people never attending highbrow art (-0.040) and positive for those attending occasionally (0.035). The corresponding inverse effect from highbrow art towards sport is stronger: -0.162 (never), 0.202 (occasionally) or -0.040 (regularly). However, viewing from highbrow arts towards sport or vice versa indicates that these events have a somewhat similar audience. There are also strong separating special effects; for example, women prefer highbrow arts, whereas men are more often found in the sport spectator group.

Performing arts attendance and sporting events are interrelated as the previous tables indicate. However, because spectators can choose movies at the cinema in addition to performing arts and sporting events, it is reasonable to add density at movies as a covariate. The results are shown in the appendix.

4.5 Conclusions and evaluation

The purpose of this study is to analyse the properties of the audiences of cultural events using Finnish 2007 data and the incidence of cultural subsidies. These subsidised events primarily include concerts, art exhibitions and theatrical or opera performances. The preliminary method is the analysis of variance (ANOVA or MANOVA). The results indicate that a person's gender, education, age and the place of residence are important factors for classifying visitor density. By definition, the analysis of variance does not expose the well-known fact that women are more active visitors. Another method, the multinomial logit analysis, is more useful because this method reveals both the direction of the effect and the statistical significance of each explanatory variable. The results additionally show that women are significantly more active visitors than men when the impact of other explanatory variables is taken into account. The other significant factors include education (higher than upper secondary school), age (between 35 and 64) and the place of residence (compared with northern Finland). The most active ("regularly") group and the less active group ("occasionally") can be separated with the factors mentioned above: gender, education, age (in this case, often vs. occasionally, 55–64 years old) and regions other than northern Finland (zero alternative in estimation). The first hypothesis is verified. Austin (1986) has shown that in the motion picture art sector, persons perceive the attendance motives differently than those attending less often; frequent movie-goers reported greater identification with the movie motives than others. The following similar explanation is also suitable here: older and highly educated women identify with the glamorous at-

mosphere of opera or theatre, whereas less-educated younger men relate to strong sportsmen.

An alternative way to spend leisure time is to attend sporting events instead of cultural events (concerts, exhibitions, performances). When the impact of sport consumption is taken into account, the results do not change. The second hypothesis proposed is partially verified. The audiences of cultural events and sporting events are not separate. An person who is active in culture is also active in sport, although age, education and gender are important variables to classify. Table 41 summarises the results.

Table 41. Consumption of various cultural events, statistically significant explanatory variables.

	High-brow	High-brow	High-brow	High-brow	Sport	Sport	Sport	Sport	Cin-ema	Cin-ema	Cinema	Cin-ema
Female	+++	+++	+++	+++	---	---	---	---	+		+++	
Single					+	+	+	+				
Married					(+)	(+)	(+)	(+)				
Age 15–24			-	-	+	+	(+)	(+)	+++	+++	+++	+++
Age 25–34			(-)	(-)		(+)			+++	+++	+++	+++
Age 45–54												
Age 55–64	+	+	+	+								
Age 65–	+	+	+	+	(-)	(-)						
Primary school		(-)			+	+	+	+				
Secondary s	(+)				+	(+)	(+)					
Tertiary s	+	++	+	+	(+)				+		+	
Sp: Primary s												
Sp: Secondary s												
Sp: Tertiary s	(+)	(+)		(+)								
Southern F	+++	+++			+	(+)			+++	+++	+++	+++
Western F	+	++			++	++	(+)	(+)	+++	+++	+++	+++
Eastern F					(+)	(+)	+	+	+++	+++	+++	+++
Children < 7	-	-	-	-		(+)						
Children 7–17	-	-	-	--	+++	+++	+++	++	+	++	+	++
Log(Std inc)	+++	+++	++	++	+++	++	+	+	+++	(+)	++	(+)
Culture					not	+/-	not	xxx	not	+++	not	+++
Sport	not	+	not						not	not	+++	+++
Movies	not	not	+++	+++	not	not	+/-	+/-				

xxx,xx,x,(x) significant at 0.1, 1, 5, 10 per cent level. not = variable is not included in the estimation, +/- = the effect is a hill-shaped

The number of cultural participation areas and/or by the number of genres in one specific area defines the omnivorousness in cultural taste. Consumers are omnivore if they participate in everything, univore if they prefer only one field and inactive if they do not participate at all (Alderson, Junisbai and Heacock 2007). The Table 41 shows that females are more univore if only highbrow performing arts and sporting events are considered. The omnivousness can be measured by the signs direct and indirect marginal effects in the bivariate probit analysis conducted in the next chapter. If both signs of the variable are positive, a group of consumers classified according to this variable is univore.

The results are in line with those of Borgonovi (2004), Montgomery and Robinson (2006) and Masters (2007). Using U.S. data, Montgomery and Robinson

show that arts' spectators are older, better educated and mostly women. A similar conclusion can be made with the Finnish data. Swanson, Davis and Zhao (2008) show that women are more active because of artistic, educational and recreational motives and that self-esteem motivation is higher for those older than age 50. Lower-educated attendees are more likely to be motivated by escapism and self-esteem. However, international comparisons must be made with caution because the international differences in culture consumption are large (Seaman 2005, Virtanen 2007).

The impact of regions is substantial. In this study, the regions have been formed mainly based on the NUTS2-classification. Sport is favoured in eastern Finland, whereas highbrow performing arts are favoured in southern or western Finland. The allocation of highbrow performing arts subsidies is not equal because highly educated elder women receive a larger portion of subsidies. The results indicate that from the viewpoint of more equal cultural consumption, sporting events should receive more subsidies directed to less-educated men. There are substantial subsidies in sport but not for spectators. The aim of sport subsidies has been to help construct sport venues (Vehmas et al. 2005, 37 or Opetusministeriö 2006), whereas performing arts subsidies are based on the unit cost of full-time equivalent persons. As a rule, the state subsidy in 2011 was 37 per cent of the price of the person. A similar subsidy system is used in the field of cinema distribution but not in the field of sport. A fair subsidy system should be based on attendance in the field of sport. A voucher or a deductible (tax deduction) ticket with limits is more equal because it does not favour only highly educated older women.

4.6 Appendix

The results (Table 29) are equal to the 1999 survey (Kulttuuripuntari), indicating that women go more often than men, highly educated people are more active and the differences among provinces are substantial.

Table 42. Culture and physical education hobbies 1981, 1991 and 1999.

Has visited during the past 12 months, %	Year	Theatre	Dance performance	Concert	Opera	Sport event
Women	1981/1991/1999	52/46/47	31/22/22	40/39/42	8/6/9	-/40/30
Men	1981/1991/1999	36/28/29	19/14/16	29/27/33	4/3/5	-/57/49
Age						
age 10–14	1981/1991/1999	48/35/40	25/17/21	42/31/33	5/2/3	-/79/57
age 15–24	1981/1991/1999	46/36/31	26/21/22	48/48/52	5/3/5	-/71/52
age 25–44	1981/1991/1999	49/36/39	27/18/22	31/34/41	6/4/7	-/54/48
age 45–64	1981/1991/1999	46/43/44	26/22/21	34/32/36	8/6/10	-/36/34
age 65–	1981/1991/1999	29/31/35	19/11/9	22/22/22	4/3/4	-/14/13
education:						
Lower basic	1991/1999	28/28	13/12	18/20	2/2	28/24
Upper basic	1991/1999	36/34	19/21	41/39	3/5	63/42
Middle	1991/1999	36/34	19/18	36/39	3/6	52/41
Lower Higher	1991/1999	49/55	24/27	47/50	8/11	55/46
Higher	1991/1999	63/60	28/29	58/61	16/22	51/46
Region:						
Metropolitan area	1991/1999	47/48	21/25	43/50	11/19	48/42
Rest of Uusimaa	1991/1999	33/41	18/19	34/40	4/8	46/36
Southern Finland	1991/1999	41/40	18/20	33/38	3/5	44/39
Eastern Finland	1991/1999	30/35	17/18	34/33	3/4	43/34
Central Finland	1991/1999	35/36	17/16	30/31	2/3	47/39
Northern Finland	1991/1999	26/25	17/14	26/30	3/5	48/29

Sample 4677 households in year 1999

Based on the statistics above, the theatre visitor density did not change essentially during the 1990s except that the youngest citizens and citizens living in eastern Finland may have increased the visitor density. In 1991, 35 per cent of the youngest (10–14 years old) visited the theatre, whereas the same measure in 1999 was 40 per cent. In eastern Finland, the share of visitors increased from 30 to 35 per cent. The visitor density of dance performances was approximately half of the theatres and no substantial changes occurred during that decade. Opera and concert performances increased, particularly among 25–44 and 45–64 year olds and in the Uusimaa region (both the Helsinki metropolitan area and eastern Uusimaa province). In comparison, the spectator frequency of the sporting events and competitions decreased. The majority of the sport spectators are men. The audience survey of two regional and occasional operas at Pori and Tampere (Kivekäs 1991) reveal that the visitors have on average a higher education than those of the

theatres although it is to some extent lower than that of the national opera and the Savonlinna opera festival. During the autumn season in 1999, the Pori opera was distinctively opera for local residents, whereas the audience at Tampere opera was more national. The audience of the Savonlinna opera festival has a high education, with more than 55 per cent possessing a university degree. There are more women than men and 60–69 year olds represent the largest cohort if the audience is classified using ten-year increments (Mikkonen and Pasanen 2009). The large majority of spectators come from other cities during the summer holidays because the opera festival is held in July and August. The music festival in Kangasniemi, which is similar to its music species event, has an audience similar to the Savonlinna opera festival (Mikkonen, Pasanen and Taskinen 2008).

In the early 1990s, one of the most severe economic recessions in the economic history of Finland occurred. Unemployment rose to record highs, a factor that might have affected visitor density. When the years 1981, 1991 and 1999 are compared (Table 42), it can be seen that practically all groups (women, men, different age cohorts) had the lowest density figure in 1991. Only the pensioners did not decrease their trips to the theatre; conversely, this group showed an increase in visits.

The figures in the culture barometer (Kulttuuripuntari in Table 44) are substantially higher than those presented above. The reason for these higher figures is not known. The leisure activities culture and sport statistics are based on interviews on the use of leisure time conducted by Statistics Finland. The 1999 figures were collected between March 1999 and February 2000, whereas the culture barometer data was collected in connection with the labour study. One commercial research institution (Taloustutkimus) has conducted several surveys on the visitor density of theatre, opera and ballet performances on the basis of assignments by the association of Finnish theatres (Suomen teatterit). The sample size has been approximately 1,000 in the surveys in 1995, 1998, 2001, 2004 and 2007 (Table 29 in text).

Table 43. Suomen Teatterit (Taloustutkimus), survey on visits to theatre, opera or ballet during the past 12 months, years 1985, 1998, 2001, 2004 and 2007 in %.

Has visited during the past 12 months	1994 n = 956	1998 n = 1013	2001 n = 994	2004 n = 984	2007 n = 999
once/occasionally(2–5)/regularly (6- times) = total	16,/25/3 = 44	19/23/3 = 45	19/20/4 = 43	23/21/2 = 42	21/22/4 = 47
gender: once/occ/reg					
women:	17/34/4 = 55	20/30/5 = 55	22/27/5 = 54	25/26/4 = 55	22/28/4 = 54
men:	16/16/3 = 35	18/15/1 = 34	15/14/3 = 36	21/16/2 = 39	19/14/3 = 36
age: once/occ/reg					
15–24 y.:	19/20/1 = 40	22/17/2 = 41	23/15/3 = 41	25/14/1 = 40	17/11/1 = 29
25–44 y.:	19/21/2 = 42	19/21/3 = 43	22/19/4 = 45	26/17/3= 46	22/19/3= 44
45–64 y:	13/30/5 = 48	19/29/3 = 51	14/23/4 = 41	22/28/3 = 53	25/27/4 = 56
65–79 y:	12/16/12/3 = 43	12/9/10/5 = 36	15/14/13/3 = 45	15/12/9/3 = 39	14/18/8/5 = 45
education (once/occ/reg)					
Basic and primary	15/22/2 = 39	17/15/2 = 42	16/16/2 = 34	19/14/0 = 33	18/16/2 = 36
Secondary	16/18/3 = 37	18/20/1 = 39	15/14/1 = 30	20/16/1 = 37	17/17/2 = 36
Upper sec:	17/32/2 = 51	26/21/5 = 52	27/19/5 = 51	20/25/2 = 47	25/15/1 = 41
Tertiary lower (AMK)	16/35/3 = 54	20/30/3 = 53	24/29/4 = 57	36/23/5 = 64	23/36/3 = 62
Tertiary higher (University):	24/31/14 = 69	18/38/12 = 68	19/31/19 = 69	17/42/11 = 70	29/23/10 = 62
Share of population in Region %: (once/occ/reg)					
Southern Finland	17/28/5 = 50	19/26/4 = 49	21/22/5 = 48	25/23/5 = 53	23/27/5 = 55
Central Finland:	14/26/2 = 42	19/18/1 = 38	15/23/2 = 40	23/21/1 = 45	18/14/1 = 33
Northern Finland:	17/16/1= 34	17/17/2 = 36	12/12/4 = 28	14/15/0 = 29	14/11/1 = 26

Table 44. Kulttuuripuntari (culture barometer) 1999.

Has visited during the past 12 months, % 1999	Theatre	Concert	Opera	Sport event
Women	68,8	75,8	15,1	42,9
Men	47,1	65,3	8,6	62,7
age 20–24	48,4	80,1	7,5	55,0
age 30–34	52,1	71,3	9,2	55,5
age 40–44	63,8	69,7	10,7	54,7
age 50–54	62,6	66,3	17,4	42,3
age 60–64	60,2	56,8	13,1	37,0
Education:				
No vocational	52,9	63,0	6,7	49,0
Vocational	49,1	63,5	6,3	54,8
University	85,0	88,9	39,3	53,2
Province (etc.):				
Southern Finland	61,7	74,9	17,8	54,1
Western Finland	60,3	69,9	7,5	55,4
Eastern Finland	50,0	67,3	9,4	48,4
Oulu	49,1	67,0	8,5	51,1
Lappi	45,5	52,6	6,1	39,2

Sample size 1810 carried out in August 1999 in connection with labour study as telephone interview

Using the MANOVA, it is possible to have more than one explanatory variable (e.g. gender, province, and age). In the MANCOVA, the values of the explanatory variables are corrected with the information from the covariate. The purpose of this covariate is to reduce the heterogeneity of the variable to be explained; for example, the majority of opera audience members live in the Uusimaa region; therefore, it is reasonable to use the place of residence as a covariate. If there are many explanatory variables, both MANOVA and MANCOVA provide results that can be divided into the separate and joint effects of each variable. The total sum of squared deviations of the grand mean is partitioned into a sum of squares based on many sources and a residual sum of squares. However, the direction of the effect remains open, e.g., it is not known whether higher education increases or decreases opera visits.

The deviation of the individual from the grand mean $X_{ij} - GM$ in the analysis of variance can be divided into two parts:$(X_{ij} - \bar{X}_J) + (\bar{X}_J - GM)$. The first part is the deviation of the individual from its own group's mean, and the second part is the deviation of the group mean from the grand mean. When the deviation is calculated for all observations, the total sum of squares $\sum_{i=1}^{n}\sum_{j=1}^{k}(\mathrm{Xij} - \mathrm{GM})^2 = SS_{total}$ can be partitioned into two parts: SS_{within} and $SS_{between}$, i.e., the internal (within) sum of squares and the sum of squares between the groups (between). When the sums of squares are divided by their degrees of freedom (within = N – k, between = k – 1, where N is the sample size and k in the number of groups), the mean squares are obtained. The mean squares of the parts (i.e., within and between) are compared with the F-test.

The test statistics $F = \frac{SS_{between}/(k-1)}{SS_{within}/(N-k)}$ are distributed according to the F-distribution. If the difference between groups is significant, the difference can be evaluated with $\acute{\eta}^2 = SS_{between}/SS_{total}$ which indicates how much of the variation of the variable can be explained by the grouping variables (Metsämuuronen 2009, 785-789).

4.7 Estimation: the analysis of variance

All the variables of ISSP 2007 are not used in this study. Only those that are related to concerts, theatre and exhibitions are used, according to the purpose of the study. The questionnaire includes the following question: "How often during the past 12 months on your leisure did you go to concerts, theatrical performances, art exhibitions, etc.?" The descriptive statistics are presented in Table 45.

Table 45. ISSP 2007, ”How often in your leisure do you go to concerts, exhibitions, theatre, etc.?”

	Daily	Several times per week	Several times per month	Less often	Never	Missing
Frequency	0	4	71	1040	209	30
%	0	0,3	5,2	76,8	15,4	2,2
% of respons-es	0	0,3	5,4	78,5	15,8	--
Women, %	0	0,3	6,6	81,2	11,3	n = 741
Men, %	0	0,3	3,9	74,3	21,5	n = 568
Women, %						
15 < age < 24	0	1,1	4,5	78,7	15,7	n = 89
25 < age < 34	0	0	1,9	85,5	15,5	n = 103
35 < age < 44	0	0	0,8	88,9	10,3	n = 117
45 < age < 54	0	0	6,7	85,2	8,1	n = 135
55 < age < 64	0	0	10,2	80,8	9,0	n = 167
65 < age	0	0,7	12,3	74,6	12,3	n = 130
Men, %						
15 < age < 24	0	0	5,2	58,6	36,2	n = 58
25 < age < 34	0	1,3	2,7	78,7	17,3	n = 75
35 < age < 44	0	0	4,2	80,2	15,6	n = 96
45 < age < 54	0	0	3,5	76,3	20,2	n = 114
55 < age < 64	0	0,8	4,7	73,2	21,3	n = 127
65 < age	0	0	3,1	73,5	23,5	n = 98

It is most reasonable to divide (from the point of view of further analysis) the visit activity into three classes as follows: regularly (daily, several times per week, several times per month), occasionally (less often) and never. The results of the analysis of variance are presented in Table 46.

The statistical programme (PASW 18) available did not conduct the multivariate analysis of variance (MANOVA) with four explanatory variables (gender, the year of birth, the place of province and education).

Table 46. Visitor density: concerts, theatrical performances, art exhibitions, ANOVA.

Grouping variable	F-value (sig.)	η^2	Grouping variable	F-value (sig.)	η^2
ANOVA					
Gender (S)	26,218 (0,000)	0,019	Year of birth(Y)	1,319 (0,055)	0,062
Province (A)	2,624 (0,000)	0,037	Education (E)	10,175 (0,000)	0,060
			MANOVA		
Gender (S)	20,068 (0,000)		Gender (S)	12,695 (0,000)	
Year of birth (Y)	1,366 (0,036)		Province (A)	2,612 (0,000)	
S*Y	1,025 (0,426)	0,130	S*A	0,663 (0,857)	0,064
Gender (S)	25,716 (0,000)		Year of birth (Y)	1,099 (0,291)	
Education (E)	9,638 (0,000)		Province (A)	1,755 (0,022)	
S*E	2,115 (0,032)	0,089	Y*A	1,029 (0,363)	0,523
Year of birth (Y)	1,655 (0,002)		Province (A)	1,188 (0,260)	
Education (E)	9,394 (0,000)		Education (E)	3,594 (0,000)	
E*Y	1,127 (0,102)	0,374	A*E	1,054 (0,328)	0,193
Gender (S)	7,485 (0,006)		Gender (S)	11,581 (0,001)	
Year of birth (Y)	1,295 (0,078)		Province (A)	1,429 (0,104)	
Province (A)	1,569 (0,060)		Education (E)	3,329 (0,001)	
S*Y	1,171 (0,193)		S*A	1,221 (0,231)	
S*A	0,681 (0,813)		S*E	1,598 (0,121)	
Y*A	1,123 (0,100)		A*E	1,144 (0,137)	
S*Y*A	1,178 (0,126)	0,688	S*A*E	1,403 (0,010)	0,314
Gender (S)	15,496 (0,000)		Year of birth (Y)	1,764 (0,002)	
Year of birth (Y)	1,510 (0,010)		Province (A)	1,775 (0,027)	
Education (E)	8,314 (0,000)		Education (E)	4,735 (0,000)	
S*Y	1,233 (0,120)		Y*A	1,162 (0,101)	
S*E	1,575 (0,129)		Y*E	1,324 (0,018)	
Y*E	1,226 (0,018)		A*E	1,174 (0,188)	
S*Y*E	1,149 (0,152)	0,535	Y*A*E	0,975 (0,532)	0,861

Education: 1 = pupil, student, 2 = elementary school, 3 = comprehensive school, 4= vocational school or course, 5= upper secondary school, 6 = college 7= university of applied sciences, 8 = bachelor, university, 9 = master, university

(significance in parenthesis)

Table 47. Visitor density, concerts, theatrical performances, art exhibitions. Anova and Manova, Women and Men separately.

Grouping variable	F-value (sig.)	$\acute{\eta}^2$	Grouping variable	F-value (sig.)	$\acute{\eta}^2$
ANOVA Men			ANOVA Women		
Year of birth	1,007 (0,465)	0,112	Year of birth	1,454 (0,017)	0,116
Province	1,870 (0,014)	0,061	Province	1,202 (0,249)	0,031
Education	6,501 (0,000)	0,087	Education	5,186 (0,000)	0,055
			MANOVA		
Men			Women		
Year of birth (Y)	1,007 (0,473)		Year of birth (Y)	1,198 (0,169)	
Province (A)	1,208 (0,203)		Province (A)	0,655 (0,861)	
Y*A	1,238 (0,066)	0,746	Y*A	1,002 (0,495)	0,621
Year of birth (Y)	0,829 (0,807)		Year of birth (Y)	2,281 (0,000)	
Education (E)	5,062 (0,000)		Education (E)	5,888 (0,000)	
Y*E	1,035 (0,395)	0,527	Y*E	1,335 (0,006)	0,525
Province (A)	1,413 (0,116)		Province (A)	1,021 (0,434)	
Education (E)	2,724 (0,006)		Education (E)	1,819 (0,071)	
A*E	1,447 (0,006)	0,370	A*E	0,924 (0,699)	0,232
Year of birth (Y)	1,575 (0,051)		Year of birth (Y)	1,612 (0,018)	
Province (A)	2,209 (0,013)		Province (A)	0,756 (0,752)	
Education (E)	3,817 (0,001)		Education (E)	3,111 (0,004)	
Y*A	1,533 (0,044)		Y*A	1,098 (0,303)	
Y*E	1,573 (0,051)		Y*E	1,324 (0,078)	
A*E	0,944 (0,514)		A*E	0,927 (0,566)	
Y*A*E	--	0,948	Y*A*E	--	0,885

Even if the ISSP 2007 data made it possible to use other explanatory variables, these are not used; based on rather high values of $\acute{\eta}^2$, the variables are adequate to explain consumers' performing arts behaviour. Although a single variable alone is not sufficient, a combination of the variables provides a more adequate explanation.

The results in Table 48 show that the area variable is significant when the zero alternative is northern Finland, a finding that is also verified in Table 49 in which the marginal effects are presented.

Table 48. Logit and probit model results: Visitor density, concerts, theatrical performances, art exhibitions, including area variables.

Multivariate models of attendance in cultural activities (zero alternative is "never")

	Multivariate logit		Ordered logit	Ordered Probit
Variables	Occasionally	Regularly	1 = occ, 2 = reg	1 = occ, 2 = reg
Female	**0,645 (0,159)*****	**0,645 (0,255)****	**0.471 (0.132)*****	**0.234 (0.070)*****
School = 2	-0,575 (0,381)	-0,362 (0,662)	-0.464 (0.362)	-0.165 (0.190)
School = 3	0,084 (0,387)	0,240 (0,702)	0.163 (0.362)	0.113 (0.193)
School = 4	0,199 (0,318)	0,044 (0,623)	0.143 (0.299)	0.090 (0.163)
School = 5	**0,703 (0,393)**$^{(*)}$	**1,366 (0,675)***	**0.860 (0.357)****	**0.467 (0.188)***
School = 6	**1,164 (0,366)****	0,696 (0,660)	**0.659 (0.313)***	**0.351 (0.168)***
School = 7	**1,038 (0,434)***	**1,408 (0,743)**$^{(*)}$	**0.907 (0.367)****	**0.491 (0.194)***
School = 8	**1,693 (0,784)***	**2,482 (0,985)***	**1.381 (0.444)*****	**0.722 (0.239)****
School = 9	**2,160 (0,594)*****	**2,840 (0,805)*****	**1.442 (0.359)*****	**0.765 (,.192)*****
Age25–34	0,366 (0,338)	-0,392 (0,664)	0.175 (0.288)	0.073 (0.155)
Age35–44	**0,617 (0,319)**$^{(*)}$	0,664 (0,567)	**0.499 (0.278)**$^{(*)}$	0.251 (0.148)$^{(*)}$
Age45–54	**0,725 (0,319)***	**1,563 (0,539)****	**0.921 (0.282)****	**0.478 (0.148)****
Age55–64	**0,842 (0,254)***	**2,115 (0,584)*****	**1.324 (0.320)*****	**0.667 (0.166)*****
Age65–	0,480 (0,314)	0,320 (0,578)	0.342 (0.277)	0.164 (0.149)
Uusimaa	**0,842 (0,254)*****	**1,045 (0,427)***	**0.740 (0.217)*****	**0.379 (0.116)*****
Rest southern Finland	**0,672 (0,246)****	0,471 (0,448)	**0.497 (0.219)***	**0.239 (0.119)***
Eastern Finland	**0,716 (0,294)***	**1,142 (0,474)***	**0.779 (0.259)****	**0.403 (0.137)****
Western Finland	**0,888 (0,260)*****	0,570 (0,464)	**0.571 (0.221)***	**0.285 (0.121)***
constant	**-0,976 (0,394)***	**-3,801 (0,754)*****	-0.435 (0.351)	-0.089 (0.194)
			μ_1 = 4.585 (0.145)***	**μ_1 = 2.610 (0.070)*****
Pseudo-R^2 (McFadden) = 0.095			Pseudo-R^2 (McFadden) = 0.061	Pseudo-R^2 (McFadden) = 0.061

Observations, n = 1269, reference group (school1 = pupil or student, age 15–24), Northern Finland, ***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level

Table 49. Marginal effects of variables: Visitor density, concerts, theatrical performances, art exhibitions, including area variables.

Marginal effects of attendance in cultural events

	Multivariate logit			Ordered logit (sum = 0)			Ordered Probit (sum = 0)		
	Never	Occasionally	Regularly	Never	Occasionally	Regularly	Never	Occasionally	Regularly
Female	-0.069***	0.064**	0.005	-0.054	0.027	0.028	-0.051	0.022	0.030
School = 2	0.060	-0.068	0.008	0.061	-0.038	-0.023	0.039	-0.020	-0.020
School = 3	-0.010	0.005	0.010	-0.018	0.008	0.010	-0.024	0.008	0.016
School = 4	-0.020	0.028	-0.008	-0.016	0.007	0.009	-0.019	0.007	0.012
School = 5	-0.080*	0.036	0.044	-0.076	0.006	0.070	-0.081	0.002	0.079
School = 6	-0.121**	0.140**	-0.019	-0.067	0.022	0.045	-0.069	0.018	0.052
School = 7	-0.114**	0.084	0.030	-0.079	0.005	0.074	-0.085	0.001	0.084
School = 8	-0.187*	0.128	0.059	-0.100	-0.041	0.141	-0.106	-0.039	0.145
School = 9	-0.236***	0.180**	0.056$^{(*)}$	-0.110	-0.032	0.142	-0.116	-0.033	0.149
Age25–34	-0.033	0.075	-0.042	-0.019	0.009	0.011	-0.016	0.006	0.010
Age35–44	-0.066*	0.059	0.007	-0.052	0.018	0.034	-0.050	0.014	0.036
Age45–54	-0.084**	0.029	0.055*	-0.089	0.020	0.068	-0.090	0.016	0.074
Age55–64	-0.100**	0.019	0.081**	-0.108	-0.014	0.121	-0.109	-0.012	0.121
Age65–	-0.051	0.056	-0.006	-0.037	0.014	0.022	-0.034	0.011	0.023
Uusimaa	-0.092***	0.073*	0.018	-0.076	0.026	0.051	-0.075	0.021	0.055
R South F	-0.070**	0.077*	-0.007	-0.052	0.019	0.033	-0.049	0.015	0.034
East Fin	-0.080**	0.049	0.030	-0.073	0.014	0.059	-0.074	0.010	0.064
West Fin	-0.093***	0.104**	-0.011	-0.059	0.020	0.039	-0.057	0.016	0.041

The significance of the marginal effects can be evaluated in the multinomial logit model: ***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level. The statistical programme used is NLOGIT.

4.8 Robustness check

Performing arts attendance and sporting events attendance are interrelated as the previous tables indicate. However, because spectators can favour movies at the cinema and not the above events, it is reasonable to add visitor density at movies as a covariate. In the sample, the majority of cinema goers are classified as "occasionally" (79.8 %) or "never (18.4 %). The share of regular visitors is only 1.8 % and is merged with "occasionally". Hence, the sample is actually binary: yes or no. Table 50 shows the spectator profile.

Table 50. Binomial Logit model results: Visitor density, movies at the cinema.

Binomial logit				
Female	0.376 (0.147)**	0.094 (0.161)	0.502 (0.152)***	0.207 (0.167)
Single	0.089 (0.283)	-0.029 (0.313)	-0.002 (0.286)	-0.103 (0.314)
Married	0.215 (0.430)	0.328 (0.469)	0.093 (0431)	0188 (0.468)
Age 15–24	1.351 (0.416)***	1.577 (0.438)***	1.322 (0.416)***	1.583 (0.440)***
Age 25–34	0.916 (0.360)**	1.083 (0.384)**	0.886 (0.362)**	1.059 (0.386)***
Age 45–54	-0.009 (0.248)	0.006 (0.266)	-0.032 (0.250)	-0.009 (0.269)
Age 55–64	-0.113 (0.248)	-0.191 (0.265)	-0.126 (0.250)	-0.204 (0.266)
Age 65–	-0.457 (0.282)(*)	-0.539 (0.304)(*)	-0432 (0.284)	-0.515 (0.305)(*)
Primary school	-0.499 (0.380)	-0.461 (0.419)	-0.602 (0.382)	-0.549 (0.417)
Secondary s	0.241 (0.362)	-0.031 (0.400)	0.176 (0.364)	-0.077 (0.397)
Tertiary s	0.850 (0.432)*	0.414 (0.468)	0.818 (0.433)(*)	0.377 (.0466)
Sp: Primary s	-0.440 (0.451)	-0.782 (0.492)	-0.360 (0.452)	-0.665 (0.490)
Sp: Secondary s	-0.134 (0.437)	-0.373 (0.477)	-0.070 (0.436)	-0.281 (0.473)
Sp: Tertiary s	0.346 (0.487)	-0.043 (0.525)	0.368 (0.486)	0.015 (0.520)
Southern F	1.161 (0.223)***	1.011 (0.242)***	1.161 (0.224)***	1.015 (0.243)***
Western F	1.293 (0.251)***	1.140 (0.270)***	1.285 (0.252)***	1.141 (0.271)***
Eastern F	1.011 (0.281)***	1.021 (0.307)***	0.956 (0.281)***	0.982 (0.307)***
Children < 7	-0.076 (0.216)	0.052 (0.230)	-0.093 (0.217)	0.044 (0.232)
Children 7–17	0.264 (0.124)*	0.388 (0.133)**	0.239 (0.124)*	0.365 (0.134)**
Log(Std inc)	0.074 (0.025)**	0.050 (0.027)(*)	0.071 (0.025)**	0.047 (0.027)(*)
Constant	-1.018 (0.478)*	-1.610 (0.532)***	-1.316 (0.489)**	-1.875 (0.540)***
Culture		1.991 (0.187)***		1.971 (0.188)***
Sport			0.423 (0.127)***	0.364 (0.134)**
Pseudo-R^2	0.146	0.247	0.155	0.253

n= 1270. ***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level.

The equation in the first column excludes the highbrow and sport consumption variable, whereas these variables are present in the other equations shown in the other columns. Younger age groups are more active as expected. The standardised household income variable is significant, showing that movies-at-the-cinema consumption has a positive income elasticity. The number of school-age children increases the likelihood of attending the cinema and other activities in culture or sport also increase the probability of movie consumption. The gender variable is not significant if the highbrow culture is a covariate, whereas the variable is significant if the highbrow culture is not included, indicating that cinema consumption has a similar gender distribution as highbrow performing art consumption.

The place of residence has a significant effect; in northern Finland, the consumption of movies at the cinema is lower than elsewhere in Finland. The education variables are not significant if the highbrow arts consumption is included.

Table 51. Binomial Logit model results: Visitor density, movies at the cinema. Marginal effects.

	Marginal effects			
Female	0.050*	0.011	0.065***	0.024
Single	0.012	-0.003	-0.000	-0.012
Married	0.029	0.039	0.012	0.022
Age 15–24	0.125***	0.120***	0.121***	0.118***
Age 25–34	0.096***	0.094***	0.092***	0.091***
Age 45–54	-0.001	0.001	-0.004	-0.001
Age 55–64	-0.015	-0.023	-0.017	-0.025
Age 65–	-0.068	-0.072	-0.063	-0.068
Primary school	-0.074	-0.059	-0.089	-0.071
Secondary s	0.032	-0.004	0.023	-0.009
Tertiary s	0.095*	0.044	0.091*	0.040
Sp: Primary s	-0.065	-0.112	-0.051	-0.091
Sp: Secondary s	-0.018	-0.045	-0.009	-0.033
Sp: Tertiary s	0.042	-0.005	0.044	0.002
Southern F	0.155***	0.119***	0.153***	0.118***
Western F	0.139***	0.109***	0.136***	0.108***
Eastern F	0.103***	0.090***	0.097***	0.086***
Children < 7	-0.010	0.006	-0.012	0.005
Children 7–17	0.035*	0.045**	0.031*	0.042**
Log(Std inc)	0.010**	0.006(*)	0.009**	0.005(*)
Culture		0.231***		0.225***
Sport			0.055***	0.042**

***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level. The cultural and sport participation have three alternatives: “never” = 0, “occasionally = 1, “regularly” = 2. n= 1270

The marginal effect of sporting event visitor density, including the movies at the cinema covariate, are shown in Table 52. The findings reveal that low-educated male dominance is clear. Single persons are more active than separated or married persons. In eastern Finland, the consumption of sporting events is higher than elsewhere in Finland.

Table 52. Marginal effects of variables: Visitor density, sporting events.

	Multinomial logit			Multinomial logit		
	Never	Occasionally	Regularly	Never	Occasionally	Regularly
Female	0.238***	-0.188***	-0.050***	0.251***	-0.204***	-0.047**
Single	-0.113*	0.042	0.071*	-0.108(*)	0.0037	0.072*
Married	-0.144	0.055	0.088(*)	-0.145	0.058	0.087(*)
Age 15–24	-0.083	0.107(*)	-0.024	-0.091	0.119(*)	-0.028
Age 25–34	-0.057	0.045	0.012	-0.067	0.057	0.010
Age 45–54	-0.046	0.066	-0.019	-0.045	0.066	-0.020
Age 55–64	0.003	0.025	-0.028	0.011	0.018	-0.028
Age 65–	0.081	-0.059	-0.022	0.091	-0.070	-0.021
Primary school	-0.139(*)	0.047	0.092*	-0.145(*)	0.053	0.092*
Secondary s	-0.123(*)	0.087	0.037	-0.114	0.075	0.039
Tertiary s	-0.089	0.098	-0.008	-0.072	0.076	-0.005
Sp: Primary s	0.057	0.008	-0.065	0.065	-0.003	-0.062
Sp: Secondary s	0.041	0.004	-0.045	0.045	-0.002	-0.042
Sp: Tertiary s	0.011	-0.025	0.014	0.020	-0.039	0.018
Southern F	-0.056	0.048	0.008	-0.049	0.039	0.010
Western F	-0.097(*)	0.086	0.011	-0.093(*)	0.082	0.010
Eastern F	-0.037	-0.024	0.061*	-0.037	-0.024	0.061*
Children < 7	-0.047	0.046	0.001	-0.054	0.056	-0.001
Children 7–17	-0.016*	-0.017	0.032***	-0.020	-0.011	0.031**
Log(Std inc)	-0.010*	0.012*	-0.002	-0.010(*)	0.011*	-0.002
Culture				-0.105**	0.130***	-0.025
Movies	-0.265***	0.331***	-0.066***	-0.228***	0.283***	-0.056**

The significance of the marginal effects can be evaluated in the multinomial logit model: ***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level. The statistical errors of the marginal effects in ordered logit are not shown in the statistical programme, NLOGIT.

The marginal effects of explanatory variables for the visitor density of highbrow performing arts are shown in Table 53. The results indicate that the number of school-age children reduced the consumption of highbrow arts, whereas the converse is true with sport or movies. The movies at the cinema variable is significant in both sport and highbrow performing arts participating equations. However, for the most active spectators of sport, the effect is negative, whereas it is positive for the most active spectators of highbrow arts.

The bivariate probit model is explained in next essay, but we present the results regarding attendance at sporting events and movies here.

The bivariate probit model results for the sporting events and movies at the cinema are presented in Tables 54 and 55. The results indicate that the youngest people in the sample view sporting events and movies as substitutes for each other. Sport participation is more favoured by males than movies at the cinema. Standardised incomes have a positive impact on participation. Area dummies are significant and tertiary education has a significant positive impact. School-age children have a positive impact on movies at the cinema participation, whereas the effect on highbrow performing arts participation is negative. Parents with school-age children choose movies instead of highbrow performing arts. This result is in line with Ruuskanen's results (2004), in which it is shown that the number of children

reduces leisure time together. An evening at the cinema requires less time than an evening at the theatre or opera.

Table 53. Marginal effects of variables: Visitor density, highbrow.

Marginal effects of attendance in highbrow events

	Multinomial logit			Multinomial logit		
	Never	Occasionally	Regularly	Never	Occasionally	Regularly
Female	-0.085***	0.069***	0.016(*)	-0.091***	0.074***	0.017(*)
Single	-0.026	0.016	0.010	-0.020	0.010	0.010
Married	-0.001	0.021	-0.020	0.006	0.015	-0.021
Age 15–24	0.087*	-0.096*	0.009	0.086*	-0.095**	0.009
Age 25–34	0.065(*)	-0.041	-0.023	0.065(*)	-0.042	-0.023
Age 45–54	0.003	-0.003	-0.001	0.004	-0.003	-0.001
Age 55–64	-0.008	-0.023	0.030*	-0.008	-0.023	0.031*
Age 65–	-0.011	-0.024	0.035*	-0.012	-0.024	0.036*
Primary school	0.038	-0.050	0.012	0.042	-0.053	0.011
Secondary s	-0.044	0.006	0.038	-0.043	0.005	0.038
Tertiary s	-0.081(*)	0.017	0.063*	-0.081(*)	0.018	0.063*
Sp: Primary s	-0.066	0.047	0.019	-0.071	0.051	0.020
Sp: Secondary s	-0.039	0.027	0.012	-0.043	0.029	0.013
Sp: Tertiary s	-0.087	0.063	0.024	-0.088(*)	0.063	0.025
Southern F	-0.033	0.014	0.019	-0.051	0.013	0.019
Western F	-0.031	0.021	0.010	-0.029	0.019	0.010
Eastern F	-0.001	0.003	-0.002	0.004	-0.002	-0.002
Children < 7	0.043*	0.014	-0.057*	0.044*	0.012	-0.057*
Children 7–17	0.034*	-0.032*	-0.002	0.034**	-0.032*	-0.002
Log(Std inc)	-0.008(*)	0.009**	-0.001	-0.008**	0.009**	-0.001
Sport				-0.020	0.017	0.004
Movies	-0.233***	0.202***	0.031*	-0.229***	0.199***	0.030*

The significance of the marginal effects can be evaluated in the multinomial logit model: ***,**,*,(*) significant at 0.1, 1, 5, 10 per cent level. The statistical errors of the marginal effects in ordered logit are not shown in the statistical programme, NLOGIT.

The results of the bivariate probit analysis confirm the importance of gender. Females are more active in attending arts exhibitions, operas and/or theatrical performances. The marginal effects of the gender variable show that females most often belong to the group ‘less often’ (occasionally). The marital status does not matter only in the case of sporting events.

Table 54. Bivariate probit analysis, visitor density, sport and movies (Table 64).

	Sport	**Sport: total marginal effect**	**Sport: direct marginal effect**	**Sport: indirect marginal effect**	**Movies**
Female	-0.560 (0.073)***	-0.220***	-0.210***	-0.010*	0.202 (0.088)*
Marital status: single	0.318 (0.149)*	0.116*	0.119*	-0.003	0.063 (0.167)
Marital status: married or common-law mar	0.414 (0.211)*	0.149*	0.155*	-0.007	0.132 (0.229)
Age 15–24	0.277 (0.161)(*)	0.069	0.103(*)	-0.035**	0.691 (0.221)**
Age 25–34	0.190 (0.141)	0.048	0.071	-0.023*	0.457 (0.196)*
Age 45–54	0.115 (0.126)	0.044	0.043	0.001	-0.027 (0.142)
Age 55–64	-0.019 (0.127)	-0.003	-0.007	0.004	-0.082 (0.143)
Age 65–	-0.243 (0.151)(*)	-0.077	-0.091(*)	0.014	-0.281 (0.169)(*)
Primary School	0.324 (0.186)(*)	0.138*	0.121(*)	0.017	-0.334 (0.242)
Secondary School	0.348 (0.167)*	0.126*	0.131*	-0.005	0.097 (0.230)
Tertiary School	0.301 (0.187)(*)	0.092	0.113(*)	-0.021	0.412 (0.266)
Spouse: Primary S	-0.233 (0.225)	-0.074	-0.087	0.014	-0.169 (0.242)
Spouse: Secondary S	-0.149 (0.209)	-0.052	-0.056	0.004	-0.076 (0.232)
Spouse: Tertiary S	-0.038 (0.221)	-0.024	-0.014	-0.010	0.191 (0.262)
Southern Finland	0.257 (0.120)*	0.062	0.097*	-0.035***	0.688 (0.134)***
Western Finland	0.371 (0.131)**	0.101*	0.139**	-0.038***	0.763 (0.152)***
Eastern Finland	0.239 (0.151)	0.061	0.090	-0.029**	0.574 (0.164)***
Children <7	0.122 (0.092)	0.048	0.045	0.002	-0.047 (0.117)
Children 7–17	0.079 (0.053)	0.021	0.030	-0.008*	0.161 (0.064)*
LOG(Standardised Incomes)	0.032 (0.013)**	0.010*	0.012*	-0.002**	0.042 (0.016)**
Constant	0.066 (0.21)				-0.644 (0.276)*
ρ = 0.337(0.052)* **					

(standard error in parenthesis.).Highbrow art: 0 =' never in the last twelve months', 1 = less often' or 'several times per month' or 'several times per week' or 'every day' - sport classified in the same way.
Log likelihood = - 1309.75, (*), *, **, *** = significance level 10%,5%,1%,0.1% .

Table 55. Bivariate probit analysis, visitor density, movies and sport (Table 65).

	Movies	**Movies: total marginal effect**	**Movies: direct marginal effect**	**Movies: indirect marginal effect**	**Sport**
Female	0.202 (0.088)*	0.062***	0.039*	0.023***	-0.560 (0.073)***
Marital status: single	0.063 (0.167)	-0.001	0.012	-0.013*	0.318 (0.149)*
Marital status: married or common-law mar	0.132 (0.229)	0.009	0.026	-0.017(*)	0.414 (0.211)*
Age 15–24	0.691 (0.221)**	0.124**	0.135**	-0.011(*)	0.277 (0.161)(*)
Age 25–34	0.457 (0.196)*	0.081*	0.089*	-0.008	0.190 (0.141)
Age 45–54	-0.027 (0.142)	-0.010	-0.005	-0.005	0.115 (0.126)
Age 55–64	-0.082 (0.143)	-0.015	-0.016	0.001	-0.019 (0.127)
Age 65–	-0.281 (0.169)(*)	-0.045	-0.055(*)	0.010	-0.243 (0.151)(*)
Primary School	-0.334 (0.242)	-0.078(*)	-0.065	-0.013(*)	0.324 (0.186)(*)
Secondary School	0.097 (0.230)	0.005	0.019	-0.014*	0.348 (0.167)*
Tertiary School	0.412 (0.266)	0.068	0.080	-0.012	0.301 (0.187)(*)
Spouse: Primary S	-0.169 (0.242)	-0.043	-0.053	0.009	-0.233 (0.225)
Spouse: Secondary S	-0.076 (0.232)	-0.009	-0.015	0.006	-0.149 (0.209)
Spouse: Tertiary S	0.191 (0.262)	0.039	0.037	0.002	-0.038 (0.221)
Southern Finland	0.688 (0.134)***	0.124***	0.134***	-0.010*	0.257 (0.120)*
Western Finland	0.763 (0.152)***	0.134***	0.149***	-0.015**	0.371 (0.131)**
Eastern Finland	0.574 (0.164)***	0.102***	0.112***	-0.010	0.239 (0.151)
Children <7	-0.047 (0.117)	-0.014	-0.009	-0.005	0.122 (0.092)
Children 7–17	0.161 (0.064)*	0.028*	0.031**	-0.003	0.079 (0.053)
LOG(Standardised Incomes)	0.042 (0.016)**	0.007*	0.008**	-0.001*	0.032 (0.013)**
Constant	-0.644 (0.276)*				0.066 (0.21)
ρ = 0.337(0.052)* **					

(standard error in parenthesis.).Highbrow art: 0 =' never in the last twelve months', 1 = less often' or 'several times per month' or 'several times per week' or 'every day' - sport classified in the same way.
Log likelihood = - 1309.75, (*), *, **, *** = significance level 10%,5%,1%,0,1% .

The age-cohort 15–34 is the most passive in attending performing arts because they prefer movies. The oldest respondents strongly classify into completely not going and actively going groups, although the probability of belonging in the 'less often' group is lowest but not significant. Education is very important in the classification of performing arts consumption. The spouse's education is significant only when the spouse has a tertiary education.

5 ARE PERFORMING ARTS SPECTATORS AND MOVIE SPECTATORS THE SAME?

5.1 Introduction

The purpose of this paper is to study performing arts consumption and movies-at-the-cinema consumption using the ISSP 2007 survey data. The question is relevant because often these events are considered as substitutes in consumption (Lévy-Garboua and Montmarquette 2003: 201). A number of different socio-economic variables are used to explain cultural consumption. The bivariate probit approach to studying performing arts and movies-at-the-cinema consumption together is useful because this approach reveals substantially new evidence on the average profile of culture consumption. It is expected that females more often attend art exhibitions, operas or theatrical performances and this expectation was supported. A significantly positive correlation between the error term of the explanatory relations of these two audiences indicates that there is a common background between both groups. The approach also allows other relevant socio-economic characteristics to be found with regard to cultural consumption. However, the bivariate probit approach classifies consumption into the following two categories: yes or no. Approximately 5 per cent of the consumers in the sample could be classified as heavy users, and another approach must be used to study the three groups as heavy, occasional and not at all. A multivariate logit analysis is one approach to classify these groups. Using both bivariate probit analysis and multivariate logit analysis results in new evidence in cultural consumption. It is widely known that gender, age and educational level are significant variables used to explain cultural consumption. As shown using the Finnish ISSP 2007 data, in addition to these variables, the educational level of the spouse and the number of children also significantly classify cultural consumption. The place of residence naturally matters because in southern and western Finland, the residential density is higher and there are more cultural institutions than elsewhere in Finland. There is only one permanent opera in Helsinki although there exist some opera associations that are more provisory and that have performances outside Helsinki. Although the theatre institutions are located mostly in larger cities, the number of travelling theatre groups makes it possible for citizens in the countryside attend performing arts events.

Approximately 60 per cent of the adult population (between the ages 15–79) in Finland have seen a movie at the cinema during the past year (Kotimaisen elokuvan yleisöt – tutkimus 2010). Ten per cent of the adult population are heavy users who attend the cinema one to three times per month. More than one-fourth

of young audience members (age 15–24) are heavy users. However, the results of that survey may be misleading because the interviews were conducted during January – February 2010, the well-known prime Christmas season. Another recent study (ISSP 2007)[41] reveals that only 1.9 % of the population are heavy users and 17.9 % have not seen a movie at the cinema during the past year. The figure is comparable with the spectator number at performing arts events (concerts, theatrical performances, art exhibitions) in which the corresponding numbers are 5.9% heavy users and 15.7% who have not been at all. A third recent survey (2006)[42] claims that 3% are heavy users and 45% have not seen a movie at the cinema during the past year. This survey is based on interviews during March – June 2006. The figures in the European Cultural Values study are somewhat different as seen in Table 56. Hence, it appears that the timing of the interviews has a significant impact on the results.

Table 56. The spectators of movies at the cinema and performing arts (concerts, theatre, art exhibitions) in Finland, recent surveys.

Survey	Often		Occasionally		Never		Interviews made	Sample size	Notes
	Cinema	Arts	Cinema	Arts	Cinema	Arts			
2006: Adult education study	8.2 %	10.5 %	46.7 %	53.3 %	45.0 %	36.2%	March – June 2006	4370	Often = more than 7 times/year
2007: European Cultural Values	3.0%	bdo1% t3% c3%	49%	bdo22% t47% c48%	48%	bdo77% t52%; c49%	February – March 2007	1041	Often = more than 5 times/year
2007: ISSP	1.9%	5.6 %	80.2%	78.9 %	17.9%	15.5 %	September – December 2007	1354	Often = more than 12 times/year
2010: Kotimaisen elokuvan yleisöt	10%		70%		20%		January – February 2010	504	Often = more than 12 times/year

In the European Cultural Values study: bdo = a ballet, a dance performance or an opera; t = the theatre; c = a concert

Studies related to the spectators of performing arts are rather common. Females attend performing arts events more often and the audience is composed of middle-age people with high educational and income levels (Baumol and Bowen 1966, Liikkanen 1996, Kracman 1996, Bihagen and Katz-Gerro 2000, Borgonovi 2004, Seaman 2005, Montgomery and Robinson 2006, Vander Stichele and Laermans

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41 International Social Survey Programme 2007, sample size 2,500 with 1,354 valid results, respondents between ages 15–74, interviews made between 18th September – 11th December 2007

42 Adult education survey 2006, sample size 6,800 with 4,370 valid results, respondents' age between 18 and 64, interviews made between May – June 2006

2006). The spectators of movies in cinemas are usually young students although there are no gender differences (Austin 1986 or F & L Research 1999).

Redondo and Holbrook (2010) showed that the family-audience profile (i.e. middle-age people with children) and the family-movie profile (various genres) are strongly associated, whereas young men appear to favour action, mystery, thriller and violence genres. It is also known that young males prefer action and excitement on the screen and women tend to favour emotional dramas (Kramer 1998). Typically the ticket price is substantially higher for performing arts than for movies, and this factor may explain the difference between age groups; e.g., in 2009 the average movie ticket price was € 8.3 in Finland and the ticket revenue per spectator was € 32.62 in the Finnish national opera. In 2009, the average ticket price in Finnish large- and medium-size theatres was €16.21 in top 30 theatres[43]. The performing arts are heavily subsidised by the state (Ministry of Education: state aid) and municipalities because the share of the ticket revenues was only 15 % for the Finnish national opera and 20 % for the top 30 theatres[44].

In 2007, there were 316 cinema screens in Finland[45]. The number of films in spreading was 410 and there were 163 premieres. The total number of spectators was 6.5 million (i.e. 1.2 per capita). Correspondingly, there were 46 drama theatres subsidised by law, 16 summer theatres and 51 theatre groups outsize the law subsidies.[46] Overall this means 184 spectators per performance or 0.57 per capita.

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[43] According to ticket revenue in top 10 theatres, the unweighted mean was €19.48, in the next 10 (11^{th} – 20^{th}) €14.07 and the next 10 (21^{st} – 30^{th}) €15.10. The weighted average price in large- and medium-size theatres was €18.63

[44] These numbers have remained fairly stable recently: e.g., in 2007 the average movie ticket price at the cinema was €7.8, in the Finnish national opera €33.19 and €17.63 in large- and medium-size theatres.

[45] Top towns based on admissions 2007. Source: The Finnish Film Foundation, Facts & Figures 2008. www.ses.fi

Town	Admissions	Admissions / capita	Screens	Seats	Seats / Screens
Helsinki	2188094	3.84	37	7327	198.02
Tampere	667205	3.21	17	2663	156.64
Turku	542398	3.09	17	2602	153.06
Oulu	329533	2.50	13	1762	135.54
Jyväskylä	237075	2.77	8	1097	137.13
Lahti	174234	1.75	7	1036	148.00
Espoo	170354	0.71	5	825	165.00
Pori	169364	2.22	6	748	124.67
Kuopio	123835	1.35	6	1191	198.50
Joensuu	123515	2.14	4	659	164.75

[46] The 46 drama theatres had 12,361 performances and 2,446,500 spectators, 16 summer theatres had 821 performances and 351,473 spectators, and 51 theatre groups outsize the law subsidies had 4,139 performances and 465,997 spectators. Overall this means 103 theatres and 16,695 performances and 3,066,530 spectators, i.e., 184 spectators per performance or 0.57 per capita.

Moreover, the Finnish national opera[47] and other operas (13 local operas with only few performances) had 285 performances with 182,728 spectators (641 per performance). Furthermore, 39 dance theatres (including the National Ballet) gave 2,377 performances with 523,620 spectators (220 per performance).[48] The total number of different plays performed in the drama theatres during the season 2006–2007 was 357 and there were 118 premieres. A large majority (203/357) of the plays were written by a Finnish writer (e.g. Saisio, Nopola, Wuolijoki, Krogerus.). English (e.g. Shakespeare, Pownall, Russell), American (e.g. Woolverton, Quilter, Williams), Swedish (e.g. Nordqvist, Lindgren), French (e.g. Duras, Molière) and Russian (e.g. Gogol, Tshehov) plays were the most performed foreign ones. Practically all dance theatre performances except The Finnish National Ballet were of domestic origin, whereas the ballets and operas were mostly of foreign origin. In top 10 towns according to the movie spectator number, the admissions per capita for movies and drama theatre performances[49] are highly correlated (0.81), hence the supply conditions for both cultural events are fairly equal. Urban citizens have better access both to the cinema and to the theatres and concerts than people living in the rural areas.

However, it is not known whether the spectators of movies and performing arts are the same. In particular, middle-age, high-income, highly educated women appear to favour performing arts. Are they also movie lovers? A bivariate probit model is a valuable method for studying this question because the model enables an evaluation of the marginal effects, both direct and indirect. In Table 56, four recent surveys have been compared. The International Social Survey Programme (ISSP 2007) study is most useful because the variables in that study are suitable.

The performing arts and films are sharing the common audience or they are separate. However, the study is incomplete if the sport events are ignored. A more

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47 The main stage of The Finnish National Opera was closed for 6 months in 2007 for renovations.

48 16 Circus companies had 804 performances with 279,544 spectators.

49 Top towns based on movie admissions 2007: * some smaller drama theatres regularly made tours

Town (m. adm.)	Theatre Adm.	Admissions/capita	Drama theatres*	Performances	Adm/Perform
Helsinki (2188094)	753233	1.33	10	3132	240.50
Tampere (667205)	325335	1.58	5	902	360.68
Turku (542398)	166442	0.95	3	991	167.95
Oulu (329533)	66725	0.51	1	351	190.10
Jyväskylä (237075)	110251	1.30	2	443	248.87
Lahti (174234)	84498	0.86	1	266	317.66
Espoo (170354)	57444	0.24	3	516	111.33
Pori (169364)	48450	0.64	1	282	171.81
Kuopio (123835)	49871	0.55	1	322	154.88
Joensuu (123515)	30986	0.54	1	280	110.66

detailed survey on the reasons to participate in a sport event is presented in the second essay earlier and it is not repeated here. Since the ISSP 2007 has similar questions concerning attendance in sport events, it is included here.

5.2 Literature review and model

This paper is closely related to the sociological literature of performing arts participation. The classical work is Bourdieu (1979). The relation of social positions to cultural tastes and practices is structurally invariable. There are two interrelated spaces as follows: the space of social space (positions) and the space of lifestyles. The social space has the following three dimensions: economic, social and cultural capital. Bourdieu identifies a structural correspondence between social space and cultural practices, with the habitus serving as a mediating mechanism. Therefore the tastes, knowledge and practices are class-based. "Highbrow" cultural consumption is typical for the dominant classes. Bourdieu argues that cultural capital or social statuses are symptoms of social exclusion, cultural dominance and inequality. Bourdieu's claims have been criticised substantially because the taste of the dominant class has lost its exclusiveness (Purhonen, Gronow and Rahkonen 2010). The dominant class has changed its cultural participation pattern and is more omnivore in nature. The audience segmentation has changed from elite and mass to omnivore and univore (Peterson 1992, Peterson and Kern 1996). In the European context, Finland and the Nordic countries in general are the leading countries in the proportion of omnivores in the population (Virtanen 2007). The omnivorousness in cultural taste has been measured according to the number of cultural participation areas and/or by number of genres in one specific area. A person is an omnivore if she has seen a ballet, a theatre performance, a movie at the cinema, reads books, attends sporting event and so on. Correspondingly, she is a univore if she prefers, e.g. only sporting events and is active in that field but not in the other areas of culture (Sintas and Álvarez 2004, Chan and Goldthorpe 2005). On the other hand, a person is an omnivore if she reads books of different genres: thrillers, science fiction, fantasy, romances, biographies, modern literature, classical literature, poetry, plays, religious books, leisure books (Purhonen, Gronow and Rahkonen 2010). Omnivores have a high probability of participating in everything from the unpopular (e.g., classical music) to the popular (e.g., cinema attendance), whereas paucivores engage in intermediate levels of cultural consumption across a range of activities and inactives have a low probability of participating in any of the activities (Alderson, Junisbai and Heacock 2007). Omnivores usually have higher levels of education and higher incomes than univores (Chan and Goldthorpe 2005). Using a multinomial logit analysis, Alderson, Junisbai and Heacock (2007) show that social status, having a bachelor's degree

and family incomes significantly classify inactive and the two other groups (omnivore and paucivore), whereas having a graduate degree classifies omnivores and the other groups (paucivore and inactive). Age is important for categorising paucivore from omnivore and inactive. Unexpectedly, gender is not a significant variable used for classification. The omnivore consumption pattern is typical among the upper social classes, univore among the upper-middle and middle classes and fragmental among the lower social classes (Sintas and Álvarez 2004).

The sociology of cultural participation has shown that consumers can be classified into the following three groups: omnivore, paucivore and inactive (Alderson, Junisbai and Heacock 2007). The omnivore group is active in all cultural consumption, from cinema to classical music. The concept of cultural capital is associated with the lowbrow/highbrow consumption styles. Arts consumption is a form of cultural capital (DiMaggio 1987). Cultural capital is the accumulated amount of past consumption of cultural goods and the initial endowment of cultural capital (Stigler and Becker 1977). The accumulation function is related to human capital, i.e., formal education. The human capital argument is based on the idea that cultural behaviour is constrained somehow, i.e., differences in cultural consumption are related to differences in cultural capital endowments, differences in budget, time, social and physical constraints (Frey 2000). Because cultural capital endowment is related both to formal education and age, these are proper explanatory variables. Moreover, it has been shown that gender and marital status are important in the explanations of cultural consumption. Time constraints are related to the place of residence (province) and budget constraints are measured by incomes (cf. Ateca-Amestoy 2008). However, there is some evidence showing that economic wealth (net incomes, material wealth) is not a significant variable in explaining cultural participation (cf. Vander Stichele and Laermans 2006).

The definition of omnivorousness is originally from sociology but in this study the focus is on economics. Is omnivore consumption related to complements or substitutes? Because both performing arts and movies have a positive income elasticity and the omnivores consume both performing arts and movies, the goods are complements; thus, the omnivorousness could be defined as complementing omnivorousness. The complementing omnivorousness or substituting omnivorousness problem can be studied by decomposing the gross effect of a price change using the Slutsky equation for a standard demand curve as follows:

$$\varepsilon_{ij} = \varepsilon_{ij}^{*} - v_i \vartheta_{im} \tag{5–1}$$

in which ε_{ij} is the uncompensated (cross)-price elasticity, ε_{ij}^{*} is the compensated (cross)-price elasticity, v_i is the relative share of good i in total expenditure, and ϑ_{im} is the income elasticity. If the compensated price elasticity is negative and if

the second term in (5–1) is also negative because of positive income elasticity, the goods are complements because ε_{ij} is negative. Only if the income elasticity is negative can the goods be substitutes. Hence, the crucial term to determine whether omnivorousness is complementing or substituting is the income elasticity, assuming that the compensated cross-price elasticity is negative. However, we have no reason to assume that the latter is negative. Using a bivariate probit model allows us to study the substitutability or complementarity issue without price data.

Alderson, Junisbai and Heacock (2007) argue that gender is not a significant variable for classifying cultural consumption pattern classes (in the USA 2002), whereas Bihagen and Katz-Gerro (2000) show using Swedish data (1993) that gender is important. Women are more active in highbrow consumption (opera, dance performance, theatrical performance) and men in lowbrow television (entertainment, sport) watching. Highbrow television (documentary, culture, news) and lowbrow culture (movies, video rentals) are less connected to gender, class and education, although these are strongly related to age. Younger people appear to favour lowbrow culture, whereas older people favour highbrow television watching. Using cluster analysis with pooled data from the 1998 and 2002 U.S General Social Survey, Lizardo (2006) shows that the following four genres comprise the highbrow cluster: arts consumption, ballet attendance, theatre attendance and classical music or opera concert attendance. The lowbrow cluster consists of attending a popular music live concert, going to see a movie in the cinema or reading a novel, poem or play. Gender matters but only for people who are active in the labour force. Among people who are not active in labour force, there is no gender difference in highbrow cultural consumption. Purhonen, Gronow and Rahkonen (2009) present similar results with Finnish data. Warde and Gayo-Cal (2009) also find mixed evidence concerning the gender effect on omnivorousness using British 2002-2003 survey data. Women appear to be more active in 'legitimate' culture. Different terminologies have been used to rank tastes, including highbrow – middlebrow – lowbrow, high – popular or legitimate – vulgar. Bourdieu defines legitimate as being connected with dominant classes and powerful social groups and being aesthetically the most valuable. The top quartile omnivores are associated with legitimate taste, whereas the lowest quartile in omnivorousness is least related with legitimate cultural consumption. Omnivorousness increases with age up to around 50 and strongly diminishes among those over 70 (Warde and Gayo-Cal 2009). Family background as a whole matters because parents' cultural participation appears to be related to cultural consumption (van Eijck 1997), whereas participating in a culturally orientated course at school has either no impact or only a slight impact on cultural consumption (Nagel, Damen and Haanstra 2010).

5.3 The method and sample

The ISSP 2007 survey was conducted between 18th September and 11th December 2007 by means of a mail questionnaire in Finland. The ISSP is a continuous programme of cross-national collaboration on social science surveys. The surveys are internationally integrated. In Finland the ISSP surveys are carried out together by three institutions: the Finnish Social Science Data Archive, the Department of Social Research at the University of Tampere and the Interview and Survey Services of Statistics Finland[50]. The other surveys mentioned in Table 56 did not collect data on marital status, for example, which has been shown to affect the attendance of cultural events (Upright 2004, Frateschi & Lazzaro 2008).

The model presented in the previous essay is mainly useful here and not represented. Alhough that model proposes that goods cannot be complements the main idea that consumption is related to socioeconomic variables is practical. The hypotheses proposed in the previous essay with regard to highbrow performing art and sport attendance will be tested in this essay using highbrow performing art and cinema attendance data. The previous essay verified that cultural consumption depends on a person's gender, age, education, incomes and that regional supply has a powerful impact on attendance. However, because the substitutability issue has been inadequately studied earlier, this issue is reinvestigated here.

The cultural participation questions in the ISSP survey included the following: "How many times in the last twelve months have you seen an art exhibition, opera or theatrical performance?" "How many times in the last twelve months have you been to the cinema?" Five alternatives were given as follows: ' every day', 'several times a week', 'several times a month', 'less often' or 'never in the last twelve months'. A conventional method of study is to use discrete choice models such as probit or logit. A Poisson model is more suitable to study count data, which is not the case here. The normal distribution for the binary choice (no = 0 / yes = 1) has been used frequently, generating the probit model.

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[50] http://www.fsd.uta.fi/english/data/catalogue/series.html#issp, cited 24.9.2010. The observation unit is a person 15-74 years old, the sampling method is a systematic random sample from the population register, the sample size was 2,500 but 1,354 answers were obtained for a response rate of 54.2%. The index terms of ISSP 2007 are the use of time, physical condition, hobbies, organisations, board games, physical education, holiday, games, social relations, sports and leisure. Among others, data on gender, the year of birth, the size of the household, education, participation in the working life, profession, the source of livelihood or branch, regular weekly working hours, professional station, employer (the private/public sector), membership in a trade union, voting behaviour, religiousness, incomes and residential were collected as background information.

(5–2) $$Prob(Y = 1|x) = \int_{-\infty}^{x'\beta} \emptyset(t)dt = \Phi(x'\beta)$$

The function $\Phi(x'\beta)$ is the commonly used notation for the standard normal distribution (Greene 2008: 773) and x is a vector of explanatory variables and β is the corresponding vector of parameters. The logistic distribution, which is mathematically convenient, has been very popular.

(5–3) $$Prob(Y = 1|x) = \frac{e^{x'\beta}}{1+e^{x'\beta}} = \Lambda(x'\beta)$$

The function $\Lambda(x'\beta)$ is the logistic cumulative distribution function. If the responses are coded 0, 1, 2, 3 or 4 ('every day', 'several times a week', 'several times a month', 'less often' or 'never in the last twelve months'), the ordered probit or logit models have been very common. The models begin with $y^* = x'\beta + \varepsilon$ in which y^* is unobserved and ε is random error. The discrete choices y are observed in the following manner:

(5–4)
$y = 0$, if $y^* \leq 0$
$y = 1$, if $0 < y^* \leq \mu_1$
$y = 2$, if $\mu_1 < y^* \leq \mu_2$
$y = 3$, if $\mu_2 < y^* \leq \mu_3$
$y = 4$, if $\mu_3 \leq y^*$

The μ's are unknown parameters to be estimated with β. If ε is normally distributed with zero mean and variance equal to one [ε~N(0,1)], the following probabilities ensue (Greene 2008, 831-832):

(5–5)
$$Prob(y = 0|x) = \Phi(-x'\beta)$$
$$Prob(y = 1|x) = \Phi(\mu_1 - x'\beta) - \Phi(-x'\beta)$$
$$Prob(y = 2|x) = \Phi(\mu_2 - x'\beta) - \Phi(\mu_1 - x'\beta)$$
$$Prob(y = 3|x) = \Phi(\mu_3 - x'\beta) - \Phi(\mu_2 - x'\beta)$$
$$Prob(y = 3|x) = 1 - \Phi(\mu_3 - x'\beta)$$

The parameters of the multivariate probit model, β's, are not necessarily the marginal effects that describe the effects of the explanatory variables on cultural participation because the model is not linear. The multivariate probit model is useful for evaluating the cultural participation and influences of different explanatory variables. However, it is widely known that the categories "every day" or "several times a week" or "several times a month" obtain a small number of respondents and it is reasonable to combine these categories with "less often" (e.g. Vander Stichele and Laermans 2006). One step further is to assume that the error terms of two explanatory models are correlated. One model is estimated for highbrow (ballet, dance performance, opera) and another for cinema (lowbrow). If the disturb-

ances are correlated, both the direct marginal effects and the indirect marginal effects can be evaluated. Using this method, the omnivore group of people can be found. The general specification for a two-equation model assuming binary choice is then (Greene 2008: 817):

(5–6)
$$y_1^* = x_1'\beta_1 + \varepsilon_1, \ then\ y_1 = 1\ if\ y_1^* > 0, and y_1 = 0\ otherwise$$
$$y_2^* = x_2'\beta_2 + \varepsilon_2, \quad then\ y_2 = 1\ if\ y_2^* > 0, and\ y_2 = 0\ otherwise$$
$$E[\varepsilon_1|x_1, x_2] = E[\varepsilon_2|x_1, x_2] = 0$$
$$Var[\varepsilon_1|x_1, x_2] = Var[\varepsilon_2|x_1, x_2] = 1$$
$$Cov[\varepsilon_1, \varepsilon_2|x_1, x_2] = \rho$$

If ρ equals zero, the two spectator groups are independent. Two independent probit models could be estimated and it could be claimed that the highbrow attendees are different from cinema attendees (Prieto-Rodríguez and Fernández-Blanco 2000). Because the marginal effects in the bivariate analysis can be partitioned into two sections, the direct marginal effect and indirect marginal effect, the signs of the two parts is important to classify goods into substitutes, complements and independent. The previous essay showed that the marginal effects in the logit models were different depending on the education of the customer. However, if the marginal effects for the majority of customers are similar, goods can be classified as substitutes, complements or independent. The following hypothesis can therefore be formed:

H1: If the direct and indirect marginal effects in the bivariate probit analysis have different signs, the goods in question are substitutes.

Because household incomes have been taken account, if the direct marginal effect in the bivariate analysis of the first good is positive and the indirect is negative, then consumers diminish consumption of the first good because they also consume the second good. If the same is true in the bivariate analysis of the second good, the hypothesis is verified and the goods are substitutes for that consumer group (e.g., females or citizens age 45–54). If the signs of the marginal effect are same in the bivariate probit analysis of the first good and of the second good, the goods are exclusionary from the point of view of the group. The claim is rather problematic since the correlation of the residuals does not necessary verify this matter. If the model fits were excellent and the correlation of the residuals positive, some indication of the complementarity or substitutability would be obtained. However, if the model fits are only satisfactory the verification might be disturbed.

Naturally, consumption depends on the ticket price, but because the available data do not include price variable, it is not considered here.

The cultural consumption y* thus depends on the following variables:

(5–7) y* = f(education, age, gender, marital status, province, incomes)

Because it has been shown that middle-age people are among the most active in highbrow cultural consumption, a suitable method is to classify age into age groups. The observation unit in the ISSP 2007 survey is a person 15–74 years old and for the purpose of this study, persons have been classified into 6 subsets: 15–24 years old, 25–34 years old, and so on with the last subset consisting of persons 65–74 years old. Table 57 presents descriptive statistics of more detailed age groups and education. The descriptive statistics show that the further analysis performed with 6 subsets of age does not distort data because the subsequent 5–year age cohorts within the 10-year subset have similar education levels.

Table 57. Descriptive statistics of age-group and education variables.

		edu1	edu2	edu3	edu4	edu5	edu6	edu7	edu8	edu9
		5.5%	10.6%	7.9%	22.1%	7.2%	24.6%	8.1%	4.1%	9.9%
age15–19	6.2%	84.0%				12.1%				
age20–24	5.4%	11.6%				26.4%				
age25–29	7.4%	4.3%						28.4%		13.6%
age30–34	6.0%							13.7%		
age35–39	8.0%						12.9%	17.7%		14.4%
age40–44	8.7%						13.5%			17.6%
age45–49	10.0%				11.6%	12.1%	15.2%		15.4%	
age50–54	8.7%			20.2%						
age55–59	11.0%			19.2%	11.6%				13.5%	
age60–64	11.2%		23.9%	15.1%	14.7%				13.5%	
age65–69	6.4%		24.6%							
age70–74	6.1%		23.9%							
	100%	Three largest age groups according to the education, e.g., 84% of the youngest are pupils/students and 23.9% of the oldest have only elementary school background.								

edu1 = pupil or student (comprehensive, upper secondary, vocational school or course, college: 5.5% in the sample are pupils or students
edu2 = elementary school
edu3 = comprehensive school
edu4 = vocational school or course
edu5 = upper secondary, secondary school graduate
edu6 = college
edu7 = bachelor's degree(polytechnic or university of applied sciences)
edu8 = bachelor (university)
edu9 = master's degree

The descriptive statistics of the explanatory variables reveal that age (age group) and education are related. The majority of the youngest people in the sample were pupils or students (at a comprehensive, an upper secondary, a vocational school, or at a college) and correspondingly, the oldest people had a rather low education (elementary or comprehensive school). A college-level education was mainly replaced by a bachelor's degree education in the early 1990s; therefore, people having a bachelor's degree from a polytechnic (university of applied sciences) are

somewhat younger than people having a college diploma. People less than 50 years old on average have a (better and) longer education than people older than 50. Age and education are related to household or personal incomes. Middle-age and highly educated people appear to have the highest standardised incomes (including all social security contributions, e.g., child benefits that may explain why the age group 25–34 has the highest incomes, see Table 58). There are some differences in education between genders. For example, men are somewhat less educated than women.

Table 58. Average monthly standardised gross incomes

Group	Standardised income = household income adjusted for family size (1st adult = 1, other adults = 0.7, children = 0.5)
Age15_24, n = 148	1028
Age25_34, n = 170	2647
Age35_44, n = 213	2446
Age45_54, n = 238	2646
Age55_64, n = 282	2075
Age65_, n = 159	1572
Pupil, n = 67	1129
Primary school, n = 230	1280
Secondary school, n = 669	2163
Tertiary school, n = 274	3084

including taxes and social security contributions by age and by education groups

Because the income variable in the sample includes all social security contributions (e.g. child benefits), the number of children is used as an explanatory variable. There are two different variables: the number of children younger than 6 years old and the number of children 7–17 years old, which lead to the following relation explaining cultural consumption. Because the number of children is considered as an explanatory variable, the marital status is also added.

(5–8) y* = f(education, age, gender, marital status, province, incomes, number of children)

Because the cultural participation variables are recoded conversely into binary variables: art-consumption01234 (‘every day’ = 0, ’several times a week’ = 1, ‘several times a month’ = 2, ‘less often’ = 3, ‘never in the last 12 months’ = 4) → art1234_5 = art (‘no’ = 0, ‘yes’ = 1), some information is lost. So the “yes” alternative thus contains the original “every day”, “several times a week”, “several times a month” and “less often” alternatives. However, the correlation of the original and the recoded variables is high: r = -0.937. The correlation of the original movie consumption variable and the recoded variable is also high: r = -0.844.

The correlation of the recoded art participation and the movie consumption variables is positive: r = 0.397. Therefore, there are plausible arguments for studying these sectors of culture jointly.

The sample includes more females (57%) than males (43%). The majority of respondents are married (50%) and the two other large groups according to the marital status are single (20%) and common-law marriage (17%). Married and common-law marriage have been combined in further analysis. Separated or widowed are considered categories of the reference group (constant) in further analysis as are northern Finland and Ahvenanmaa.

Table 59. Descriptive statistics of some explanatory variables.

	female: 57 %	male: 43 %	n = 1232
marital status: single	18.3%	23.0%	20,3%
married or registered pair relation	48.6%	51.9%	50.0%
common-law marriage	17.0%	17.3%	17.1%
judicial separation*	0.3%	0.7%	0.5%
separated*	11.0%	5.2%	8.4%
widow(er)*	4.9%	1.9%	3.6%
Province: Area1	53.0%	49.3%	51.4%
Area2	25.9%	25.7%	25.8%
Area3	12.2%	13.6%	12.8%
Rest of Finland*:	8.8%	11.5%	10.0%

* = reference groups (constant) in probit or logit analysis

5.4 Results

Table 60 presents the results of bivariate probit analysis when the age group 35-44 and pupils are considered as reference values (i.e., the constant in the equation). The two spectator groups are not independent because $\rho = 0.634$. Hence, the hypothesis that the spectators of movies and arts belong to independent groups can be rejected. There are common characteristics and a common background, which could be viewed as an intrinsic culture orientation. If a person enjoys art exhibitions, operas and theatrical performances, she also enjoys attending movies at the cinema. People who are inactive and not culture-oriented do not go to exhibitions, performances or the cinema. However, there are some particular effects that are related to exhibitions and performances or to movies.

The importance of gender is very strong; for examples, females are more active in both arts (highbrow) and movies. The direct marginal effect of gender (female) is positive, whereas the indirect marginal effect is negative. Both the direct and indirect marginal effects have been reported for highbrow arts (art exhibitions, operas

and theatrical performances) in Table 60. The negative indirect effect describes the preference of seeing a film in the cinema. These leisure-time activities are to some extent substitutes. Marital status does not matter. The gender effect on arts consumption found here is in line with the results of Bihagen and Katz-Gerro (2000). Females are more omnivore in nature compared with males, who are more univore and prefer sport.

Table 60. Bivariate probit analysis, visitor density, highbrow performing art and movies.

	Art	**Art: total marginal effect**	**Art: direct marginal effect**	**Art: indirect marginal effect**	**Movies**
Female	0.459 (0.087)***	0.070***	0.083***	-0.013*	0.209 (0.088)*
Marital status: single	0.161 (0.178)	0.025	0.029	-0.004	0.074 (0.168)
Marital status: married or common-law mar	0.113 (0.220)	0.010	0.021	-0.010	0.169 (0.237)
Age 15–24	-0.206 (0.185)	-0.076*	-0.037	-0.038**	0.641 (0.222)**
Age 25–34	-0.144 (0.181)	-0.053	-0.026	-0.027*	0.451 (0.195)*
Age 45–54	-0.018 (0.148)	-0.002	-0.003	0.001	-0.019 (0.143)
Age 55–64	-0.006 (0.151)	0.004	-0.001	0.005	-0.091 (0.144)
Age 65–	-0.112 (0.178)	-0.003	-0.020	0.018(*)	-0.293 (0.171)(*)
Primary School	-0.304 (0.197)	-0.034	-0.055	0.021	-0.345 (0.252)
Secondary School	0.259 (0.174)	0.042	0.047	-0.005	0.085 (0.240)
Tertiary School	0.516 (0.204)**	0.070*	0.093*	-0.023	0.391 (0.274)
Spouse: Primary S	0.140 (0.235)	0.043	0.025	0.018	-0.302 (0.248)
Spouse: Secondary S	0.106 (0.227)	0.025	0.019	0.006	-0.094 (0.237)
Spouse: Tertiary S	0.439 (0.272)(*)	0.069	0.079(*)	-0.011	0.180 (0.273)
Southern Finland	0.419 (0.138)**	0.035	0.076**	-0.041***	0.677 (0.134)***
Western Finland	0.433 (0.153)**	0.034	0.078**	-0.044***	0.735 (0.152)***
Eastern Finland	0.215 (0.169)	0.005	0.039	-0.034***	0.573 (0.164)***
Children <7	-0.196 (0.109)(*)	-0.032(*)	-0.036(*)	0.004	-0.062 (0.117)
Children 7–17	-0.108 (0.060)(*)	-0.028**	-0.020(*)	-0.009*	0.147 (0.063)*
LOG(Standardised Incomes)	0.052 (0.014)***	0.007**	0.009***	-0.002**	0.041 (0.016)**
Constant	-0.611 (0.273)*				-0.477 (0.293)
ρ = 0.634 (0.043)* **					

(standard error in parenthesis.). Art: 0 =' Never in the last twelve months', 1 = less often' or 'several times per month' or 'several times per week' or 'every day' - movies classified in the same way.
Log likelihood = - 997.23, (*), *, **, *** = significance level 10%,5%,1%,0,1% .

The effect of age on cultural consumption in Table 60 is relative to the age group 35–44. All younger cohorts prefer movies and only the oldest (65–) seem to go less often to the cinema than the reference group. The indirect marginal effect of age on highbrow arts is negative for each younger age group. The direct marginal effects of cohorts are not significant. The results indicate that age is a relevant variable for classifying highbrow arts consumption into active and inactive groups. Education appears to be very important for the classification of culture consumption structures. When the reference level is pupil, citizens with tertiary education levels are significantly more active in highbrow performing arts culture consumption. A spouse's education in some cases is relevant in explaining the consumption of highbrow arts. If the spouse has a tertiary education, the person is more active in highbrow arts participation. It is reasonable to assume that a highly educated married couple favours opera, theatre and art exhibitions although the questionnaire in ISSP 2007 did not particularly ask whether the person has visited these cultural events alone or together with spouse. In table, the direct and indirect marginal effects of variables explaining movies-at-the-cinema consumption are shown. Education is not relevant in explaining cinema attendance. The results confirm the well-known hypothesis that omnivores have higher levels of education (Chan and Goldthorpe 2005, Alderson, Junisbai and Heacock 2007) because education is not reducing cinema attendance.

The effect of domicile on culture consumption is selective. In southern and western Finland, people are more active in both highbrow arts and movies-at-the-cinema consumption. In eastern Finland, people are not significantly more active in highbrow arts consumption but are significantly more active in movie attendance than in northern Finland or in the Ahvenanmaa archipelago (reference areas). The number of small children (less than 7 years old) or older children (7–17 years old) significantly reduces highbrow performing arts consumption, whereas the number of older children increases cinema consumption. Standardised household incomes have a significant positive effect on both culture consumption segments.. The survey article by Seaman (2006: 441) shows that there is mixed evidence with regard to whether education outweighs incomes in explaining performing art consumption. The results here indicate that incomes are significant when education, age, gender and regional area have been controlled. While rising incomes would make a theatre ticket more affordable, for example, this factor might also increase the opportunity cost of time-intensive leisure activities be-

cause higher incomes are associated with less leisure time (Werck and Heyndels 2007).[51]

Table 61. Bivariate probit analysis, visitor density, movies and highbrow performing arts.

	Movies	**Movies: total marginal effect**	**Movies: direct marginal effect**	**Movies: indirect marginal effect**	**Art**
Female	0.209 (0.088)*	0.014	0.043*	-0.029***	0.459 (0.087)***
Marital status: single	0.074 (0.168)	0.005	0.015	-0.010	0.161 (0.178)
Marital status: married or common-law mar	0.169 (0.237)	0.028	0.035	-0.007	0.113 (0.220)
Age15_24	0.641 (0.222)**	0.146***	0.132**	0.013	-0.206 (0.185)
Age25_34	0.451 (0.195)*	0.102**	0.093*	0.009	-0.144 (0.181)
Age45_54	-0.019 (0.143)	-0.003	-0.004	0.001	-0.018 (0.148)
Age55_64	-0.091 (0.144)	-0.018	-0.019	0.000	-0.006 (0.151)
Age65-	-0.293 (0.171)$^{(*)}$	-0.053$^{(*)}$	-0.061$^{(*)}$	0.007	-0.112 (0.178)
Primary School	-0.345 (0.252)	-0.052	-0.071	0.020	-0.304 (0.197)
Secondary School	0.085 (0.240)	0.001	0.018	-0.017	0.259 (0.174)
Tertiary School	0.391 (0.274)	0.048	0.081	-0.033*	0.516 (0.204)**
Spouse: Primary S	-0.302 (0.248)	-0.071	-0.062	-0.009	0.140 (0.235)
Spouse: Secondary S	-0.094 (0.237)	-0.026	-0.019	-0.007	0.106 (0.227)
Spouse: Tertiary S	0.180 (0.273)	0.009	0.037	-0.028	0.439 (0.272)$^{(*)}$
Southern Finland	0.677 (0.134)***	0.113***	0.140***	-0.027**	0.419 (0.138)**
Western Finland	0.735 (0.152)***	0.124***	0.152***	-0.028**	0.433 (0.153)**
Eastern Finland	0.573 (0.164)***	0.105***	0.118***	-0.013	0.215 (0.169)
Children <7	-0.062 (0.117)	-0.000	-0.013	0.013$^{(*)}$	-0.196 (0.109)$^{(*)}$
Children 7–17	0.147 (0.063)*	0.037**	0.030*	0.007$^{(*)}$	-0.108 (0.060)$^{(*)}$
LOG(Standardised Incomes)	0.041 (0.016)**	0.005$^{(*)}$	0.009**	-0.003***	0.052 (0.014)***
Constant	-0.477 (0.293)				-0.611 (0.273)*
ρ = 0.634 (0.043)***					

(standard error in parenthesis.). Art: 0 =' never in the last twelve months', 1 = less often' or 'several times per month' or 'several times per week' or 'every day' - movies are classified in the same way.
Log likelihood = - 997.23, $^{(*),*,**,***}$ = significance level 10%,5%,1%,0,1% .

[51] Colbert (2003) classifies arts attendees into two groups who have different responses to ticket price as follows: high earners for whom the ticket price is not a constraining factor but for whom leisure time is, and pensioners and students who have the time but not the income.

Because the direct and indirect marginal effects have different signs for females in southern or western Finland, highbrow performing arts and cinema are substitutes for women. The direct and indirect marginal effect of school-age children (7–17 years old) are negative in the case of highbrow arts and positive in the case of movies, indicating that these events are exclusionary. Movies at the cinema are preferred in the cost of highbrow arts if the family has school-age children.

The results using the Finnish data align with the results of Kracman (1996), Bihagen and Katz-Gerro (2000) and Vander Stichele and Laermans (2006), who show that educational level, gender and age are related to performing arts consumption. However, the effect of education is not linear. It is true that better and longer education leads to a higher probability of consuming performing arts, although those with secondary education are not more active in highbrow performing arts consumption. Incomes appear to explain cultural participation in both segments, and the number of children has a significant role in performing arts cultural participation.

For the purpose of analysing cultural participation using bivariate probit analysis, the original data were recoded and reclassified into two categories: yes vs. no. However, approximately 5 percent of the respondents in the sample could be classified in the category 'often' ('every day' + 'several times per week' + 'several times per month') in participating in performing arts events. Using multinomial logit analysis, the three groups can be studied although the indirect effects (between performing arts and movies) that could be evaluated using bivariate probit model could not be obtained.

The results shown in the previous chapter (Table 50) indicate that highbrow arts and cinema participation are interrelated. The movie attendance variable in its binary form (yes/no) is significant in explaining the participation of highbrow arts. The corresponding marginal effects are extremely strong. People who do not go to the cinema are more likely to avoid highbrow performing arts. People who go to the cinema are more likely to attend performing arts. The youngest age cohorts are significantly less active in performing arts participation. The area dummies for southern, western or eastern Finland are not significant in the logit analysis shown in the previous chapter. The multinomial or ordered logit models indicate that omitting the movie attendance variable might lead to a biased explanation of performing arts participation. The total marginal effect of southern Finland is not significant in the bivariate probit model (Table 60) explaining highbrow arts, as also shown in the previous chapter (logit model results in Table 53), whereas the direct and indirect marginal effects in the bivariate probit model are significant although the signs are different. The direct marginal effect is signifi-

cantly positive and the indirect is significantly negative, favouring the conclusion that these cultural types are substitutes.

The bivariate probit model explaining jointly highbrow performing art and sporting events participation are shown below in Tables 62 and 63.

Table 62. Bivariate probit analysis, visitor density, highbrow performing art and sport.

	Highbrow	**Highbrow: total marginal effect**	**Highbrow: direct marginal effect**	**Highbrow: indirect marginal effect**	**Sport**
Female	0.473 (0.087)***	0.106***	0.087***	0.019***	-0.558 (0.072)***
Marital status: single	0.122 (0.76)	0.012	0.022	-0.011*	0.315 (0.149)*
Marital status: married or common-law mar	0.066 (0.216)	-0.002	0.012	-0.014(*)	0.418 (0.212)*
Age15_24	-0.179 (0.184)	-0.042	-0.033	-0.009(*)	0.273 (0.161)(*)
Age25_34	-0.151 (0.180)	-0.034	-0.028	-0.006	0.190 (0.142)
Age45_54	-0.023 (0.148)	-0.008	-0.004	-0.004	0.112 (0.126)
Age55_64	-0.025 (0.150)	-0.004	-0.005	0.001	-0.024 (0.126)
Age65–	-0.112 (0.181)	-0.012	-0.021	0.008	-0.250 (0.151)(*)
Primary School	-0.281 (0.196)	-0.062(*)	-0.051	-0.011(*)	0.323 (0.186)(*)
Secondary School	0.287 (0.173)(*)	0.041	0.052(*)	-0.012*	0.349 (0.166)*
Tertiary School	0.535 (0.204)**	0.088*	0.098**	-0.010	0.301 (0.186)(*)
Spouse: Primary S	0.155 (0.236)	0.036	0.028	0.008	-0.236 (0.227)
Spouse: Secondary S	0.142 (0.224)	0.031	0.026	0.005	-0.152 (0.210)
Spouse: Tertiary S	0.434 (0.263)(*)	0.081(*)	0.080(*)	0.001	-0.039 (0.222)
Southern Finland	0.431 (0.137)**	0.070**	0.079**	-0.009*	0.257 (0.119)*
Western Finland	0.442 (0.153)**	0.069**	0.071**	-0.012**	0.367 (0.130)**
Eastern Finland	0.213 (0.169)	0.031	0.039	-0.008	0.238 (0.149)(*)
Children <7	-0.190 (0.112)(*)	-0.039(*)	-0.035(*)	-0.004	0.119 (0.092)
Children 7–17	-0.113 (0.059)*	-0.023*	-0.021*	-0.003	0.075 (0.053)
LOG(Standardised Incomes)	0.054 (0.015)***	0.009***	0.010***	-0.001*	0.032 (0.013)**
Constant	-0.644 (0.276)*				0.073 (0.250)
ρ = 0.302(0.054)* **					

(standard error in parenthesis.).Highbrow art: 0 =' never in the last twelve months', 1 = less often' or 'several times per month' or 'several times per week' or 'every day' - sport classified in the same way.
Log likelihood = - 1292.02, (*), *, **, *** = significance level 10%,5%,1%,0,1% .

Table 63. Bivariate probit analysis, visitor density, sport and highbrow performing arts.

	Sport	Sport: total marginal effect	Sport: direct marginal effect	Sport: indirect marginal effect	Highbrow
Female	-0.558 (0.072)***	-0.230***	-0.210***	-0.020***	0.473 (0.087)***
Marital status: single	0.315 (0.149)*	0.113*	0.119*	-0.005	0.122 (0.176)
Marital status: married or common-law mar	0.418 (0.212)*	0.154*	0.158*	-0.003	0.066 (0.216)
Age 15_24	0.273 (0.161)(*)	0.110(*)	0.103(*)	0.008	-0.179 (0.184)
Age 25–34	0.190 (0.142)	0.078	0.071	0.006	-0.151 (0.180)
Age 45–54	0.112 (0.126)	0.043	0.042	0.001	-0.023 (0.148)
Age 55–64	-0.024 (0.126)	-0.008	-0.009	0.005	-0.025 (0.150)
Age 65–	-0.250 (0.151)(*)	-0.009(*)	-0.094(*)	-0.012	-0.112 (0.181)
Primary School	0.323 (0.186)(*)	0.133*	0.121(*)	0.012	-0.281 (0.196)
Secondary School	0.349 (0.166)*	0.119*	0.131*	-0.012	0.287 (0.173)(*)
Tertiary School	0.301 (0.186)(*)	0.091	0.113(*)	-0.023*	0.535 (0.204)**
Spouse: Primary S	-0.236 (0.227)	-0.095	-0.089	-0.007	0.155 (0.236)
Spouse: Secondary S	-0.152 (0.210)	-0.063	-0.057	-0.006	0.142 (0.224)
Spouse: Tertiary S	-0.039 (0.222)	-0.033	-0.015	-0.018	0.434 (0.263)(*)
Southern Finland	0.257 (0.119)*	0.079(*)	0.097*	-0.018**	0.431 (0.137)**
Western Finland	0.367 (0.130)**	0.119*	0.138**	-0.019**	0.442 (0.153)**
Eastern Finland	0.238 (0.149)(*)	0.081	0.090(*)	-0.009	0.213 (0.169)
Children <7	0.119 (0.092)	0.053	0.045	0.008(*)	-0.190 (0.112)(*)
Children 7–17	0.075 (0.053)	0.033(*)	0.028	0.005(*)	-0.113 (0.059)*
LOG(Standardised Incomes)	0.032 (0.013)**	0.010*	0.012*	-0.002**	0.054 (0.015)***
Constant	0.073 (0.250)				-0.644 (0.276)*
ρ = 0.302(0.054)* **					

(standard error in parenthesis.).Highbrow art: 0 =' never in the last twelve months', 1 = less often' or 'several times per month' or 'several times per week' or 'every day' - Sport classified in the same way.
Log likelihood = - 1292.02, (*), *, **, *** = significance level 10%,5%,1%,0,1% .

In Tables 62 and 63, the marginal effects indicate a notable difference between genders. Highbrow arts are preferred by females, whereas men prefer sport. The results confirm the hypothesis that these events are to some extent exclusionary. However, people who have a secondary education do not consider these events exclusionary because the direct and indirect marginal effects have a different sign, favouring the conclusion that these events are substitutes for this consumer group. The youngest people appear to favour sport, whereas the oldest are the most inac-

tive in sporting events consumption. There is some evidence that the highest educated people consider sport and highbrow events as substitutes.

The Tables 64 and 65 are represented here for consistency purposes. The tables have been already presented and commented in the previous chapter.

Table 64. Bivariate probit analysis, visitor density, sport and movies.

	Sport	**Sport: total marginal effect**	**Sport: direct marginal effect**	**Sport: indirect marginal effect**	**Movies**
Female	-0.560 (0.073)***	-0.220***	-0.210***	-0.010*	0.202 (0.088)*
Marital status: single	0.318 (0.149)*	0.116*	0.119*	-0.003	0.063 (0.167)
Marital status: married or common-law mar	0.414 (0.211)*	0.149*	0.155*	-0.007	0.132 (0.229)
Age 15–24	0.277 (0.161)(*)	0.069	0.103(*)	-0.035**	0.691 (0.221)**
Age 25–34	0.190 (0.141)	0.048	0.071	-0.023*	0.457 (0.196)*
Age 45–54	0.115 (0.126)	0.044	0.043	0.001	-0.027 (0.142)
Age 55–64	-0.019 (0.127)	-0.003	-0.007	0.004	-0.082 (0.143)
Age 65–	-0.243 (0.151)(*)	-0.077	-0.091(*)	0.014	-0.281 (0.169)(*)
Primary School	0.324 (0.186)(*)	0.138*	0.121(*)	0.017	-0.334 (0.242)
Secondary School	0.348 (0.167)*	0.126*	0.131*	-0.005	0.097 (0.230)
Tertiary School	0.301 (0.187)(*)	0.092	0.113(*)	-0.021	0.412 (0.266)
Spouse: Primary S	-0.233 (0.225)	-0.074	-0.087	0.014	-0.169 (0.242)
Spouse: Secondary S	-0.149 (0.209)	-0.052	-0.056	0.004	-0.076 (0.232)
Spouse: Tertiary S	-0.038 (0.221)	-0.024	-0.014	-0.010	0.191 (0.262)
Southern Finland	0.257 (0.120)*	0.062	0.097*	-0.035***	0.688 (0.134)***
Western Finland	0.371 (0.131)**	0.101*	0.139**	-0.038***	0.763 (0.152)***
Eastern Finland	0.239 (0.151)	0.061	0.090	-0.029**	0.574 (0.164)***
Children <7	0.122 (0.092)	0.048	0.045	0.002	-0.047 (0.117)
Children 7-17	0.079 (0.053)	0.021	0.030	-0.008*	0.161 (0.064)*
LOG(Standardised Incomes)	0.032 (0.013)**	0.010*	0.012*	-0.002**	0.042 (0.016)**
Constant	0.066 (0.21)				-0.644 (0.276)*
ρ = 0.337(0.052)* **					

(standard error in parenthesis.).Highbrow art: 0 = 'never in the last twelve months', 1 = less often' or 'several times per month' or 'several times per week' or 'every day' - sport classified in the same way.
Log likelihood = - 1309.75, (*), *, **, *** = significance level 10%,5%,1%,0,1% .

Table 65. Bivariate probit analysis, visitor density, movies and sport.

	Movies	**Movies: total marginal effect**	**Movies: direct marginal effect**	**Movies: indirect marginal effect**	**Sport**
Female	0.202 (0.088)*	0.062***	0.039*	0.023***	-0.560 (0.073)***
Marital status: single	0.063 (0.167)	-0.001	0.012	-0.013*	0.318 (0.149)*
Marital status: married or common-law mar	0.132 (0.229)	0.009	0.026	-0.017(*)	0.414 (0.211)*
Age 15–24	0.691 (0.221)**	0.124**	0.135**	-0.011(*)	0.277 (0.161)(*)
Age 25–34	0.457 (0.196)*	0.081*	0.089*	-0.008	0.190 (0.141)
Age 45–54	-0.027 (0.142)	-0.010	-0.005	-0.005	0.115 (0.126)
Age 55–64	-0.082 (0.143)	-0.015	-0.016	0.001	-0.019 (0.127)
Age 65–	-0.281 (0.169)(*)	-0.045	-0.055(*)	0.010	-0.243 (0.151)(*)
Primary School	-0.334 (0.242)	-0.078(*)	-0.065	-0.013(*)	0.324 (0.186)(*)
Secondary School	0.097 (0.230)	0.005	0.019	-0.014*	0.348 (0.167)*
Tertiary School	0.412 (0.266)	0.068	0.080	-0.012	0.301 (0.187)(*)
Spouse: Primary S	-0.169 (0.242)	-0.043	-0.053	0.009	-0.233 (0.225)
Spouse: Secondary S	-0.076 (0.232)	-0.009	-0.015	0.006	-0.149 (0.209)
Spouse: Tertiary S	0.191 (0.262)	0.039	0.037	0.002	-0.038 (0.221)
Southern Finland	0.688 (0.134)***	0.124***	0.134***	-0.010*	0.257 (0.120)*
Western Finland	0.763 (0.152)***	0.134***	0.149***	-0.015**	0.371 (0.131)**
Eastern Finland	0.574 (0.164)***	0.102***	0.112***	-0.010	0.239 (0.151)
Children <7	-0.047 (0.117)	-0.014	-0.009	-0.005	0.122 (0.092)
Children 7–17	0.161 (0.064)*	0.028*	0.031**	-0.003	0.079 (0.053)
LOG(Standardised Incomes)	0.042 (0.016)**	0.007*	0.008**	-0.001*	0.032 (0.013)**
Constant	-0.644 (0.276)*				0.066 (0.21)
ρ = 0.337(0.052)* **					

(standard error in parenthesis.).Highbrow art: 0 =' never in the last twelve months', 1 = less often' or 'several times per month' or 'several times per week' or 'every day' - sport classified in the same way.
Log likelihood = - 1309.75, (*), *, **, *** = significance level 10%,5%,1%,0,1% .

5.5 Conclusions

The purpose of this paper is to study performing arts consumption and movies-at-the-cinema consumption. A number of different socio-economic variables are used to explain cultural consumption. The bivariate probit approach for studying performing arts and movies-at-the-cinema consumption as a bundle is useful because the approach reveals substantially new evidence on the average profile of culture consumption. It is expected that females more frequently attend art exhibi-

tions, operas or theatrical performances and this expectation was supported. In the introduction, we were interested in discerning whether middle-age, high-income, highly educated women who favour performing arts are also movie lovers. Our analysis is confirmative. There is a significantly positive correlation between these two audiences, particularly among the women, indicating that there is a common background between both groups. The approach also allows the identification of the most relevant socio-economic characteristics in explaining cultural consumption. Based on the results in this and the previous chapter it is reasonable to argue that a certain type of hierarchy in culture consumption is valid. Younger consumers prefer movies and if they are familial with this the second step is to go to the theatre. Once the theatre experience (track record) is sufficient the final step is to go the opera.

It is widely known that the gender, age and educational level of the consumer have an impact on cultural consumption (e.g. Kracman 1996, Borgonovi 2004 or Montgomery and Robinson 2006). The novelty of the results here indicates that the educational level of the spouse also matters. If the spouse has a high level of education, this factor significantly increases highbrow cultural consumption. However, the probability of being classified into a heavy user group increases only when the person herself/himself has a tertiary education. The analysis shows that when the effects of other socio-economic variables have been controlled, the gross income level does significantly explain cultural consumption. Younger people prefer movies and their incomes are typically low, explaining why they do not attend highbrow performing arts events. All these results have important policy implications. Cultural subsidies for highbrow arts may not sufficiently subsidise the cultural consumption of younger people, and subsidies primarily benefit highly educated females.

Table 66. Summary of marginal effects of highbrow, movies and sport participation models.

	High-brow	+ Cin-ema	Cin-ema	+ High-brow	Sport	+ high-brow	High-brow	+ Sport	Cin-ema	+ sport	Sport	+ Cin-ema
	direct	indi-rect	direct	indi-rect	direct	indi-rect	direct	indirect	direct	indirect	direct	indi-rect
Female	+++	-	+	---	---	---	+++	+++	+	+++	---	-
Single								-		-	+	
Married					+			(-)		(-)	+	
Age 15–24		--	++		(+)			(-)	++	(-)	(+)	--
Age 25–34		-	+						+			-
Age 45–54												
Age 55–64												
Age 65–		(+)	(-)		(-)				(-)		(-)	
Primary school					(+)			(-)		(-)	(+)	
Secondary s					+		(+)	-		-	+	
Tertiary s	+			-	(+)	-	++				(+)	
Sp: Primary s												
Sp: Secondary s												
Sp: Tertiary s	(+)						(+)					
Southern F	++	---	+++	--	+	--	++	-	+++	-	+	---
Western F	++	---	+++	--	++	--	++	--	+++	--	++	---
Eastern F		---	+++		(+)				+++			--
Children < 7	(-)			(+)		(+)	(-)					
Children 7–17	(-)	-	+	(+)		(+)	-		++			-
Log(Std inc)	+++	--	++	---	+	--	+++	-	++	-	+	--

xxx,xx,x,(x) significant at 0.1, 1, 5, 10 per cent level. not = variable is not included in the estimation.

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Statistical programs used:

ANOVA & MANOVA: PASW 18 (www.spss.com)

Estimation method: LIMDEP - NLOGIT 4.0 (www.limdep.com)

Data sources:

Finnish Film Foundation (www.ses.fi); Helsingin Sanomat, Nyt – available at Päivälehden museo, Ludviginkatu 2–4, Helsinki, Finland (www.paivalehden museo.fi)

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