Movie Enthusiasts versus Cinemagoers in Spain: A Latent Class Model Approach

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Abstract
The aim of this paper is to test if there are more than one kind of cinema consumer attending to underlying tastes. And, once individuals are classified into *latent* groups, how they decide going to the pictures. By doing so, we want to discover if there is a group of movie enthusiasts that are not regular cinemagoers or if there is an unsatisfied market share that could be supplied by a forthcoming audiovisual business. Since, at first sight, a movie enthusiast cannot be easily identify and, hence, to classified *a priori* people as cinema fans, we have estimated a latent class model using the data offered by the *Encuesta sobre Hábitos de Consumo Cultural* (Cultural Consumption Habits Survey), conducted in Spain during 1998.

Keywords
Cinema, subjective valuation, latent class, mixture models

Introduction

The aim of this paper is to analyze the relationship between cinema tastes and consumption in Spain. We want to discover if there is a group of movie enthusiasts that are not regular cinemagoers, to identify their particular socio-economic characteristics, to define what factors can explain their scarce assistance to cinemas and to find if they use other alternative windows -as video, DVD or TV- to satisfy their cinema interest or if they are an unsatisfied market share that could be supplied by a forthcoming audiovisual business. The main problem is that, at first sight, a movie enthusiast cannot be easily identified. In fact, we believe that it is very difficult to observe tastes and, hence, to classified *a priori* people as cinema fans.

To solve this problem, we propose to apply a latent variable mixture model. This technique allows us to classify individuals in classes by analyzing each class estimated behavior function. Latent class models have other advantage over other techniques that permit to find non-observed groups in the data like cluster analysis: they allow separating the sample into different groups of persons, even if we do not have enough information about what is their correspondent class. Moreover, latent variable approaches are model based and we can estimate the parameters that evaluate the effect of a certain variable on each class and it is possible to test these models and to analyze their goodness of fit.

Latent variable mixture model analysis is a new procedure to analyze cultural markets and, in this paper, we use it to classify individuals differentiating, at a first stage, between movie enthusiasts and not interested people and, at a second step, identifying the factors that determine behavior respect cinema attendance. The results could be used, for instance, to identify what kind of barriers (economic, family responsibilities, movies and other leisure activities supplies) move the enthusiasts away from the cinema screens.

Obviously, this information could be very important for many people, especially for Spanish and American film industries. From the nineties onwards, the Spanish film industry is trying to leave a deep economic crisis that began in the seventies and to reach a place into the cinema preferences of Spanish people. In this sense, it has to fight with the American majors, who always have controlled the Spanish film market and, if the economic growth of the nineties is consolidated, they could consider that Spain is a good destination for their film exports. In fact, today Spain is the fourth EU market in absolute terms and the first in attendance per capita. For these reasons, our paper includes a brief and descriptive section of the Spanish market during the last years, paying special attention to Spanish and American market shares in the nineties.

To carry out the empirical research we will use the data coming from a new cultural survey, *Encuesta sobre Hábitos de Consumo Cultural* (Cultural Consumption Habits Survey), conducted in Spain during 1998[1]. This Survey, which total sample size was 12,072 people, can be defined as an opinion survey dedicated to analyze the cultural behavior in Spain. It covers the most important fields in cultural consumption: performing arts, cultural industries (music, publishing and audiovisual industry –including cinema, video and TV-) and other group of leisure activities such us cultural formation, attendance to museums, to natural parks, etc. And it combines all this information with a set of socio-economic characteristics of the individuals as age, level of studies, marital status, familiar responsibilities, and family income[2].

The paper has the following structure. Section I discuses the relevance of the studies on audiences in cultural economics, in general and in cinema industry, in particular, focusing specially on export activities. Section II describes the cinema market in Spain and the presence of American film industry on it. Section III presents a model of individual consumption of cultural goods and its econometric specification. The results of the estimation of this model are displayed in Section IV. Finally, Section V offers the main conclusions of this work. Finally, the Appendix includes the definitions of all the variables used in this paper.

Studies on Cultural and Cinema Audiences

The studies on audience are an essential element to know the demand of cultural goods. Baumol and Bowen (1966, pp. 71-72) pointed out that companies producing cultural goods should know “something about those who demand the commodity, just as an automobile

manufacturer needs to know who buys his cars." This information is vital if we wish to define the composition or the style of the product, to identify an unsatisfied group of consumers or a not well delivered market share, to design a price policy that provides incentives the attendance of the public or to mount a campaign of promotion that brings the product closer to new social sectors[3].

For all these reasons, studies on audience and cultural consumption have been common in cultural economics (Throsby and Withers, 1979, Abbé-Decarroux and Grin, 1992, and O´Hagan, 1996, for the performing arts; Abele, 1987, for the opera; Kurabayashi and Matsuda, 1987, Kurabayashi and Ito, 1992, and Prieto-Rodríguez and Fernandez-Blanco, 2000, for music; Dickenson, 1992, and Towse, 1994, for museums; and Holopainen, 1997, for theatre, even, inside the entertainment industry, the associations of producers have promoted the analysis of audiences.

In the case of cinema industry, the correspondent studies agrees that moviegoers are essentially young people and more likely male and that the presence of family responsibilities discourages cinema attendance while education reinforces it (Squire, 1992 and Vogel, 2001).

Moreover, there are some distinguishing characteristics that have made studies of cinema audience even more important than those are for other cultural goods. First, the film industry is one of the largest cultural sectors in economic terms and it has become more and more important as a result of advertising support arising from the publicity included in the films and the emission of commercials during the intermission time at cinema theatres[4]. This practice has been common in Spain for a long time but there are, however, few published studies on cinema audience by marketing experts or professionals of any kind[5].

Second, the current high cost of making films, the impact of films on the public and the possibility of earning additional income from advertising have made audience studies necessary because they are vital for the identification of potential consumers of new films.

Third, as Vogel (2001) pointed out, and every Disney's release confirms, merchandising is an important and increasing source of revenue for cinema industries and, obviously, in this area is essential to know our audience is to decide what kind of products (toys, music, books, CD games, etc.) we can sell.

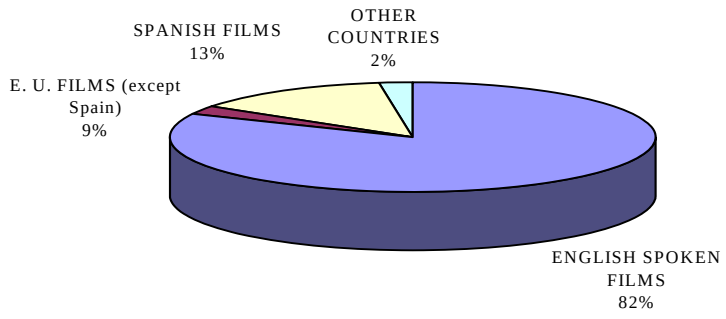
Fourth, the foreign markets revenues are an important share of total revenues of film industry, especially in USA. Since 1910, foreign markets are a relevant source of income for USA film industry that have used them "not primary because it has product surpluses but because high production costs have made it difficult to recoup investment from the home market alone". So, from the forties to the nineties foreign markets represented over 40 to 55% of the rentals obtained by the American film companies[6]. The home and foreign market rentals were the most important source of revenues for American film industry until 1980, when they represent about 52% of these revenues (23% corresponding to foreign markets). However, during the last twenty years, we could observe a revolution in these sources of income (Vogel, 2001) and, in 2000 38.2% of the income came from home video (7% in 1980), 32.4% from different kinds of TV (44.5% in 1980) and 29.4% from theatrical rentals (14,2% corresponding to foreign markets). After all, although foreign theatrical rentals have lost part of their presence, as theatrical rentals in general did, they still have an important share in the revenues of the film industry- and even in 2004 have exceed domestic theatrical grosses (European Audiovisual Observatory, 2004), so they must be taken into account.

Our paper focuses in this fourth reason and on the film market in Spain. But previously, there is a question that we must answer: is Spain really an attractive market for American film industry? The European Union (EU) is the number-one export market for American films. Inside the EU, Germany and France are the most important countries and Spain is in the fourth place in 2003. So, Spain is an attractive and relevant market for American film industry. In the next Section we analyze the situation of the Spanish market in the nineties and the power position that it is occupied by American movies.

The Spanish Film Market

In 2004 the situation of the film market in Spain was very similar to other principal European markets and it was characterized by the control exercised by Hollywood majors. As we can see in Figure 1, the English spoken films (mainly Hollywood movies) market share of box office revenues was about 82 percent; while Spanish films share was only about 13 percent.

FIGURE 1
Market shares by nationalities 2004
(% box office total revenues)



Source: Spain's Ministry of Culture

If we look at Table 1, we can see that nine of the ten most important films of 2004, in terms of revenues and filmgoers, were English spoken movies, leaded by *Shrek 2*. There was only one Spanish movie (*Mar adentro*), in third place, in the top ten. Moreover, if we want to find the second Spanish film (*Isi & Disi*), we must go down to the 22nd position.

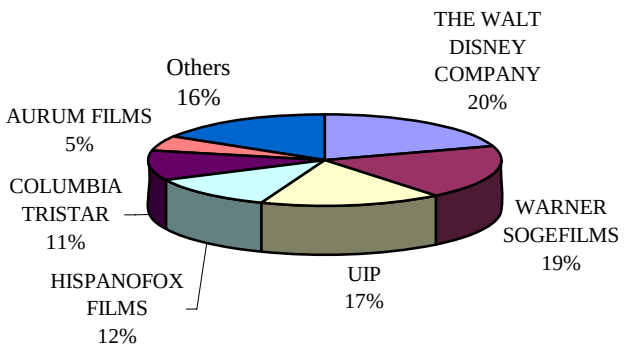
Table 1:
Top Ten Movies at the Box Office in Spain 2004

TITLE	FILMGOERS	REVENUES (euros)
SHREK2	6,195,499	28,769,404.68
TROY	4,241,144	20,539,834.22
MAR ADENTRO (THE SEA INSIDE)	4,073,934	19,346,668.51
THE LAST SAMURAI	3,834,933	18,652,300.26
THE INCREDIBLES	4,118,268	16,875,526.38
HARRY POTTER AND THE PRISIONER OF AZKABAN	3,476,442	16,291,341.56
SPIDER-MAN 2	3,398,302	15,582,290.46
I ROBOT	3,053,310	14,549,165.19
THE DAY AFTER TOMORROW	3,000,455	14,500,074.10
THE LORD OF THE RINGS: THE RETURN OF THE KING	2,641,400	12,586,447.49

Source: Spain's Ministry of Culture

These facts are due to the power of the Hollywood majors in the films distribution. Figure 2 shows us the distribution market shares in Spain in 2004. Five firms, linked with the majors, controlled almost 80% of the market although they only distributed 20% of the films exhibited this year. These figures tell us that there are supply reasons that explain the supremacy of American cinema in Spain. Or, in other words, Spanish film industry is on a very weak position.

Figure 2
Distribution Companies Market Shares in 2004

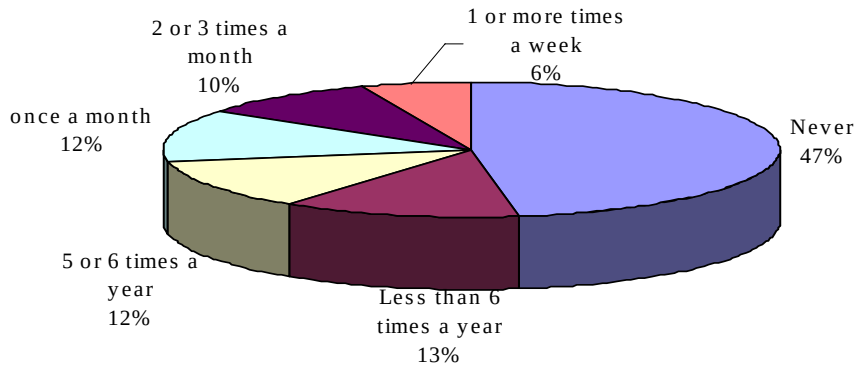


Source: Spain's Ministry of Culture

And, if we pay some attention to the demand side, we also can find other source of weakness for Spanish industry. Almost a half of Spanish people over fourteen never go to the cinema. Hence it is very important to carry on audience studies that allow us to know not only how the cinemagoers are but also non-cinemagoers. This information can be crucial to discover if there is a group of people potentially consumers of Spanish movies that, due to supply reasons (American distributors control the Spanish market and benefit their own films) or demand reasons (familiar responsibilities, price, other alternative windows to consume movies, etc.), do

not consume them. In accordance, and following previous researches that pointed out cinema enthusiasts are a significant group of Spanish films attendants (Fernandez-Blanco and Prieto-Rodríguez, 2003), it could be very relevant to discover if, among cinema fans, some of them do not go to the cinema. Identifying them and explaining what factors determine their behavior could be the firs step to design a policy to encourage Spanish films consumption.

Figure 3
Attendance to cinema in Spain



Source: *EHCC*

What is Latent Class Analysis?

Latent Class Analysis, or a finite mixture model, is a statistical method for finding subtypes of related cases (latent classes) from multivariate categorical data[7]. In our case, it can be used to find different kinds of cinemagoers or different attitudes toward movies from survey responses. This allows us to find consumer segments from demographic and preference variables. In such a case, estimating a commom behaviour function encompassing every sample observation may not be appropriate in the sense that the estimated function is not likely to represent the 'true' preferences or behavior of cinemagoers. That is, the estimate of the underlying preferences may be biased.

To reduce the likelihood of this type of misspecification, researchers often estimate functions by classifying the sample observations into certain categories using a cluster analysis. In this approach, estimation of the underlying behavior function is carried out in two stages. First, the sample observations are classified into several groups. This classification is based on some *a priori* sample separation information (e.g., sex, marital status, etc.).[8] Second, separated analyses are carried out for each subsample.

In the present paper, we advocate using a procedure that combines standard Probit models (PM) and latent class models (LCM) in order to exploit more efficiently the information contained in the data.[9] In this model we do not have to know beforehand which group produced an observation since both individual's preferences and the probability of particular group membership are estimated *simultaneously*. Individuals are probabilistically separated into several classes and, for each class, a behavior function is estimated. Since each observation might have a nonzero probability of belonging to any class, all the observations in the sample are used to estimate all the behavior functions.[10] On the other hand, the proposed methodology

also allows for splitting the sample into several groups even when sample-separating information is not available. In this case, the LCM uses the goodness of fit of each estimated function as additional information to identify groups of individuals.

Assume that the probability of movie attendance (*PMA*) follows a probit distribution, the log density for individual *i* assuming that it belongs to class *j* can be written as:

$$\ln PMA_{ij}(\theta_j) = y_i \cdot \ln \Phi(\theta' x_i) + (1 - y_i) \cdot (1 - \ln \Phi(\theta' x_i)) \tag{1}$$

In a LCM, the unconditional likelihood for individual *i* is obtained as the weighted sum of their *j*-class likelihood functions, where the weights are the probabilities of class membership. In this formulation, $P_{ij}(\delta_j)$ is the probability, for individual *i*, of being member of class *j*. Moreover, the probabilities of cinema attendance reflect the uncertainty that we have about the true partitioning in the sample. That is,

$$PMA_i(\theta, \delta) = \sum_{j=1}^{J} PMA_{ij}(\theta_j) \cdot P_{ij}(\delta_j) \quad , \quad 0 \le P_{ij} \le 1 \quad , \quad \Sigma_j P_{ij} = 1 \tag{2}$$

where $\theta = (\theta_1, \ldots, \theta_J)$, $\delta = (\delta_1, \ldots, \delta_J)$ and the class probabilities are parameterized as a multinomial logit model,

$$P_{ij}(\delta_j) = \frac{exp(\delta_j' q_i)}{\sum_{j=1}^{J} exp(\delta_j' q_i)} \quad , \quad j = 1, \ldots, J \quad , \quad \delta_J = 0 \tag{3}$$

where q_i is a vector of individual-specific, but time-invariant, variables. The overall likelihood function resulting from (2) and (3) is a continous function of the vectors of parameters θ and δ, and can write as:

$$\ln PMA(\theta, \delta) = \sum_{i=1}^{N} \ln PMA_i(\theta, \delta) = \sum_{i=1}^{N} \ln \left\{ \sum_{j=1}^{J} PMA_{ij}(\theta_j) \cdot P_{ij}(\delta_j) \right\} \tag{4}$$

Under the mantained assumptions, maximum likelihood techniques will give asymptotically efficient estimates of all the parameters.[11] A *necessary* condition for identifing the parameters of the latent class probabilities is that the sample must be generated from either different groups of movie consumers or different noise terms. That is, J, the number of classes in equation (4), is taken as given. If J is larger than the "true" number of classes (i.e. if we try to fit a model with "two many" classes) our model will be overspecified and the parameters cannot be estimated.

The estimated parameters can be used to compute the conditional posterior class probabilites as

$$P(j \mid i) = \frac{PMA_{ij}(\theta_j) \cdot P_{ij}(\delta_j)}{\sum_{j=1}^{J} PMA_{ij}(\theta_j) \cdot P_{ij}(\delta_j)} \tag{5}$$

This expression shows that the posterior class probabilities depend not only on the estimated δ parameters, but also on the vector θ, i.e., the parameters from the movie attendance probability model. This means that a latent class model classifies the sample into several groups even when sample-separating information is not available. In this case, the latent class structure uses the goodness of fit of each estimated probability of attendance model as additional information to identify groups of individuals.

In the standard model where the behaviour function (usually a probit or logit model for cinema attendance probability) is the same for every individual, we estimate elasticities or marginal effects using the same function for all observation. Although this function could be evaluated at different points given different results for each individual.

However, in the present case, we estimate as many behaviour functions as the number of classes. What remains an issue here is how to measure the individual' behaviour when there is no unique function against which marginal effects are to be computed. There are two ways to solve this problem.

First, we can evaluate the marginal effects as:

$$\ln ME_i = \sum_{j=1}^{J} P(j \mid i) \cdot \ln ME_i(j) \qquad (6)$$

where P(*j*|*i*) is the posterior probability of belonging to class *j* given individual *i* defined in (4), and $ME_i(j)$ is its marginal effect using the function of class *j* as the reference behavior function. Note that here we take into account all the possible behaviors related to the different classes -$ME_i(j)$- weighted by their posterior probabilities -P(*j*|*i*).

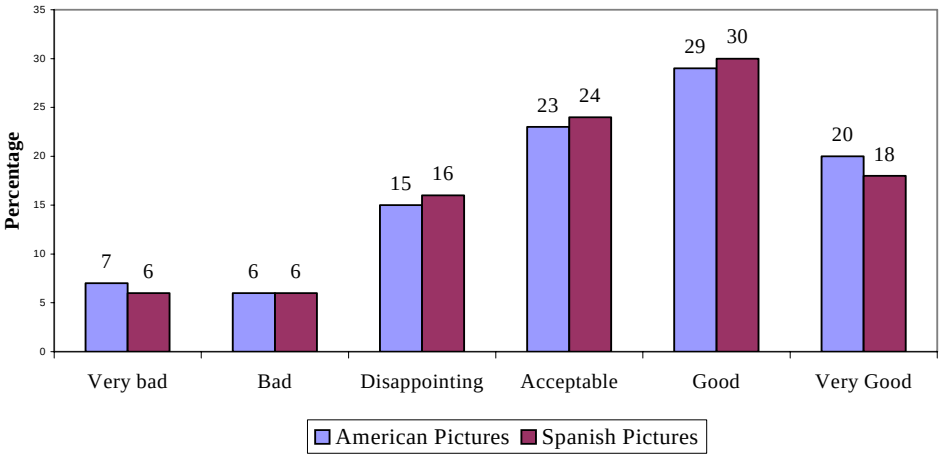
Alternatively, we can examine the posterior class probability for each individual and assign her to the class with the highest probability. Once the class assignment is done, the marginal effects for that individual are computed using the function of that assigned class. Note that this method ignores all other class probabilites, that is, it is equivalent to assign a weight equal to one to the most likely class and zero to the rest of alternatives. This scheme of weighting is more straightforward but can be considered as an *ad hoc* selection approach.

Obviously, the results obtained by both methods may differ and the magnitude of the difference depends on the relative importance of the posterior probability of the most likely consumer's behavior: the higher the posterior probability the smaller the differences.

Results

In this paper we want to test if there are more than one kind of cinema consumer, that is, we want to use the latent class models to test if the Spanish film market is segmented or not. This will allow us to know how people belonging to these *latent* groups decide going to the movies. To do this we have used the data offered by the *Encuesta sobre Hábitos de Consumo Cultural* (Cultural Consumption Habits Survey (*EHCC*) wich includes some questions directly related with unobservable taste. Interviewee is asked for his/her evaluation of American and Spanish cinemas, taking into account the films that have been released during the past three months. The interviewee can choose between six alternatives, from very bad to excellent. Figure 4 summarizes the main results and, at first sight, we can conclude that Spanish people have just the same opinion on both types of cinema: almost 50% consider that Spanish and American movies are "good" or "excellent" and around 12% say that they are "bad" or "very bad".

Figure 4
Evaluation of Releasing Pictures



Source: EHCC

The information on these variables and other socio-economic characteristics (educational level, age, gender) that can be related with tastes are used as independent variables in the *latent class equation* in order to classify people as cinema enthusiasts.

As it can be previously observed in Figure 3, almost half the population does not go to the cinema theatres and only 6 percent of people do every week. However, we do not know if all the cinemagoers could be considered as cinema enthusiasts or if there are barriers that keep some people away even if they are genuine cinema fans. In the other hand, not very good aficionados could attend cinema parlors under certain circumstances that we are going to study. Hence we are going to estimate simultaneously a behavior equation for each latent class and an equation that classified people into these groups.

The dependent variable (CINEMA ATTENDANCE) in the *cinema behavior equations* takes value one if individual attends movies at least once a month and zero in any other case. As independent variables we use a set of variables that can be linked to economics restrictions faced by the consumers (i.e. the budget line and the opportunity cost of time). In this set we include marital status and family responsibilities, the family income purchasing power in terms of cinema attendance, that is, we have divided income by ticket prices, screens per (10000) inhabitants, other house leisure activities, social class and town size. Finally, we introduce three terms dummy variables to control the presence of seasonality effects in the consumption of cinema.

Only one latent class model

In Table 2 we present a behavior model with only one latent class; the outcome is the standard result of consumer profile analysis using probit models for the complete sample. Respect to the familiar variables, we have found that the number of children over fourteen years discourages attendance to cinema while being single increases it and being married does not affect it. These outcomes may suggest that the opportunity cost of time dissuades cinema attendance. The positive coefficient of real income variable indicates that the probability of cinema attendance increases with income and decreases with prices. Moreover, videotapes consumption seems to

be a complementary good to cinema attendance since the number of videotapes bought in the last three months affects positively the probability of going to the cinema theaters. Meanwhile, TV consumption can be considered as a substitutive good as it is suggested by its negative estimated coefficient. Furthermore, we can observe some relevant supply effects. In this sense, the density of screens per inhabitants has a positive incidence on cinema attendance, as well as the size of the city of residence, reflecting the conditions of the films supply in Spain since movie theaters have tended to concentrate in the big cities in the last years. Also, as expected, there is a very significant seasonal effect. People tend to go to the cinema especially around Christmas till the Oscar period. Hence, it is not surprising that term2 and term3 present negative and significant coefficients. This conclusion is adjusted to the reality of our market, clearly dominated by the American products with a market share of 70% and American majors traditionally have taken advantage of the high demand of non rated films around Christmas. Finally, the higher the social status, the higher the probability of going to the movies.

Table 2:
Movie attendance probit

	parameter	t-student
CONSTANT	-11.901	-16.052
SINGLE	1.498	13.908
MARRIED	0.153	1.365
N14	-0.036	-0.829
N14MORE	-0.345	-11.428
LOG (INCOME/PRICE)	0.871	12.810
SCREENS/INHABITANT	0.082	5.772
TV HOURS	-0.081	-4.723
# VIDEOS	0.060	3.257
MIDDLE CLASS	0.649	7.602
HIGH CLASS	1.395	11.076
CITY SIZE 1	0.586	7.259
CITY SIZE 2	0.601	7.055
CITY SIZE 3	0.351	3.829
TERM 1	-0.009	-0.129
TERM 2	-0.366	-5.160
TERM 3	-0.187	-2.676
N	10842	
Log-likelihood	-4876.02	
(2 16 d. of f.	3087.081	

A two latent class model

However, the one latent class model is too aggregated and we have found that dividing population in two latent groups is a much more sensible approach (see Table 3). This result confirms our initial insight that there are more than one movie consumer profiles in Spain.

Since consumption is the result of a utility maximization program restricted by some monetary and non-monetary restrictions, our first equation, that allows us to distinguish the determinist factors that can be used to classify movie enthusiasts, includes some variables that can be considered as proxies of consumer's tastes. Given the estimated coefficients, the higher educational level and the higher cinema valuation the higher the probability of being member of Group 2. Moreover, being young also increases this probability. Due to these outcomes, Group 2 can be defined as the best cinema fans group and, indeed, its members have a higher probability of cinema attendance.

Table 3:
Movie attendance probit

	Parameter	t-Student
Latent class equation		
CONSTANT	0.593	1.386
VALUSA	-0.343	-6.471
VALSPAIN	-0.226	-4.656
MALE	-0.106	-0.964
AGE	0.089	11.218
PRIMARY SCHOOL	-0.701	-2.273
HIGH SCHOOL	-2.217	-6.921
UNIVERSITY DEGREE	-2.985	-8.528
Behavior eq (latent class=1)		
CONSTANT	-13.357	-4.601
SINGLE	0.886	2.48
MARRIED	-0.386	-1.078
N14	0.310	2.651
N14MORE	-0.334	-2.6
LOG (INCOME/PRICE)	0.839	3.166
SCREENS/INHABITANT	0.092	1.627
TV HOURS	-0.249	-2.403
# VIDEOS	0.178	2.997
MIDDLE CLASS	0.721	1.937
HIGH CLASS	2.140	3.865
CITY SIZE 1	1.422	2.618
CITY SIZE 2	1.253	2.234
CITY SIZE 3	0.610	1.016
TERM 1	0.162	0.535
TERM 2	-0.309	-0.972
TERM 3	-0.119	-0.394
Behavior eq (latent class=2)		
CONSTANT	-3.607	-2.211
SINGLE	-0.375	-0.867
MARRIED	-1.128	-2.65
N14	-0.802	-5.752
N14MORE	0.015	0.151
LOG (INCOME/PRICE)	0.397	2.777
SCREENS/INHABITANT	0.110	3.641
TV HOURS	-0.009	-0.29
# VIDEOS	-0.030	-0.965
MIDDLE CLASS	0.110	0.565
HIGH CLASS	0.183	0.631
CITY SIZE 1	0.341	2.108
CITY SIZE 2	0.392	2.303
CITY SIZE 3	0.394	2.104
TERM 1	-0.286	-1.776
TERM 2	-0.673	-4.256
TERM 3	-0.321	-1.999
N	10842	
Log-likelihood	-4415.526	
Global test (χ^2 33 d. of f.)	920.9871	

Second and third equations display the effect of monetary and non-monetary restrictions on the behavior of these two groups respect to cinema attendance. In the first one, where people less interested on cinema predominate, the probability of attendance is higher among those individuals with high purchasing power measured by the relative income respect to cinema prices. Moreover, there is an important difference respect to the *one latent class model* since

the number of children younger than fourteen has now a positive and significant effect on cinema attendance while children over fourteen years discourages it. It seems that less interested people usually do not go to the cinema but they tend to do it when they need to take care of their youngest kids. Also, being single has a positive effect and being married is not statistically significant. The supply conditions have a very notorious and positive influence as we can deduce from the positive coefficients of the variables representing big cities and the number of screens per inhabitant. Hence, if we increase cinema supply, both in quality and quantity, we could be able to attract some new spectators that can be considered as not cinema enthusiasts. The estimated coefficients for the rest of the variables have the same sign than in the *one latent class model* unless for the term variables that now are not significant.

Relating to the second group -movie enthusiasts-, we can affirm that income has a significant positive effect: the higher the income level, the higher the probability of cinema attendance; but comparing with the first group coefficient this income effect is lower; and, simultaneously, ticket prices have a lesser influence between movie fans. Hence, these results confirm the idea that economic variables (especially prices) are a barrier that limits greater cinema consumption, especially in the case of less interested people (see Fernández-Blanco *et al*, 2002). The negative and significant coefficient of the variable N14 tells us that, once more time, family responsibilities may have a negative impact on cinema attendance: people that usually have very high cinema consumption may suffer a temporal reduction due to their familiar responsibilities when they have young children even taking into account that they will escort their kids to the cinema. These family effects among cinema enthusiasts are reinforced with the negative coefficient estimated for married people. Moreover, the non significant coefficients of the number of videotapes and the television consumption indicate us that, for the movie enthusiasts, cinema attendance at theatres has not any adequate substitutes nor complementary goods. Again, the supply variables play the role of encouraging cinema attendance. Finally, for movie enthusiasts, the probability of going to the cinema is higher in the last term. However, in the case of less interested people, we cannot distinguish any significant difference between terms. Hence, the seasonal effect estimated in the only one latent class model is due to the enthusiasts' strong effect.

Conclusion

Since movie enthusiasm cannot be easily identified, in this paper, we propose to apply a latent variable mixture model that allows us to classify individuals in non-observed classes. Our main outcome is that there are two statistically different groups respect to cinema interest in our sample. These groups are non defined *a priori* and we can observe both attendants and non-attendants within each group. However, the average probability is very different comparing both *latent classes*. We have found that the higher educational level, the younger and the higher cinema valuation, the higher the probability of being a *good* cinema lover.

Related to the barriers that constraint cinema attendance in each group we can observe some similarities and differences. First, we observe a geographical barrier, due to living in a small city decreases the probability of attendance in both groups. Second, we have tested the presence of an economic barrier, but it is more binding in the case of non-enthusiast people who have a stronger income or price effects. Third, the opportunity cost of time can be considered an important barrier to cinema consumption for both groups. Fourth, home leisure activities, particularly TV consumption, are good substitutes of cinema in the case of non enthusiast people; so we can presume that they could satisfy their movies necessities using other windows

than the big screen. But this is not the case of cinema fans: in this case, TV is not a substitute and video can not be considered a complementary good. Finally, we did not find any gender differences.

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Notes

[1] The EHCC was also conducted quarterly during 1997 but during this year, the questionnaire suffered a lot of variations. So, to guarantee a sufficient uniformity degree, we have decided to use only the data related to 1998.
[2] The technical details of the *EHCC* survey are described in Fundación Autor (2000).
[3] Baumol and Bowen (1966) give us another two reasons to take care about the audience analysis. First, if cultural goods are merit goods, we must be able to recognise those who are being deprived of their consumption in order that we can design a special policy for this group. Second, audience profile is an important input into the process defining the desirability and political feasibility of government support for cultural goods.
[4] On this issue see Secunda, E. and Nebenzahl, I. D. (1995).
[5] See Ipmard (1997).
[6] See and Vogel (1994) The worse stage was between 1980 and 1985 when the foreign market rentals percentage were under 40%.
[7] See, for instance, Lazarsfeld and Henry (1968); McCutcheon (1987) and Heinen (1996).
[8] It is worth noting that this procedure does not use information contained in one class to estimate the preferences' function of individuals that belong to other classes. However, in most of the empirical applications this inter-class information may be quite important because individuals belonging to different classes often come from the same population, family, etc. Although their preference function may be different, they share some common features. Since this kind of information is not exploited, it is possible to say that two-stage procedures are not *efficient*.
[9] See Greene (2002) for a survey of latent class models or Beard *et al.* (1991).
[10] In the standard procedure, we are *implicitly* restricting the cross-class probabilities to be zero and the own probabilities to be equal one. This precludes using observations from other classes to estimate a particular one.
[11] Note that here both individual's choice and the probability of a particular group membership are estimated simultaneously. Since these class probabilities might be *a priori* nonzero, all the observations in the sample should be used to estimate the underlying choice procedure for each class, unlike standard two-stage procedures that implicitly restrict the class probabilities to be equal one for a particular class and zero for the others. This precludes using observations that were allocated to one particular group to estimate other classes' behaviour.

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Appendix

Dependent Variable

CINEMA ATTENDANCE: Dummy variable; it takes value one when the interviewee goes to the cinema at least once a month, and zero otherwise.

Independent Variables

#VIDEOS: Number of videotapes acquired by the interviewee last three months.

AGE: Continuous variable; it measures the interviewee's age.

CITY SIZE 1: Metropolitan area.

CITY SIZE 2: Cities from 50000 to 200000 inhabitants.

CITY SIZE 3: Cities from 10000 to 50000 inhabitants.

HIGH CLASS: Dummy variable; it takes value one when the interviewee belongs to the high class, and zero otherwise.

HIGH SCHOOL: Dummy variable; it takes value one when the interviewee has intermediate studies, and zero otherwise.

LOG (INCOME/PRICE): This variable measures, in logs, the interviewee's purchasing power of family income in cinema attendance terms.

MALE: Dummy variable; it takes value one when the interviewee is a man, and zero otherwise.

MARRIED: Dummy variable; it takes value one when the interviewee is married, and zero otherwise.

MIDDLE CLASS: Dummy variable; it takes value one when the interviewee belongs to the middle class, and zero otherwise.

N14: Number of children under fourteen years.

N14MORE: Number of family member above fourteen years.

PRIMARY SCHOOL: Dummy variable; it takes value one when the interviewee has elementary studies, and zero otherwise.

SINGLE: Dummy variable, it takes value one when the interviewee is single, and zero otherwise.

TERM 1: Dummy variable; it takes value one if the interviewee was surveyed in the first term.

TERM 2: Dummy variable; it takes value one if the interviewee was surveyed in the second term.

TERM 3: Dummy variable; it takes value one if the interviewee was surveyed in the third term.

TV HOURS: Number of hours that the interviewee watches TV in a day.

UNIVERSITY DEGREE: Dummy variable; it takes value one when the interviewee has university studies, and zero otherwise.

VALSPAIN: Ordered discrete variable; it takes values from one to six measuring the interviewee's interest on Spanish movies releases.

VALUSA: Ordered discrete variable; it takes values from one to six measuring the interviewee's interest on American movies releases.

Table A1: Descriptive Statistics

	GROUP 1				GROUP 2			
	Mean	St. dev.	max	min	Mean	St. dev.	max	min
CINEMA ATTENDANCE	0,021	0,142	0	1	0,735	0,441	0	1
VALUSA	2,859	1,434	0	5	3,619	1,045	0	5
VALSPAIN	3,010	1,364	0	5	3,402	1,107	0	5
SINGLE	0,182	0,386	0	1	0,655	0,476	0	1
MARRIED	0,656	0,475	0	1	0,314	0,464	0	1
N14	0,359	0,752	0	10	0,331	0,699	0	6
N14 MORE	2,173	1,365	0	10	0,895	1,202	0	8
Log(INCOME/PRICE)	10,57	0,433	8,10	12,3	10,87	0,420	8,10	12,4
SCREENS/INHABITANT	7,539	1,809	3,01	14,3	7,591	1,815	3,01	14,3
TV HOURS	2,918	1,827	0	24	2,473	1,530	0	20
# VIDEOS	0,209	1,081	0	40	0,431	1,690	0	40
MIDDLE CLASS	0,732	0,443	0	1	0,775	0,418	0	1
HIGH CLASS	0,026	0,158	0	1	0,153	0,360	0	1
MALE	0,437	0,496	0	1	0,516	0,500	0	1
AGE	51,27	17,860	14	98	27,38	9,894	14	81
PRIMARY SCHOOL	0,618	0,486	0	1	0,265	0,442	0	1
HIGH SCHOOL	0,106	0,308	0	1	0,429	0,495	0	1
UNIVERSITARY DEGREE	0,047	0,211	0	1	0,298	0,457	0	1
N	6920				3922			