Econometric Analysis of the Causes That Limit Cultural Participation

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Abstract

To design efficiently public policy and cultural promotion funding is necessary to know what they are and what role the restrictions on access to culture. In this study we used as database and the Survey of Cultural Habits and Practices 2010-2011, conducted by the Ministry of Education and Culture to analyze the declared causes that limit assistance to film and contemporary music concerts. Given the large number of people who do not go to any of these activities regularly and how the information about the dependent variable is collected, the econometric analysis is based on count data models with zero inflation. According to the test based on information criteria, the negative binomial distribution with zero inflation was found to be the most appropriate to analyze the factors that limit the access to culture.

Keywords: Cultural participations, constraints, zero-inflated negative binomial regression **JEL Codes**: Z11, D12

1. Introduction

For decades, governments have considered one of the tasks of the public sector the foundership and promotion of culture. One of the reasons why governments invest on cultural policy is because the consumption of culture is a positive externality. The consumption of culture generates benefits not only for the consumer itself but for the whole society. As it happens with any positive externality, the optimal social demand of culture is greater than the private demand. Nevertheless, the financiation of culture presents some problems. For example, due to the fact that cultural goods have got a high income elasticity, public expenses in culture policies are regressive (Prieto-Rodríguez et al, 2005). Under this conditions, cultural policies promoting cultural participation, particularly on those who never attend and have the lower income levels are essential. Therefore, is convenient to attempt an efficient design of public policies of promotion and financiation of culture. For this purpose, is basic to identify the restrictions on access to culture, the role that they play and on which groups act with greater force.

In this paper we analyze the main reasons why cultural participation is not greater. For this purpose, we use as examples two activities of cultural goods consumed outside home. Specifically, we have chosen two of the most common cultural practices: attending to concerts of popular music and movies. We have selected these two activities because the barriers to entry are small, while others such as opera, ballet, or theater are more minority and elitist. For these activities, we investigate which are the most common reasons that limit cultural participation and we seek to find common patterns on them that can be extrapolated to other cultural practices.

In this paper, we use a database from the Spanish survey on Cultural Habits and Practices 2010-2011, conducted by the Spanish Ministry of Education and Culture. This database contains information of the demandants of culture in Spain, and its main caracteristics are presented in Section 2. The empirical model we use is a count data model, specifically, we use a variant particularly suitable for treating the problem of zero inflation, called ZINB (zero inflated negative binomial). This choice has been determined by the way the data has been collected in this survey. The dependent variable is a count and, therefore, is truncated and discrete, because it only takes positive values or zero, so the observations that

we have are integer numbers. Furthermore, due to the characteristics of the object of analysis, the proportion of zeros existing between observations is very high, that is, we have the problem known as "inflation of zeros" (see, for example, Greene 1994).

The paper has the following structure. Section 2 presents the data base we used. Section 3 analyzes the metodology. Section 4 describes the empirical model that we employed. Section 5 offers the results obtained and, by last, section 6 contains the main conclusions.

2. Data base

In this section we present the database that we used for the empirical analysis. In this paper, we used the Survey of Cultural Habits and Practices (EHPC) in Spain, conducted by the Ministry of Culture and Sports for the period 2010-2011. During the two years of the survey, every three months it has been interviewed an individual from a random sample of households, which resulted in a total of 14,486 observations. The respondents comprise a representative sample of the Spanish population over 15 years of age, both in terms of their educational level, economic activity and type of residence and in terms of other relevant aspects for the posterior analysis of the results. The database we studied has a cross-section structure, because although data have been collected in several quarters, it have not been followed individuals all over time, so we have a single observation per person. Thus, the features of the database make it impossible to use data panel techniques.

As pointed out by Borowiecki and Prieto-Rodriguez (2015), the EHPC is an opinion survey that covers most of the relevant fields of interest in the economy of culture, both in cultural practices and the use and consumption of cultural products. In this survey the information is combined with relevant socio-economic characteristics of the respondents. Among other variables, we have age, sex, education level, employment or family status and type of residence. The definition and the main descriptive statistics of the variables used in the empirical analysis are presented in Table 2.1.

Among the questions in the survey we can distinguish a list of the main reasons why individuals who had attended to contemporary music concerts or movies in the last three months had not gone more frequently. It highlights the fact that twothirds of respondents had not been on the cinema in the last three months, a proportion that rises to 88 % in the case of concerts. This shows an important aspect that has to be taken into account: the high proportion of zeros that we have in the dependent variable (frequency with which individuals surveyed attended to the cinema or to a concert in the last three months). This high proportion of zeros is called zero inflation (Greene, 1994). Also, we see that despite the large number of individuals who do not go to cinemas, the average attendance per quarter is greater than one. However, as expected, this variable has a high standard deviation. Regarding the contemporary music concerts, the average attendance per quarter is 0.26 times. That is, on average one in four people over 15 years attend to a concert of this kind of music in the last quarter. Again, the large proportion of non-attendees makes this average is due to the fact that there is a high attendance of a small group, what can be seen on the high the standard deviation of this variable relative to the average.

Table 2.1

| Descriptive statistics (| I) |
|--------------------------|----|
|--------------------------|----|

| Variable | Definition | Mean | Std. Dev. |
|-------------------|--|---------|--------------|
| Dependent variabl | les | | |
| Movies | Number of times the individual has gone to the movies in the last three months | 1,1024 | 2,52 |
| Music | Number of times the individual has gone to concerts in the last three months | 0,2595 | 1,18 |
| Characteristics | | | |
| Age | Individual's age | 44,2161 | 19,10 |
| Woman | If the individual is a female | 0,5200 | 0,50 |
| Man | If the individual is a male | 0,4800 | 0,50 |
| Educative Level | | | |
| BelowPrim | Below primary studies | 0,2480 | 0,43 |
| Primary | Primary studies | 0,3107 | 0,46 |
| Secondary | Secondary studies | 0,1359 | 0,34 |
| FP 1 | Medium-grade vocational training | 0,0590 | 0,24 |
| FP 2 | Superior-level vocational training | 0,0763 | 0,27 |
| 3years | Universitary studies, 3 years | 0,0719 | 0,26 |
| 5years | Universitary studies, 5 years | 0,0982 | 0,30 |
| Household charac | teristics | | |
| Home | Household size | 3,1239 | 1,34 |
| Under18 | Number of children under 18 | 0,5706 | 0,88 |

Tabla 2.1

| Descriptive statistics (II) | | | | | |
|-----------------------------|------------|--|--|--|--|
| Variable | Definition | | | | |
| Personal characteristics | | | | | |

| variable | Deminion | wear | Dev. |
|--------------------|--|--------|------|
| Personal characte | pristics | | |
| Single | The individual is single | 0,1529 | 0,36 |
| Married | The individual is married | 0,6051 | 0,49 |
| Dependent | The individual lives with his or her parents | 0,2085 | 0,41 |
| Withchildren | If the individual has children | 0,4297 | 0,50 |
| Withoutchildren | If the individual does not have children | 0,2140 | 0,41 |
| Population size | | | |
| Capitalcity | If the individual lives in a capital city | 0,4141 | 0,49 |
| City | Population over 100,000 | 0,0886 | 0,28 |
| Town | Population between 50,001 to 100,000 | 0,0967 | 0,30 |
| Smtown | Population between 10,001 to 50,000 | 0,2125 | 0,41 |
| Village | Population under 10,000 | | |
| Labour situation | | | |
| Employed | The individual is employed | 0,4504 | 0,50 |
| Unemployed | The individual is unemployed | 0,1249 | 0,33 |
| Retired | The individual is retired | 0,1988 | 0,40 |
| Disabled | The individual has a disability | 0,0061 | 0,08 |
| Student | The individual is studing | 0,0940 | 0,29 |
| Householdwork | The individual does housework | 0,1174 | 0,32 |
| Factorial analysis | predictions | | |
| AF_Equipment | Equipment's factorial analysis | 0,7425 | 3,96 |
| AF_Informatic | Informatic equipment's factorial analysis | 0,8952 | 0,75 |
| AF_Reading | Reading interest factorial analysis | 0,0048 | 0,94 |
| Causes of nonatte | endance (movies) | | |
| C_Supply | Non assistance because supply problems | 0,0984 | 0,30 |
| C_Interest | Non assistance because of lack of interest | 0,2966 | 0,46 |
| C_Time | Non assistance because of lack of time | 0,3017 | 0,46 |
| C_Social | Non assistance because of lack of social relations | 0,0287 | 0,17 |
| C_Price | Non assistance because excesive pricing | 0,2746 | 0,45 |
| Causes of nonatte | endance (concerts) | | |
| M_Supply | Non assistance because supply problems | 0,2236 | 0,42 |
| M_Interest | Non assistance because of lack of interest | 0,3088 | 0,46 |
| M_Time | Non assistance because of lack of time | 0,2684 | 0,44 |
| M_Social | Non assistance because of lack of social relations | 0,0160 | 0,13 |
| M_Price | Non assistance because excesive pricing | 0,1831 | 0,39 |

Regarding the reasons stated as main causes that limit the assistance to these activities, it must be taken in count that respondents could only point one reason

Std.

Mean

of the proposed list. Therefore, the dummy variables defined and included in Table 2.1, collect the entire universe of probability, there is not any survey in which these variables have not been answered. For the two activities, the lack of interest and restrictions of time are the most frequent motives declared for not having a greater assistance. However, its nature is completely different. The lack of interest makes reference to the role that preferences play in the election process. Thus, they can only be changed in the long term, for example, through learning processes of the consumption (learning-by-consuming) as proposed by Lévy-Garboua and Montmarquette, c. (1996). On the other side, time restrictions can be altered in a more simple way and its modification is often the goal of cultural policies. Note that, as was expected, the restrictions on supply are more important in the case of music concerts that in films and that the restrictions of a social nature are the less frequent.

3. Metodology

As we mentioned above, in this paper we use a zero inflated negative binomial model (ZINB). This model is the most indicated for cases where we have inflation of zeros in the dependent variable while it is a count variable. This type of models allow to differentiate the absolute or "pure" zeros from the rest of zeros inside the sample.

An observation will be an absolute zero when the above mentioned individual in no case is going to be present at concerts or cinema. This case is different from other individual who has not gone to a concert or cinema in the last three months, but if he had had more time, money, another age, or another labor situation, he would have gone one, or even several times. This condition turns him into a potential consumer. The count models with zero inflation are able to differ between these two situations, and this models allow us to use different explanatory variables to separate the individuals who are "absolute zeros" and the potential consumers.

Count models are suitable when we seek to explain the number of times that occurs an event. In the case study, we attempt to model the number of times an individual participates in a cultural activity, such as cinema or music concerts. For a significant proportion of the sample, the number of times will be zero, and most

individuals will attend a small number of times. It also highlights that, in count models, the dependent variable is discrete and tidy, but the response values have a cardinal interpretation, not only ordinal. For example, going to the cinema four times is twice going two times (Verbeek, 2008).

When we deal with data obtained through surveys, the object of analysis is expressed as a non-negative integer, denoted by $y \in \mathbb{N}_0 = \{0, 1, 2, ...\}$. The objective is to analize y in a regression, for a vector x of K explanatory variables. Since the response variable is discrete, its distribution has its probability mass concentrated in the non-negative area and integers. For these cases we use count models, which fit to this property of the distribution function. Count regressions are non linear, that is, E(y|x) is usually non linear. Several of count models characteristics are closely related to the properties of non negativity and discreteness (see, for example, Cameron y Trivedi, 2009).

Some of the most common complications when dealing with count data are pointed below. First of all, the presence of unobservable heterogeneity due to omitted variables. Second, the small variance observed evidenced by the existence of many zeros. And third, the excess zeros itself, which comes from the truncation of the observed distribution of y, in addition to the endogeneity of the regressors.

Unobserved heterogeneity, which generates greater variability on y, it can be collected by introducing multiplicative randomness. We replaced μ for μv , where v is a random variable, so that you have $y \sim Poisson(y|\mu v)$. It is defined v with moments E(v) = 1 and $Var(v) = \sigma^2$, so that the mean is constant and the dispersion is increasing. Thus we have $E(y) = \mu$ and $Var(y) = \mu(1 + \mu\sigma^2) > E(y) = \mu$. The over-dispersion therm has the characteristic that Var(y|x) > E(y|x) in this regression model.

In this working paper we have applied a model of count data that allows observed zeros to be generated in different way that observations with positive values. Specifically, we have implemented a subclass called zero inflation negative binomial models. This variant is specific for cases where there are an "excess of zeros". The flexibility in the specification of density functions makes these models an adequate econometric option to study a variety of decisions, including those that are related with cultural participation, presenting a high predictive capacity (see, Ateca y Prieto-Rodríguez, 2013).

4. MODEL

As we noted above, in this study we analyze the causes that limit cultural participation in Spain. Although certain cultural activities can be done at home, we considered, in order to assess the role of temporary restrictions, that it was necessary to study activities carried out outside the home. This is the only that allow us to see the true role that time constraints play. Therefore, we decided to study the limits of cultural participation analyzing cinema attendance and contemporary music concerts.

Since Baumol and Bowen (1966) papers, in cultural economics it is common to study the socioeconomic differences among consumers of different types of cultural goods, even when it comes to cultural goods as close as classical music and popular music.

Cultural products have some features that differentiate their consumption and production from other goods and services. Among them is the characteristic of being shared experiences. Cultural activities are social activities because usually people go to the cinema or to a concert with their family or friends. Furthermore, they have economies of drag. Often they carry associated the consumption of some complementary goods or generate performing some other activity, such as going out to dinner.

The cultural activities we studied are particularly time-intensive, as they are performed outside the home, so they have a higher opportunity cost. Further, cultural goods are experience-goods (Levy-Garboua y Montmarquette, 1996), since many of the cultural aspects are not known previously and we can know relevant characteristics only through consumer experience. This makes important to consider asymmetric information problems, because companies have more information about the product they are selling than buyers. Either way, the consumer does not know many of the characteristics at the time of purchase.

The approach we use to analyze the participation in cultural activities is based on the assumption that individuals are utility maximizers subject to budget and time constraints (Gray, 2003). When a potential consumer decides whether or not to go to a movie or concert, takes into account several aspects. Among them, we can find the purchase price of the tickets, the costs in terms of time and alternative uses of both things, time and money, that is, the opportunity cost. Some of the reasons on which it depends the participation on cultural activities are common, such as age, sex or education level. However, there are also other factors that affect specifically, as the number of children living at home. In this sense, somehow we should take into account the implicit costs of cultural activities. Regarding how these factors are expected to affect to participation, Gray (2003) makes few hypothesis, some of which are set out below.

Following the standard specification used in the literature, participation in the cultural activities discussed in this study aer assumed to depend on personal and contextual factors. These factors will determine the optimal demand for these goods, both to take the decision whether or not to participate and, in the case of a potential consumer, the amount of the consumption.

The estimated model has two parts, the count regression and the inflation of zeros regression associated with the two density functions of the zero inflation negative binomial model. The dependent variables are defined as the number of times the individual has attended a concert and the number of times that attended to the cinema in the past three months. The explanatory variables used are equivalent in the two estimations. In count and inflation equations there were included as independent variables gender, age, educational level, the autonomous community (included as a control), the size of the place of residence, marital status, household size, and number of children under 18 years. The employment situation for reasons discussed below, is only included in the zero inflation equation. The variables that differ between the two models indicate the reasons why individuals said they have not attended more frequently to these activities in the last quarter. Obviously, we used the specific responses for each activity, while sex, age, etc., are the same in both regressions.

In this way the model is specified such that y_i represents the number of times an individual *i* attend contemporary music concerts or movies, which depends on the factors listed in the following generic equation:

$y_i = f(P_i, E_i, G_i, H_i, L_i, TH_i, K_i, NA_i)$

First, we should analyze the impact of the geographical location and size of the population in the place of residence, P_i . Participation in cultural activities is strongly influenced by economies of agglomeration (Gray, 2003). Such economies appear when firms are able to share inputs (productive factors) in a particular geographic region. In the case of analysis, the fact is that in cities with larger populations inherently there are a greater volume of potential customers. This makes the more multitudinous concerts held in Spain to be concentrated in cities like Madrid or Barcelona, and, on the other side, small towns to do not have cinemas. It is expected therefore that residents of metropolitan cities show a greater likelihood and greater intensity attending cultural events, simply by the fact that there is more supply and lower costs in terms of displacement on these areas.

In terms of age, E_i , it is said that the taste for culture is acquired over time. In this sense, we expect that participation in cultural activities increases with age (Gray, 2003). However, this does not happen for any kind of cultural consumption, as some cultural events are specifically for teenagers or children.

Moreover, regarding the effect of gender, G_i , it is known that women have a higher rate of participation in culture (see, for example, Ateca 2008), although, a priori, there is not any intrinsic reason that explains why do we have to expect it.

By the other side, the effect of human capital in culture consumption, proxied by educational level, H_i , is one of the most clear and consistent. In fact, the acquisition of a taste for culture is mainly obtained through education. The ability to appreciate some types of art requires an investment in skills of cultural consumption, and also in many educational levels there are subjects related to culture, such as music or art (Gray 2003). Therefore, we expect a positive effect of education on cultural consumption.

What happens with the effect of income is firstly obvious: the higher the income, the greater the participation in cultural events, since we know that culture is in one way or another a luxury that is not available to everybody (see Prieto-Rodriguez et al 2005). Because there is no information available on the income of individuals, we have included two variables that may capture the income effect. First, education is closely correlated with income. Therefore, the estimated effect

of education may overestimate the pure effect of education to also capture part of the income effect. Second, the L_i variable, reflecting the employment situation. Again, the estimated effect of this variable can capture two different effects. On the one hand, the effect associated with having a greater income and, on the other hand, free time availability is lower. Clearly, both effects may tend to be compensated as they affect in opposite direction.

Household size, TH_i , may affect attendance to cultural events in two different ways. First, it can have a positive effect generating more consumption because, for example, the whole family would consume together, which is usual in the case of film. Second, children constitute a family burden that often limits the time and it does not allow parents to attend to cultural activities of their choice as much as they would like.

The physical cultural capital, K_i , has been approximated by conducting an analysis factor of main components. That is, we have grouped the available information on domestic objects related with culture consumption to create proxies of the cultural capital of the home. This group includes variables such as books, ebooks, CDs, MP3s, computers, and other items that people may have at home and that they are oriented to culture consumption. In addition there has been a specific factor analysis for computer equipment, including internet access or possession of mobile internet. The values obtained for the first factor have been used as proxies of the physical cultural capital. As a proxy of interest in culture in general, similarly, there has been a factorial analysis of the interest in reading, including variables such as time spent reading or frequency of reading non-professional books (reading leisure). The results of the factor analysis can be found in the Annex.

The response variables which explain why there was not a higher frequency in theater attendance or music concerts, NA_i , that are included as options in the EHPC, are encompassed in five dummy variables. First of all, the price of tickets. We have chosen price of tickets as the omitted dummy variable, so that we can take it as a reference demand curve. Second, we have the lack of time, comprising the of lack of time in general and more specifically the complication to go out home, family responsibilities or other similar reasons. These aspects

are especially relevant because the consumption of cultural goods is timeintensive. Third, lack of interest, including the preference for other options. Fourth, the reasons related to supply problems, such as difficulties to get tickets, lack of information or lack of variety. Finally, it is also included as social restriction the fact that some people does not have anyone who accompany them to this events. This is an interesting aspect because part of cultural consumption are often consumed with other people, specially concerts and films.

5. Results

The study population can be classified into two groups: individuals who have attended cultural activities at least once in the last three months, and those that have not. People who correspond to observations for which assistance variable takes zero value, that is, non assistants, constitute the major group. This group in turn can be divided into two: absolute zeros and occasional zeros. Those individuals who never go to the movies or concerts are absolute zeros or pure zeros. Meanwhile, occasional zeros correspond to those individuals who are potential consumers but, for one reason or another, they did not attend to these events during the period we studied.

As it was already indicated, to analyze the reasons that lead an individual to belong to one group or another, we have used count models with zero inflation. These include two equations where we have used the same explanatory variables, except for the dummy variables concerning the labor situation, which have been included only in the zero inflation equation. The fact that vectors of both equations differ, improves the convergence conditions of the econometric model. With this decision, we have implicitly assumed that the employment situation can be related to restrictions but not with the preferences that influence consumer's choice. With this specification, it is possible to distinguish potential consumers of non-consumers, and analyze how the different explanatory variables used affect to each. First, we will focus on the results for classification among potential or not potential consumers (zero inflation equation) and then we move to analyze the factors on the intensity of consumption (count equation).

When comparing the two equations of zero inflation, we found some common significant effects that establish patterns in the profiles of the applicants in cultural

property. First, and as expected for cultural property (see, for example, Ateca-Amestoy and Prieto-Rodriguez, 2013), human capital, measured as educational attainment, increases the likely to attend movies and concerts in a significative way. That is, the lower the educational level, the more likely that the individual belongs to the group of pure zeros. This effect is especially pronounced in the case of cinema attendance.

Regarding gender, to be a man increases the probability of participating in both cultural activities, because the effect of being a man is negative on the probability of being an absolute zero. This result contradicts previous effects found for the performing arts such as Borgonovi (2004), Kane (2004) or Ateca (2008), who found that women had a bigger demand for cultural goods. In our case, women are more likely to never go to the movies or to popular music concerts. Age affects negatively, because the more years the individual has, the lower its chance of being a potential consumer. This effect is especially significant in the case of films. With regard to the labor situation, no significant effects were observed when the individual is employed, unemployed or retired, or performing household chores. However, the condition of permanent disability is significant. When the individual has a disability, his chance of never going to the movies or music concerts is higher. This is understandable given that the two activities are conducted outside the home and disability could reduce the individual mobility. Marital status, tenure or without children, or stay at parents home also have a significant effect on the probability of being an absolute zero.

With respect to cultural capital (proxy by the predictions of the factor analysis), the greater is the interest in reading, the lower the probability of being an absolute zero in both activities.

On the other side, there are effects which have a sign and significance level that differs between film and music concerts in the inflation component of the model. Regarding the size of the household, the more people live in the residence, the greater the chance that it will never go to the movies. This result, very significant in the case of film, it is not relevant to explain attendance at music concerts. Moreover, when increases the number of children under 18 living at home, the probability of being a potential consumer of films increases, while the probability of going to concerts is reduced. It seems that film consumption is household

consumption that can be conducted with the children, while this phenomenon does not occur for music concerts, that is an activity for doing with friends.

The size population of residence is also an aspect that affects very significantly to the probability of going to the movies. When the size of the city increases, the probability of never going is significantly reduced. This effect is not observed in contemporary music concerts. While cinema's offer is clearly focused on large cities and provincial capitals, music concerts have a more diffuse offer. Finally, the physical cultural capital (proxied by the prediction of factor analysis of the home kit) has a positive and significant effect on the probability of being a potential assistant to contemporary music concerts. The higher the equipment, the less is the likely of never go to concerts. This effect is not significant in the case of cinema.

Particularly important is the analysis of the causes of non-participation in both cultural activities, the results are as follows. Since respondents can only point one cause of non-attendance, the definition of dummy variables is a excluyene classification and they must choose a group as the reference category. In our case, it was set as the reference category those individuals who say they do not go more often because of the price. Thus, the omitted category refers to the demand curve, that we could not estimate because the necessary information on prices and income was not available. Positive signs in the inflation equation indicate reasons that have a greater effect than the price on the probability of not being a potential consumer. In both cases, the main reason that makes an individual to never go (to be an absolute zero) is the lack of interest. When lack of interest increases, the probability of never participate in these activities is much higher. In the case of cinema, this variable has an effect twice important than to not have someone to go (variable which is the second most important), and three times much important than the lack of time or the problems associated with the offer. Since all variables have a positive and significant effect, for cinema, excessive price is the reason of absence whose effect is smaller. At concerts, the second most significant reason for non-attendance is lack of time, while supply problems and lack of company are not significant and therefore, have a statistically similar effect as the price.

In the econometric analysis of the count equation (the behavioural equation) we found common behavioural patterns between cinema and music that are

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discussed below. However, it highlights the fact that the results differ more in analyzing consumption intensity than in the probability of never attend these activities. The results of this equation should be interpreted conditioned to the fact of being a potential consumer or what is the same, not to be an absolute zero. For both cinema and concerts, individuals with higher levels of education are more likely to attend more often these cultural activities. This effect is observed particularly significantly in individuals with Bachelor or Vocational Higher Level. By contrast, the lowest education levels do not present significant results. Factor analysis of home computer equipment sheds a significant positive effect: the higher the equipment, the more likely to attend more often. Marital status and household size are not significant aspects to explain the influx to any of these two cultural activities.

The differences between the frequency of cinema and concerts attendance among potential consumers are numerous. Age has an increasingly negative effect on the frequency of going to the cinema, ie, the older, less likely to attend more often. However, it is not significant to explain the attendance to music concerts. Regarding gender, among potential consumers, men are significantly more likely to attend more often music concerts. Unlike age, gender is not significant to explain the intensity of cinema demand. Among film demand, men and women attend with the same frequency on average, however, depending on the outcome of the inflation equation is more likely that a man demand films than a woman. Moreover, the likelihood that a man attend to a concert is greater than the probability of a woman, and they demand concerts more often.

The presence of children under 18 reduces the chance of going to the movies among consumers. With respect to this variable, the estimation with zero inflation identifies two significant effects that tend to offset. On the one hand, to have minor children increases the likelihood of being a cinema demandant (inflation equation) but reduces the average number of times of going to the cinema. It looks like it could capture the effects associated with induced demand: the individual with minor children are more likely to demand films but, if it is to satisfy the demand for their minor children, they attend less frequently than those demanding film for themselves.

The size of the population of the city of residence and the interest in reading are strongly and positively associated with the number of times an individual goes to the movies, but not with the concerts. With bigger population of the city and more interest in reading, it is more likely that a potential consumer attend the cinema more frequently.

Regarding the causes that limit attendance, the reference category are people who say that they do not attend more because of the prices. Again, the most important reason to explain why potential claimants do not go more often to the cinema and concerts is the lack of interest. The negative effect of this variable is very significant and far superior than other reasons. Therefore, when the main stated reason is lack of interest, the frequency with which they participate in these cultural activities is significantly lower. Obviously, this effect captures the individual's preferences, but not the restrictions associated with consumption. On the other hand, time constraints seem less limiting among potential consumers than price. The ones that declare lack of time have, in both cases, a positive effect on attendance in relation to the reference category. Moreover, despite being activities conducted outside the home and often consumed with other people, lack of company, or what we call social restrictions, has no significant effect different from the effect of price. Since the film in Spain has an elastic demand (see Fernández-Blanco et al, 2012 and Prieto-Rodriguez et al, 2005) this social effect can not be considered negligible, at least for the cinema. Finally, in the case of concerts, supply problems have not significantly effect different from the price effect.

Since the ZINB is not a linear model, the estimated coefficients have no direct interpretation in terms of elasticities. To interpret naturally the values of these coefficients, there have been calculated the marginal effects associated with the variables used in the analysis. These marginal effects have taken in count the effect of each of the two equations and, therefore, they collect the overall effect of the independent variables over the dependent ones.

Focusing on the causes of non-attendance, according to the results of count and inflation equations, the lack of interest is the reason that affects more negatively on the probability of participating in this cultural activities. When the lack of interest goes from 0 to 1, attendance is reduced 50.66 % in the cinema and 63.29% in contemporary music concerts. It is also observed that lack of time and company have also negative elasticities, although they are much smaller amount. Among those who report lack of time as principal cause of not attendance, the

demand for these activities is reduced by 4.98% for film and 9.12% in concerts with respect to the reference category, that are those who declare high prices as the main reason.

Table 5.1

Results of cinema attendance estimation

| | Count | | Inflation | | Marginal ef. | | | | |
|-----------------|----------|--------------|-----------|----------|--------------|-----|----------|--------------|-----|
| Variables | Coef. | Std. Err. | | Coef. | Std. Err. | | ey/ex | Std. Err. | |
| Age | -0,02248 | 0.01 | ** | 0,05525 | 0,02 | *** | -2,50810 | 0,47 | *** |
| Age^2 | 0,03414 | 0,01 | *** | 0.00318 | 0,02 | | 0,73957 | 0,29 | ** |
| Man | -0,00333 | 0,04 | | -0,39440 | 0,09 | *** | 0,08979 | 0,02 | *** |
| Primary | -0,00183 | 0,08 | | -0,44488 | 0,12 | *** | 0,07511 | 0,02 | *** |
| Secundary | 0,08988 | 0,09 | | -1,00270 | 0,16 | *** | 0,05471 | 0,01 | *** |
| FP1 | 0,00391 | 0,10 | | -1,10859 | 0,19 | *** | 0,02067 | 0,01 | *** |
| FP2 | 0,16329 | 0,10 | * | -0,84085 | 0,18 | *** | 0,03366 | 0,01 | *** |
| 3years | 0,06477 | 0,10 | | -1,61726 | 0,20 | *** | 0,03329 | 0,01 | *** |
| 5years | 0,23024 | 0,09 | ** | -1,51538 | 0,18 | *** | 0,05502 | 0,01 | *** |
| Single | 0,35525 | 0,24 | | -0,04731 | 0,33 | | 0,05869 | 0,03 | * |
| Married | 0,07850 | 0,22 | | 0,02228 | 0,31 | | 0,03976 | 0,12 | |
| Dependent | 0,24519 | 0,22 | | -0,52007 | 0,35 | | 0,07019 | 0,04 | * |
| Withchildren | -0,21892 | 0,12 | * | -0,03119 | 0,17 | | -0,08719 | 0,05 | * |
| Withoutchildren | -0,04832 | 0,13 | | 0,03792 | 0,17 | | -0,01507 | 0,03 | |
| Householdsize | 0,03529 | 0,02 | | 0,14282 | 0,05 | *** | -0,09632 | 0,07 | |
| Under18 | -0,12618 | 0,03 | *** | -0,21077 | 0,07 | *** | -0,03092 | 0,02 | ** |
| CapitalCity | 0,22686 | 0,06 | *** | -0,30282 | 0,12 | ** | 0,15078 | 0,03 | *** |
| City | 0,20115 | 0,08 | ** | -0,34658 | 0,18 | * | 0,03231 | 0,01 | *** |
| Town | 0,17284 | 0,09 | ** | -0,42144 | 0,18 | ** | 0,03617 | 0,01 | *** |
| Smtown | 0,17747 | 0,07 | *** | -0,24153 | 0,13 | * | 0,06417 | 0,01 | *** |
| AF_Equip | 0,00626 | 0,01 | | 0,00095 | 0,00 | | 0,00429 | 0,00 | |
| AF_Informat | 0,12543 | 0,02 | *** | -0,02250 | 0,05 | | 0,12308 | 0,03 | *** |
| AF_Reading | 0,07569 | 0,02 | *** | -0,60897 | 0,06 | *** | -0,09005 | 0,01 | *** |
| C_Supply | 0,14652 | 0,06 | ** | 0,36858 | 0,14 | *** | -0,00190 | 0,01 | |
| C_Interest | -0,30982 | 0,08 | *** | 1,76460 | 0,13 | *** | -0,50664 | 0,03 | *** |
| C_Time | 0,08181 | 0,05 | * | 0,57236 | 0,11 | *** | -0,04967 | 0,02 | *** |
| C_Social | -0,14419 | 0,13 | | 0,85118 | 0,25 | *** | -0,02026 | 0,01 | *** |
| Employed | | | | -0,04815 | 0,40 | | 0,00784 | 0,06 | |
| Unemployed | | | | 0,58022 | 0,41 | | -0,03416 | 0,02 | |
| Retired | | | | 0,36119 | 0,41 | | -0,06262 | 0,07 | |
| Disabled | | | | 1,33175 | 0,74 | * | -0,00670 | 0,00 | |
| Student | | | | -0,65883 | 0,50 | | 0,00443 | 0,00 | |
| Householdworker | | | | 0,18050 | 0,41 | | -0,01623 | 0,04 | |

Table 5.2

Results of music concerts attendance estimation

| | Count | | Infla | Inflation | | Marginal ef. | | | |
|-----------------|----------|--------------|-------|-----------|--------------|--------------|----------|--------------|-----|
| Variables | Coef. | Std. Err. | | Coef. | Std. Err. | | ey/ex | Std. Err. | |
| Age | -0,00765 | 0,02 | | 0,02732 | 0,04 | | -1,13623 | 0,81 | |
| Age^2 | -0,01819 | 0,02 | | 0,01696 | 0,04 | | -0,70749 | 0,53 | |
| Man | 0,35603 | 0,09 | *** | -0,36140 | 0,18 | ** | 0,26548 | 0,04 | *** |
| Primary | -0,11327 | 0,20 | | -0,52335 | 0,31 | * | 0,05474 | 0,04 | |
| Secundary | -0,13171 | 0,21 | | -0,96313 | 0,44 | ** | 0,02923 | 0,02 | |
| FP1 | 0,31374 | 0,26 | | 0,00916 | 0,40 | | 0,01822 | 0,01 | * |
| FP2 | 0,40228 | 0,23 | * | -0,08201 | 0,35 | | 0,03401 | 0,01 | *** |
| 3years | 0,09535 | 0,23 | | -0,80014 | 0,42 | * | 0,03009 | 0,01 | ** |
| 5years | 0,38532 | 0,21 | * | -0,18441 | 0,34 | | 0,04692 | 0,02 | *** |
| Single | -0,08732 | 0,46 | | -0,50745 | 0,75 | | 0,03525 | 0,05 | |
| Married | -0,51302 | 0,43 | | -0,25874 | 0,70 | | -0,20687 | 0,19 | |
| Dependent | -0,16681 | 0,36 | | -0,01570 | 0,65 | | -0,03402 | 0,06 | |
| Withchildren | 0,18336 | 0,32 | | 0,80131 | 0,55 | | -0,14900 | 0,09 | |
| Withoutchildren | -0,03865 | 0,36 | | 0,35562 | 0,58 | | -0,05326 | 0,04 | |
| Householdsize | -0,07528 | 0,05 | | -0,06769 | 0,11 | | -0,11964 | 0,12 | |
| Under18 | -0,04419 | 0,07 | | 0,26093 | 0,13 | * | -0,10673 | 0,03 | *** |
| CapitalCity | 0,14034 | 0,15 | | 0,02181 | 0,28 | | 0,05308 | 0,05 | |
| City | -0,12570 | 0,24 | | -0,14684 | 0,44 | | -0,00354 | 0,01 | |
| Town | -0,23762 | 0,19 | | -0,45833 | 0,37 | | 0,00090 | 0,01 | |
| Smtown | 0,01411 | 0,16 | | -0,19966 | 0,28 | | 0,02681 | 0,03 | |
| AF_Equip | -0,00081 | 0,00 | | -0,36381 | 0,09 | *** | 0,11524 | 0,02 | *** |
| AF_Informat | 0,14801 | 0,05 | *** | 0,09635 | 0,10 | | 0,08123 | 0,04 | * |
| AF_Reading | 0,04235 | 0,05 | | -0,56757 | 0,13 | *** | -0,06873 | 0,02 | *** |
| M_Supply | 0,06661 | 0,11 | | -0,26111 | 0,28 | | 0,03268 | 0,02 | * |
| M_Interest | -0,61555 | 0,23 | *** | 1,74606 | 0,34 | *** | -0,63287 | 0,06 | *** |
| M_Time | 0,29383 | 0,12 | ** | 0,99419 | 0,23 | *** | -0,09121 | 0,03 | *** |
| M_Social | -0,49098 | 0,36 | | 0,48746 | 0,71 | | -0,01245 | 0,01 | ** |
| Employed | | | | -0,39679 | 0,67 | | 0,09252 | 0,16 | |
| Unemployed | | | | -0,23448 | 0,68 | | 0,01444 | 0,04 | |
| Retired | | | | -0,19732 | 0,73 | | 0,03219 | 0,12 | |
| Disabled | | | | 2,57644 | 1,48 | * | -0,01504 | 0,01 | |
| Student | | | | -1,44985 | 0,83 | * | 0,01522 | 0,01 | ** |
| Householdworker | | | | -0,20393 | 0,70 | | 0,01833 | 0,06 | |

To check the adequacy of the negative binomial model with zero inflation, three other alternative specifications were estimated: poisson count model, count model of the negative binomial and poisson model with zero inflation. As a model selection method, we used Akkaike information criterion. We compared the four variants and we saw that the negative binomial with zero inflation (ZINB) is the most appropriate econometric model to explain the participation in cultural activities. This result is shown in Table 5.3.

Table 5.3

| Comparision | between | count model | s |
|-------------|---------|-------------|---|
|-------------|---------|-------------|---|

| MOVIES | | AIC | Better | than | CONCERTS | AIC | Better | than |
|--------|---------|-------|--------|------|----------|-------|--------|------|
| ZINB | | 2.288 | | | ZINB | 0.948 | | |
| | vs PRM | 3.355 | ZINB | PRM | vs PRM | 1.288 | ZINB | PRM |
| | vs NBRM | 2.399 | ZINB | NBRM | vs NBRM | 0.964 | ZINB | NBRM |
| | vs ZIP | 2.592 | ZINB | ZIP | vs ZIP | 1.045 | ZINB | ZIP |

We have also made a graphical analysis that proves that the methodology is the most appropriate. In Figure 1, there are represented the deviations between observed and predicted values for the four alternative models. You can see that the ZINB model adjusts its predictions to the observed values with a lower deviation than the other three.

6. Conclusions

In this paper we have studied the determinants of cinema and contemporary music concerts attendance, and the main causes that limit their assistance. To do this, we have taken into account the socioeconomic characteristics of individuals and the reasons why they declare that they do not attend more often. Given the evidence of over-dispersion and excess zeros, possibly due to unobserved heterogeneity, and according to the hypothesis to be tested, the econometric model chosen to analyse the causes that limit cultural participation is a negative binomial count model with zero inflation, ZINB.

This study provides relevant results for both public cultural policy design and production decisions in the private sector. The behavior of the culture demanders

responds to certain common patterns in cinema and contemporary music concerts, but also shows some behavioral differences between the demand for each of these activities.

First, it emphasizes the already known effect of education on cultural participation. The higher the human capital, the lower the probability that the demand for cultural activities is zero, and within the applicants, the effect is significantly positive. A higher level of education increases the probability of being a potential consumer and the intensity with which film and music concerts are demanded. Gender behaves contrary to the results analyzed in other studies of literature, women are more likely to do not be consumers of these activities. With regard to consumption's intensity, it is at concerts where we found a significantly higher. Age has a negative effect on the probability of being a potential consumer, the more years, the most likely of never participate in these activities. Effect that is also observed in the intensity of film's demand, which is reduced with age.

Having children, and the number of children under 18 living at home, increase the intensity of film's demand and the number of minor children also reduces the chance of never going to the movies. These two effects tend to cancel, maybe because it is capturing induced film's demand, they attend less frequently but are potential consumers because their children asked for it. By contrast, the effect of household size is negative, as it increases the chance of never going to the movies. On the other hand, it is more likely that a person living in a big city is a potential film consumer and also the higher the population of the city, the higher the frequency of attendance. This is because the film supply is concentrated in large cities and provincial capitals. However, this effect associated with the population size of residence is not observed at concerts, probably because their offer is more variable and reaches the big cities but also to the villages.

Regarding the variables used as proxy the cultural capital, the interest in reading has a double positive effect. The cultural capital increases not only the likelihood of being a potential consumer, but in the case of film, it also increases intensity of the demand. Physical capital is also positively correlated with attending contemporary music concerts. The higher is physical capital, the less likely never going to concerts, effect that is not found on films.

Finally, with regard to the causes that limit participation, it is the lack of interest the main reason that makes an individual more likely to never participate, and if it does, it is less frequently, since the intensity of their demand is lower when the lack of interest increases. This variable captures the fact that the effect of tastes and preferences in these two activities is much more marked than does restrictions on assistance caused by the prices, which are set as the reference category.

In fact, in the case of film, the excessive price is the reason of absence that has the minor effect. However, in terms of intensity, supply problems are the cause which least hinders the demand, meanwhile the lack of time and excessive price have intermediate effects. For concerts, lack of time is the second reason that increases more the likelihood of never participate, but within the applicants, the excessive price limits rather than lack of time.

Therefore, it is clear that the analysis of patterns of behaviour is valid for the study of cultural participation. The analysis of this pattern of behaviour is relevant to improve the quality of the information available to design cultural policies and production decisions of private companies. The knowledge of these patterns also contributes to approach to the consumer in order to provide a tighter supply and demand of cultural activities and thus improve the market efficiency by maximizing the utility of consumers and producers, not only individually but also socially. From the results it is clear that cultural policies need not to focus on subsidizing prices. Although excessive pricing is one of the reasons that individuals recognize as limiting their cultural consumption, is neither the most frequent cause declared nor one the presenting the most important effect. In fact, it seems clear that education and training policies are essential to encourage cultural consumption, as the lack of interest is the most important reason to reduce people's consumption of films and live music concerts.

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ANNEX

Table A.1

Factorial analysis of cultural equipment

| Factor | Own value | Proportion of variance explained |
|-----------------------|---------------------|----------------------------------|
| Factor 1 | 2,3107 | 0,7611 |
| Variables | | Weights |
| Number of books | | 0,3451 |
| Number of e-books | | 0,0761 |
| Paper encyclopedias | | 0,2599 |
| Electronic encycloped | lias | 0,1765 |
| E-book readers | | 0,1091 |
| Number of CDs | | 0,2992 |
| Number of vinil cd's | | 0,4242 |
| Number of MP3s | | 0,1630 |
| Number of musical ins | struments | 0,3925 |
| VCR | | 0,4047 |
| Number of VHS reade | ers | 0,3442 |
| Number of DVD or Blu | u-ray readers | 0,3931 |
| Other visual equipmer | nt | 0,3132 |
| Number of photo cam | eras | 0,3475 |
| Number of photo and | video cameras | 0,4331 |
| Number of video came | eras | 0,4453 |
| Número de smartphor | nes with video came | 0,4733 |
| Number of VHS | | 0,3770 |
| Number of DVD or Blu | ue-ray cds | 0,4321 |
| Number of other video | o cds | 0,1748 |
| Ν | | 14.486 |

As it can be seen, the coefficient for the first factor is positive and, consequently, factor analysis predicts that the cultural capital is positively correlated with the variables that a priori were considered relevant. The eigenvalue of the first factor is 2.3107 and explained 71.66% of the total variance. The same applies to the factorial analysis of computer equipment, the coefficient for the first factor is also positive. Its own value is 4.3567 and 98.11 % explains the total variance. Regarding the factorial analysis of interest in reading, a positive value of the first factor is obtained. In this case the eigenvalue 2.2038 and 84.79 % explains the total variance (see Fernández -Blanco, V. et al, 2015).

Table A.2

Factorial analysis of computer equipment and new technologies

| Factor | Own value | Proportion of variance explained |
|------------------------|-----------------|----------------------------------|
| Factor 1 | 4,3567 | 0,9811 |
| Variables | | Weights |
| Number of computers | 3 | 0,7308 |
| Number of computers | s with recorder | 0,7934 |
| Number of multimedia | a cds | 0,6571 |
| Videogame software | | 0,7157 |
| Educative software | | 0,6429 |
| Audiovisual software | | 0,7131 |
| Internet at home | | 0,7135 |
| Internet on the mobile | e phone | 0,3241 |
| PDA tablet | | 0,3235 |
| Videogame hardware | | 0,5614 |
| Smartphones with inte | ernet | 0,5416 |
| Ν | | 14.486 |

Table A.3

Factorial analysis of interest on reading

| Factor | Own value | Proportion of variance explained |
|---------------------------|-----------|----------------------------------|
| Factor 1 | 2,2038 | 0,8479 |
| Variables | | Weights |
| Interest on reading | 0,1890 | |
| Leisure time reading on b | 0,2810 | |
| Leisure time reading on v | 0,2745 | |
| Frequency of leisure read | 0,4069 | |
| Ν | 14.486 | |