And the Oscar Goes to.....Peeeeedrooooo![1]

Betty Agnani and Henry Aray [2]
University of Granada
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Abstract

In this article we are interested in how the production of Spanish feature films reacts to an Oscar award. We use time series data for the 1953-2008 period and estimate a production function assuming that the Oscar effect accrues through an augmenting input factor. We consider a lag structure that allows the Oscar to have a diminishing effect over time. In general our evidence supports a positive Oscar effect. Nevertheless, the only significant Oscar award at the 1% and 5% levels is that of *Talk to Her*, which Penélope Cruz euphorically announced with her celebrated cry.

Key words: Movie production, Oscar awards, Cobb-Douglas Production Function.
JEL Classification: Z11, C13.

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[2]Corresponding Author: Universidad de Granada. Facultad de Ciencias Económicas y Empresariales. Dpto. de Teoría e Historia Económica. Campus de la Cartuja S/N, Granada 18011, España. e-mails: bagnani@ugr.es, haray@ugr.es Tel: +34958241000 ext 20140. Fax: +3495849995.

1 Introduction

A review of the relevant literature reveals scant interest among researchers in motion picture production with the exception of the articles by Lamson (1970) and Canterberry and Marvasti (2001). However, the same cannot be said of the demand for cinema attendance. Since the article of Cameron (1986), which studies cinema demand and supply in the United Kingdom, several researchers have examined cinema demand in their respective countries. For Spain, the most important article is probably that of Fernandez-Blanco and Baños-Pino (1997) in which the authors use a cointegration analysis to estimate the individual demand function for cinema. Macmillan and Smith (2001) study the case of the United Kingdom using a long term VAR, while more recently Dewenter and Westermann (2005) analyze the German case using SURE models. All these papers concentrate on explaining the market for cinema attendance and most of them estimate demand functions.

Unlike the traditional literature, we focus on the supply side. Specifically, we are interested in testing what effect awards may have on Spanish movie production. This article is related to Agnani and Aray (2010) who used panel data regression to test the effects of subsidies and international awards on Spanish movie production. In fact, they found that awards positively affect the productivity of the movie production industry, while subsidies have no effect.

In this article, we focus particularly on the Academy Awards (Oscars) due to the enormous importance typically attributed to them around the world and because they enable us to bring together to a large extent the influence of all awards that a movie could win. Before winning an Oscar, a movie has typically won a large number of awards already.[3]

In spite of the importance normally attributed to Oscar awards in cinematography, there are no articles in the relevant literature that quantitatively measure their impact on movie production in a country with a relative small industry such as Spain.[4] Nevertheless, the effect of Oscar nominations and awards on the financial success of a movie has been analyzed by Nelson *et al.* (2001) and Deuchert *et al.* (2005). Our assumption is that winning an Oscar could be interpreted as a positive expectation in general by motion picture producers in this kind of country. Domestic and foreign demand for Spanish films might be expected to rise, which would imply higher expected profits for domestic producers.

Winning an Oscar can also be important in that it could attract foreign investment to the domestic industry. The international trend in movie production shows an increase in films made by more than one country. This is pointed out by Hoskins *et al.* (1997), who highlight the increase in co-productions between Europe and Canada, and by McCalman (2004), who claims that higher foreign direct investment in the movie production industry leads to increased collaboration between countries.

Our approach consists of using a time series of total feature film production and

[3]The Oscars are the last awards announced on the cinematography awards calendar.

[4]According to the publication *Focus 2008* of the European Audiovisual Observatory, Spanish feature film production in 2007 accounted for about 5% of the total production of the 27 European Union countries, US, Japan, India and China.

estimating a Cobb-Douglas production function accounting for an augmenting input factor. We consider that the impact of an Oscar win on movie production is neither static nor fully persistent, but vanishes over time. We therefore introduce a lag structure that allows the Oscar effect to diminish over time.

The rest of the paper is organized as follows. A preliminary analysis of the data is outlined in Section 2. In Section 3 we specify the econometric model to be estimated. The main results are presented in Section 4. Finally, our conclusions are presented in Section 5.

2 Data and Preliminary Analysis

Our data come from the *Estadísticas de Cine y Audiovisuales* (Cinema & Audiovisual Statistics) report published by the Spanish Ministry of Culture. We concentrate on the period between 1953 and 2008 and use annual data on the total production of feature films. Therefore, we include domestic films that are wholly produced by Spanish firms and films produced jointly with foreign partners (co-productions).

Table 1 shows basic statistics for the series of feature films. As shown, Spain produces on average 98 films per year with a deviation of 35 films. Figure 1 plots the evolution of Spanish movie production. It can be observed that the production of films has fluctuated considerably over time. Indeed, there was an important drop in the industry in the 1980s, which was probably related to the general economic reforms implemented by the government[5] and also due to a specific reform aimed at the cinema industry introduced by Pilar Miró,[6] who was in charge of the *Dirección General de Cinematografía* (General Directorate for Cinematography) from 1982 to 1985. Given that the main objective of this reform was to improve movie quality, it may have had a negative effect on the quantity of movies produced.

According to Figure 1, the series of feature film production is suspected to have a unit root. Therefore, we perform unit root tests considering the following specifications

$$Y_t = C + \rho Y_{t-1} + \mu_t$$
$$Log(Y_t) = C^* + \rho^* Log(Y_{t-1}) + \mu_t^*$$

where Y_t is the production of feature films at each period t, C and C^* are constants and μ_t and μ_t^* are random disturbances. Table 1 shows the Dickey-Fuller (DF) test which assumes that disturbances are iid and the Phillip-Perron (PP) test which typically turns out to be more powerful since it allows for serial correlation. All τ-statistics are higher than the critical value -2.93 at the 5% significance level. Therefore, we cannot reject the null hypothesis of existence of a unit root. In fact, the series is stationary at taking first

[5]Spain became a member of the European Community in 1986. This forced the government to undertake major economic reforms in the early 1980s in order to meet the requirements for entry.
[6]Pilar Miró was an important producer, writer and director in the cinema and television industries.

difference.[7]

3 The Econometric Model

We consider an input augmenting Cobb-Douglas production function model as follows[8]

$$Y_t = (A_t K_t)^{\alpha} (A_t L_t)^{\beta} \tag{1}$$

K_t is the physical capital, L_t is the labor input and A_t is an augmenting input factor specified as

$$A_t = A_{t-1} e^{(\delta + D'_{1t} B_1 + D'_{2t} B_2 + b_3 d_{3t} + \varepsilon_t)} \tag{2}$$

where δ is a constant term. D_{1t} is a $(n \times 1)$ vector of dummy variables which takes the value of one in the following year in which the industry wins an Oscar, and zero otherwise. In the sample period considered, the Spanish motion picture industry as included here won four Oscars in the category of Best Foreign Language Film and one in the category of Best Writing, Original Screenplay, so $n = 5$. The award-winning films are as follows:[9]

- *To Begin Again*, José Luis Garci (1983), Best Foreign Language Film.
- *Belle Epoque*, Fernando Trueba (1994), Best Foreign Language Film.
- *All About My Mother*, Pedro Almodóvar (2000), Best Foreign Language Film.
- *Talk to Her*, Pedro Almodóvar (2003), Best Writing Original Screenplay.
- *The Sea Inside*, Alejandro Amenabar (2005), Best Foreign Language Film.

D_{2t} is a $(m \times 1)$ vector of dummy variables that takes the value of one from the year following a government reform of the cinema industry, and zero otherwise. Here $m = 3$ with the following reforms being considered:

- The appointment of Pilar Miró to the General Directorate for Cinematography, which we call the Pilar effect.
- The legislation introduced as Royal Decree 1039/1997, which allowed subsidies to be generalized to most movies produced in Spain. This decree was superseded by Royal Decree 526/2002, which promoted independent productions by making it compulsory for TV companies to become involved in movie production.
- Act 15/2001, which alleging arguments on cultural grounds, guarantees public funds for the production of movies.

We also introduce a dummy variable, d_{3t} , which takes the value of one from the time

[7] We also carried out regressions introducing a linear trend and obtained similar results.
[8] A similar specification of the production function in (1) was used by Bergström (2000) to study the effect of subsidies on the performance of firm productivity and by Agnani and Aray (2010).
[9] Notice that the year we take into account is the year in which the award is announced and not the year of the corresponding Oscars event, which is the previous year.

that Private TV appears in Spain (1990) to the end of the sample period, and zero otherwise. The reason for including that variable is that Private TV operators have had a very important roll in the production of films in Spain.

Finally, ε_t is a random disturbance.

Taking natural logarithm to equation (1) we obtain

$$Log(Y_t) = (\alpha + \beta)Log(A_t) + \alpha Log(K_t) + \beta Log(L_t)$$

In the previous section we show that $Log(Y_t)$ has a unit root. Therefore, in order to avoid spurious regression, we consider

$$\Delta Log(Y_t) = (\alpha + \beta)\Delta Log(A_t) + \alpha\Delta Log(K_t) + \beta\Delta Log(L_t) \tag{3}$$

Substituting (2) in (3) we write

$$\begin{aligned}\Delta Log(Y_t) = {} & \delta^* + D'_{1t}B_1^* + D'_{2t}B_2^* + b_3 d_{3t} \\ & + \alpha\Delta Log(K_t) + \beta\Delta Log(L_t) + \varepsilon_t^*\end{aligned} \tag{4}$$

$$\begin{aligned}\delta^* &= (\alpha + \beta)\delta \\ B_1^* &= (\alpha + \beta)B_1 \\ B_2^* &= (\alpha + \beta)B_2 \\ b_3^* &= (\alpha + \beta)b_4 \\ \varepsilon_t^* &= (\alpha + \beta)\varepsilon_t\end{aligned}$$

A drawback to the specification in equation (4) is that the Oscar would have a constant effect, and then only in the year after the announcement: it has no effect for the rest of the sample period. A more natural assumption would be that the initial impact diminishes over time. To overcome this shortcoming, we incorporate a simple lag structure *à la* Koyck (1954) into the equation (4), which in this specific case allows for a more general model

$$\begin{aligned}\Delta Log(Y_t) = {} & \delta^* + \sum_{k=0}^{K} D'_{1t-k}B_{1,k}^* + D'_{2t}B_2^* + b_3^* d_{3t} \\ & + \alpha\Delta Log(K_t) + \beta\Delta Log(L_t) + \varepsilon_t^*,\end{aligned} \tag{5}$$

where $B_{1,k}^* = \lambda B_{1,k-1}^* = \lambda^k B_{1,0}^*$ with λ being the decay rate of the distributed lag structure and whose value falls in the interval $(0,1]$.

In order to estimate the equation model (5) for values of λ in the interval $(0,1]$, we

construct the vector of auxiliary variables, $V_{1t} = \sum_{k=0}^{K} \lambda^k D_{1t-k}$ and write the model as follows

$$\begin{aligned} \Delta Log(Y_t) = {} & \delta^* + V_{1t}' B_{1,0}^* + D_{2t}' B_2^* + b_3^* d_{3t} \\ & + \alpha \Delta Log(K_t) + \beta \Delta Log(L_t) + \varepsilon_t^* \end{aligned} \tag{6}$$

Notice that we consider a unique lag structure, K, for the five dummy variables included in D_{1t} and we know that the Oscar is awarded on different dates, thus it is natural to think that each dummy variable in D_{1t} should have its own lag structure. However, it is straightforward to see that with the specification of the dummy variables, whenever we consider a lag structure that is equal to or larger than the total lag structure of the Oscar for 1983, that is 24 (2008-1984), we obtain the same vector of the auxiliary variables, V_{1t}. In fact, our model can even be interpreted as having an infinite lag structure since we know that the dummy variables take the value of zero before the beginning of our sample period.

Equation (6) nests the opposite cases of an Oscar effect only in the period following the announcement and a fully persistent Oscar effect over time. Thus, whatever the value of λ, if $K = 0$, we have the model from the equation (4) with $V_{1t} = D_{1t}$ and $B_{1,0}^* = B_1^*$. On the other hand, if $\lambda = 1$, the vector of auxiliary variables, V_{1t}, becomes a vector of dummy variables that take the value of one from the period following the period in which the industry wins an Oscar to the end of the sample period, and zero otherwise. In this case, the effect of the Oscar is constant over time and persists forever.

We have to estimate the parameters in vectors $B_{1,0}^*$, B_2^* and b_3^*, δ^*, α and β, which can be interpreted as the sensitivity of $\Delta Log(Y_t)$ to each explanatory variable in equation (6).

When attempting to perform the econometric estimation we encounter a problem. Data for physical capital and labor input are not available. Therefore, in order to overcome this problem, we have to rely on proxies and make a very restrictive assumption. We consider that the physical and human capital grow at the same rate and are equal to the growth rate of the number of firms involved in the production of at least one film in each period t. Therefore, by letting N_t be the number of firms, we consider

$$\Delta Log(N_t) = \Delta Log(K_t) = \Delta Log(L_t)$$

This is actually a very strong assumption. However, it is true that the larger the number of firms in the industry, the higher the physical and human capital employed in the production of films. Therefore, we rewrite equation (6) as

$$\begin{aligned} \Delta Log(Y_t) = {} & \delta + V_{1t}' B_{1,0}^* + D_{2t}' B_2^* + b_3^* d_{3t} \\ & + (\alpha + \beta) \Delta Log(N_t) + \varepsilon_t^*, \end{aligned} \tag{7}$$

4 Estimation Issues

We estimate equation (7) controlling for heteroskedasticity and autocorrelation by means of a covariance matrix *à la* Newey and West (1987) and considering increments of λ of 0.1 in the interval $(0,1]$. Therefore, we carry out 10 regressions and choose the one which provides the lowest sum of squared residuals or the highest R^2. The results are shown in Table 2. According to our criterion, we choose the estimation with $\lambda = 0.9$. As can be seen, all the coefficients of the Oscar's dummies are positive, which suggest that Oscar awards impact positively the production of films. However, the only significant Oscar coefficient at the 1% and 5% significance levels is that of 2003 for *Talk to Her* by Pedro Almodóvar. At the 10% significance level, the Oscar of 1983 (*To Begin Again*) and 1994 (*Belle Epoque*) are significant. Notice that the Oscar for *Talk to Her* aparts from being strongly significant respect to the others, its effect is also much higher.

As we point out, winning an Oscar could be interpreted as a positive expectation in general by motion picture producers in a country with a relatively small industry. Demand for Spanish films might be expected to rise, which would imply higher expected profits for domestic producers. Therefore, an Oscar award proves to be an incentive to increase production for active firms and also for the entry of new firms. Much more importantly, an Oscar win affects the productivity of the sector since it allows for an increase in output, which is not explained by an increase in inputs.

Somehow our results would suggest an Almodóvar effect on the Spanish motion picture industry. The popular filmmaker became well known in Hollywood when his film *Women on the Verge of a Nervous Breakdown* was nominated for an Oscar in 1988 and *All About My Mother* was awarded an Oscar in 2000. Moreover, the Spanish movie industry had already been awarded three previous Oscars. However, it was not until the Oscar for *Talk to Her* and the much celebrated and funny announcement of Penélope Cruz, "Peeeeedroooo", that the Spanish movie industry began to be very popular at the international level. Somehow, that Oscar made it easier for new Spanish talents such as Penélope Cruz, Javier Bardem or Alejandro Amenabar, among others, to break into Hollywood; an event which is assumed to have benefitted the Spanish cinema industry as a whole.

Our lag structure has allowed us to estimate a diminishing Oscar effect over time. Figure 2 shows the time-varying Oscar effects of *To Begin Again*, *Belle Epoque* and *Talk to Her* on $\Delta Log(Y_t)$, since they are the only significant effects. As we can see, given the high value of λ (0.9), there is not a fully persistent Oscar effect, but it vanishes over time. In fact, after five years it is about a half of the initial impact, after ten years it is about a third of the initial impact and after twenty years it approaches to zero. The total effect over time can be calculated as $\sum_0^\infty B_{1,k} = B_{1,0}\left(\frac{1}{1-\lambda}\right)$. In the case of the Oscar effect of *Talk to Her* is 1.1391. Therefore, if we interpret $\Delta Log(Y_t)$ as a growth rate, this particular Oscar could lead to at least a twofold increase in Spanish movie production over time. The total effects of *To Begin Again* and *Belle Epoque* are 0.6783 and 0.6372, which have not been in any case negligible.

The variable collecting the effect of the inputs, $\Delta Log(N_t)$, has had a positive effect on the production, with a significant coefficient at the 1 %, as we expected, due to the larger the number of firms are, the higher the production of movies is.

Table 2 also suggests that the production function of the Spanish motion picture industry exhibits constant returns to scale. This is due to the fact that we test the hypothesis $H_1 : \alpha + \beta = 1$ (*p*-values in parentheses), and are unable to reject it at the 1% level. A

stronger result was found by Agnani and Aray (2008) since they do not even reject the null hypothesis at the 10% level.

Regarding cinema industry reforms, the Pilar effect and the effect of Act 15/2001 are negative at the 1% level, respectively. Recall that in Section 2 we pointed out that the movie production reform of the early 1980s was aimed at improving the quality of films. On the other hand, following concerns about the cultural importance of domestic production, the government passed Act 15/2001 in the early 2000s. Our results are therefore very striking. In spite of the movie industry being largely financed through public funds, the actions taken by the government had negative effects on movie production. In fact, what our results suggest is that there is a negative effect of legislation on $\Delta Log(Y_t)$ accruing through productivity.

The introduction of private television channels has had a positive effect on the production of films. As we can see in Table 2, the dummy variable for Private TV is significant at the 5% level. Private TV firms have become very important supporters of the Spanish film industry and much more important they have improve the productivity of the sector.

Finally, note that our specification accounts for about 70% of the variability of the dependent variable.

5 Conclusions

This paper analyzes motion picture production in Spain. Specifically, we test the effect of awards on movie production. We use the Oscars since they are considered to be the most important awards worldwide. We estimate a production function accounting for an augmenting input factor and considering a lag structure that allows Oscars to have a diminishing effect over time.

Our general evidence supports the existence of a positive Oscar effect on the productivity of Spanish movie production. The time-varying Oscar effect suggests that it vanishes over time. However, the only Oscar significant at the 1% and 5% levels was the one awarded to Pedro Almodóvar in 2003 for *Talk to Her*.

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Table 1. Preliminary Data Analysis

Basic statistics	
Sample Mean	98.1429
Standard Error	34.9022
Unit Root Tests	
$Y_t = C + \rho Y_{t-1} + \mu_t$	
DF	-1.8655
PP	-1.9003
$Log(Y_t) = C^* + \rho^* Log(Y_{t-1}) + \mu_t^*$	
DF	-2.2907
PP	-2.3335
$P(\hat{\tau} < -2.93) = 0.05$, $T = 50$	

Table 2. Estimation of the Equation (7)

$(\lambda = 0.9)$

Variable	Estimate	Standard Error
Constant	0.0136	0.0200
$\Delta Log(N_t)$	0.7937***	0.0882
Oscar83	0.0637*	0.0372
Oscar94	0.0678*	0.0362
Oscar00	0.0272	0.0555
Oscar03	0.1139***	0.0246
Oscar05	0.0032	0.0215
Pilar effect	-0.1169***	0.0441
RD 1039/1997	0.0346	0.0548
Act 15/2001	-0.1202***	0.0150
Private TV	0.0448**	0.0229
R^2	0.6983	
H_1	5.4720 (0.0193)	

*** Significant at 1% level
** Significant at 5% level
* Significant at 10% level

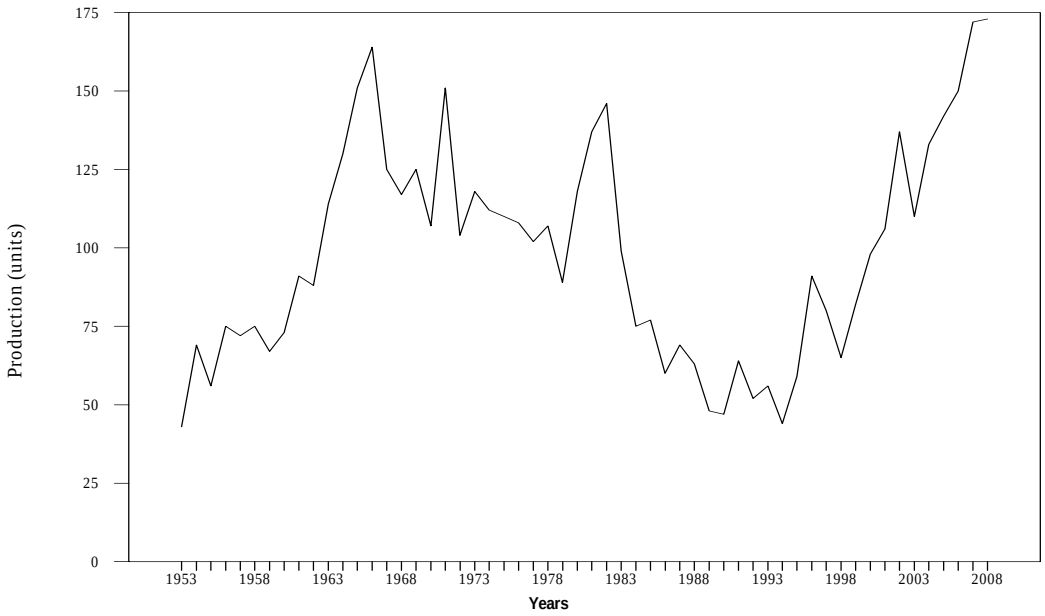

Figure 1. Spanish Feature Film Production. 1953-2008

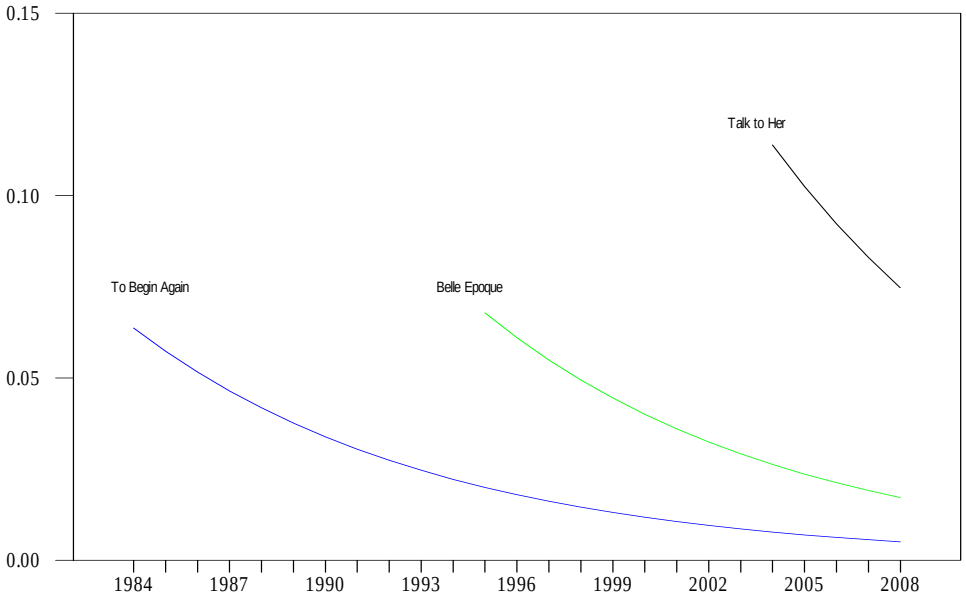

Figure 2. Time-Varying Oscar Effect