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Subsidization, culture, and profit on the Spanish cinema industry

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Abstract: The cinema industry generates substantial academic interest due to its complexity and its simultaneous effect across different domains (economics, culture, etc.). Governments often subsidize domestic film production with the objective of promoting production or specific criteria they want to meet, while helping to maintain the industry alive in a very competitive environment. This study examines the impact of public subsidies on Spanish movie production between 2016 and 2019, focusing on revenues and attendance, while controlling for the movie's individual characteristics. Employing an Ordinary Least Squares (OLS) method, the research analyses the role of the General and Selective subsidies for feature-length films granted by the Instituto de la Cinematografía y las Artes Audiovisuales (ICAA). Results indicate that although the system seem to have had a positive effect on both revenues and attendance, this is mainly carried through the Selective subsidy. Moreover, subsidies tended to the reflect the profitability associated with the different major category of movies (*blockbusters* or *Cine de autor*) that applied to them. Variables influencing success include genre, budget, being part of saga, and receiving an award. The study contributes insights into the public aid for films literature and film success factors and offers some policy suggestions for the Spanish film industry.

Key Words: Cinema Industry, Public aid for film production, General Subsidy, Selective subsidy, Direct subsidization.

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1 Introduction

"To grow, yet not to control: This is the mysterious virtue"
- Lao Tzu, *Tao Te Ching.*

The cinema industry and its subsidization have been subjects of considerable interest and debate in academic literature due to its far-reaching impact on the film industry, cultural diversity, and economic development. Additionally, the movie business is known for its uncertainty and risk, where filmmakers normally operate with limited knowledge of the probabilities of outcomes, resulting in highly unpredictable box-office revenues.

The complexity of the film industry arises from its own nature, being an amalgamation of a profit-seeking motive (affects economic wealth), as any other business does, while in parallel seeking to create a product that is original and that possesses artistic value. Indeed, movies reflect and fuel a culture in constant evolution, contributing to its expansion with new productions, while trying to promote a type of cinema that aspires to reflect this same culture. Nevertheless, it is not a non-profit organization, it is a major industry that provides employment, contributes to national economies, and its subject to its own market principles. In fact, according to Vogel (2020), although an art form, movies are not protected from factors that also affect other industries such as economic cycles, exchange rates, national policies, etc.

This duality is noticeable also in the creation of a basic categorization of movies used both by the public and in the academic field, which is the differentiation between *blockbusters* and *cine de autor* (author's cinema). The first being major productions with big budgets, recognizable cast members, and better promotion strategies but less original in their themes. The second being smaller productions (low capital intensity) with not much visibility, but often depicting more original themes and representing socially oriented or cultural issues in which the vision of the director constitutes the building block. Producers are then presented with a decision when deciding in which projects to invest: should they lower the artistic pretension of their works to appeal to a broader audience that just expects to be entertained? Or should they just follow their own intuition, create something new and unique while risking their financial success?

Even with a relatively small market (compared to the US) the level of uncertainty makes predicting European consumer taste, thus a movie's success or failure, rather difficult (McKenzie, 2012). Especially when the latter is much more common than the former (Jansen, 2005). Tastes can change from year to year as well, affected by personal, social, or even political circumstances, making their success almost unpredictable (Murschetz, Teichmann, and Karmasin, 2018).

In fact, in previous literature, this context is referred to as the "nobody knows anything" property, related to the uncertainty that producers of creative goods face (Caves, 2003). Or as De Vanny and Walls (1999, p.286) put it: "The audience makes a movie a hit and no amount of "star power" or marketing can alter that. The real star is the movie.". Moreover, Einav (2007) also indicated that unobserved characteristics play a very important role in the industry as it constitutes one of the most product-differentiated markets.

Some elements can influence their final decision. It is fairly evident that differences in cultures tends to be reflected in the characteristics of its cinema industry. For example, Hollywood has given the US an almost total omnipresence and domination over the whole film production process. Being able to create a homogenous product, not particularly original, that tends to follow similar "success patterns" while having a good understanding of ongoing trends. On the other hand, the European film industry tends to be a mirror of its cultural diversity, social complexity,

and international relations, which results in a more artistically oriented cinema, of smaller size, and less reach.

National Governments also play a part in the final product through their subsidization programs and general financial aid, providing support, and in some cases constituting a significant portion of a film's budget. The reasons for this intervention vary across them but tend to have common grounds. The most employed one being that as a cultural asset it deserves protection by the State (European Commission, 2014). At the same time, this intervention looks to expand and strengthen the industry. By lowering financial risks to producers that now worry less about covering costs and can focus instead on increasing the artistic or technical quality of their production and incur in more ambitious promotion campaigns. Or by directly incentivizing the production of more films.

Most of the general support that State aid has, as Pratt (2005) observed, is derived from the fact that movies fall under the category of "merit goods". Implying that these types of goods are provided by the government on paternalistic grounds despite the lack of demand from the public, due to the benefits of their promotion. Meloni, Paolini and Pulina (2018) go further by employing a "market-failure approach" by which regardless of their efficiency in increasing revenues and/or attendance, State aid for cinema is needed to ensure that movies with cultural merit are not undersupplied when left to the free market.

Nevertheless, this is a terrain embedded in criticism, not that much related to its cultural element, but from a more political/economic approach. Critics often present this type of subsidization systems as an inefficient, bureaucratic, politically charged, and a paternalistic way of creating a dependency on public handouts. Moreover: that these programs constitute an inefficient allocation of public funds towards a socially perceived "glamorous" industry while potentially diverting resources from other social and welfare programs. With the result of neither helping industry members nor succeeding at increasing the public's interest in these projects.

The Spanish system of film subsidization then becomes particularly relevant as it possesses two direct subsidies for feature-length movie production, granted by the Instituto de la Cinematografía y las Artes Audiovisuales (ICAA). These two subsidies are the General and the Selective subsidies. The definition of the General subsidy is provided by the ICAA (ICAA, *Ayudas*), which indicates that it is an "advance aid to production companies to finance the cost of production of feature film projects based on objective economic criteria". While the Selective is defined as an "aid to independent production companies for projects that have a special cinematographic, cultural or social value, are documentary or experimental in nature or incorporate new filmmakers". In other words, the General subsidy focuses on the financial viability of the project (industry development through market-oriented products), while the second considers the cultural value that the project may possess (artistic/cultural criteria).

This research delves into the effects that these subsidies had on the profitability (revenues and attendance) of the movies that received them from the years 2016 to 2019. Using an Ordinary Least Squares (OLS) method, it looks at the joint and separate effects of the subsidies, while accounting for the individual characteristics that may have played a role in their success.

As a main strategy the research will use the smaller sample with information on the budget as it gives the most precise estimates. First, it will measure the effect of applying and receiving a subsidy, without differentiating which is the subsidy received to infer whether the subsidization system improved the profitability of the movies; then, it will include the amount of aid each

subsidized movie received, also without differentiating, to observe whether a bigger amount of aid implies better financial success.

The strategy then separates the effects of the General from the Selective, allowing to evaluate differences in criteria (profit for the General, culture for the Selective). It will not account for differences in the amounts granted initially, as it will be just based on whether the movie applied and received it or not. Finally, an identical approach is applied but including the different amount received by each subsidized movie. As a robustness check the same regression will be run, but using the larger sample that lacks information on the budget. This will make the regressions less accurate but provides extra context in terms of interpretation of the results.

The data for each movie has been hand collected individually, discarding those for information could not be found, and using three main sources: (1), the information regarding the characteristics of each movie (genre, revenues, attendance, season, year, coproduction, festivals, and awards) has been obtained from the ICAA (ICAA, *Catálogo de cine)*; (2) the Boletín Oficial del Estado (BOE) to obtain the official resolutions which report the movies that applied for each subsidy, the movies that received either subsidy, the budget of those that got granted one, and the ones that applied but did not obtain either of both subsidies, as they did not fulfil the criteria; and (3) IMDB is used to obtain data on individual characteristics that were missing from the ICAA such as the language of the movie or extra information on the budget (IMDB Pro*, Search*). The data collection process allowed for the creation of two samples: a larger one consisting of 598 observations and a second smaller one consisting of those movies from the sample that had information on their budget (213 observations).

In accordance with the prevailing literature, which emphasizes the inefficiency of analysing public State aid for films just by testing its efficiency at increasing revenues and/or attendance, this research tries to offer a multifaceted vision. First, the research tests whether the Spanish direct subsidization system aligns with previous literature in its lack of effects on both revenues and attendance. Furthermore, the study seeks to validate the insights of Jansen (2005) and Fernández-Blanco and Gil (2012) concerning the impact of the different selection criteria and objectives. Additionally, it evaluates McKenzie and Walls' (2013) findings about the effects of the different levels of funding on film success. With the incorporation of a broad array of control variables inspired by existing research, it will test whether there are characteristics that may systematically distinguish successful films from their counterparts.

Results find a positive effect for receiving a subsidy, but only when is awarded through the Selective subsidy. Moreover, results appear to validate the intuition that heterogeneity in effect may arise from differences in subsidization criteria. Differentiation of the amounts granted by each subsidy are statistically significant although its effect is almost negligible. Regarding individual characteristics, the budget, the genre of the movie, being part of a saga, and award reception stand as significant factors for profitability.

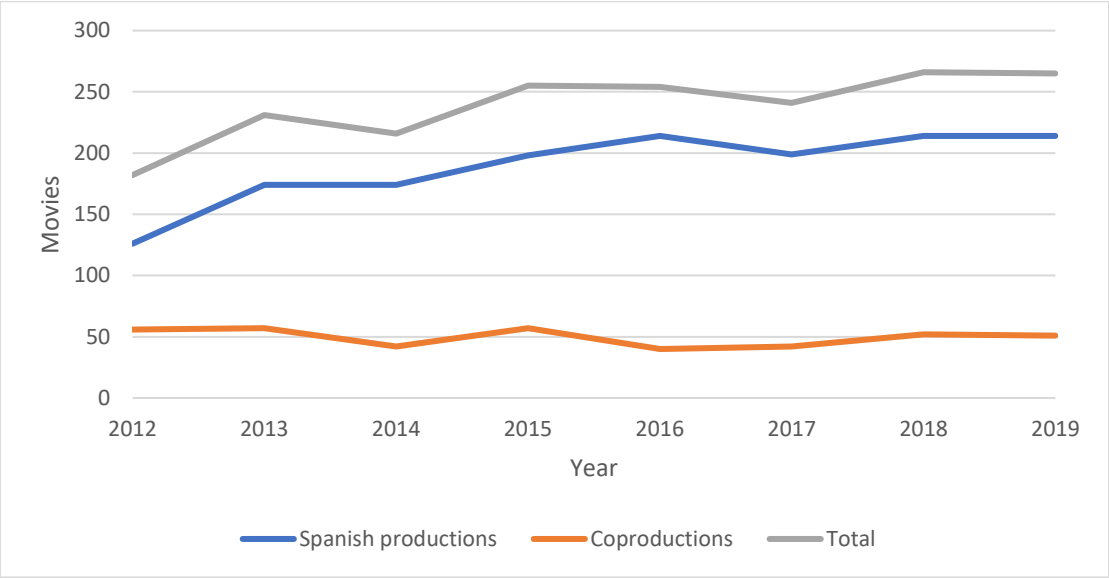
The research is organized in the following manner, Section 2 provides the Spanish institutional context, focusing on its system of direct subsidization for cinema. Then. Section 3 provides a comment on the previous literature regarding subsidization. Section 4 explains the empirical strategy followed for the main strategy and for the robustness test. Section 5 is the data section, where the summary statistics are provided. Section 6 shows and comments the main results and the ones obtained in the robustness test. Section 7 indicates some of the limitations present in the data and in the strategy. Section 8 includes the commentary regarding future research. Section 9 gives some policy suggestions and finally, Section 10 concludes the research.

2 Institutional Context

2.1 The Spanish film industry (2012-1019)

As general context, Figure 1 displays the trends for different types of productions in the Spanish cinema industry before and during the years of the research (2016 to 2019). The number of productions showed steady growth, starting at 126 productions in 2012 and reaching 214 in both 2018 and 2019. However, coproductions experienced fluctuations, with a peak of 57 in 2013 and a low of 40 in 2016. Despite these variations, the overall total remained relatively stable, hovering around 250 films during this period. In the year 2019 employment in the cinematographic sector was situated at approximately 76.100 workers, being the historical maximum in the year 2017, with 85.700 workers (División de Estadística y Estudios, 2022). From the total, an average of 27% were coproductions being the average Spanish participation in coproductions a 56.70%. Thus, it can be concluded that there was not a big change in the number of productions that could disrupt the model of this research. The years following 2019, as they were affected by COVID-19, cannot be included neither for sample formation nor for observing the evolution of productions in Spain.

Figure 1: Evolution of Exhibited Film Productions in Spain (2012 – 2019)



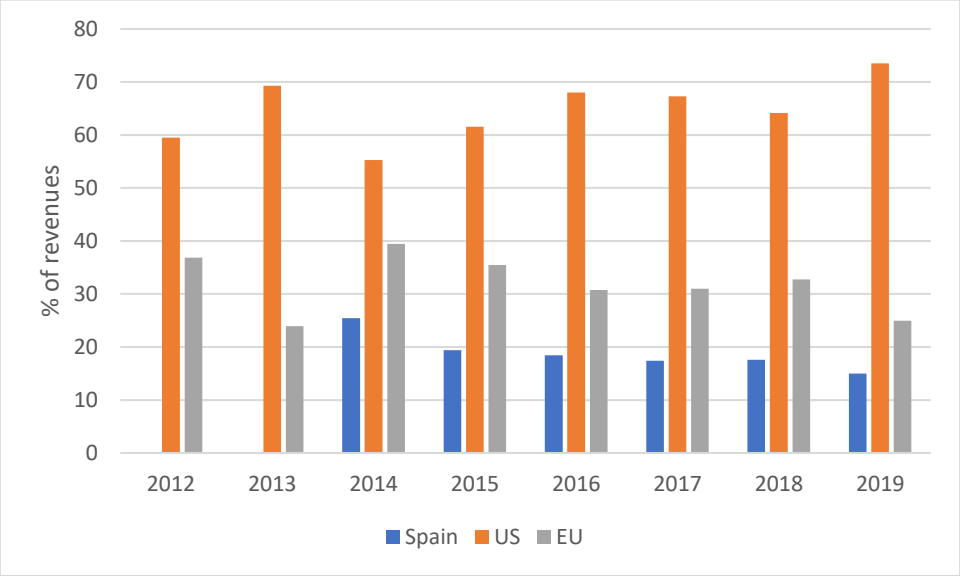
Source: Instituto de la Cinematografía y las Artes Audiovisuales (ICAA). *Anuario de Cine.*

2.2 The Spanish system of State aid for film production

In the context of EU law, public aid to the cinema industry means a confrontation with the Art. 107 of the European Treaty (EUR-Lex Access to European Union Law, 2012) as government intervention that favours a particular product may be seen as distorting competition. Thus, the film industry remains an exception in European law. As indicated in the introduction, the cultural diversity among member countries is present in the organization of the different national schemes, even on a regional level for each country. According to Kolokytha and Sarikakis (2018) this would contribute even further to its fragmentation.

However, according to Ferri (2015), without intervention competition with American integration and its maximization of the global box office may lead to “deculturized” and homogeneous products (“cultural uniformity”). The Hollywood industry, when contrasted to the Spanish/European case seems to be more focused on the profit side rather than orienting it on the qualitative or artistic side of the production. Fernández-Blanco and Prieto-Rodriguez (2003) suggest that the predominance of US movies (see Figure 2) on the global markets is mainly due to supply factors and probable monopolistic strategies. Proving to have a better understanding of demand, and power to influence it through distribution and exhibition strategies. Thus, the complex task of the EU and its member countries would be "to find a balance among economic, cultural, and legal concerns” (Murschetz et al., 2018, p. 6).

Figure 2: Global Market share (% of revenues) cinema industry US, EU, and Spain

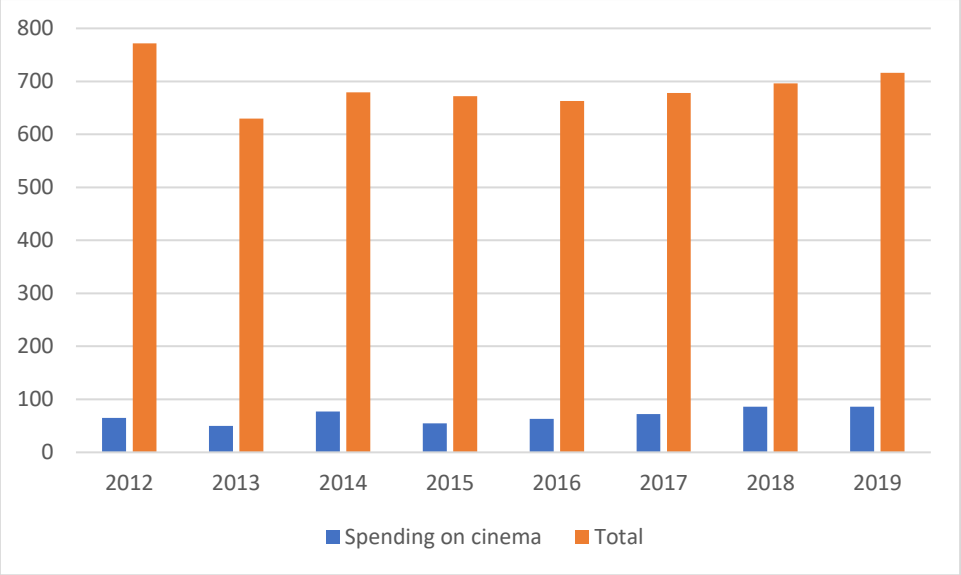


Source: Instituto de la Cinematografía y las Artes Audiovisuales (ICAA). *Anuario de Cine.*

Apart from the two subsidies analysed in this paper, the ICAA also possesses an array of other subsidies, such as: aid for short movies, aid to national distribution, international distribution, organization of festivals, exhibitions, and project formation labs. Moreover, the Spanish Government has other types of subsidization apart from the indirect methods, like mandatory TV Network (private and public) investment in film production as seen in Fernández-Blanco (2012), as well as rebates and tax exemptions for the different stages of the production.

Based on the data provided by the *División de Estadística y Estudios* (2022) and shown in Figure 3, spending on cinema varied between 50 million euros in 2013 and 86 million euros in 2018 and 2019, showing moderate fluctuations. Meanwhile, the total culture spending ranges from 630 million euros in 2013 to 716 million euros in 2019, exhibiting a general upward trend. Comparing both, spending on cinema represents a small portion, ranging from around 7% to 12% of the total culture expenditure during this period. Overall, the spending pattern shows relative stability without significant changes year-to-year. In what pertains to this research, the presence of this parallel funding mechanisms becomes a source of omitted bias to the results.

Figure 3: Expenditure on Culture by the Spanish General State Administration by destination (M.€)



Source: División de Estadística y Estudios (2022). *Indicadores Estadísticos Culturales Vinculados al Cine y Desglose por Sexo.*

2.3 The General and Selective subsidies

The focus of this research is on the General and Selective direct subsidies provided by the ICAA. The system of public subsidization of the film industry applied during that period is codified in the order CUD/769/2018 (Ministerio de Cultura y Deportes, 2018). It lays down the regulatory bases for the aids contemplated in the *Ley del Cine* (Law of the Cinema) of 2008.

According to this order, government intervention is justified as the film and audiovisual industry hold significant cultural value in Spain, reflecting a crucial aspect of its collective identity. Moreover, subsidies have been introduced after a process of consultation with different actors involved in the industry, aiming to sustain and advance this sector within the digital and global economy. It also introduces improvements to harmonize and adapt the aid system to meet the evolving needs of creation, production, distribution, and promotion in the film and audiovisual sector. The order also indicates that cultural significance, gender equality, and technological advancements will be specially rewarded with the new set of criteria.

Subsidies are managed centrally by the state to ensure fair opportunities for recipients throughout the nation, while regional entities may also provide support. For each year, an average of 15 movies receives one subsidy of each type (around 30 movies in total for both subsidies). Typically, more movies are applying for the Selective than the General subsidy (three times more on average), as small-sized productions (which are more numerous) tend to apply to the Selective and not the General.

The overall criteria for applying for a subsidy requires that films seeking support for feature length projects must prove their cultural nature with a corresponding *cultural certificate*. To qualify for the certificate projects must meet at least two of these criteria: (1) having the original version in an official language of Spain or the EU for coproductions; being primarily set in Spain; (2) having a central theme related to artistic creations; adapting a preexisting literary work; (3) holding biographical significance; (4) incorporating cultural heritage or traditions; (5) promoting diversity; (6) addressing current social or political matters in Spain; (7) targeting a young audience with values aligned with the Spanish educational system; and (8), having cultural or social significance for European and/or Ibero-American audiences.

General and Selective aid are incompatible, and a project can take part in only one line of aid per budgetary year, with a maximum of 4 applications for General aid and 3 for Selective aid. Film aid amounts will be reduced if certain conditions are not met, such as using Spanish languages in the original version, predominantly shooting in Spanish territory, and conducting post-production primarily in Spain.

The General subsidy evaluation criterion uses a system with maximum weightings: the cultural character of the project (up to 3 points), the director's track record (up to 3 points), the solvency of the applicant production company or producer-manager (up to 18 points), the economic and financial viability of the project (up to 41 points), and socio-economic impact and innovation in Spain (up to 35 points). Solvency - of the applicant, not the project - is assessed based on the number of viewers, national and international sales, awards in festivals, and participation in a Spanish film produced by the applicant or its linked companies. To qualify, projects need a minimum total score of 50 points, and the distribution of aid is based on total scores. In cases of tied scores, other evaluation criteria are used to break the tie. Projects that meet aid eligibility but are excluded due to budget constraints can reapply in subsequent calls. Moreover, in situations where the available budget does not fully cover the last project's aid, the beneficiary can choose to accept the reduced available one for that year or participate in the next selection process.

The Selective criteria follow a similar strategy of points which involves three phases. In the initial phase, specific factors are assessed, and each project is assigned a score of up to 50 points. Only projects obtaining a minimum of 25 points advance to the subsequent phase. During the second phase, emphasis is placed on the script's artistic quality and value, with a potential score of up to 35 points. Considerations include the script's maturity and the composition of the creative team. For documentaries, evaluation extends to the narrative development and thematic significance. Projects attaining at least 15 points in this phase proceed to the final phase. In the third phase, the project's budget adequacy is scrutinized, and a maximum of 15 points can be awarded. The accumulated scores from all three phases are then used to rank the projects. The top-ranked projects are provided support, subject to budget availability.

Thus, the General subsidy employs a criterion based on projected solvency while the Selective applies a more social/culturally based one. Central to this research is the assumption that producers are aware of this difference and thus apply accordingly. This is the criteria applied during the years used in the research and the one that is still in place nowadays, and no significant exogenous policy change in the sample years seems to have happened. Nevertheless, the criteria and the types of aid have been evolving since the Spanish government decided to put them in place. It was not possible to include years before 2016, as, despite being similar in the type of aid, the criteria awarded the subsidies after the exhibition of the movie.

3 Previous Literature

3.1 Theoretical approach to film subsidization

The debate on the role of public aid for cinema on the industry's profitability is intertwined across disciplines (economics, governance, arts, law, etc.) showing the vast reach of the industry. This research will mainly focus on those in favour and against public aid from an economic approach (cultural economics), both theorical and quantitative. It is important to note first, and as mentioned in the introduction section, that most of the support towards State aid to film is based on movies being characterized as "merit goods" (Pratt, 2005). This implies that although there may not be a demand for them, they are being subsidized due to the benefits derived from their promotion. Moreover, it is also affirmed that without the existence of these subsidies, the cinema industry would be at risk as most movies would not be able to cover costs (Jansen, 2005), undersupplied (Meloni et al. (2018), or it would lead towards underinvestment in the industry (Ferreira, Petrin, and Waldfogel, 2012). This is probably the reason most governments and authors debate how to improve the systems of subsidisation rather than focusing on whether to remove them or not.

Murschetz et al. (2018) give a more detailed argumentation by summarizing the general economic arguments that supporters of public aid use: (1) resources may cover financial needs (Lacy, 1992); (2) they may help the organization optimize the use of both internal and external resources (Pfeffer and Salancik, 1978); (3) they help balance financial resources and relieve from financial distress (Modigliani and Miller, 1958); and (4), they may support the capital structure of producing companies when leveraging future investment needs (Myers, 2000). Moreover, another argument often employed is that due to the positive externalities' movies have (educational development mainly), financing them could enhance other social or cultural benefits that affect societies such as education and cultural enrichment (Meloni et al., 2018).

On the other hand, arguments against the use of public aid make use of several factors to sustain their critique. In particular: the prevailing negative rates of return, the opportunity costs in terms of public money allocation, and the possibility of contracting the economy due to higher taxation. Tannenwald (2010) goes further by concluding that State film subsidies are "wasteful, ineffective, and unfair" (Tannenwald, 2010, p. 13) as the benefits of subsidization are visible but just for a few individuals, while the costs are big but hidden due to their spread.

3.2 Quantitative approach to film subsidization

3.2.1 Effects of subsidization

On the side of previous literature that uses an economic quantitative approach, the results for State aid are mixed, depending on their object of study. This manifests not only the complexity of the topic but also how each subsidization system represents their country's preferences and objectives. State aid varies in the criteria, in the mechanisms employed to grant the subsidies, or even in the type of subsidy itself, by choosing whether to use direct or indirect subsidies. This results in apparently similar contexts giving different results. That is why Messerlin and Vanderschelden (2018) indicated that any economic analysis that looks to assess the efficiency of a subsidization system must account for the complexity of these aid systems, with the intertwining between financing bodies and its differences in criterion. For this reason, this research reviews previous literature on subsidies that focuses on similar cultural and regulatory systems to the Spanish one.

One of the most relevant papers, also considered to be the first to quantitatively investigate the effects of subsidies on movie production, is the study conducted by Bagella and Becchetti (1999). Using data from Italian movies from 1985 to 1996. In this paper, before running their econometric model, the authors present the 5 most common rationales that according to them are often used to defend paternalistic government intervention in the film industry. For them, having State aid: (1) broadens the range of cultural options available by increasing their utility and by intergenerational transmission of cultural heritage; (2) improves the industry by reducing the commercial imperative in favour of entertainment and cultural enrichment; (3) helps develop cultural identity; (4) generates positive economic externalities through artistic heritage; and (5), helps lower the costs of producing the good (movies). If achieved, each of the 5 objectives would impact movie supply and the resulting films would be more socially oriented (in terms of being more align with audiences' demand). Then, the authors employ a similar division to the one between *blockbusters* and *cine de autor* that was explained in the introduction. Moreover, they indicated that these points would only be applicable to *cine de autor* movies (original movies), as these are the ones in particular need for this type of aid, while also being the main contributors to culture.

To test the 5 arguments, they perform an econometric analysis by means of a Generalised Method of Moment (GMM) on the effect of specialisation genres, production, and distribution companies, cast and director ex ante popularity, and state subsidies on box office performance. In their results, they found that subsidies did not have a negative effect on revenues, even though in their sample subsidized movies appeared to have lower attendance level when compared to non-subsidized ones. According to them, this result is explained by the ex-ante characteristics of the movies. In their case, by the lower popularity of actors and directors in subsidized movies.

In other words, their results did not show any significant effect of subsidies that could not be explained by the movie's characteristics. Moreover, the genre "comedy" had a positive, statistically significant effect on revenues regardless of the movie's individual traits or whether they were subsidized or not. Their policy suggestion has a normative approach in the sense that although not having significant positive results, they state that movies cannot be left to the free market as it would undersupply them and thus society would lose the positive externalities that arise from them.

Teti, Collins, and Sedgwick (2018) criticized that the results of Bagella and Becchetti (1999) did not reflect the total of resources employed in production, distribution, or the opportunity costs from alternative societal use of public funds. Nor considered the effects of having rent-seeking or politically motived bureaucracy. They argued that revenues alone were not a good measure for public evaluation, as the relative costs also change with the size of the movie, thus film profitability (or the ability to cover costs) stands as a better measure for evaluation. In their OLS estimation, they employed a dataset covering movies exhibited in Italy from 1995 to 2003, and their results showed that just 17 out of the 135 subsidized movies were able to cover production costs (including the received aid). Moreover, State aid was not translated into greater attendance or prestige to Italian cultural movies (catalogued as movies of "national cultural interest"). Finally, they concluded that subsidies misallocate resources as they just increase deadweight loss (decrease in social welfare when public spending is increased) without any of the apparent benefits to society.

Thus, from Bagella and Becchetti's five points, only the fourth argument regarding the positive cultural externalities is not completely rejected. Still, this also entitles a moral hazard situation, as producers and political figures (in their study they mention the case of Silvio Berlusconi's

influence in Italian media) would try to get subsidies for movies of apparent niche cultural interest despite being perfectly aware of their lack of profitability.

Meloni et al. (2018) also studied the Italian subsidization system but for the years 2002 to 2011 using both a random-effects model and a panel fixed-effects model. They conclude that the second is the best of both. In this model the authors account both for the subsidies and for the genre of the movie (comedy, drama, thriller) as fixed effect to remove possible omitted bias. Their research is of particular interest as they also observe the impact of subsidies on the movie's quality. To do so, they employed a Poisson model and measured the effect on awards that both the subsidies and the movie's genre may have had. Their results shown a negative, statistically significant effect of the subsidy system in both revenues and quality. The only exception were dramas and thrillers, which performed relatively better when subsidized. Moreover, they confirmed the results of Bagella and Becchetti (1999) with respect to the positive bias that Italian moviegoers have towards comedies.

Regardless of their generally negative results for subsidization, Meloni et al. (2018) suggest that public resources should be allocated towards dramas and thrillers as they could be more positive productions for the public. They go even further by indicating that despite the negative empirical evidence, public financing should be supported on several economic and non-economic grounds such as their possible positive spillovers across sectors (employment, education, culture, etc.).

3.2.2 Differences in subsidisation criteria

Jansen (2005), also using Bagella and Becchetti (1999) as reference, analyses the impact that subsides had in the German industry. His strategy employs a log-linear specification and a dataset composed of 120 movies released during the years 1993 to 1998. In his research, the author observes the difference between two subsidy allocation methods: the committee principle, which he indicates that it may be influenced by external factors like lobbying or a political agenda, and the reference principle, whose criteria depends on the producing company's previous market performance. We draw a comparison between the German system and the Spanish aid system analysed in this research. In the Spanish, the General subsidy follows more business-like criteria as in Jansen's case reference principle. The Selective subsidy is of the style of the committee principle, which follows a more cultural-based criteria. His results showed that only the movies subsidized under the reference principle (General) benefited from the subsidies while those under the committee (Selective) did not.

The intuition that the author provides for the disparity in results for the two principles is caused by the different assigning criteria each employs. In other words, the effect of subsidies is a manifestation of the movie's ex-ante characteristics through reverse causality, as happened in the case of Bagella and Becchetti (1999). For example, if there is a type of subsidy that prioritizes cultural products - as in the case of the Selective subsidy – *cine de autor* movies may apply more to this aid than other types of movies. As they are generally not successful, the results could appear as being significantly negative. But is the product of generally less profitable movies applying and receiving it and not *blockbusters,* that generally have better returns. Moreover, the author states that another possibility for these results is that in the reference criteria, agents may be more skilled than others at choosing which profitable movies to produce. In this case, the subsidies of the committee may target films less likely to succeed commercially. Nevertheless, he concludes that

there was not enough support for their use due to the great dependency on these aids German movies had, and the persistent and general economic non-viability of the industry.

Fernández-Blanco and Gil (2012) employed a similar intuition as Jansen (2005) when conducting their research on the Spanish movies released between the years 2000 and 2008. They combined information on box office returns, individual movie characteristics, and the different TV Network (both public and private) levels of investment in the movie's financing. Their empirical results for their OLS model indicated that there was indeed a positive correlation between revenues and TV Network participation, although mainly when the financing was done by private networks and the budget of the movie was treated as endogenously formed. This means that is the fact that the TV-Networks participated what raised the budget. When the budget was assumed to be exogenously formed, and thus previously determined regardless of TV-Network participation, subsidies appeared to have a positive but non-statistically significant effect.

Again, they indicate that it could be the case that public TV Networks, fulfilling a more socially oriented role, focused on movies of *cine de autor* instead of those that would bring higher returns to investment. It could also be the case, as Jansen (2005) suggested, that private networks may be better skilled at project selection or better at resource allocation. This would also result on them being able to predict more accurately consumer taste and ultimately influence it. Thus, for the authors, to implement a policy that encourages private TV-Network investment could have a positive effect for the industry.

3.2.3 Differences in granted amounts

The research done by McKenzie and Walls (2013) regarding the Australian Film Finance Corporation (FFC) public film subsidization system for the years 1997 to 2007 confirmed both the results of Bagella and Becchetti (1999) and Jansen (2005). Employing a log-linear model, the authors found that the different levels of funding did not have an impact either in terms of box-office revenues (for subsidized movies) when other variables such as opening screens, genre, or advertising are being accounted for. In their conclusion, the authors insisted that any analysis of the efficiency of these subsidies should consider the assigning criteria, making a separation between pure commercial or cultural support objectives.

Table 1: Overview of the literature on Subsidies

Theoretical Approach	
Author	**Statement**
Pratt (2005)	Movies are "merit goods"
Jansen (2005)	Without subsidies movies will not be able to cover costs
Ferreira et al. (2012)	Without public aid for films there would be underinvestment in the industry
Murschetz et al. (2018)	Four general economic arguments for public aid
Meloni et al. (2018)	Financing movies enhances positive externalities

Quantitative Approach			
Author	**Method and Year**	**Findings**	**Conclusion**
Bagella and Becchetti (1999)	Generalised Method of Moments (GMM) 1985-1996	Subsidies do not affect revenues. Individual characteristics matter (genre).	There must be public aid or there would be an undersupply of movies and positive externalities will be lost
Teti, Collins, and Sedgwick (2018)	Ordinary Least Squares (OLS) 1995-2003	Subsidies do not even cover costs nor increase attendance.	Subsidies are a waste of resources.
Meloni et al. (2018)	Random and fixed-effects models 2002 - 2011	Negative, stat. signif. effects of subsidies on revenues and quality except for some genres.	Public aid should be allocated towards profitable genres due to their positive externalities.
Jansen (2005)	Log-linear model 1993 - 1998	Only movies using the reference principle (profitability criteria) increased revenues. Subsidy selection manifests the previous profitability of the movie when individual characteristics. are accounted for.	The persistent non-viability of the industry and its dependence of public aid does not provide support for its use.
Fernández-Blanco and Gil (2012)	Ordinary Least Squares (OLS) 2000 - 2008	Positive correlation between TV-Network participation and revenues when budget is treated endogenously. Positive but statistically non-significant effect when budget is treated exogenously.	Private TV-Network participation should be encouraged.
McKenzie and Walls (2013)	Log-linear model 1997 - 2002	No effect of differences in level of funding on box-office revenues.	Is not possible to assess any public aid for film model without considering differences in objectives (culture vs. profit)

Note: This table presents an overview of the studies discussed in the main text.

3.3 Hypotheses

It can be seen that most of the quantitative previous literature points towards the inefficiency of public State aid for films. Nevertheless, virtually all authors underline the importance of the context, in terms of objectives, mechanisms, and industry characteristics, while recognizing the difficulty of establishing causal inference. This last one being the product of an unbalanced industry, where only a few productions can even cover costs. Moreover, apart from the natural skewness in the movie distribution (in terms of revenues and attendance), there are several omitted biases and endogeneity concerns that arise from the difficulty of including all the factors that may influence the subsidization system.

This research tries to, first, test whether the Spanish direct subsidization system also had no effects on revenues or attendance as previous literature seems to find.

Hypothesis 1 (H1): The Spanish subsidization system had no effect on revenues or attendance.

Second, to reinforce the intuition of Jansen (2005) and Fernández-Blanco and Gil (2012) regarding the effects of the different selection criteria employed by the General and Selective subsidies when choosing which projects to finance. The assumption being those movies of the same general category, which in this case are either *blockbuster* or *cine de autor*, will apply to the subsidies exploiting these differences in criteria.

Hypothesis 2 (H2): Differentiating among the General and Selective subsidies may reflect heterogenic effects arising from differences in assigning criteria.

Third, test whether differences in amounts granted play a role in the success of the movies.

Hypothesis 3 (H3): Differences in amounts granted by each subsidy will not influence profitability.

Moreover, by employing a wide set of control variables inspired by previous literature, the research will indicate whether there are certain movie individual characteristics that could systemically make some movies more successful than others.

Hypothesis 4 (H4): Some movie characteristics systematically affect profitability.

4 Empirical Methodology

4.1 Main strategy

In this research, performing a log-linear Ordinary Least Squares (OLS) method analysis will allow us to test the impact that the ICAA's subsidization system may have had on both cumulative revenues and cumulative attendance. As it moves forward from the first model (1) onwards, the regressions will get more specific. Starting from not differentiating between subsidies obtained through the General and Selective subsidies, to later separating the effects of applying and receiving them, to finally include the different amounts of subsidy each movie got through each direct subsidy.

All the regressions will also control for movie-specific characteristics that may have had an impact on the movie's general profitability, based on intuition explained later in Section 4.3. The continuous variable ln_*Budget* indicates the amount of budget the movie had in logarithmic form; the categorical value *Genre* indicates the movie's genre (1 for Fiction, 2 for Children, 3 for Documentary, and 4 for Comedies); the categorical variable *Season* indicates the quadrimester of the year the movie was exhibited on (1 for the period of January to April, 2 for May to August, and 3 for September to December); the categorical value *Rating* indicates the age rating of the movie (1 for All Publics to 7 years old, 2 for 12 to 16 years old, and 3 for movies categorized for publics older than 18); the categorical value *Year* indicates the year in which the movie was exhibited (from 2016 to 2019); the dummy variable *Saga* takes value 1 if the movie is part of a saga and 0 otherwise; the dummy variable *Coproduction* takes value 1 if the movie is a coproduction and 0 otherwise; and finally the variable *Spanish* takes value 1 if the movie uses Spanish as main language and 0 otherwise. The interaction of the variable *Spanish* with the variable *Coproduction* would give the joint effect of being a movie coproduced with other country but using Spanish as the main language, as in the case of Latin-American coproductions. All variable accompanied with the subscript "i" for each observation (movie) on the sample.

Equation (1) will measure the impact of the subsidization system in general, without differentiating the two mechanisms that the ICAA employs (the General and Selective subsidies) allowing us to measure the general significancy of the aid system. For this, the research will regress both cumulative revenues (*ln_Revenues*) and cumulative attendance (*ln_Attendance*) in logarithmic form on two main independent variables: (1) *Any_Application,* which is a dummy variable taking the value 0 if the movie did not apply to any subsidy and 1 otherwise; and (2) the dummy variable *Any_Subsidy* which also takes the value 0 if the movie did not receive any subsidy and 1 otherwise.

- Equation (1):

$$\begin{aligned}\log\_Y_i = {} & \beta_0 + \beta_1 * \text{Any\_Application}_i + \beta_2 * \text{Any\_Subsisidy}_i + \beta_3 * \text{Budget}_i + \beta_4 * \text{Year} + \beta_5 * \text{Saga}_i \\ & + \beta_6 * \text{Genre}_i + \beta_7 * \text{Season}_i + \beta_8 * \text{Rating}_i + \beta_9 * \text{Festival}_i + \beta_{10} * \text{Award}_i \\ & + \beta_{11} * \text{Coproduction}_i + \beta_{12} * \text{Spanish}_i + \beta_{13} * (\text{Coproduction x Spanish})_i + e_i\end{aligned}$$

Equation (2) will include the effect on the logarithmic cumulative revenues and attendance for: first, any application (*Any_Application)* and second, the continuous logarithmic variable ln_*Any_Amount,* which measures any amount of subsidization that a movie may have received. As receiving any amount implicitly implies receiving it, for this regression the *Any_subsidy* variable can be taken out while increasing the precision of the estimation.

- Equation (2):

$$\begin{aligned}\log\_Y_i = {} & \beta_0 + \beta_1 * \text{Any\_Application}_i + \beta_2 * \text{Any\_Money}_i + \beta_3 * \text{Budget}_i + \beta_4 * \text{Year} + \beta_5 * \text{Saga}_i \\ & + \beta_6 * \text{Genre}_i + \beta_7 * \text{Season}_i + \beta_8 * \text{Rating}_i + \beta_9 * \text{Festival}_i + \beta_{10} * \text{Award}_i \\ & + \beta_{11} * \text{Coproduction}_i + \beta_{12} * \text{Spanish}_i + \beta_{13} * (\text{Coproduction x Spanish})_i + e_i\end{aligned}$$

Equation (3) allows to differentiate the effects that the General and Selective subsidy may have had on both cumulative revenues and cumulative attendance in logarithmic form. In this case the four main independent variables are: first, the dummy variable *Appgen* taking the value 1 if the movie applied for the General subsidy and 0 otherwise; second, the dummy variable *Appselec* taking the value 1 if the movie applied for the Selective subsidy and 0 otherwise; third, the dummy variable *General* will take the value 1 if the movie received the General subsidy and 0 otherwise; and fourth, the dummy variable *Selective* that indicates whether the movie received the Selective subsidy (*Selective =1)* or not (*Selective=0).* The intuition would be then that although movies can be very different, there are two major categories (*blockbusters* or *cine de autor)* that share common traits among them. The first type, the more profitable ones, would apply to the General as it focuses on profitability, while the second would apply to the Selective as they focus on movies with cultural value. Thus, by separating the effects, it should be possible to assess any heterogeneity in effects arising from this difference in criteria.

- Equation (3):

$$\begin{aligned}\log\_Y_i = {} & \beta_0 + \beta_1 * \text{Appgen}_i + \beta_2 * \text{Appselec}_i + \beta_3 * \text{General}_i + \beta_4 * \text{Selective}_i + \beta_5 * \text{Budget}_i \\ & + \beta_6 * \text{Year} + \beta_7 * \text{Saga}_i + \beta_8 * \text{Genre}_i + \beta_9 * \text{Season}_i + \beta_{10} * \text{Rating}_i \\ & + \beta_{11} * \text{Festival}_i + \beta_{12} * \text{Award}_i + \beta_{13} * \text{Coproduction}_i + \beta_{14} * \text{Spanish}_i \\ & + \beta_{15} * (\text{Coproduction x Spanish})_i + e_i\end{aligned}$$

The fourth and final equation (4) includes again the dummy variables *Appgen* and *Appselec,* but now also with two logarithmic continuous variables measuring the amount of money received through each subsidy type. The variable *ln_Genlev* indicating the level of aid received through the General subsidy and the variable ln_*Sellev* measuring the same but for the Selective subsidy. As in the second equation, by differentiating the amounts received with each subsidy, a more precise estimation would be obtained. If, for example, the variable *General* was not significant, but the variable *ln_Genlev* was, it could be inferred that being selected for the subsidy is not significant while the amount of funding received is.

- Equation (4):

$$\begin{aligned}\log\_Y_i = {} & \beta_0 + \beta_1 * \text{Appgen}_i + \beta_2 * \text{Appselec}_i + \beta_3 * \text{Genlev}_i + \beta_4 * \text{Sellev}_i + \beta_5 * \text{Budget}_i + \beta_6 * \text{Year} \\ & + \beta_7 * \text{Saga}_i + \beta_8 * \text{Genre}_i + \beta_9 * \text{Season}_i + \beta_{10} * \text{Rating}_i + \beta_{11} * \text{Festival}_i \\ & + \beta_{12} * \text{Award}_i + \beta_{13} * \text{Coproduction}_i + \beta_{14} * \text{Spanish}_i \\ & + \beta_{15} * (\text{Coproduction x Spanish})_i + e_i\end{aligned}$$

Thus, hypothesis 1 (subsidies had no effects) and 4 (movie characteristics will affect profitability) will be tested in all equations. Hypothesis 2 (there are heterogeneous effects of subsidization due to differences in criteria) will be tested in equations (3) and (4) when the two subsidies are separated. And hypothesis 3 (differences in amount will not influence profitability) are tested in equations (2) and (4).

4.2 Robustness test

As it happened to McKenzie and Walls (2013) in their research over the Australian film industry, due to the lack of reliable of published data regarding each movie's budget, we count with another bigger data sample than the one used for the main empirical strategy (598 observations instead of 213). The summary statistics of the sample for the robustness test is displayed on Table 15, on the appendix A. Despite having almost three times more observations than the main one and similar distributions of observations for each variable, the precision of this sample is considerably lower, as it lacks information on the budget for 385 of the exhibited movies. Still, by running the same regressions with this bigger sample, we will see how not including the budget variable may over-estimate the rest of the variables, as well as giving us stronger evidence for those control variables that result to be significant on both the main empirical strategy and in the robustness test. As indicated, the regressions employed for the robustness test are going to be the same used for the main empirical strategy but without the inclusion of the budget variable. The regressions for the robustness test will be then:

- Equation (5):

$$\begin{aligned}\log\_Y_i = {} & \beta_0 + \beta_1 * \text{Any\_Application}_i + \beta_2 * \text{Any\_Subsisidy}_i + \beta_3 * \text{Year} + \beta_4 * \text{Saga}_i \\ & + \beta_5 * \text{Genre}_i + \beta_6 * \text{Season}_i + \beta_7 * \text{Rating}_i + \beta_8 * \text{Festival}_i + \beta_9 * \text{Award}_i \\ & + \beta_{10} * \text{Coproduction}_i + \beta_{11} * \text{Spanish}_i + \beta_{12} * (\text{Coproduction x Spanish})_i + e_i\end{aligned}$$

- Equation (6):

$$\begin{aligned}\log\_Y_i = {} & \beta_0 + \beta_1 * \text{Any\_Application}_i + \beta_2 * \text{Any\_Money}_i + \beta_3 * \text{Year} + \beta_4 * \text{Saga}_i \\ & + \beta_5 * \text{Genre}_i + \beta_6 * \text{Season}_i + \beta_7 * \text{Rating}_i + \beta_8 * \text{Festival}_i + \beta_9 * \text{Award}_i \\ & + \beta_{10} * \text{Coproduction}_i + \beta_{11} * \text{Spanish}_i + \beta_{12} * (\text{Coproduction x Spanish})_i + e_i\end{aligned}$$

- Equation (7):

$$\begin{aligned}\log\_Y_i = {} & \beta_0 + \beta_1 * \text{Appgen}_i + \beta_2 * \text{Appselec}_i + \beta_3 * \text{General}_i + \beta_4 * \text{Selective}_i + \beta_5 * \text{Year} \\ & + \beta_6 * \text{Saga}_i + \beta_7 * \text{Genre}_i + \beta_8 * \text{Season}_i + \beta_9 * \text{Rating}_i + \beta_{10} * \text{Festival}_i \\ & + \beta_{11} * \text{Award}_i + \beta_{12} * \text{Coproduction}_i + \beta_{13} * \text{Spanish}_i \\ & + \beta_{14} * (\text{Coproduction x Spanish})_i + e_i\end{aligned}$$

- Equation (8)

$$\begin{aligned}\log\_Y_i = {} & \beta_0 + \beta_1 * \text{Appgen}_i + \beta_2 * \text{Appselec}_i + \beta_3 * \text{Genlev}_i + \beta_4 * \text{Sellev}_i + \beta_5 * \text{Year} + \beta_6 * \text{Saga}_i \\ & + \beta_7 * \text{Genre}_i + \beta_8 * \text{Season}_i + \beta_9 * \text{Rating}_i + \beta_{10} * \text{Festival}_i + \beta_{11} * \text{Award}_i \\ & + \beta_{12} * \text{Coproduction}_i + \beta_{13} * \text{Spanish}_i + \beta_{14} * (\text{Coproduction x Spanish})_i + e_i\end{aligned}$$

4.3 Control for individual characteristics

The use of these control variables has been decided, first, by the availability of reliable data, and second, using these variables in previous literature. In this section we will present and explain the results from previous research regarding control variables.

From all the variables, the one that has the higher level of relevance is the *Budget* variable, as its impact has been researched extensively and it is employed as a control in most of the previous research. There are several empirical studies (Fernández-Blanco and Gil, 2012, 2018; Einav, 2007; McKenzie and Walls, 2013) measuring the effect of the budget in a movie's quality and profitability. Consistently showing that higher production budgets are associated with improved box office results, including higher revenues and ticket sales. Both Jansen (2005) and Bruneel, Guy, Haughton, Lemercier, McLaughlin, Mentzer, Vialle and Zhang (2018) also found that investing more resources (having a bigger budget) in a film's production is significant and generally linked to greater commercial success.

Jansen, who references the work of Kornai (1986), theorizes that producing companies and movie performance may be influenced by the "softening of the budget constraint". This intuition indicates that there is a direct relationship between the budget and returns, that subsidies lower as excess expenditures are now being paid by an external agent. If having a lower budget requires more entrepreneurial efforts to improve quality, lower the costs, or by improving the general producing process, then, having an aid may effectively lower the level of effort needed.

On the other hand, Ravid (1999) investigated if large budgets (with star-driven productions) lead to higher revenues and general profitability. Finding with multiple regression analyses that in fact, big budgets did not significantly influence financial success. Instead, the study highlights the significance of factors such as critical reception, film ratings, and the presence of sequels as better predictors of a film's financial performance than star power or inflated budgets.

Fernández-Blanco and Gil (2012) acknowledge another empirical issue that arises regarding the formation of the production budget, more precisely, the effects of budgets being endogenous or exogenously formed. They show that depending on how this variable is treated it can affect the level of the significance of the rest of variables, as in their case, private TV-Network participation (the object of their study), lost its significance when the budget for the movie was treated as exogenous (formed independently before the producers decided whether to be involved).

Intuitively, the variable *Genre* must be included, as it may be a driving force for individuals when choosing which movie to watch, as for example, it is much more difficult for a horror movie to become a mass sensation compared to any average action *blockbuster*. This is consistent with previous literature, as almost every paper with a quantitative approach on this topic includes it as well. Bagella and Becchetti (1999) used several genres for their empirical strategy, such as western, comedy, cartoon, adventure, horror, thriller, and more. They found that Italian cinema traditionally specializes in comedies, having a significant higher effect on per screen daily admissions and revenues when compared to dramatic films or other genres. As a reinforcement of their result and as commented before, Meloni et al. (2015) also found that comedies were especially significant on revenues and attendance for the Italian movie industry from the years 2002 to 2011. Fernández-Blanco and Gil (2018) also included the genre of the movie as a fixed effects control, but without explicitly commenting on its significancy. Finally, Jansen (2005) also found that dramatic

or children movies performed significantly worse than the base category comedy in terms of rates of return.

The research follows Bruneel et al. (2018) when controlling for seasonality. First with the variable *Season* (indicating in which quadrimester was the movie exhibited) as well as the *Year* of exhibition, as Einav (2007) found that the observed seasonal fluctuations in revenues are significantly influenced and amplified by movie studios' choices regarding when and which movies to release. Thus, by including these two variables we should account for systematic monthly patterns - such as holidays, school vacations, and cultural events – behind seasonal variations in profit.

The *Rating* in terms of age restrictions of the movie may also be a significant factor on revenues and attendance as it directly affects the level of audience allowed for a particular movie (broader for "all publics" movies and more restricted for "older than 18" movies). This variable can be found included in the works of Bruneel et al. (2018), who found it to have a significant effect, as well as Einav (2007) for whom PG-13 (movies for 13 years old or older) and R rated movies (for older than 18 years) appeared to be significant.

The effect of the movie being part of a *Saga* has been studied extensively in previous literature and the different mechanism explored are well summarized by Chisholm, Fernández-Blanco, Ravid and Walls (2015) in its research of the state of the art regarding the economics of motion pictures. Regarding the significance of sequels (movies that spawn from an original one and thus creating a saga), Ravid (1999), found that sequels generally performed better than the median original movie.

By including the variables *Festival* (participation) and *Award* (winning), the strategy tests the results obtained by Ravid (1999), who found that although both may contribute to a film's prestige and recognition within the industry, they did not seem to translate directly into higher revenues. Meloni et al. (2015) also observed the effects of the interaction between subsidies and film festival awards (using them as a proxy for quality and critical recognition), finding that: (1) overall participation in festivals was larger for subsidized movies than non-subsidized, meaning that public aid may work as an incentive to gain exposure/recognition; and (2) that the overall effect of subsidies on the likelihood of winning awards was relatively minor, meaning that not all subsidized films achieved greater acclaim or recognition at film festivals.

The equations also include whether the movie uses *Spanish* as the main language, as this factor can have an impact on the box office revenues. While some non-Spanish films may gain popularity and attract a niche audience, language barriers could limit their broader commercial success, particularly considering that a movie, by being in Spanish, can be watched not only in Spain but also in a great part of the Latin-American continent. Furthermore, considering that Spain has different official languages apart from Spanish (Euskera; Galician; and Catalan, with its derivates Valencian and Mallorquin) it could be the case that movies are only/mainly exhibited in their respective regions, thus having lower attendance and returns, especially when the relation between the language of the movie and deciding to assist can be considered a political matter (Xavier Vidal-Folch, 2015). Fernández-Blanco and Prieto-Rodriguez (2003) indicated that generally, Spanish cinemagoers dislike watching movies in the original version instead of dubbed [1], which could make us expect a positive and significant result for the movie being in Spanish.

[1] Spain is notorious for its low level of English compared to other countries (Nacho Meneses, 2021)

Finally, the reason to include the variable *coproduction* comes from Fernández-Blanco and Gil (2018) as they found that there was a strong positive relationship between the percentage of domestic production and movie market performance. The authors inferred that domestic production companies in Spain may have a better understanding of local tastes, cultural preferences, and market trends, allowing them to produce movies that answer better to domestic demand.

Perhaps it is possible to get a previous idea of how the results are going to be for these variables before running the regression by means of the survey *"Indicadores estadísticos culturales vinculados al cine"* (Cultural statistical indicators related to cinema) for the years 2018 to 2019 (División de Estadística Y Estudios, 2022). In this survey, conducted by the Spanish Government, recent Spanish cinemagoers were interviewed regarding their cultural habits. The results showed that in terms of movie genre, most people preferred to watch: first, comedies, then action, and then science fiction. Thus, if this survey is a good indicator of the average Spanish cinemagoer, we could anticipate similar positive results to the ones found for Italy regarding the *genre* variable.

Regarding the general reasons to assist to a movie, the order of importance was: first, the genre of the movie, then, the opinion of other people ("word of mouth"), and third, the starring actors. Moreover, the survey also indicates the ratings given to the different cinema industries, revealing that in fact Spanish cinema is more appreciated than European cinema, but less than the North American. This could be anticipated based on their respective total yearly box office revenues for each country. Thus, a negative effect for coproductions and a positive one for Spanish could be anticipated as well.

5 Data

The data used in this research regarding profitability and individual characteristics for all movies accredited as Spanish productions that were exhibited during the years 2016 to 2019 has been collected manually. The main primary source has been the *Catálogo de cine español* (Catalogue of Spanish Cinema) of the ICAA, where I obtained the information regarding the characteristics of each movie (genre, revenues, attendance, coproduction, year, season, rating, festival participation and award received) This process meant searching for each movie individually on the catalogue, as the catalogue does not provide an already collected data set.

The official resolutions which report the movies that applied for each subsidy, the movies that received either subsidy, the budget of those that got granted one, and the ones that applied but did not obtain either of both subsidies were obtained in the *Boletín Oficial del Estado* (BOE). An extra constraint on the collection process occurred as some of the movies indicated on the BOE had applied to these subsidies under different project titles, which required to find the movie in the catalogue by searching their producing companies.

Finally, IMDB is used to obtain data on individual characteristics that were missing from the ICAA such as the language employed in the movie or extra information on the budget, still, as indicated, not every movie had the information on their budget posted on this webpage.

Overall, in the sample of 213 movies with information on the budget, the number of movies per year is fairly stable across the four years of the study (56, 56, 59 and 42 movies respectively), the average film collects 1.284.228€ and has an attendance of 218.974 viewers. As the methodology employed by the ICAA to collect this information is not available, is not possible to assert with total confidence whether the revenues or the attendance are limited to the Spanish frontiers or if they represent the worldwide box-office. However, when contrasting with IMDB, which does differentiate among both, the ICAA numbers seem to be coincide (not always exactly) with the national revenues and not the worldwide figures. The average profitability in the sample (in terms of average revenues and attendance) appears to be strikingly similar to the sample of Fernández-Blanco and Gil (2012), for which the average movie collected 1.1M€ and sold 250.000 tickets (but from the period of 2000 to 2008). However, this statistic may be misleading as when observing the percentile distribution, it clearly shows the skewness of the data, as more than 80% of the movies obtained less than 1.000.000€ in revenues, and more than 85% had less than 250.000 viewers. This shows the complexity of the movie industry, in which small productions of cultural importance face *blockbusters* that respond to the demand of a wider audience. For this reason, the research uses logarithms for the continuous variables, to smooth skewness and possible heteroskedasticity.

Table 2: Summary Statistics for the main sample

Variable	Description	Obs.	Mean	Std. Dev.	Min.	Max.
Revenues	Revenues	213	1284228	3520491	52	2.62e+07
ln_Revenues	Log revenues	213	10.6385	10.6385	3.951244	17.0798
Attendance	Attendance	213	218973.8	3.3042	6	4613696
ln_Attendance	Log attendance	213	8.9960	3.2075	1.791759	15.3445
Any_Application	Applying to any subsidy	213	.4694	.5002	0	1
Any_Subsidy	Receiving any subsidy	213	.4084	.4927	0	1
Any Amount	Total aid received (any subsidy)	213	181083.8	301679.9	0	1000000
ln_Any_Amount	Log. total aid received	213	-.3020	10.7662	-9.21034	13.8155
Appgen	Applying to the General subsidy	213	.2629	.4412	0	1
Appselec	Applying to the Selective subsidy	213	.2206	.4156	0	1
General	Receiving the General subsidy	213	.2441	.4305	0	1
Selective	Receiving the Selective subsidy	213	.1643	.3714	0	1
Genlev	Level of aid by General subsidy	213	149765	304072.8	0	1
ln_Genlev	Log. aid by General subsidy	213	-3.7550	9.6279	-9.21034	13.8155
Sellev	Level of aid by Selective subsidy	213	31318.86	89306.53	0	404440
ln_Sellev	Log. aid by Selective subsidy	213	-5.7573	7.8144	-9.21034	12.9102
Budget	Budget of the production	213	3164172	7826794	0	8.43e+07
ln_Budget	Log. budget of the production	213	13.2194	3.1238	-9.21034	18.2503
Saga	Movie being part of a saga	213	0.3286	0.1787	0	1
Spanish	Movie being in Spanish	213	0.8262	.3797	0	1
Coproduction	Movie being a coproduction	213	.2629	.2629	0	1
Festival	Movie participating in a festival	213	.7699	.4218	0	1
Award	Movie receiving an award	213	.3051	.4615	0	1

Note. All the monetary units represent euros.

As seen in Table 3, from the whole sample, 103 movies applied to at least one of the subsidies, from which 87 of them where successful at receiving one. From the ones that applied, 52 got the General subsidy (Table 4) and 35 the Selective (Table 5). Table 2 shows that the average level of aid received for the General (*Genlev)* is 149.765€ and for the Selective (*Sellev)* was considerably less, around 31.318€.

It can also be observed that the average production *Budget* is 3.164.172€, but again, less than 30% of movies in the sample have a budget of this size. Regarding the *Genre* distribution (Table 9 on Appendix A), it is not completely balanced, being fiction the most abundant, followed by documentaries, comedies, and finally children movies. Of course, this represents the different market demands for these movies. It also has to do with the classification employed in this research, as if movies were divided in more categories the distribution probably would be more equal. A good example of this is the comedy category, as technically, most of comedies are also works of fiction, but with the purpose of observing its effect it has been separated as a major category. Regarding the *Years* of exhibition many the distribution is almost the same for each one, except for 2019 that was slightly smaller (Table 10 on Appendix A).

Regarding the *season* of exhibition (the quadrimester) on Table 11 (Appendix A), it also shows an imbalance. Intuitive nevertheless, as the major season (in terms of number of movies exhibited) is the Christmas season, where most Spanish students get their vacation days. Followed by the summer season (also holiday season), and finally, the first months of the years, where most of the jobs and academic programs have resumed their activity.

With respect to the *rating* of the movies (Table 12 on Appendix A), most of movies are made for all publics, being the movies for public older than 16 years old the less common, probably due to its reduced demand. *Coproductions* and movies using *Spanish* as their main language are shown in Table 13 on the Appendix A. The sample indicates that from the 56 movies that were a coproduction, most of them (42) were made in Spanish, and only 14 used a different one. Finally, from the 164 movies that were able to participate on a film *festival*, less than half (65) received an *award* (Table 14 on Appendix A). The data that this research uses presents a similarity with the results obtained by Meloni et al. (2015), who found that participation in festivals was higher for subsidized movies than for non-subsidized ones. This indicates that perhaps the channel through which subsidisation make their effect is through "signalling" the quality of the movie.

Table 3: Summary statistics (main sample) variables *Any_App* and *Any_Subsidy*

	Any_Subsidy		
Any_Application	0	1	Total
0	110	0	110
1	16	87	103
Total	126	87	213

Table 4: Summary statistics (main sample) variables *Appgen* and *General*

	General		
Appgen	0	1	Total
0	157	0	157
1	4	52	56
Total	161	52	213

Table 5: Summary statistics (main sample) variables *Appselec* and *Selective*

	Selective		
Appselec	0	1	Total
0	166	0	166
1	12	35	47
Total	178	35	213

6 Results

6.1 Main Analysis

Table 6 shows that in the results of the model in equation (1). Receiving any kind of subsidy is in fact statistically significant and positive, increasing both revenues and attendance for subsidized movies in a +1.7% and +1.8% respectively. Without differentiating, we cannot assess if the apparent total positive effect of receiving a subsidy is the product of both subsidies in an equal manner or if one is driving a positive effect over the other.

In second equation (2), the variable that represents receiving any amount of money (*ln_Any_Amount*) is highly statistically significant, although with a very small effect (around +0.09%). Considering that this variable implicitly equals the "*Any_Subsidy*" one, as for obtaining any amount movies had to apply and the subsidy as well, the difference in effect can be then attributed to the differences in amounts received. Seeing how small of an effect it has compared to this previous variable, it seems to reinforce the intuition of the subsidy effect taking place through the signalling of the movie, and not by the amount awarded.

On the third equation (3) the significance is now given to two variables: applying for the General subsidy and receiving the Selective subsidy. Considering the high statistical significance and positive effect of the first, compared to applying to the Selective subsidy, it could be inferred that this is again the product of reverse causality. Where big productions (or blockbusters). are applying to the General as this is the type of productions this subsidy seeks to finance. The same reason why applying to the Selective subsidy has the contrary effect, appearing as negative, although statistically insignificant. In other words, the effect obtained may just be reflecting reverse causality as movies that are able to pass this criterion are required to be profitable already (General subsidy) or because the topics have a higher social value (Selective subsidy) or quality, and thus higher future revenues.

Nevertheless, receiving the General subsidy does not appear to have a significant effect on the movie's profitability, in fact it may hinder it as it has a negative effect. A possible intuition is that although the criterion applied is efficient at making the more successful movies apply for it, the fact of receiving it does not increase revenues or attendance from what they would have originally achieved without the aid. Moreover, although awarded with the aid, these movies may have not been particularly successful and thus the variable shows a negative effect.

On the other hand, receiving the Selective subsidy does seem to have a positive and significant effect on revenues and attendance (around +1.7%). The intuition that receiving public aid makes producers more relaxed about covering costs, so they can focus on making better artistic products, could explain the positive effect. In the case of low budget movies that applied for the Selective subsidy, the final product may be of more artistic quality thus succeeding at attracting more viewers. While in the case of big productions with less original scripts, an increase in funding probably will not alter the final product much. It is also interesting to note how once the effects of the General subsidy are separated from the Selective, the variables indicating whether a movie applied to an aid move from having negative effects in general (*Any_Application*) to having positive and negative effects respectively. This gives support to the intuition that the results are representing reverse causality originated from the type of movies that apply to each.

Finally, in the fourth equation (4), where the effects of the amount of aid received by each subsidy are considered, the results are very similar to the third (3) equation. Again, applying to the General

subsidy is highly statistically significant, whereas the effect of the variable indicating the amount received (*ln_Genlev*) is statistically non-significant, negative, and small (around -0.01%). Moreover, for the Selective subsidy amount variable (*ln_Sellev*), although again it appears to be positive and significant, its small effect compared to the *Selective* variable effect - where we only measured the effect of receiving this subsidy. Again, it seems to indicate that the quantity received is not the mechanism through which the subsidy aids the production.

When comparing with the previous literature, there are some similarities present in these results. First, as Bagella and Becchetti (1999) saw in their results, subsidized movies[2] do not underperform when compared to non-subsidized ones. In fact, in the results of this research they have a positive and statistically significant effect (around +1.7%). This indicates that perhaps receiving one of the ICAA's subsidy positively affects the public's perception of the movie. Nevertheless, these results contradict the ones from Meloni et al. (2018) who found a negative effect of the subsidies in both revenues and quality.

The main difference between the results obtained in this research compared to the previous literature that differentiates between two types of selection criteria [3], is that in this study, the Selective subsidy - which includes more socially oriented criteria - seems to have a positive effect. Even when the average aid this subsidy awards is considerably smaller than for the General subsidy. Nevertheless, as the variables indicating amounts of aid are not significant or with a very low value, we cannot determine with confidence which is the other mechanism (apart from the monetary one) through which the aid is improving the movie's profitability. This result is particularly interesting when remembering that Bagella and Becchetti (1999) indicated that their five main arguments for subsidisation could only apply to *cine de autor* movies. Precisely what is represented in the positive and statistically significant effect of the Selective subsidy, assuming that this is the subsidy this type of movies applies the most.

[2] In the first model: *Any_Subsidy* = 1.

[3] As in Jansen (2005) and Fernández-Blanco and Gil (2012)

Table 6: Results Main Strategy

	(1)		(2)		(3)		(4)	
VARIABLES	ln Revenues	ln Attendance	ln Revenues	ln Attendance	ln Revenues	ln Attendance	ln Revenues	ln Attendance
Any_Application	0.158	-0.0163	-0.0360	-0.184				
	(0.759)	(0.733)	(0.751)	(0.725)				
Any_Subsidy	1.724**	1.829**						
	(0.738)	(0.712)						
ln_Any_Amount			0.0902***	0.0936***				
			(0.0336)	(0.0324)				
Appgen					3.656***	3.458***	3.447***	3.303***
					(1.245)	(1.199)	(1.248)	(1.203)
Appselec					-0.801	-0.947	-0.809	-0.947
					(0.707)	(0.681)	(0.706)	(0.680)
General					-0.504	-0.377		
					(1.229)	(1.184)		
Selectiva					1.676**	1.773**		
					(0.797)	(0.768)		
ln_Genlev							-0.0119	-0.0088
							(0.0550)	(0.0530)
ln_Sellev							0.0802**	0.0842**
							(0.0379)	(0.0365)
ln_Budget	0.243***	0.232***	0.240***	0.229***	0.203***	0.192***	0.203***	0.192***
	(0.0650)	(0.0628)	(0.0648)	(0.0626)	(0.0620)	(0.0597)	(0.0620)	(0.0597)
Children	-0.160	-0.131	-0.164	-0.136	0.202	0.232	0.194	0.221
	(0.944)	(0.911)	(0.939)	(0.908)	(0.895)	(0.862)	(0.896)	(0.863)
Documentary	-2.246***	-2.161***	-2.208***	-2.123***	-1.924***	-1.837***	-1.898***	-1.810***
	(0.494)	(0.477)	(0.493)	(0.476)	(0.473)	(0.455)	(0.474)	(0.456)
Comedy	1.361***	1.336***	1.327***	1.301***	1.017**	0.993**	1.015**	0.992**
	(0.471)	(0.455)	(0.469)	(0.453)	(0.453)	(0.437)	(0.454)	(0.437)
2nd Quadrimester	-1.193**	-1.068**	-1.173**	-1.048**	-0.857*	-0.737	-0.858*	-0.737
	(0.486)	(0.470)	(0.484)	(0.468)	(0.465)	(0.448)	(0.465)	(0.448)
3rd Quadrimester	-0.611	-0.552	-0.592	-0.534	-0.406	-0.353	-0.400	-0.347
	(0.453)	(0.437)	(0.451)	(0.436)	(0.430)	(0.414)	(0.431)	(0.415)
+12	-0.344	-0.343	-0.341	-0.342	-0.409	-0.405	-0.411	-0.408
	(0.433)	(0.418)	(0.431)	(0.416)	(0.411)	(0.396)	(0.411)	(0.396)
+16	-0.167	-0.0667	-0.165	-0.0664	-0.522	-0.410	-0.519	-0.410
	(0.508)	(0.490)	(0.505)	(0.488)	(0.488)	(0.470)	(0.488)	(0.470)
2017	-1.466***	-1.407***	-1.473***	-1.415***	-1.624***	-1.571***	-1.624***	-1.571***
	(0.509)	(0.491)	(0.506)	(0.489)	(0.476)	(0.458)	(0.476)	(0.459)
2018	-1.762***	-1.688***	-1.752***	-1.678***	-1.851***	-1.785***	-1.856***	-1.789***
	(0.542)	(0.523)	(0.540)	(0.521)	(0.502)	(0.484)	(0.502)	(0.484)
2019	-1.879***	-1.778***	-1.868***	-1.765***	-2.107***	-2.011***	-2.098***	-2.002***
	(0.577)	(0.557)	(0.575)	(0.555)	(0.544)	(0.524)	(0.544)	(0.524)
Saga	2.488**	2.395**	2.435**	2.343**	1.779*	1.690*	1.761*	1.676*
	(0.978)	(0.944)	(0.974)	(0.941)	(0.945)	(0.911)	(0.945)	(0.911)
Festival	0.544	0.550	0.529	0.538	0.702	0.709*	0.690	0.700*
	(0.450)	(0.434)	(0.447)	(0.432)	(0.426)	(0.410)	(0.426)	(0.411)
Award	0.665*	0.736*	0.649	0.720*	0.793**	0.862**	0.785**	0.854**
	(0.401)	(0.387)	(0.399)	(0.386)	(0.381)	(0.367)	(0.382)	(0.368)
Spanish	-0.387	-0.334	-0.365	-0.311	-0.149	-0.0977	-0.142	-0.0907
	(0.563)	(0.544)	(0.561)	(0.542)	(0.537)	(0.517)	(0.537)	(0.517)
Coproduction	-0.313	-0.336	-0.332	-0.352	-0.621	-0.631	-0.622	-0.628
	(0.866)	(0.836)	(0.862)	(0.833)	(0.824)	(0.793)	(0.824)	(0.793)
Spanish#Coproduction	0.216	0.307	0.235	0.324	0.398	0.476	0.401	0.475
	(0.949)	(0.916)	(0.945)	(0.912)	(0.903)	(0.870)	(0.904)	(0.871)
Constant	8.747***	7.049***	9.580***	7.912***	8.801***	7.102***	9.419***	7.783***
	(1.124)	(1.086)	(1.166)	(1.126)	(1.063)	(1.024)	(1.243)	(1.197)
Observations	213	213	213	213	213	213	213	213
R-squared	0.519	0.524	0.523	0.528	0.574	0.580	0.574	0.580

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Regarding the control variables, the variable *Budget* is highly statistically significant and positive on both revenues and attendance across all models, which comes as no surprise considering the importance that has been giving to this variable in previous literature. Nevertheless, the effect is also really small compared to other variables (+0.2%). From the *genre* variable, documentaries appear to have a negative significant effect on both revenues and attendance whereas comedies have a significant and positive effect, both constant across all models although slightly decreasing

as the models get more specific. With respect to the variables controlling for seasonal patterns (*Year* and Season) both seem to be negative and significant on all models. In particular, the second quadrimester (months from May to August) had a statistically significant negative effect on revenues and attendance (-1.1%) while the third quadrimester had also a negative effect but not statistically significant. The interpretation of these variables will be done in the robustness section, as they may be product of the data sample characteristics or other omitted biases consequence of having a reduced sample.

The age ratings do not appear to have any statistically significant effect over revenues or attendance, apart from a small negative effect (around -0.3% on average). From the rest of control variables, also relevant due to its relationship with previous literature is the effect obtained for the movie being part of a *Saga*. It being statistically significant and positive fully aligns with the results of Ravid (1999) who found that sequels performed better than the median movie. Moreover, it is also important to notice the result for the movie receiving an *award* as it does not align perfectly with the previous literature. As commented in the empirical strategy section, Ravid (1999) did not find positive effects on revenues for festival participation or winning an award, although he acknowledged that they may contribute to the movie's recognition. But, in this research, the effect of receiving an award is indeed positive and statistically significant across all models, even increasing its statistical significance and effect as the models get more specific. Nevertheless, Ravid's intuition regarding the exposure that festivals and awards gives to participating movies may be validated based on the results for the *festival* variable. In this research, festivals only appear to be statistically significant and positive in terms of attendance and only when the model differentiates between the General and Selective subsidies. This points towards a possible "word of mouth" mechanism in which the quality of the movie (assuming that this is manifested when we separate *blockbusters* from *Cine de autor* movies through the two subsidies) is perceived by its participation in festivals.

Still, we will test some of the assumptions and the hypothesis in the robustness section with the bigger sample with 598 observations. The fact that more movies are observed in these regressions will help to reduce some of the effects caused by high volatility and skewness present in the sample. Nevertheless, the fact that the sample has these characteristics is just a reflection of the unbalance of the industry, where just a few big productions or *blockbusters* can cover production costs, let alone make a profit. Thus, any empirical estimation over the cinema will always be subject to statistical concerns in the data or in the strategy that arise from the differences in productions and the complex intertwining of actors.

These results imply the rejection of the first hypothesis as we do observe statistically significant effects on the subsidies on revenues and attendance in general, and when differentiating subsidies. Although mainly through the Selective subsidy. Hypothesis 2 (there are differences in effects between the General and Selective subsidies) is not rejected but corroborated by the results. This research does find differences between the effects of the General and the Selective, although they are probably product of the differences in assigning criteria. Hypothesis 3 (differences in amount will not influence profitability) is partially supported by the results, as although there is a positive, statistically significant effects of the granted amounts on revenues and attendance, its effect are small and only through the Selective subsidy. Finally, hypothesis 4 is also sustained as there are some movie characteristics (genre, receiving an award, and being part of a saga) with a statistically significant effect on the profitability and that are aligned with previous literature.

6.2 Robustness Test

When performing the robustness test it is necessary to consider two factors: first, these regressions do not include the variable *Budget*, so the other main variables and control variables may be overestimated, as some individual characteristics of movies tend to be very correlated with the budget. For example, children movies that are made through animation tend to have big budgets as the labor and capital employed in the production is of high cost. Thus, it could appear that the children genre is statistically significant and positive when in fact is the effect of having a greater budget or being associated with a greater production company. And second, this sample is not only of greater size, but it also has a similar distribution of the observations than in the main regression. Thus, there is a trade off in this robustness test, as the regressions gain precision due to the increased size (manifested in the reduced standard deviations in all variables), while also suffers from omitted bias as it does not include important information on the budget. Table 7 displays the results of the robustness test.

On the models (5) and (6), the effects for the variables of interest (*Any_Application, Any_Subsidy,* and *ln_Total_Amount*) are almost the same. The difference compared the main model being that here, the effect in revenues is slightly higher while for the attendance is slightly lower, and with slightly higher but similar statistical significance for both variables.

The greater differences start to appear on the models (7) and (8), where the differences on the General and Selective subsidies are introduced. For the variable *Appgen*, the effect is still equally statistically significant but now, both the effect and the standard deviation have been reduced in almost 2% for both revenues and attendance. On the other hand, the *Appselec* variable has become significant, both in terms of revenues and attendance, but also with reduced effect and standard deviation when compared to the main model.

Nevertheless, is on the variables *General* and *Selective* where we find the biggest differences compared to the main model. Now, instead of just the *Selective* variable being significant, both subsidy variables become significant. At the same time, receiving the General subsidy significantly increases its effect, moving from a negative 0.5% - 0.3% effect on revenues and attendance to a positive 1.3%. and 1.1% effects respectively. On the other hand, the *Selective* variable, although still statistically significant, loses half of its effect on both dependent variables, moving from a 1.6% and 1.7% positive effect on revenues and attendance to an - still positive - 0.87% and 0.83% effect.

The explanation to these changes seems to be attributable to the absence of the budget variable on the regressions. When this variable is not included, the model is not able to differentiate the effects of the subsidies on different types of movies (*blockbusters* with bigger budgets or *Cine de autor* movies with lower ones). This can explain why the variable *General* appears to be significant and with a positive effect, as it interprets it as the effect of receiving it without considering that the movies that are able to do so also tend to have big budgets. Thus, it suffers from omitted bias as the budget variable is probably the one carrying most of this effect.

The same intuition can be applied to the reduction in effect of the *Selective* variable: when the budget is not being considered, the Selective subsidy appears to not have such a strong effect, but when it differentiates the effects of the aid on a low or high budget production, it increases its effect on both revenues and attendance. This could also be interpreted as a reinforcement to the

importance of the Selective subsidy, as it is significant and positive whether the budget is included or not.

Finally, this same dynamic is reproduced on the results for the *Genlev* and *Sellev*, where the first one moves from not statistically significant and negative to being statistically significant and with a positive effect, while the *Sellev* variable remains significant but with a lower effect. Interestingly, in this model, these two have also a lower effect than their counterpart, the *General* and *Selective* variables.

Table 7: Results Robustness Test

	(5)		(6)		(7)		(8)	
VARIABLES	ln Revenues	ln Attendance	ln Revenues	ln Attendance	ln Revenues	ln Attendance	ln Revenues	ln Attendance
Any_Application	-0.101	-0.0504	-0.219	-0.156				
	(0.274)	(0.267)	(0.274)	(0.267)				
Any_Subsidy	1.786***	1.678***						
	(0.311)	(0.303)						
ln_Any_Amount			0.0920***	0.0860***				
			(0.0144)	(0.0141)				
Appgen					1.608***	1.647***	1.501***	1.558***
					(0.469)	(0.457)	(0.467)	(0.456)
Appselec					-0.564**	-0.510*	-0.608**	-0.549**
					(0.273)	(0.266)	(0.275)	(0.268)
General					1.355***	1.190**		
					(0.508)	(0.495)		
Selective					0.877**	0.838**		
					(0.367)	(0.358)		
ln_Genlev							0.0678***	0.0593***
							(0.0228)	(0.0222)
ln_Sellev							0.0464***	0.0440**
							(0.0178)	(0.0174)
Children	0.448	0.626	0.448	0.626	0.334	0.511	0.336	0.513
	(0.517)	(0.503)	(0.513)	(0.500)	(0.493)	(0.480)	(0.492)	(0.479)
Documentary	-2.097***	-1.937***	-2.062***	-1.904***	-1.879***	-1.729***	-1.866***	-1.718***
	(0.247)	(0.240)	(0.246)	(0.239)	(0.237)	(0.231)	(0.236)	(0.230)
Comedy	1.471***	1.405***	1.445***	1.381***	1.201***	1.145***	1.191***	1.137***
	(0.265)	(0.258)	(0.263)	(0.257)	(0.254)	(0.248)	(0.254)	(0.248)
2nd Quadrimester	-0.689***	-0.575**	-0.671**	-0.558**	-0.574**	-0.469*	-0.567**	-0.463*
	(0.261)	(0.254)	(0.260)	(0.253)	(0.251)	(0.244)	(0.250)	(0.244)
3rd Quadrimester	-0.197	-0.110	-0.183	-0.0970	-0.141	-0.0562	-0.136	-0.0518
	(0.236)	(0.230)	(0.235)	(0.229)	(0.225)	(0.219)	(0.225)	(0.219)
+12	-4.617**	-4.392**	-4.626**	-4.399**	-4.383**	-4.169**	-4.395**	-4.178**
	(2.194)	(2.135)	(2.180)	(2.123)	(2.088)	(2.035)	(2.083)	(2.032)
+16	-4.746**	-4.475**	-4.762**	-4.489**	-4.626**	-4.361**	-4.638**	-4.371**
	(2.197)	(2.138)	(2.183)	(2.126)	(2.091)	(2.038)	(2.086)	(2.034)
2017	-0.798***	-0.770***	-0.814***	-0.786***	-0.860***	-0.827***	-0.870***	-0.836***
	(0.268)	(0.261)	(0.267)	(0.260)	(0.255)	(0.248)	(0.254)	(0.248)
2018	-0.592**	-0.608**	-0.603**	-0.618**	-0.635**	-0.650***	-0.641**	-0.655***
	(0.270)	(0.262)	(0.268)	(0.261)	(0.254)	(0.248)	(0.254)	(0.247)
2019	-0.798***	-0.799***	-0.804***	-0.805***	-0.833***	-0.835***	-0.835***	-0.838***
	(0.268)	(0.261)	(0.267)	(0.260)	(0.255)	(0.249)	(0.255)	(0.248)
Saga	1.696***	1.701***	1.654***	1.663***	1.339**	1.360**	1.326**	1.348**
	(0.577)	(0.562)	(0.574)	(0.559)	(0.551)	(0.537)	(0.550)	(0.536)
Festival	0.437*	0.487**	0.448**	0.498**	0.512**	0.560***	0.516**	0.564***
	(0.228)	(0.222)	(0.227)	(0.221)	(0.217)	(0.212)	(0.217)	(0.211)
Award	0.594***	0.607***	0.579***	0.592***	0.727***	0.736***	0.715***	0.725***
	(0.213)	(0.208)	(0.212)	(0.207)	(0.204)	(0.199)	(0.204)	(0.199)
Spanish	0.373	0.346	0.363	0.336	0.274	0.253	0.271	0.250
	(0.278)	(0.270)	(0.276)	(0.269)	(0.265)	(0.258)	(0.264)	(0.257)
Coproduction	0.860*	0.820*	0.805	0.769	0.234	0.224	0.222	0.214
	(0.496)	(0.483)	(0.494)	(0.481)	(0.480)	(0.468)	(0.479)	(0.467)
Spanish#Coproduction	-0.418	-0.331	-0.384	-0.299	0.0421	0.102	0.0474	0.108
	(0.550)	(0.536)	(0.547)	(0.532)	(0.529)	(0.516)	(0.528)	(0.515)
Constant	14.45***	12.45***	15.30***	13.24***	14.19***	12.20***	15.26***	13.16***
	(2.205)	(2.146)	(2.196)	(2.139)	(2.099)	(2.046)	(2.115)	(2.062)
Observations	598	598	598	598	598	598	598	598
R-squared	0.422	0.417	0.430	0.424	0.479	0.473	0.481	0.474

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The control variables of the robustness test (Table 7) do not appear to have suffered significant changes apart from those than can be easily attributed to sample size differences.

Regarding the *Genre* of the movie: productions oriented towards children, although still not statistically significant, now appear to have a slightly higher and positive effect on both revenues and attendance across all models. In the case of documentaries, they remain significant and negative, although with a slightly lower effect. The same occurs for comedies, as they are still positive and statistically significant, although now this effect is slightly higher. With respect to the *Season* variables: both quadrimesters remain negative and both reduce their effects as it moves from model (5) to (8). The main difference being that the 2nd quadrimester has gained statistical significance across all models, when originally it was only significant until the effects of the General and the Selective subsidies where separated.

The greatest difference in results is present in the effects for the age *rating*, as it switched from statistically non-significant and with small negative effect (around -0.3% on average) to being statistically significant and with great negative effects on both revenues and attendance (-4.4% on average). Nevertheless, its standard deviation has increased proportionally, also moving from an average of 0.4 to an average of 2.1. The fact that the effect is negative can be explained theoretically as the manifestation of putting restrictions over the type of public the movie may have, practically limiting the demand. But why would this variable suffer such a change, passing from being statistically non-significant to significant and with a considerable effect, from one model to another? The reason seems to be statistical, as observing the increase in the standard deviation for the variable may indicate that the recently acquired statistical significance is the product of the increase in observations in the sample, which strengthens its statistical power.

The explanation for the persistent negative effects for the variable *year* comes from the fact that it may not be capturing a trend-effect on the industry, but rather is the product of using 2016 as a base year. As I have not been able to identify any major political or economic effect taking place at the time in which this research takes place, the explanation seems to be that 2016 was a rather profitable year compared with the following ones, even if it did not translate in more movies being produced (as shown in the Industry Context section). As we can see on Table 8, the year 2016 had the highest levels of revenues and attendance from the whole sample, and this, with the fact that increasing the number of observations in the sample strengthens the statistical power of the different variables, should be the main explanation to the significance and effect of the *Year* variable.

Table 8: Mean Profitability per Year

	Revenues		*Attendance*	
Year	Mean	S.D.	Mean	S.D.
2016	675922	210101	115658	36390.45
2017	670278	225937.9	113037	37881.58
2018	603134	167140.9	104786	28859.42
2019	566984	157166.6	96107	26787.05

Note: Number of observations = 598. All revenues represent €.

There may be two possible explanations for this disparities across years: either there are omitted bias not being accounted for in the model that made the year 2016 particularly profitable apart from the variables being considered here; or, this is simply the unpredictability of the cinema industry manifesting itself, where perhaps the films being produced in 2016 were just of a superior quality that draw the public to assist more. This second theory could be supported by the fact that 2016, although not having the most profitable genres (in 2016 the most common movies were fiction and documentaries, the least profitable of the four), or ratings (the most common ratings were +7 and +12 years old, the least profitable ones), was the year with the most revenues gained.

Regarding the rest of the control variables, the results for the *Saga* variable seem to reinforce its importance, as it has increased its significance and remains positive, moreover its standard deviation has decreased and with it its effect, probably due to the increase in the variable's precision. The variables *Festival* and *Award* present similar changes, both being slightly more statistically significant but now with reduced standard deviation and positive effect. Interestingly, with this sample, the positive effect of both variables increases when the regression differences between the types of subsidies, reinforcing the idea that through subsidization and participation in events, the movie gains better public perception, thus increasing its demand.

Finally, for the variables *Spanish* and *Coproduction*, although both remain being statistically non-significant, they also show a positive sign, perhaps suggesting that in the first model the negative sign was caused by omitted and/or selection bias by those movies with information on their budget. Even if the average revenues for movies in Spanish is higher than for non-Spanish speaking movies on both samples.

Thus, the results of the robustness test confirm those obtained for the main regression. Hypotheses 1 and 3 are rejected again as subsidies do appear to influence the movie's performance as well as the differences in amounts granted. Hypotheses 2 and 4 are again corroborated as there are still differences in the effects between both subsidies, and some movie characteristics may systemically impact profitability.

7 Limitations

As indicated in the introduction of this research, there is not plenty of research done on this topic (from a quantitative analysis point of view) due to the difficulties this kind of empirical strategies suffer from, the limited amount of available data, and the lack of natural experiments to observe. Moreover, due to the complexity of the industry, there are inevitable empirical limitations such as omitted bias, multicollinearity, or reverse causality posing a challenge for establishing linear causality. Therefore, most of the previous literature is cautious when making statements about causality, and this research is not an exemption.

7.1 Data limitations

One of the main limitations of this study is not having detailed information of what sources of income are included in the revenues value, as the ICAA does not specify the collection method for the data they provide. Thus, it is not possible to know if the published amounts represent just the theatre exhibition revenues (national or international) or whether they also include revenues from the commercialization (such as DVD's) after the theatre exhibition. It could be just a case of differences in prices, in which movies may have the same level of attendance but are exhibited in more pricy cinemas. On the other hand, the commercialization strategy of the movie (merchandising, DVD's, etc.) could also increase the perceived revenues without increasing the number of viewers on cinemas.
This type of empirical limitations could be avoided if public administrations were generally more transparent and constant about the data and methods they employ. For these reasons, in this research the effect on attendance is also measured next to revenues, as it provides a more direct representation of the effect of the subsidies on the public. It could be the reason that from the two dependent variables, attendance is the one that consistently displays higher R^2 levels across all models. Still, if the subsidy has been received before the exhibition date, it is possible to draw a correlation among receiving it and its impact on revenues. Either by an increase on cinema theatre profit or through other channels, as the production company will likely invest the aid either it on the project itself (improving its quality) or in its posterior commercialization.

7.2 Model limitations

A second limitation, present in many of the previous research, is the difficulty in complying with some of the econometric assumptions. As many authors indicate, this kind of concerns, especially when using more limited econometric models such as OLS, hinders the establishment of causal inference (just indicative evidence). The fact that in the cinema industry a few big productions are the ones making profits (or at least covering costs) while the rest of movies depend on subsidization naturally makes any sample to show outliers and skewness towards the right (on the revenue distribution chart). Although normally this concern is tackled by taking logarithms, the regression results are still going to be affected by these facts. Secondly, the lack of information about the decision process behind the production of a movie difficulties including key variables such as the budget. For example, there is no possibility of knowing if the movie had a big budget because of its characteristics (topic, cast, associated producing companies, etc.) or if in the other hand, the project was assigned a predetermined budget beforehand, and then had to modify the project accordingly (endogeneity concerns).

Particularly related to this research is the issue explained by Jansen (2005) of reverse causality. Meaning that in the case of public aid, these subsidies would not be directly affecting the profitability of the movie but rather adapting to its individual characteristics. In other words, the movie did not become more successful because they applied and received the General subsidy, but at the contrary, it received the General subsidy as it complied with its stablished measurements of profitability. Still, there is not enough data on the mechanisms through which the subsidies make their effect on the movie (where do producers decide to spend it for example) to establish causal inference. Moreover, when analysing the public subsidization system, it should also be considered the many channels of financing the Spanish public aid system provides, as it could have an effect as omitted bias overestimating the effect of the subsidy. For example, some of the movies in the sample were also financed by TV networks, both public and private, as it is mandatory for this companies to invest a percentage of their yearly revenues in new movie productions. Their effects on the profitability of this system of aid have been explored already by Fernández-Blanco and Gil (2012), who did not find any effect of them on revenues unless the endogenous formation of the budget variable was considered and a separation between public and private TV-Networks was made in the model.

8 Discussion

There are many possible ways to improve the efficiency of the estimation with the inclusion of more detailed information. For example, the sample could indicate the number of screens for each movie. The variable genre could even be divided into more categories, and the percentage of Spanish productions could indicate the exact percentage of Spanish investment and the size of the production company. In addition, the language of the movie could indicate the different types of official languages present in Spain (Spanish, English, Catalan, Euskera, Galician, etc.). It would also be interesting to test the previous literature regarding sagas and adaptions by including a variable for whether the movie is an adaptation. It would also be helpful to include the amount each movie spends on marketing and advertisement in order to remove possible omitted bias. Another possible improvement could be to use different categories when measuring the effect of festivals, as it is evident that participation in the Oscars will not have the same effect than a regional cinema festival.

In terms of future research, the complexity of the industry also allows us to look at specific details that we may be interested in, from previous research or considering the context of the sample. Such as the inclusion of variables indicating the effect of actors and directors (Jansen, 2005) on profitability, by using IMDB as a tool (Basuroy, Chatterjee and Ravid, 2003). Whether the director of the project is a woman in case we would like to test the economic efficiency of the gender criteria (similar to Raveney, F.H., Moldaschl, B., and Koblitz, A., 2018). Moreover, the duration of the movie could also be a significant factor if we remember that surveyed people included it as a reason to choose a movie or not. To remove possible omitted bias, it should be studied the differences in subsidization strategies coming from the regional or local political levels in comparison with the national funding scheme. The time distance in exhibition with other movies (Chiou, L., 2008; Gutierrez-Navratil, F., Fernandez-Blanco, V., Orea, L., and Prieto-Rodriguez, J., (2014); internet reviews differentiating by individual or expert opinions (Basuroy, Chatterjee and Ravid, 2003); and even cultural distance can be a determinant factor for success and presence in foreign markets (Bergfelder, 2005, p. 325; Gubbins, 2012). Nevertheless, the more variables are included as controls, the less observations could each variable have, taking out statistical power from the regression. Unless there is a large and consistent set of data available that has not suffered from exogenous policy changes, performing this type of regressions seems complex.

Ideally, the ICAA would also survey the main beneficiaries of the subsidies and track where they choose to invest the money they receive through public subsidisation. This way researchers could try to use variables that represent the objectives producers' want to accomplish. For example, if the money is used to increase the size of the production or just to cover costs, then it would be interesting to measure the impact on labour or on capital investments. But generally, empirical analysis of subsidisation systems is limited to a purely financial evaluation, and not so much in the impact on the quality of movies, making the arguments too one-sided.

Nevertheless, an ideal up-to-date regression model that could consider both the nuances and differences present in the dynamic and complex film industry seems far in the distance to achieved, especially when obtaining reliable well-specified information delves into a time-consuming battle against odds. Nor should ignore the increasing omnipresence of streaming platforms and the constant improvement in technology, which are already changing the ways audiences decide to enjoy unattainable.

9 Policy Suggestions

As the system of direct subsidization at hand (the General/Selective subsidies) have changed some of its characteristics due to the COVID-19 and the appearance of streaming services, this research does not offer a tailored suggestion for this system. Nevertheless, there are some takeaways that can be taken from other papers dealing with the Spanish cinema industry from a non-quantitative approach and that can be confirmed by this research.

Apart from the already mentioned lack of transparency that hinders research, also noted by García Fernández (2009), there is a general support to increase the level of financing that the system offers (Monzoncillo and Villanueva, 2015). Although this research does not offer evidence that the amounts awarded contributed significantly to the movie's profitability, it is interesting to note that for every year of this research there was an average of at least five movies that despite complying with the criteria and even having "good grades", were not aided due to lack of funds. This begs the questions of whether there would have been different results for the public aid system had these movies being aided. Moreover, these authors also suggest an increase of funding for promotion and distribution as a possible way for increasing profitability. This last proposal could be supported by the results of this study regarding the positive effect of receiving awards in film festivals, and the small positive results (although non statistically significant) for coproductions in Spanish.

Nevertheless, the most repeated issue in the literature about the Spanish system and perhaps the one that has the biggest correlation with the obtained effects of subsidization, is the excessive atomization of producing companies. In Spain, most of the producing companies are settled-up for each particular movie under the form of *Agrupaciones de Interés Económico* (Economic Interest Groupings), as this entails some particular fiscal incentives. The perversive effect that this model has was already noted by several authors as early as 2001 (Martí and Muñoz Yebra, 2001; and Sacristán, 2021). These authors indicate that in such a competitive market such as the cinema industry is, this type of figure limits the ability and freedom of producers in an already competitive industry (Sacristán, 2021). The implications of this could provide an explanation for the low or inexistent effects of the subsidies in this research. According to the ICAA, in 2019, from the 381 producing companies that made a movie in this year, only 6 have produced from two to four movies, and only three produced more than five. This atomization leads to an impossibility to develop economies of scale, producing in a non-continuous rhythm, and with less diversified projects, as producers are not willing to take extra risks with more original projects. Moreover, as some of the subsidies the ICAA offers are incompatible with each other for a single movie, producing companies do not benefit from these aids as they would if they managed several projects at the same time. It is obvious then, that in a market where the big multinational producing companies dominate, such limitations are a burden to the competitiveness of the Spanish industry.

10 Conclusions

This paper looks to contribute to the previous literature on public aid for the film industry. An OLS model is used to estimate the effects of the Spanish General and Selective direct subsidization system. By using two hand-collected samples of movies (213 and 598 observations) exhibited in the country from 2016 to 2019, the research looks at the effect that the subsidization system had in general, and through these two subsidies in particular.

Contrary to most of the previous literature, the estimates suggest that receiving any subsidy had a positive effect on both revenues and attendance, and that the amount rewarded is also positive in effect. Although not as strong as just being awarded the subsidy. On the other hand, when differentiating between the effects of applying to the General or Selective, the results seem to reflect the previous profitability of the movies but without necessarily increasing it. This intuition has been drawn from similar research that found this effect when differentiating between subsidisation systems that employ different awarding criteria, creating a difference in the type of movies (*blockbuster* or *cine de autor*) that apply to them.

From both subsidies, only the Selective subsidy had a positive effect on both revenues and attendance. There is not enough information available to make a confident assessment of the mechanism through which the subsidy may operate. Nevertheless, the small coefficients given to the effect of the awarded amounts, and the significance of receiving awards, indicate a possible "word of mouth" mechanism. Alternatively, the research conducts a robustness test with the bigger but less precise sample, replicating the regressions of the main model. The results of this test reinforce the intuition provided in the commentary for the results of the main model.

Regarding the individual characteristics included as control variables in both models, although they support the statement that some characteristics systematically influence the movie's performance, the results are mixed. The effects of the different genres (documentaries and comedies in particular), of the movie pertaining to a saga, and the effects of awards, are aligned with previous literature. However, variables such as the year in the main model and the robustness test, reflect some econometric concerns (reverse causality, omitted bias and outliers) that are present in this sample as well as in similar research, which manifest the characteristics of the industry. These limitations impede an assertion of causal inference.

Moreover, this paper suggests some possible paths and limitations to be considered in future research on the topic. For this, an increase in the availability and transparency of data would be required, along with econometric models that are able to represent the complexity and dynamism of the constantly evolving cinema industry. Still, as other authors have indicated before, any analysis of the efficiency of the public aid for cinema should incorporate perspectives that complement a purely economic approach, such as its impact on culture, education, and social values.

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Appendix A: Extra summary statistics

Table 9: Summary statistics (main strategy) variable *Genre*

Genre	Freq.	Percent	Cum.
Fiction	96	45.07	45.07
Children	8	3.76	48.83
Documentary	65	30.52	79.34
Comedy	44	20.66	100.00
Total	213	100.00	

Table 10: Summary statistics (main strategy) variable *Year*

Year	Freq.	Percent	Cum.
2016	56	26.29	26.29
2017	56	26.29	52.58
2018	59	27.70	80.28
2019	42	19.72	100.00
Total	213	100.00	

Table 11: Summary statistics (main strategy) variable *Season*

Season	Freq.	Percent	Cum.
1st Quadr.	46	21.60	21.60
2nd Quadr.	57	26.76	48.36
3rd Quadr.	110	51.64	100.00
Total	213	100.00	

Table 12: Summary statistics (main strategy) variable *Rating*

Rating	Freq.	Percent	Cum.
A.P.	95	44.60	44.60
+ 7 years	75	35.21	79.81
+16 years	43	20.19	100.00
Total	213	100.00	

Table 13: Summary statistics (main strategy) variables *Coproduction* and *Spanish*

	Spanish		
Coproduction	0	1	Total
0	23	134	157
1	14	42	66
Total	37	176	213

Table 14: Summary statistics (main strategy) variables *Festival* and *Award*

	Award		
Festival	0	1	Total
0	49	0	49
1	99	65	164
Total	148	65	213

Table 15: Summary statistics (robustness test) main variables of interest

Variable	Description	Obs.	Mean	Std. Dev.	Min.	Max.
Revenues	Revenues	598	626330.1	2303871	52	2.62e+07
ln_Revenues	Log revenues	598	9.886.831	2.794821	3.951244	17.07981
Attendance	Attendance	598	106977.6	393827.9	6	4613696
ln_Attendance	Log attendance	598	8.244.937	2.708088	1.791759	15.34454
Any_Application	Applying to any subsidy	598	.3729097	.4839832	0	1
Any_Subsidy	Receiving any subsidy	598	.235786	.4248444	0	1
Any_Amount	Total aid received (any subsidy)	598	90925.54	222934.8	0	1000000
ln_Any_Amount	Log. total aid received	598	-4.146406	9.181689	-9.21034	13.81551
Appgen	Applying to the General subsidy	598	.1705686	.3764464	0	1
Appselec	Applying to the Selective subsidy	598	.2140468	.4105028	0	1
General	Receiving the General subsidy	598	.1337793	.3407	0	1
Selective	Receiving the Selective subsidy	598	.1020067	.3029105	0	1
Genlev	Level of aid by General subsidy	598	73884.1	218856	0	1
ln_Genlev	Log. aid by General subsidy	598	-6.239195	7.571643	-9.21034	13.81551
Sellev	Level of aid by Selective subsidy	598	17041.44	65760.2	0	404440
ln_Sellev	Log. aid by Selective subsidy	598	-7.117551	6.279364	-921034	12.91026

Note. All the monetary units represent euros