SUBSTITUTION BETWEEN LEISURE ACTIVITIES: A QUASI-NATURAL EXPERIMENT USING SPORTS VIEWING AND CINEMA ATTENDANCE

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SUMMARY

In this paper the allocation of time between alternative leisure activities is considered. This question typically has not been considered in the economics literature to date. International football tournaments provide an opportunity to consider consumers' preferences for watching football and films in a quasi-natural experimental setting. Hence, the impact of these mega sports football events on cinema admissions is considered, testing to see if they can be considered substitute leisure activities. To the extent that cinema admissions fall during the periods of major international football tournaments, a further cost to the entertainment industry of large-scale sporting events not previously considered in the economics literature may be identified. Using an original dataset comprising six years of data for four countries whose national men's football teams had very different levels of success in the football World Cup and two European Championships covered by the period of the dataset, and using a Difference-in-Differences methodology, results strongly support the idea that per capita box office revenues decrease when mega sports events take place.

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ABSTRACT

The allocation of time between leisure activities and work has been extensively analysed in academic literature. However, leisure time is limited and there may not be sufficient time to enjoy all the leisure activities desired. Hence, this paper considers the allocation of time between substitute leisure activities. International football tournaments provide an opportunity to consider consumers' preferences for watching football and films in a quasi-natural experimental setting. A trade-off between these leisure activities is identified using a Difference-in-Difference methodology. Using an original, four country dataset, a large and robust negative effect of mega sports events on cinema admissions is identified.

I. INTRODUCTION AND LITERATURE REVIEW

Existing research has questioned alternative possible economic impacts of leisure activities. Sports events, such as major football tournaments, basketball competitions or the Olympic Games represent large injections of money into the hosting national economies even before the events start (Dwyer et al. 2005; Matheson, 2006). Some authors claim that these events seem to have positive effects on employment and wages (Lozano, 2011; Hagn and Maennig, 2008); tourism (Golovnina, 2002); infrastructure investment (Badee and Matheson, 2001) and national well-being (Kavetsos and Szymanski, 2010; Kahn, 2007). Some literature alternatively finds effects can be negative or non-existent in the hosting economies (Badee

and Dye, 1990; Coates and Humphreys, 2003). Interestingly, some negative effects on education have been identified. Metcalfe et al. (2011) show how General Certificate in Secondary Education (GCSE) examination results in England are lower in major sport tournament years.

The allocation of time between leisure and work has also already been studied by economists (early analyses include Becker, 1965; Gronau, 1977; Lancaster, 1966). The theoretical literature explains how people select hours of work and leisure in order to reach a time allocation point that maximizes an individual's utility subject to a budget constraint, since people have to spend time working in order to earn money to spend on leisure pursuits. Considering the time individuals spend working, and deducting the time needed to sleep and eat, there is a limited amount of time to spend on leisure activities and individuals may not have time to enjoy all the leisure activities that they would like.

Consequently, in this paper the allocation of time between alternative leisure activities is considered, treating working time as fixed. [1] This question typically has not been considered in the economics literature to date. International football tournaments provide an opportunity to consider consumers' preferences for watching football and films in a quasi-natural experimental setting. Hence, the impact of these mega sports football events on cinema admissions is considered, testing to see if they can be considered substitute leisure activities. To the extent that cinema admissions fall during the periods of major international football tournaments, a further cost to the entertainments industry of large-scale sporting events not previously considered in the economics literature may be identified. Further, this cost may be

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[1] Working time can vary and produce a change in the free time available. To analyse the substitution between leisure activities we will assume that, in the short run, working hours are fixed.

substantial: for example, indicating the importance of the UK film industry its contribution to Gross Domestic Product was over £4.6 billion in 2013 (www.bfi.org.uk).

Trends in leisure have changed over the years (Aguiar and Hurst, 2007). These changes may be due to changes in individuals' incomes, leisure activity prices or changes in individuals' preferences over the years. Leisure services tend to be normal goods, holding real prices constant. Two leisure activities can be considered substitutes if, when the cost of engaging in one of these activities increases, the demand for the other activity increases, ceteris paribus. This cost can be monetary, for example an increase in film or theatre ticket prices, or what may be termed a "non-monetary cost".

An example of a "non-monetary cost" can be seen in the case of mega sports events. People may enjoy a major sports event (football/basketball/rugby European tournaments, FIFA Football World Cup, Olympic Games, etc.) only every two/four years. These international sports events are culturally very popular and can be followed on television, radio, Internet, newspapers, etc. Indeed the Olympic Games 2012 in London had a media television viewing share of 29.7% between 7pm-10pm, 24.9% between 2pm-4pm and 35.3% between 4pm-6pm in the UK (The Guardian, 2012). During the European Football Championship in 2012, the match between England and Italy recorded 20.3 million viewers in Britain, 21.8 million in Italy and, in Spain, the match between Spain-Portugal recorded 83.3% market share in Spain, marking it as one of the most viewed programmes in Spanish history (The Citizen, 2012). Hence there is a "non-monetary opportunity cost" in not following these sports events when they are shown 'live', the figures above suggesting that this is particularly true when a country's national team is participating. First, a huge proportion of the population are following the sporting event and second, the competition cannot be enjoyed again for two/four years. Watching a film may be deferred to a later date whereas a major football

match is best enjoyed live rather than viewed as a recording at a later date when the suspense and excitement of the contest may have been lost. This is comparable to the shadow price of time which Loyland and Ringstad (2009) use to study sports demand in Norway concluding that sports and other leisure goods are substitutes. Utility may also be gained from watching a match in the company of others: Jenkins and Osberg (2005) highlight benefits when individuals coordinate their leisure activities. Note also that these international matches typically can be viewed for free even when top league football matches in a country are offered on a pay-per-view basis.

Hence, this undoubted popularity of major sports events does not only result in huge injections of money in hosting cities but watching the event can substitute for alternative leisure activities. Considering film ticket prices fixed in the short run it may be possible to observe a substitution between viewing a sports event and cinema admissions due to a "non-monetary cost". People may stop going to the cinema, theatres or shopping, rather watching international football tournaments on the television. The intention in this paper is to test for the substitution or opportunity cost of watching mega sports events, showing how sports events may not just affect employment, education, tourism or infrastructures of hosting economies but also the demand for other leisure activities in a country, specifically, in this paper, an effect on cinema admissions.

For this purpose a Difference-in-Difference methodology comparable to that already used by other authors (Metcalfe et al. 2011; Lozano, 2011) will be adopted, and the cases of Spain, UK, Finland and Belgium will be compared. Metcalfe et al. (2011) use a Difference-in-Difference methodology to identify the impact of the FIFA Football World Cup on student effort in England. They study the effect of the 2006 World Cup in Germany and obtain data from the National Pupil Database (NPD) about age, ethnicity, gender and GCSE examination

results and broadcast audiences. They conclude that examination results are lower in tournament years and that, in general, males are more affected than females. Lozano (2011), in the most closely related analysis to that in this paper, uses the FIFA Football World Cup to study the flexibility of the hours of work in the United States. He uses data from 1994 to 2007 to identify variation in hours of work during the World Cup. A Difference-in-Difference methodology is used to compare the difference between usual hours of work and hours of work during the tournament, showing that during the World Cup American workers reduced their hours of work, with the magnitude of this result greater among salary paid workers.

This paper is divided as follows. In Sections II and III the data and the methodology are introduced, Section IV presents the main results and robustness checks and the conclusions are presented in Section V.

II. DATA

Our statistical analysis considers how weekly per capita box office revenues are affected by major international football tournaments in Spain, the UK, Finland, and Belgium.[2] The World Cup and the European Championship are two international football tournaments contested by the senior men's national football teams. Before the final weeks of the tournaments qualifying tournaments are held. The qualification process starts as early as three years before the final tournament phase and lasts over a two year period. National football teams who qualify play the final stage which will take four or five weeks for the European Championship and the World Cup respectively. This final phase is the period for which the substitution between

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[2] Weekly data are appropriate as matches take place throughout the tournament weeks, so even though, for example, finals matches take place during weekends, the crucial semi-final matches are mid-week.

international football tournaments and cinema admissions will be considered. The cinema data from Spain, UK, Finland and Belgium are used as the different fortunes of their national teams in recent international football championships provide a quasi-natural experimental setting for modelling the impact of mega sports events on demands for cinema admissions in these countries.

The original dataset comprises six years of data, from 2007 to 2012. There were no major international football championships in 2007, 2009 and 2011. In 2008 and 2012 there were European Football Championships, the Spanish team winning both; the English team did not participate in 2008 and, in 2012, was eliminated in the quarter finals, the third week of the tournament (out of four weeks). In 2010 there was a Football World Cup Championship in which the Spanish team won; England was eliminated in the knock-out round of the remaining sixteen teams after qualifying from the initial group stage. Finland and Belgium did not participate in any of the tournaments, having failed to qualify and so represent the control group.

Other factors may affect demand for cinema admissions in these countries so weather conditions (temperature) and unemployment rates are controlled for, with unemployment rates being considered an important indicator of the economic health of a country. UK daily weather data were retrieved from the UK Institute of Meteorology, and comparable Spanish, Finnish and Belgian weather data were obtained from The Met Office MIDAS Land Surface Station dataset, which contains data for global stations. The variable average weekly temperature includes the average temperature for Madrid, Barcelona, Seville and Valencia for Spain, London, Cardiff, Glasgow and Belfast for the UK, Helsinki for Finland and Brussels for Belgium.

UK monthly unemployment data came from the UK National Statistics database, www.statistics.gov.uk. Spanish unemployment data were obtained from the Spanish National Institute of Statistics, www.ines.es. Finnish and Belgian unemployment data were collected from the International Labour Organization (ILO) database, www.ilo.org. Weekly film industry revenues were obtained from the webpage box office Mojo, www.boxofficemojo.com. This popular webpage includes data on the weekly box office revenues, in US dollars, of at least fifty countries. Values for box office revenues for each country were adjusted using the dollar annual general CPI and dividing by the population of each country, as reported in the EUROSTAT database, http://epp.eurostat.ec.europa.eu. Descriptive statistics are presented in Table 1.

Table 1 about here

Table 2a shows the number of new film releases during the key sports periods in the dataset, the European Championship 2008, the Football World Cup 2010 and the European Championship 2012, in comparison with the new film releases during the same period in the relevant previous year. No systematic patterns in the numbers of films released can be observed, comparing years in which international football tournaments do and do not take place.

Table 2a about here

Film companies' strategies regarding which films to release do not noticeably change either, indeed during the European Championship 2008 *Sex and the City* and *Indiana Jones and the Kingdom of the Crystal Skull*, during the World Cup 2010 *Shrek Forever and Ever* and *The Twilight Saga: Eclipse*, and during the European Championship 2012 *Prometheus* and *Snow White and the Huntsman* were on screens, all considered blockbusters and recording high box office revenues. Considering the total box office revenues *Sex and the City* ranked number 5

in the UK in 2008; *Indiana Jones and the Kingdom of the Crystal Skull* ranked number 4 in the UK in 2008; *Shrek Forever and Ever* ranked number 5 in the UK in 2010; *The Twilight Saga: Eclipse* ranked number 6 in the UK in 2010; *Prometheus* ranked number 10 in the UK in 2012 and *Snow White and the Huntsman* ranked number 22 in the UK in 2012. [3] Hence, film companies do not appear to avoid releasing potential blockbusters during major international football tournaments. Further, Figures 1 and 2 show the average production budgets and the production budget distributions in real terms per year (for the relevant months June and July) and country respectively. We observe that the quality of movies does vary per year during the months of June and July but this variation is not related to the football tournaments, for example the quality of movies shown in June-July Spain in 2010 (coinciding with the World Cup) was higher than in June-July 2011 (no football tournament), and in general there is an increase in quality in June-July 2012 (coinciding with the European Championship). [4] Moreover Table 2b shows the results for the Wilcoxon Matched Pairs (WMP) test, with production budgets across years for the months of June and July compared. Results indicate that any significant decrease or increase in quality as measured by film budgets does not appear to be related to whether there is a major international football tournament during the summer of any year. [5]

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[3] These data can be found in www.thenumbers.com

[4] We assume that production budget expenditure is a reasonable signal of movies' quality before release.

[5] Specific release dates of films per country are available on request. It could be argued that release dates change per country and movie, but this is not considered a significant issue in this paper as the differences between release dates with respect to blockbusters are not significant; for example *Twilight* was released in 2010 within one week for the four countries, when there was approximately one and a half weeks remaining until the end of the World Cup; and *Snow White and the Huntsman* was released in the four countries within a period of two weeks, during the 2012 European Championship.

Despite the lack of any significant difference in the quality of films shown across the years of the dataset, Table 3 indicates some tendency for box office revenues in the UK, and Spain in the latter stages of the competitions, to decrease during international football tournaments in comparison with box office revenues during the corresponding periods in the years before the tournaments. It appears that due to the participation of their national football teams in international football tournaments people may select not to go to the cinema in these countries during major international tournament periods, particularly in key periods of the tournaments for their national teams. The aim of the econometric analysis that follows is to quantify the magnitude of this effect.

Figure 1 around here

Figure 2 around here

Table 2b about here

Table 3 around here

Figures 3a, 3b and 3c provide further evidence that box office revenues decrease during major international football tournaments. During the European Championship in 2008 (Figure 3a) the only country in the sample participating was Spain and it can be observed that during the tournament weeks Spanish box office revenues decreased, until around the last week of the tournament when the Spanish team played in the final. A notable decrease in UK box office revenues can also be observed. During the World Cup in 2010 (Figure 3b), England and Spain were participating. British box office revenues clearly declined during the tournament and start to increase again after the round of sixteen when the England team was eliminated. Spanish box office revenues also declined when the championship started, reaching their lowest points when the Spain national football team was playing critical matches and started

rising again after the final week when Spain won the tournament. Finally, during the 2012 European Championship (Figure 3c) in which England and Spain both participated, the British box office revenues declined again and started to increase after the England team was eliminated from the tournament. Spanish box office revenues fell considerably during the last week when the Spanish team won the tournament. The econometric analysis which follows controls for other potentially confounding factors that may impact on box office revenues, such that the extent to which consumers substitute away from cinema admissions towards watching international football at times of major tournaments can be estimated.

Figure 3a about here

Figure 3b about here

Figure 3c about here

III. METHODOLOGY

A Difference-in-Difference (DiD) methodology is adopted, comparable to Metcalfe et al. (2011) and Lozano (2011), to examine the possible substitution between mega sports events and cinema admissions in Spain, the UK, Finland and Belgium. Assuming similar characteristics of people who watch sports events and go to cinema theatres, a possible causal relationship can be identified by examining the variation in per capita box office revenues across countries reflecting the timing of international football tournaments while controlling for fixed unobserved factors at a country level. In a difference-in-difference model, one treatment group is exposed to a treatment in one period but not in the others and the remaining control groups are not exposed to the treatment during any period. The difference-in-difference estimator will measure a double difference, one over time (before and during a

mega sports events take place) and across countries (between the treated and non-treated groups). The analysis is divided into two parts: first, all four countries are considered, and then to provide a robustness check, data just for Spain, Belgium and Finland are used.

In the first analysis there are two countries that participate in the tournaments, Spain and England. A difference-in-difference methodology is applied, similar to that in Autor (2003), who uses it to assess the contribution that different law employment doctrines adopted by 46 states had on the growth of employment in the USA. The key difference-in-difference variable in the current analysis is a dummy variable that will take the value unity for Spain during the period the tournaments take place, since in each of the football tournaments in the dataset (European Championship 2008, World Cup 2010 and European Championship 2012) the Spain football team was the winner; and for the UK[6] the dummy variable will be equal to unity during the periods the England team was in a tournament and zero after it was eliminated. The difference-in-difference variable for Finland and Belgium will always be zero, as neither of these countries participated in any of the tournaments. Account is also taken of fixed unobservable factors at the country level.

In the regression analysis, the differences in per capita box office revenues between the period of time when a sports event takes place and the same period of time in a different year are compared, when there is not any major international football event. The econometric analysis also controls for unemployment rates and weather conditions (temperature) in each country. In general, going to the cinema in the UK is more popular than in the other countries in the sample (Figure 4). Other relevant factors are disposable income and leisure time differences,

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[6] Note that the English team does not represent the whole UK. However, it is assumed that the different countries of England, Scotland, Wales and Northern Ireland may be interested in the performance of the English team even if not everyone may be hoping the English team wins.

proxied here by unemployment rate differences. According to the 2012 data, Spain had the highest unemployment rate amongst the four countries with 26.2% unemployment.

Figure 4 about here

Specifically, the following equation is estimated by ordinary least squares using country fixed effects:

$$Y_{ijt} = \alpha_0 + \beta_1 * UR_{itj} + \beta2 * Temp_{itj} + \beta_3 * Country_i + \beta_4 * Year_j + \beta_5 * DD_{jt} +$$

$$u_{ijt} \hspace{6cm} (1)$$

where Y_{ijt} corresponds to the per capita box office revenues in country i, week t and year j. UR_{itj} is the unemployment rate for country i in week t and year j. $Temp_{itj}$ is the weekly average of daily maximum temperatures for country i in week t and year j. $Country_i$ is a set of dummy variables which controls for pre-existing differences in country-specific box office revenues. $Year_j$ is a set of dummy variables which controls for pre-existing differences in time when a tournament is played.

The β_5 coefficient, associated with the interaction variable between country and time, is the difference-in-difference estimate that reveals the potential decrease on cinema tickets sales associated with the major sports events. This estimator is measuring the double difference, over time and across countries as explained above. This estimation method identifies a causal relationship between tournament participation and cinema audiences.

In equation (1) two teams were included who participated in the tournaments, the England and the Spain teams, but there is a concern that the results may be affected since the England team was eliminated before the final phase of the tournaments finished. Hence, the model is also estimated considering only Spain as treated during the tournament periods, leaving

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Finland and Belgium, which did not participate in any of the football tournaments, as untreated control group countries.

In order to find evidence of substitution between cinema admissions and mega sports events, β_5 in equation (1) should be negative. β_5 represents the change in box office revenues during a mega sports event. $\beta_5<0$ indicates that box office revenues are smaller during mega sports events and so a substitution between these two leisure activities can be observed. The coefficient β_5 therefore indicates how film industry revenues are affected in each country during a mega sports event.

IV. RESULTS

IV.1 Football Tournaments

The estimated coefficients for the above model are reported in Table 4. Results labelled (1) report the results when Spain and the UK are included in the sample, so Spain will be considered as treated during the tournament period and the UK will be considered as treated until the English team drops out of a tournament; Finland and Belgium will be considered untreated throughout. In results labelled (2) the UK is not considered and instead results are reported when Spain is the treated country and Finland and Belgium are the untreated countries.

In the first set of results, with Spain and the UK included in the sample, the coefficient on the difference-in-difference variable is negative and significant at the 1% level. The results support the idea that per capita box office revenues decrease significantly during tournaments, and a substitution effect between cinema admissions and mega sports events is identified. Specifically, the results suggest that box office revenues decrease around 15% per capita

during these tournaments. Yet while this coefficient highlights the substitution between leisure activities, other variables are also found to have a significant impact on per capita box office revenues. As suggested before, it is possible that the popularity of visiting the cinema is different across countries because of differences in weather conditions and unemployment levels. The coefficient on average maximum temperatures is significant; this suggests that even if evidence of substitution between visiting the cinema and viewing mega sports events can be identified, other variables also play an important role in explaining national differences in cinema attendance. Specifically, as temperatures in any week rise, per capita box office revenues can be expected to fall.

In the second set of results, in which Spain is the treated country and Finland and Belgium are the control countries, Spanish box office revenues are compared with Finnish and Belgian box office revenues, to confirm the substitution between cinema admissions and mega sports events exists. The coefficient on the difference-in-difference variable is negative and significant at the 1% level, so again the results support the notion that box office revenues decrease when a mega sports event take place. Specifically, the results suggest that box office revenues decrease around 18% per capita during major international tournaments. As in the first set of results discussed above, other key variables, temperature and unemployment, again have a significant impact on per capita box office revenues, with the magnitudes of the coefficients reassuringly similar. The coefficient on unemployment is significant and negative, indicating that as unemployment rises box office revenues will decline.

Table 4 about here

To check the validity of the control groups, Belgium and Finland, this paper considers as a control group USA, which although its national football team qualified for the World Cup in 2010, being eliminated in the round of 16; however the US is a good control to check the

robustness of the results for the European Championships in 2008 and 2010 by geographical location and because football tournaments may be less popular than in Europe. This paper has collected additional weekly data for box office revenues from 2007 to 2012 and quarterly unemployment data from the US Bureau of Economic Analysis. Below the results are shown when including the USA, Spain, and the UK; the DD coefficient is still negative and statistically significant. This indicates that even when including the US as a control we still can observe a decrease in box office revenues during major football tournaments, highlighting the robustness of our results.

Table 5 about here

IV.2 Further Robustness Tests

The key assumption of any difference-in-difference strategy is that the outcomes in the treatment and control groups would follow the same common time trend in the absence of the treatment (Figure 2)[7]. However, due to the pre-existing natural differences amongst the countries of the database, time trend and treatment trends interactions are included to check the robustness of the results above.

Including time trend and treatment trend interactions to equation (1) will allow for trend differences between treatment and control groups prior to the event. This method is used to check robustness in the literature when using a difference-in-difference methodology (Autor et al. 2006; Dachis et al. 2012). Specifically, equation (2) is estimated:

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[7] We assume the absence of pre-existing differences between the countries. However, the data in Figure 4 indicate that this issue needs further investigation through the use of robustness checks to be discussed below.

$$Y_{ijt} = \alpha_0 + \beta_1 * UR_{ijt} + \beta_2 * Temp_{ijt} + \beta_3 * Country_i + \beta_4 * Year_j + \beta_5 * DD_{jt} +$$

$$\beta_6 * trend + \beta_7 * Country_i * trend + u_{ijt} \qquad (2)$$

where *trend* indicates year, month or week and β_7 is associated with the treatment trend interactions.

The results in Tables 6 and 7 still indicate a significant and negative difference-in-difference coefficient which strongly supports the notion of a substitution between cinema admissions and mega sports events viewing. We note that the time trends seem to be significant too. These results support the data shown in Table 3, where box office revenues decrease during the summer period (June, July, August) but this decrease is higher if the national team of a specific country is participating in an international football tournament.

Of course it is possible that rather than switching from watching films at the cinema to watching international football matches, consumers rather choose to visit the cinema before and/or after a major international football tournament takes place. Hence, a final robustness check involved re-running regressions to test if per capita box office revenues were higher in any of the four weeks before and/or after a major international football tournament. No significant effect on per capita box office revenues either before or after these mega sports events could be identified, indicating that consumers switch between watching films and international football matches, rather than timing cinema visits not to coincide with international football tournaments.[8]

<div align="center">Table 6 about here</div>

<div align="center">Table 7 about here</div>

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[8] For the sake of brevity results are available upon request.

V. CONCLUSIONS

A difference-in-difference methodology has been applied to identify substitution between leisure activities. Specifically, the paper analyses the effect that mega sports events have on cinema admissions, using data from 2007 to 2012 for Spain, the UK, Belgium and Finland. The data comprise six years where there were two football European Championships in 2008 and 2012 and one football World Cup in 2010, providing a quasi-natural experimental setting for analysing choices amongst leisure activities. Spanish, UK, Finnish and Belgian box office revenues were first compared, and then Spanish, Finnish and Belgian box office revenues, to check if it was possible to observe a leisure activity substitution using the different control groups. Various forms of time trends were considered to check the robustness of results further. The results strongly support the idea that per capita box office revenues decrease when mega sports events take place. It is concluded that there is a clear substitution between cinema admissions and the viewing of mega sports events, specifically international football tournaments.

The results add to the economic literature finding significant negative spillover effects from holding or participating in mega-events. It is argued in this literature, for example, that domestic residents might leave their cities or countries when a major sporting event is being hosted (Golovnina, 2002). This paper highlights the presence of additional negative spillovers, in the form of displacement effects on other leisure industries when a large sports tournament takes place, even in a different country. These substitution effects are clearly not confined to the host country. Further research could usefully examine whether there are similar impacts on other leisure activities.

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Table 1: Descriptive Statistics

Country	Variable Definition	N	Mean	Std. Dev.	Max.
Spain	Average (weekly) Temperature (ºC)	300	19.86	7.30	39.90
	Weekly Real box office Revenues per capita $ (millions)	300	1.15	0.32	2.73
	Weekly Number Film Releases	300	62.72	18.65	101
	Monthly Unemployment (%)	300	17.01	5.72	25.02
UK	Average (weekly) Temperature (ºC)	300	10.31	4.92	22.10
	Weekly Real box office Revenues per capita $ (millions)	300	0.80	0.70	4.49
	Weekly Number Film Releases	300	48.81	21.61	90
	Monthly Unemployment (%)	300	7.27	1.23	8.70
Finland	Average (weekly) Temperature (ºC)	300	7.61	8.98	27.45
	Weekly Real box office Revenues per capita $ (millions)	300	0.81	0.29	2.24
	Weekly Number Film Releases	300	27.23	8.32	52
	Monthly Unemployment (%)	300	2.99	0.40	3.80
Belgium	Average (weekly) Temperature (ºC)	300	12.43	6.84	28.50
	Weekly Real box office Revenues per capita $ (millions)	300	1.26	0.47	2.94
	Weekly Number Film	300	47.31	10.10	66

Releases				
Monthly Unemployment (%)	300	7.50	0.56	8.60

Table 2a: New Releases during Major International Football Championships

European Championship 2008 New Releases					
Country	8-10 Jun 2007	15-17 Jun 2007	22-24 Jun 2007	29 Jun – 1 Jul 2007	Sum across weeks
UK	7	10	4	13	34
SPAIN	12	11	7	10	40
FINLAND	2	0	2	1	5
BELGIUM	8	6	9	7	30
	6-8 Jun2008	**13-15 Jun 2008**	**20-22 Jun 2008**	**27-29 Jun 2008**	
UK	7	9	9	5	30
SPAIN	5	8	9	3	25
FINLAND	3	2	0	3	8
BELGIUM	7	11	7	10	35
World Cup 2010 New Releases					

	12-14 Jun 2009	19-21 Jun 2009	26-28 Jun 2009	3-5 Jul 2009	10-12 Jul 2009	
UK	6	5	12	6	10	39
SPAIN	7	7	6	5	7	32
FINLAND	1	1	2	3	1	8
BELGIUM	7	4	5	7	8	31
	11-13 Jun 2010	**18-20 Jun 2010**	**25-27 Jun 2010**	**2-4 Jul 2010**	**9-11 Jul 2010**	
UK	3	5	4	3	4	19
SPAIN	8	9	10	5	5	37
FINLAND	4	4	0	3	3	14
BELGIUM	4	6	5	5	7	27
European Championship 2012 New Releases						

	10-12 Jun 2011	17-19 Jun 2011	24-26 Jun 2011	1-3 Jul 2011		
UK	7	12	7	6		32
SPAIN	6	8	6	9		29
FINLAND	4	3	0	5		12
BELGIUM	5	6	7	7		25
	8-10 Jun 2012	**15-17 Jun 2012**	**22-24 Jun 2012**	**29 Jun-1 Jul 2012**		
UK	7	19	10	14		50
SPAIN	10	10	5	3		28
FINLAND	1	1	1	3		6
BELGIUM	3	5	9	6		23

Note: The Table shows a comparison between film releases during the weeks mega sports events in the dataset take place and film releases during the corresponding weeks in the previous year. Data were obtained from www.boxofficemojo.com and the dates indicated are the end of each week of the tournaments.

Table 2b: Mean Comparison Test (WMP test)

Spain	2007	2008	2009	2010	2011
2008	-1.904 (0.057)				
2009	-2.042 (0.041)	-0.707 (0.479)			
2010	-0.643 (0.52)	1.863 (0.062)	2.487 (0.013)		
2011	0.637 (0.524)	3.424 (0.001)	3.730 (0.000)	1.988 (0.047)	
2012	-2.335 (0.019)	-1.326 (0.185)	-0.544 (0.587)	-2.871 (0.004)	-4.284 (0.000)
UK	2007	2008	2009	2010	2011
2008	-9.05 (0.365)				
2009	-2.394 (0.017)	-1.754 (0.079)			
2010	-1.428 (0.153)	-0.927 (0.354)	0.987 (0.324)		
2011	-1.882 (0.059)	-1.342 (0.179)	1.227 (0.219)	0.089 (0.929)	
2012	-1.974 (0.048)	-1.606 (0.108)	0.442 (0.659)	-5.93 (0.553)	0.266 (0.79)
Belgium	2007	2008	2009	2010	2011
2008	-1.860 (0.063)				
2009	-2.993 (0.003)	-2.308 (0.021)			
2010	-3.321 (0.001)	-2.157 (0.031)	0.226 (0.821)		
2011	-1.7 (0.089)	-0.47 (0.639)	2.354 (0.019)	2.07 (0.039)	
2012	-4.26 (0.000)	-4.805 (0.000)	-1.626 (0.104)	-2.126 (0.034)	-3.867 (0.000)
Finland	2007	2008	2009	2010	2011
2008	1.591 (0.112)				
2009	1.903 (0.057)	-0.072 (0.942)			
2010	1.439 (0.15)	-0.557 (0.577)	-0.534 (0.593)		
2011	1.495 (0.135)	-0.247 (0.805)	0.49 (0.624)	0.549 (0.583)	
2012	-2.252 (0.024)	-4.822 (0.000)	-4.079 (0.000)	-3.853 (0.000)	-3.787 (0.000)

Note: (1) Data for those films shown during the months June and July is included and tested as June and July correspond with the dates of the major international football tournaments considered in the analysis. (2) p-value in parenthesis.

Table 3: Box Office Revenues during Major International Football Championships

European Championship 2008 Box Office Real Revenues $millions				
Country	8-10 Jun 2007	15-17 Jun 2007	22-24 Jun 2007	29 Jun – 1 Jul 2007	Sum across weeks
UK	68,194	97,599	61,100	208,912	435,805
SPAIN	39,209	35,867	50,218	48,309	173,603
FINLAND	4,139	4,247	3,763	3,101	15,250
BELGIUM	8,056	8,861	16,769	12,797	46,483
	6-8 Jun 2008	**13-15 Jun 2008**	**20-22 Jun 2008**	**27-29 Jun 2008**	
UK	59,760	141,917	79,735	93,259	374,671
SPAIN	72,546	61,680	36,778	38,456	209,460
FINLAND	4,030	2,498	4,636	4,186	15,350
BELGIUM	12,951	10,206	10,972	11,019	45,148
World Cup 2010 Box Office Real Revenues $millions					
	12-14 Jun 2009	19-21 Jun 2009	26-28 Jun 2009	3-5 Jul 2009	10-12 Jul 2009	
UK	492,871	74,101	54,639	82,143	77,397	781,151
SPAIN	25,761	25,358	27,091	40,901	33,882	152,993
FINLAND	1,490	398	1,471	3,313	2,888	9,560
BELGIUM	5,274	6,809	7,579	9,647	15,012	44,321
	11-13 Jun 2010	**18-20 Jun 2010**	**25-27 Jun 2010**	**2-4 Jul 2010**	**9-11 Jul 2010**	
UK	87,272	54,580	39,610	31,440	23,915	236,817
SPAIN	37,328	34,235	34,892	27,794	20,165	154,414
FINLAND	1,978	2,140	3,521	2,393	344	10,376
BELGIUM	9,043	6,859	6,583	7,686	6,006	36,177
European Championship 2012 Box Office Real Revenues $millions					
	10-12 Jun 2011	17-19 Jun 2011	24-26 Jun 2011	1-3 Jul 2011	
UK	108,534	84,677	74,144	112,352	379,707
SPAIN	48,371	67,158	44,881	50,292	210,702
FINLAND	2,817	3,981	841	2,988	10,627
BELGIUM	11,284	12,693	13,436	14,612	52,025
	8-10 Jun 2012	**15-17 Jun 2012**	**22-24 Jun 2012**	**29 Jun-1 Jul 2012**	
UK	48,346	113,740	83,609	63,488	309,183
SPAIN	30,375	36,665	22,860	20,657	110,557
FINLAND	2,648	4,180	2,890	2,218	11,906
BELGIUM	6,527	10,929	10,039	10,237	37,732

Note: The Table shows a comparison between box office revenues during the weeks mega sports events in the dataset take place and box office revenues during the corresponding weeks in the previous year. Data were obtained from www.boxofficemojo.com and the dates indicated are the end of each week of the tournaments.

Table 4: Difference-in-Difference Regression Results

VARIABLES	(1) Real box office revenues per capita	(2) Real box office revenues per capita
Unemployment	-0.014***	-0.013***
	(0.004)	(0.004)
Temperature	-0.012***	-0.011***
	(0.002)	(0.002)
UK	-1.164***	
	(0.055)	
Finland	-0.628***	-0.615***
	(0.052)	(0.053)
Belgium	-0.126**	-0.113**
	(0.052)	(0.052)
Year 2008	-0.042	-0.003
	(0.043)	(0.043)
Year 2009	0.042	0.061
	(0.050)	(0.051)
Year 2010	0.019	0.011
	(0.052)	(0.052)
Year 2011	0.035	0.059
	(0.051)	(0.053)
Year 2012	-0.052	-0.088
	(0.058)	(0.058)
DD	-0.250***	-0.295***
	(0.046)	(0.058)
Constant	1.645***	1.610***
	(0.067)	(0.065)
Country clustered standard errors	Yes	Yes
N	1,184	884
R-squared	0.497	0.286

Note: (1) Adding the average temperature is a way of controlling for weather conditions which may vary between countries more than within the country. It can be confirmed that there were no extraordinary weather circumstances in any of the four countries during the relevant periods from 2007 to 2012, and so average temperature should be enough to control for weather conditions. To support this argument and to show that the results are robust, the regression has been run including daily rain data instead of average temperature data. Results are available to request (2) Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, *

p<0.10

Table 5: Difference-in-Difference Regression Results: Spain, UK, and USA

VARIABLES	(1) Real box office revenues per capita
DD	-0.0023***
	(0.000)
Constant	0.0135***
	(0.000)
S.E cluster	YES
Observations	1,983
R-squared	0.339

Note: (1) other controls have been considered: country dummy variables, year dummy variables, and monthly unemployment rates. (2) Data for the year 2010 has not been included as the US qualified for the World Cup 2010. (3) Robust standard errors in parentheses ***p<0.01, **p<0.05, *p<0.1

Table 6: Difference-in-Difference regression results: Spain, UK, Finland, Belgium common

trends

VARIABLES	(1) Real box office revenues per capita	(2) Real box office revenues per capita	(3) Real box office revenues per capita
Unemployment	0.025	0.016	-0.015***
	(0.015)	(0.016)	(0.004)
Temperature	-0.011***	-0.012***	-0.012***
	(0.002)	(0.002)	(0.002)
UK	-1.218***	-1.169***	-1.120***
	(0.085)	(0.082)	(0.086)
Finland	-0.735***	-0.675***	-0.567***
	(0.065)	(0.061)	(0.065)
Belgium	-0.187**	-0.123*	-0.106
	(0.078)	(0.064)	(0.075)
Year 2008	-0.166***	-0.117*	-0.042
	(0.064)	(0.063)	(0.043)
Year 2009	-0.290**	-0.176**	0.044
	(0.135)	(0.115)	(0.050)
Year 2010	-0.445**	-0.282*	0.021
	(0.180)	(0.159)	(0.052)
Year 2011	-0.529**	-0.325*	0.038
	(0.211)	(0.195)	(0.052)
Year 2012	-0.746***	-0.485***	-0.040
	(0.257)	(0.239)	(0.059)
DD	-0.241***	-0.244***	-0.247***
	(0.047)	(0.048)	(0.046)
Year*UK	0.129***		
	(0.047)		
Year*Finland	0.143***		
	(0.049)		
Year*Belgium	0.128***		
	(0.054)		
Month		-0.002	
		(0.005)	
Month*UK		0.008**	
		(0.004)	
Month*Finland		0.009**	
		(0.004)	
Month*Belgium		0.008*	
		(0.005)	
Week			0.003**

			(0.001)
Week*UK			-0.002
			(0.003)
Week*Finland			-0.003*
			(0.002)
Week*Belgium			-0.001
			(0.002)
Constant	1.321***	1.412***	1.589***
	(0.141)	(0.134)	(0.068)
Country clustered standard errors	Yes	Yes	Yes
N	1,184	1,184	1,184
R-squared	0.500	0.500	0.499

Notes: (1) Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.10. (2) In the first column of results, results are confirmed not to be affected by year trends; in the second column results are confirmed not to be affected by monthly trends; and in the third column results are confirmed not to be affected by weekly trends.

Table 7: Difference-in-Difference regression results: Spain, Finland, Belgium common trends

| VARIABLES	(1) Real box office revenues per capita	(2) Real box office revenues per capita	(3) Real box office revenues per capita
Unemployment	0.034**	0.030**	-0.013***
	(0.015)	(0.015)	(0.004)
Temperature	-0.011***	-0.011***	-0.012***
	(0.002)	(0.002)	(0.002)
Finland	-0.745***	-0.670***	-0.554***
	(0.066)	(0.062)	(0.066)
Belgium	-0.203***	-0.125*	-0.094
	(0.077)	(0.064)	(0.075)
Year 2008	-0.148**	-0.089	-0.003
	(0.062)	(0.063)	(0.043)
Year 2009	-0.339***	-0.215**	0.063
	(0.128)	(0.109)	(0.051)
Year 2010	-0.544***	-0.364**	0.013
	(0.173)	(0.158)	(0.053)
Year 2011	-0.603***	-0.371*	0.061
	(0.201)	(0.195)	(0.054)
Year 2012	-0.908***	-0.610**	-0.076
	(0.244)	(0.239)	(0.059)
DD	-0.268***	-0.273***	-0.290***
	(0.060)	(0.059)	(0.058)
Year*Finland	0.173***		
	(0.047)		
Year*Belgium	0.160***		
	(0.052)		
Month		-0.003	
		(0.004)	
Month*Finland		0.013***	
		(0.004)	
Month*Belgium		0.012***	
		(0.004)	
Week			0.003*
			(0.001)
Week*Finland			-0.003
			(0.002)
Week*Belgium			-0.001
			(0.002)
Constant	1.210***	1.267***	1.558***
	(0.132)	(0.124)	(0.066)
Country clustered standard errors	Yes	Yes	Yes
N	884	884	884
R-squared	0.295	0.295	0.289

Notes: (1) Robust standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.10. (2) In the first column of results, results are confirmed not to be affected by year trends; in the second column results are confirmed not to be affected by monthly trends; and in the third column results are confirmed not to be affected by weekly trends.

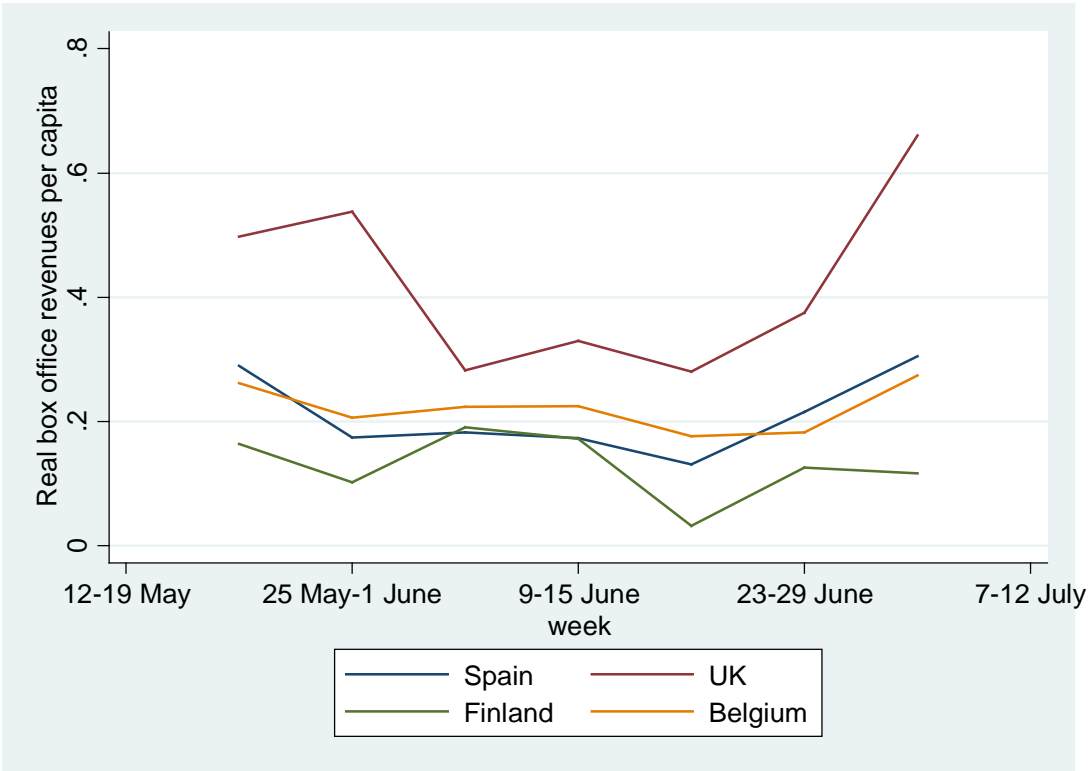Figure 1: Average Production Budget by year and country
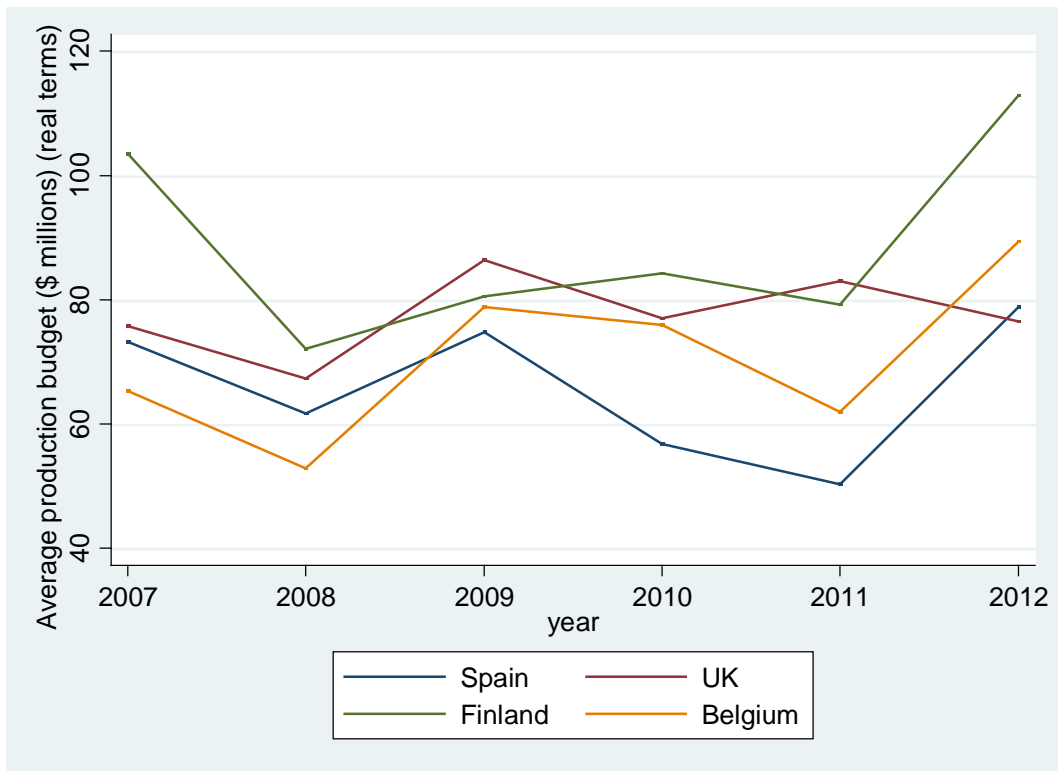
Note: Just data for those films shown during the months June and July is included.
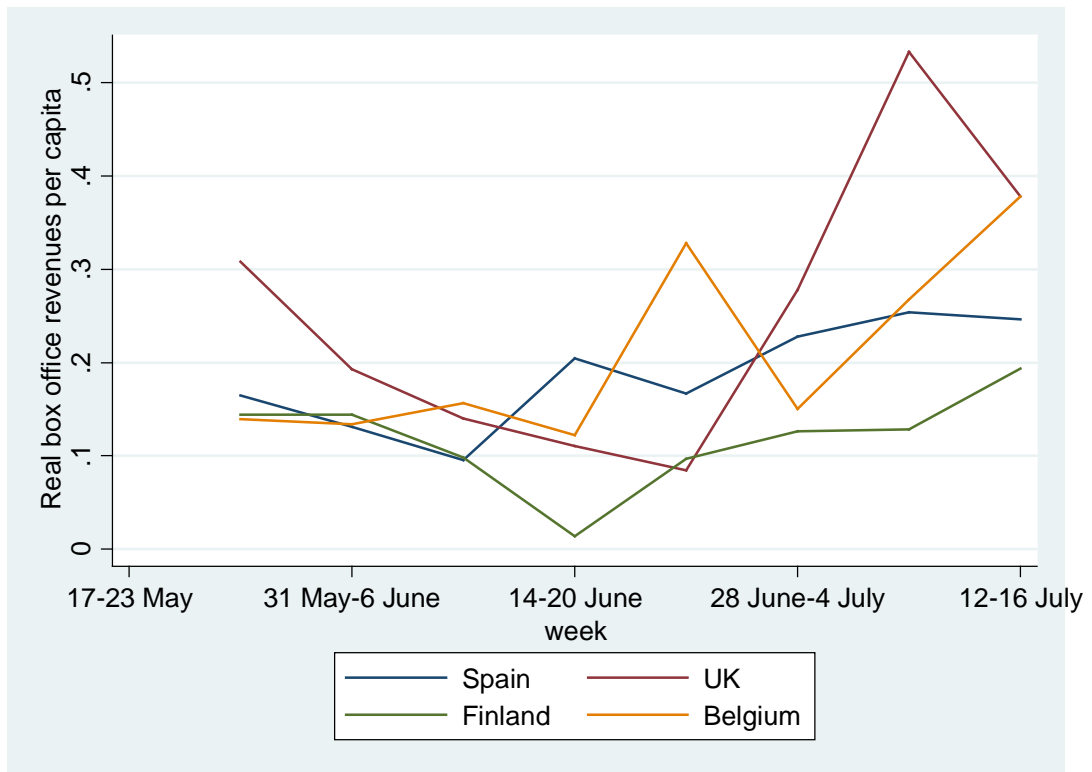
Figure 2: Production Budget Distributions
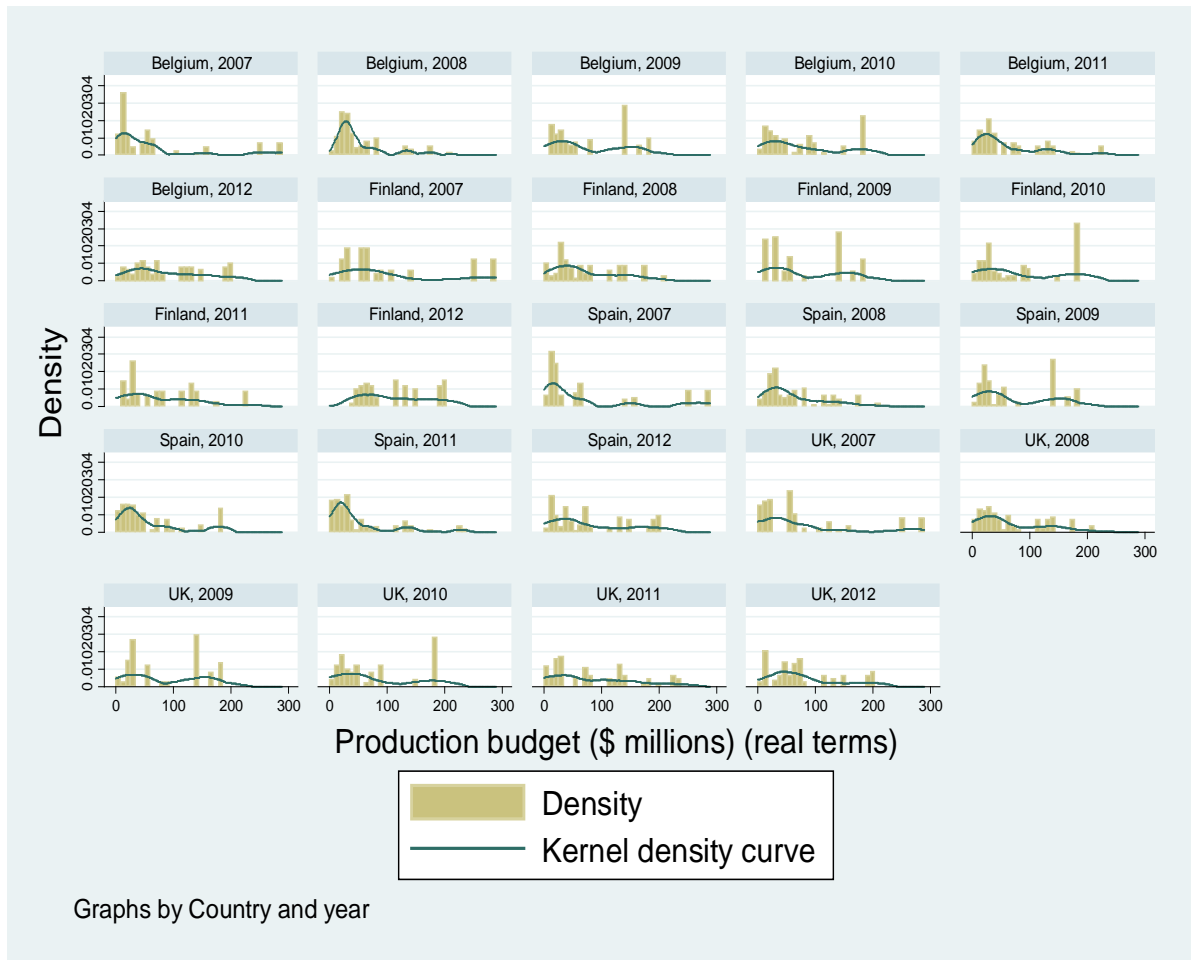
Note: Data for those films shown during the months of June and July each year are included.

Figure 3a: European Championship 2008 Film Revenues Per Capita
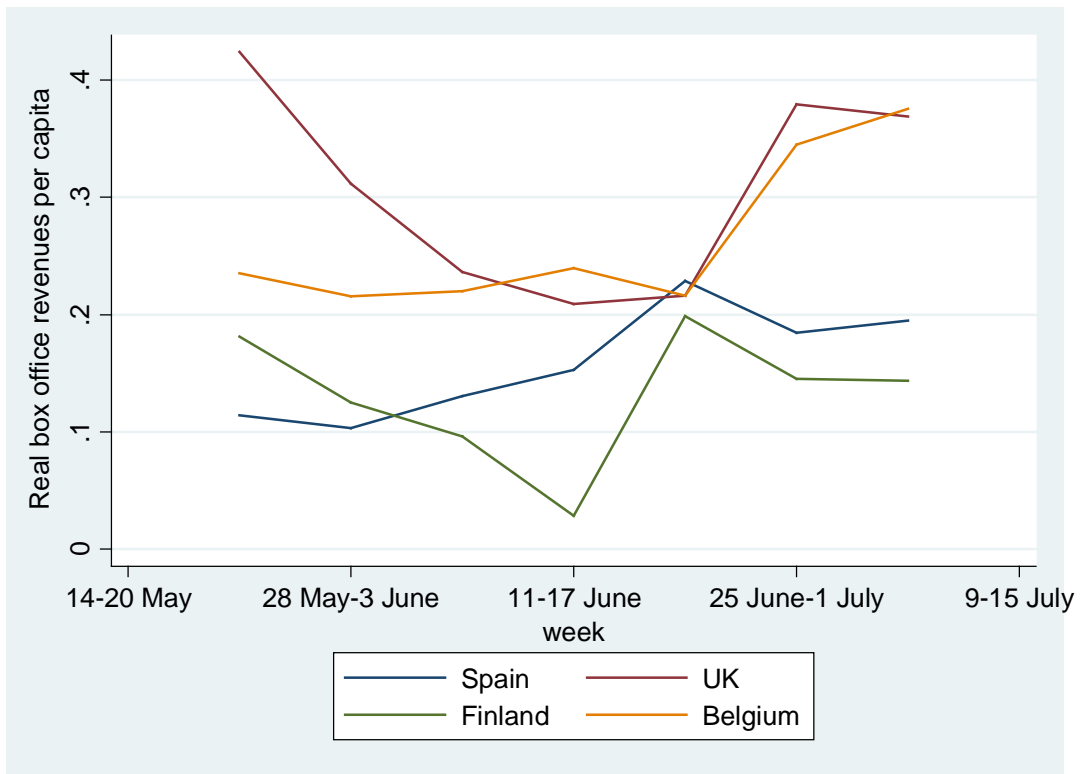

Note: The tournament was from the 7th June until the 29th June. England, Finland and Belgium did not participate.

Figure 3b: World Cup 2010 Film Revenues Per Capita

Note: The tournament was from the 11th June until the 11th July. Finland and Belgium did not participate and England was eliminated the 27th June.

Figure 3c: European Championship 2012 Film Revenues Per Capita

Note: The tournament was from the 8th June until the 1st July. Finland and Belgium did not participate and England was eliminated the 24th June.

Figure 4: Annual Box Office Revenues Per Capita