Measuring tourism and film relationship with panel one-way fixed and random data

Carmin Carmen Ludivina Montante[1]
Carlos Fong Reynoso[2]

Abstract:

Several studies have focused on the economic impact that can be attributed to films and series on tourism in a certain location. Many have focused on the general economic effects such as employment due to the increase of films or series. Others on the effects of film tourism on the overall image of a particular destination. In the case of Mexico, tourism contributes 8.4% to its overall GDP (INEGI, 2023). Through our study, we show how the films and series can contribute to tourism and through it to economic growth in developing countries in which tourism contributes significantly, like Mexico, by highlighting the overall Gross Production Output, intermediate consumption, and GDP of the filmmaking industry growth rates according to the satellite data account of culture in Mexico from 2015 to 2021 and proceeding to construct a econometric evaluation. The measurement is performed using a comparison of fixed and random panel data models and a set of tests that allow for us to measure the influence of film and tv series on tourism in Mexico so as to strongly suggest economic policies that will further benefit growth through the means of the film industry towards tourism.

Keywords: film tourism, economic impact, tourism growth, filmmaking industry, gross production output, econometric evaluation, developing countries tourism policy

1. INTRODUCTION

The correlation between film destinations and tourism is one that has been studied through various means including the financial spillover that can result into a particular place (Beeton, 2005; Busby & Klug, 2001; Evans, 1997; Osácar, 2018) The influence of film productions on tourism is one that has included a social analysis involving a case by case study that attempts to evaluate effect of movies in the cultural imagery of the destination (Camprubí, Guia & Comas, 2009; Croy & Walker, 2003; Kim & Richardson, 2003; Parra & Beltrán, 2016). These locations involve both external and internal variables that contribute to the economic growth experienced by the community from the involvement of the film industry within their geographical placement that can include a special emotional connection brought about by a particular scene in a movie or series, a psychological attachment to a particular celebrity or person, and a place seen as a representation of a cultural-religious symbolism (Lee, Scott &

[1] Guadalajara University (Mexico). carmin.montante7847@alumnos.udg.mx
[2] Guadalajara University (Mexico). carlos.fong@academicos.udg.mx

Kim 2008; Mordue, 2001; Russell, 2002). Despite these studies, rarely has one attempted to incorporate econometric models that can allow for a modeling of the formal relationship between tourism and the filmmaking industry along with a detailed possibility of modeling it in a per state bases to see the effects the location of film versus series production can have and doing so decide if implementing a strategic tourism-filming plan similar to that offered in other countries. The case of the UK and New Zealand for example has been one signaled out as possible success stories that can be incorporated in regional development policies in other countries (Sydney-Smith, 2006; Vila, Brea, & de Carlos, 2021; Wray & Cory, 2015).

In the case of Mexico, the situation in the film industry from 2016-2021 showed an average growth of up to 136.14% on average per GDP percentage growth amounts from data collected by INEGI (2022). Gross production output percentage growth from those same years have been up to 34.22%, although intermediate consumption growth percentage is at a -46.23% with 2020 hitting the industry heavily according to data analyzed from IMCINE annual reports (2022). The value added average amount towards the economy has been $16, 123.29 national currency. Although it is a small industry, it shows potential to be exploited economically if it can be perceived as such from a policy level. Most studies on the film industry in Mexico has focused on some aspects of the production, cultural, sociological, and politics with only a few touching upon its economic contribution to regional growth and possible ways of measuring its effect in tourism (Acevedo-Muñoz, 2003; Goldsmith & O'Regan, 2005; MacLaird, 2013; Muñoz-Larroa & Gómez-García, 2011).

These panel data models would allow for evidence that indeed films and series do contribute to tourism in a country and can account partially to the attractiveness of the state and economic growth. First, we will try to show how much each tourist location is related to films and series produced in the state and then the econometric measures that allow us to see how it is the production of films and series in the state that contribute to the tourism and not tourism to the films and series produced through analyzing panel data models that can be best suited for this analysis. Second, we will analyze what the results are telling us and what this means for policymakers looking to make informed economic decisions on investing in the filmmaking industry from not the area of the cultural department but alongside the tourism department as well. Lastly, we will provide suggestions for further studies in other countries that might be similar to Mexico or that might benefit from this study to make relevant economic decisions.

2. DATA DESCRIPTION

When analyzing the data that is necessary to compile a panel data in this study several variables need to be considered of importance and supported in previous research. The panel data model that will be explained under methodology is one commonly used in sociological-econometric research that incorporates panel data models (Bollen & Brand, 2010). This is due to the size of the market that is relatively small but that we want to measure using quantitative tools that will permit an objective analysis.

The variables considered were those used in previous studies involving both creative industries and those used in studies involving the flow of tourism (Bergua amores et al, 2016; Florida & Tinagli, 2004; Baños-Pino et al., 2021; Piergiovanni et al. 2011). By combining these two, we highlight that Filmmaking is considered part of the creative industry. It is important to note that data collected for short films included series (IMCINE Anuarios, 2022; INEGI 2022). The description of each variable can be seen in the below table 1.

Table 1. Description of variables used in study and its sources

Industry	Indicators	Reason	Data source	Authors
Tourism	Hotel stays	Approx. number of tourist	SATUR, 2015-2021	Baños-Pino et al. 2021
Culture	Featured films	Percentage of films produced by a state	IMCINE/INEGI, 2015-2021	Singh & Best, 2004
	Series and short films	Percentage of series and short films produced by a state	IMCINE/INEGI, 2015-2021	Cheng, Zhou, & Wei, 2015

In the following descriptive table, the observations collected in the case of national GDP and the value added of filmmaking production account for 7 observations. In the case of the panel data, the number of observations were 224 per variable which included 32 states in Mexico and the datasets available from 2015-2021 (Table 2). These years were selected since they are the years with the most complete data due to more recent attempts in keeping data from the filmmaking industry. Unlike tourism, the filmmaking industry has in recent years been attracting more attention and is becoming seen as a strategic industry that can add to economic growth for the country.

Table 2. General Data description analyzed throughout this study

Variable	Obs.	Median	SD	Var	Min	Max
Hotel stays	224	3.098	8.431	7.108	8.198	4.222
Featured films	224	2.000	6.969	4.857	0	5.400
Short films/Series	224	1.000	8.416	7.082	0	8.000

Short films account for both short films and series according to databases in both IMCINE and INEGI. According to data from IMCINE annual reports from 2015-2021, the average percentage of animated short films and series was 8%, in documentaries 25% and fiction 69%. Since the data is limited and due to previous studies suggestions, we have presented the average GDP and value-added as the background information of Mexico and have kept the Hotel stays, Featured films, and short films/series as data for our panel that is focused on understanding their relationship with each other. This is an attempt of providing a better picture of the situation in developing countries like Mexico and to provide a more robust study.

3. METHODOLOGY

A panel data one-way fixed effect was seen fit to analyze the relationship between each variable and whether or not one would influence the other considering the following equation

for fixed effect panel data following similar work presented by Bollen & Brand (2010) and Baltagi (2005).

(1)$V_{i,t} = B_{vFeatredt}Featured_{it} + B_{vSeriest}Series_{it} + State_i + \varepsilon_{it}$ (1)

in which $V_{i,t}$ is the number of visitors per state for each case of the sample and t refers to the time period, $Featured_{it}$ is one vector of time-varying covariates for the case at t time period of featured films, $B_{vFeaturedt}$ is the row vector of coefficients that impact $Featured_{it}$ on $V_{i,t}$ at the specific t, $Series_{it}$ is the vector of observed time-variant covariates for short-films which include series for the case at t time period in which $B_{vSeriest}$ is its row vector of coefficients for the case at time t, $State_i$ is a scalar of all other latent time-invariant variables that influence $V_{i,t}$, and ε_{it} is the random disturbance for each case in time with $\mathrm{E}(\varepsilon_{it}) = 0$ and $E(\varepsilon_{it}^2) = \sigma_{\varepsilon t}^2$. assuming that ε_{it} is uncorrelated with $Featured_{it}$, $Series_{it}$, and $State_i$ in the one-way random effect model the equation is

(2) $V_{i,t} = B_{vFeatred}Featured_{it} + B_{vSeries}Series_{it} + State_i + \varepsilon_{it}$ (2)

in which all variables are similarly defined as mentioned for the fixed effect panel model. However, the difference being, that in the random effect we assume that the effects of $Featured_{it}$ and $Series_{it}$ on $V_{i,t}$ do not change over time. this is why $B_{vFeatred}$ and $B_{vSeries}$ are assumed to be the same values over each variable without considering time. the hausmann test was carried out to determine the plausibility of the fixed effect versus the random effects model (Greene, 1997).

4. RESULTS

The results of the panel data using the fixed effects model showed the most significant year as being 2020 due to the pandemics and with a 0.5 significance level for featured films filmed (Table 3).

Table 3. Results for fixed effect model (*Significance:(***)0.001, (**) 0.01, (*) 0.5(.)0.1)

Variables	Estimate	Std. Error	T-ratio	Probability
Featured	6.60E+07	3.02E+07	2.1868	0.0299776*
Series	4.23E+06	1.12E+07	378	7.058.146
2016	4.29E+05	2.06E+06	2.087	8.349.005
2017	1.01E+06	2.04E+06	4.954	6.208.884
2018	1.65E+06	2.04E+06	8.109	4.184.446
2019	1.33E+06	2041708	6.522	5.150.917
2020	-7.54E+06	2131124	-35.398	0.0005035***
2021	-3.11E+06	2048464	-15.191	1.304.035
R-squared	1.32E-01	Adjusted R-squared	-5.10E-02	
F-statistic	3.60E+00	Prob (F-statistic)	6.37E-04	

For the fixed effect model, as for the random effect model, both 2020 and featured films strongly influenced visitor numbers to a state whereas only a 0.1 significance level was found in locations that series and short-films were produced (Table 4). The Hausman test showed that the null hypothesis holds in which the random effects model is preferred (Table 5).

Table 4. Results for Random effect model

Variables	Estimate	Std. Error	T-ratio	Probability
Intercept	2.15E+06	2.38E+06	9.037	36.616
Featured	1.55E+08	1.34E+07	11.5774	2.2e-16***
Series	1.85E+07	1.04E+07	1.7748	0.07593 .
2016	2.11E+04	2.09E+06	101	99.197
2017	8.93E+05	2.08E+06	4.299	6.673
2018	1.65E+06	2.08E+06	7.953	42.643
2019	1.00E+06	2.08E+06	4.821	62.977
2020	-9.38E+06	2.10E+06	-44.765	7.588e-06***
2021	-3.74E+06	2.08E+06	-17.964	0.07242 .
R-squared	5.95E-01	Adjusted R-squared	5.81E-01	
Chi-square	3.27E+02	Prob (F-statistic)	2.22E-16	

*Significance:(***)0.001, (**) 0.01, (*) 0.5(.)0.1

Table 5. Results for Hausman test

	Res.Def	Df	P-value
Chi2	10.818	8.00E+00	2.12E-01

*Significance:(***)0.001, (**) 0.01, (*) 0.5(.)0.1

As for evaluating in which direction is the relationship between number of visitors to the number of featured films and series, the granger test was used. The results show that visits to featured films are insignificant compared to featured films to visitors in a state with a 0.0001 significance level (Table 6). In the case of series the same results were found in which series will influence the number of visitors with a 0.001 significance level (Table 7).

Table 6. Results for Granger test for Featured to visits relationship

	Res.Def	Df	F	Probability
Visits to Features	228	-1.00E+00	3.26E-01	5.689
Features to Visits	228	-1.00E+00	1.32E+01	0.0003385***

*Significance:(***)0.001, (**) 0.01, (*) 0.5(.)0.1

Table 7. Results for Granger test for Series to visits relationship

	Res.Def	Df	F	Probability
Visits to Series	228	-1	3.473	5.562
Series to Visits	228	-1.00E+00	3.40E+01	1.886e-08***

*Significance:(***)0.001, (**) 0.01, (*) 0.5(.)0.1

Despite Mexico having a relatively small filmmaking industry, it nonetheless shows a clear relationship between films and tv series induced tourism. This along with market information shows Mexico as an example of a market with potential in this sector to create policies that will allow for a stronger coordination between films, TV series, and tourism.

5. DISCUSSION

We consider the panel data model one that can help in the analysis of the effects of featured films and short films in further economic growth analysis for a given state or country especially in developing countries similar to Mexico in which a correlation can be measured and further policy evaluation can be pursued to apply it to the decision making. From a policy perspective, although the filmmaking industries and series do not have a huge impact on its overall economic production at this time, it should be seen as a potential force in the future. With this study we are now more certain that featured films and short films can contribute to tourism and can further the growth of tourism in the country. While also keeping in mind of course the role of latency between the viewing and the actual traveling factors that might influence decision making for the tourist (Contu & Pau, 2022). In addition, it is important to aim in retaining a cultural and emotional response by the viewers since the tourist will feel a need to connect to the particular location (DeNian, YongBo & XiangDong, 2015). For this a positive image in films and series is highly suggested since it can provide an economic incentive to travel and invest (Camprubí, Guia & Comas, 2009; Croy & Walker, 2003; Kim & Richardson, 2003; Lee, Scott & Kim 2008; Parra & Beltrán, 2016). Lastly, with this additional information and evaluation, a proper cultural-economic policy can provide for regional and national level economic growth.

6. CONCLUSION

Since Mexico is showing already an interest in growing and investing in its films and TV series as reported in data analyzed from the IMCINE annual reports (2021) and the quantitative relationship between films, TV series, and tourism, this study shows that economic policy development in Mexico should involve filmmaking industry and tourism sector in promoting tourism and a positive cultural image (Araújo, Brea & Carlos, 2021; Sydney-Smith, 2006; Wray & Cory, 2015). It is suggested that future studies should include further application of the research by state level so as to help in deciding where further aid towards this industry should go since the benefits of it will be seen from a national level. At the state level economic policies that favor and encourage filmmaking industries should be taken into consideration since it can be an asset to touristic attractions and potential economic growth. Along with consideration of using panel data analysis alongside qualitative research that indicates clearly whether a particular tourist visit was triggered by a TV series and film, so as to identify such films and use them as promotional material for attracting tourists similar to cases worldwide. Finally, it is advised to have a strategic planning in place to ensure that the location is ready to receive a large influx of tourist since there should be enough establishments and amenities available for visitors to help promote an ongoing sustainable tourism (Araújo, Brea & Carlos, 2021; Beeton, 2005; Busby & Klug, 2001; Evans, 1997; Osácar, 2018).

REFERENCES

Aceves-Muñoz, E. R., (2003). *Buñuel and Mexico. The Crisis of National Cinema*; University of California Press: Berkeley, 202-248.

Almeida-Santos, C., & Buzinde, Ch. (2007). Politics of identity and space: representational dynamics. *Journal of travel research*, 45(3), 322-332.

Andsager, J. L., & Drzewiecka, J. A. (2002). Desirability of differences in destinations. *Annals of tourism research*, 29(2), 401-421.

Araújo, N., Brea, J. A., & Carlos, P. (2021). Film tourism in Spain: Destination awareness and visit motivation as determinants to visit places seen in TV series. *European Research on Management and Business Economics*, 27(1), 100135.

Baltagi, B.H. (2005). *Econometric Analysis of Panel Data*. 3rd ed.; John Wiley & Sons Inc.: New York.

Baños-Pino, J. F., Boto-García, D., Del Valle, E., & Sustacha, I. (2023). The impact of COVID-19 on tourists' length of stay and daily expenditures. *Tourism Economics*, 29(2), 437–459.

Breton, S. (2005). *Film-induced tourism*; Channel View Publications: Chichester.

Bergua Amores, J. Á., Pac Salas, D., Báez Melián, J. M., & Serrano Martínez, C. (2016). La clase creativa. Una aproximación a la realidad española. *Revista Internacional de Sociología*, 74(2), e032.

Bollen, K. A., & Brand, J. E. (2010). A general panel model with random and fixed effects: A structural equations approach. *Social Forces*, 89(1), 1–34.

Busby, G.Y., & Klug, J. (2001). Movie-induced tourism: The challenge of measurement and other issues. *Journal of Vacation Marketing*, 7(4), 316-331.

Camprubí, R., Guia, J., & Comas, J. (2009). The formation of the induced tourist image: A conceptual model. *Pasos*, 7(2), 255-270.

Contu, G., & Pau, S. (2022). The impact of TV series on tourism performance: the case of Game of Thrones. *Empirical Economics*, 63(6), 3313–3341.

Croy, W.G., & Walker, R.D. (2003). Tourism and film: Issues for strategic regional development. In *New Dimensions in Managing Rural Tourism and Leisure*, Mitchell, M., Kirkpatrick, I., Eds.; Scottish Agricultural College: Ayr, 115-133.

DeNian, C., YongBo, Z., & XiangDong, W. (2015). A structure comparison between tourism short films and promos based on content analysis. *Tourism Tribune*, 30(10), 109–121.

Evans, M. (1997). Plugging into TV tourism. *Insights March*, 3, 35-38.

Florida, R., & Tinagli, I. (2004). *Europe in the Creative Age*. *Report*; Carnegie Mellon Software Industry Center: Pittsburg.

Goldsmith, B., & O'Regan, T. (2005). *The film studio: film production in the global economy*. Rowman & Littlefield: New York.

Greene, W.H. (1997). *Econometric Analysis*. 3rd ed.; Prentice-Hall: Upper Saddle River, New Jersey.

Grihault, N. (2003). *Film tourism - The global picture;* Mintel International Group Ltd: London.

Gundle, S. (2002). Hollywood glamour and mass consumption in postwar Italy. *Journal of Cold war studies*, 4(3), 95-118.

Hahm, J., & Wang, Y. (2011). Film-induced tourism as a vehicle for destination marketing: is it worth the efforts? *Journal of travel & tourism marketing*, 28(2), 165-179.

Hudson, S. (2011). Working together to leverage film tourism: Collaboration between the film and Tourism Industries. *Worldwide Hospitality and Tourism Themes*, 3(2), 165–172.

Iwashita, C. (2006). Roles of films and television dramas in international tourism: The case of Japanese tourists to the UK. In *The International Conference on Impact of Movies and Television on Tourism Conference Proceedings*, Chon, K., Chan, A., Eds.; The Hong Kong Polytechnic University: Hong Kong.

Kim, H., & Richardson, S. L., (2003). Motion picture impacts on destination images. *Annals of Tourism Research*, 30(1), 216-237.

Lee, S., Scott, D., & Kim, H. (2008). Celebrity fan involvement and destination perceptions. *Annals of Tourism Research*, 35(3), 809-832.

López, E., & Osácar, E. (2006). Tourism Destination Placement: la imagen de los destinos turísticos a través de los largometrajes en el caso de Barcelona. In *OcioGune: el ocio de las disciplinas y áreas de conocimiento: comunicaciones*, Aguilar Gutiérrez, E., Rubio Florido, I., Eds.; Universidad de Deusto: Bilbao, 123-134.

Maclaird, M. (2013). *Aesthetics and politics in the Mexican film industry*; Palgrave Macmillan: Basingstoke.

Mordue, T. (2001). Performing and directing resident/tourist cultures in Heartbeat country. *Tourist Studies*, 1(3), 233-252.

Muñoz Larroa, A., & Gómez García, R. (2011). Análisis de la producción cinematográfica en la Ciudad de México 2006-2008. *Estudios sobre las Culturas Contemporáneas*, 17(34), 31-64.

Osácar, E. (2018). Cinematographic tourism. In *Spanish tourism activity in 2017,* Alén, E., Calero, F., Dirs.; Edition AECIT and Synthesis: Madrid, 351-358.

Parra, M.C.Y., & Beltrán, M.A. (2016). *Marketing strategies for tourist destinations*; UCAM Publications: Murcia.

Piergiovanni, R., Carree, M. A. & Santarelli, E. (2011). Creative industries, new business formation, and regional economic growth. *Small Business Economics*, 39(3), 539-560.

Russell, C. A. (2002). Investigating the effectiveness of product placements in television shows: The role of modality and plot connection congruence on brand memory and attitude. *Journal of consumer research*, 29(3), 306-318.

Singh, K., & Best, G. (2004). Film-Induced Tourism: Motivations of Visitors to the Hobbiton Movie Set as Featured in The Lord Of The Rings. In *International Tourism and Media Conference Proceedings*, Frost, W., Croy, G., Beeton, S., Eds.; Tourism Research Unit, Monash University: Melbourne, 98-111.

Suhud, U., Handaru, A. W., Allan, M., & Wiratama, B. (2021). Turkish destination image and attitude toward Turkish television drama. In *Promoting Creative Tourism: Current Issues in Tourism Research*; Routledge: London, 223-229.

Sydney-Smith, S. (2006). Changing places: Touring the British crime film. *Tourist studies*, 6(1), 79-94.

Valdez Alvarado, L., Arriaga Molina, D., Urbina Islas, A., & Cortés Aguirre, A. (2012). *Imcine-AnuarioCineMx;* Instituto Mexicano de Cinematografía: Ciudad de México.

Wray, M., & Croy, W. G. (2015). Film tourism: Integrated strategic tourism and regional economic development planning. *Tourism analysis*, 20(3), 313-326.