

Quantifying Regional Film Tourism: Impacts of *The Hangover* on Las Vegas

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ABSTRACT

The use of incentives to attract movie and TV show production to stimulate economic development has gained popularity in local development bodies and state legislatures even though gains from such activities remain unclear at the regional level. One such argument advanced by proponents of the film industry is that exposure of a place used as a film location will result in increases in tourism. Film – a term encompassing both movies and TV shows – has been shown to positively impact tourism in very small communities and at a national level, but not for anything in between. This paper begins to fill this gap by analyzing how The Hangover influenced tourism and gambling revenues in Las Vegas, Nevada. Overall tourism is found to have increased following the film even though convention attendance declined. Gross gaming revenues were not statistically impacted. These results imply that regional and state policy makers should exercise caution when using film as a development strategy.

Keywords

Film tourism, gaming, regional development

INTRODUCTION

In 2009 the city of Las Vegas, Nevada was featured in the popular motion picture *The Hangover*. The resulting worldwide exposure has since been touted as a motivator of tourism to Las Vegas (Lawrence 2013). Six years later, the Nevada Film Office continued to promote this idea, tweeting in October of 2015 that “[t]he Hangover had major economic impact on Las Vegas and as of 2013, people continuously quote the film at Caesars Palace” (Nevada Film Office 2015). In spite of this anecdotal evidence, the impact on tourism from this film has yet to be formally quantified. If the *Hangover* has had an impact on tourism to Las Vegas, what was it?

Encouraging film production as an economic development strategy has been a popular strategy among state and local policymakers for many years.¹ The purported benefits are two-fold. First, there is the increased economic activity that accompanies the film production process. Local goods and services including labor are employed, and out-of-state personnel are fed and housed. Second, the increased exposure of the

¹ See Adkisson (2013) for an explanation of the proliferation of film tax credits over the last few decades.

locations used in filming lead to an increase in tourism that benefits the local economy long after filming concludes.

Most states have film commissions that exist to encourage film production within the state, and Nevada is no exception. As of July 1, 2015, films were eligible for a 15% transferable tax credit on resident wages and other qualified production costs, with non-resident wages eligible for tax credits of 10% or 12%, depending on the type of labor. The tax credits for any single production is capped at \$6,000,000, with the program itself capped at \$20,000,000 per fiscal year (Nevada Revised Statute 360, “Transferable Tax Credits for Film and Other Productions”).²

The notion that film production influences tourism seems to have become part of the conventional wisdom. Still, the mechanisms through which films influence tourism and the extent of the actual impacts have not been clearly established.

LITERATURE REVIEW

Questions about the ways in which films impact tourism are the source of a small but growing body of social science literature. These studies typically take one of two approaches, either by trying to better explain how films influence tourism, or by attempting to quantify tourism changes in locations featured on movie and television screens. Both of these approaches are valuable. The former constitutes the majority of film tourism research and deals with the ‘how’ question: how do movies and TV shows influence individuals in their choices of locations to visit? The latter studies seek to answer the ‘what’ question: what is the impact of a movie or a TV show on the number of tourists visiting a location? This paper centers on the latter while touching on the former, so both types of literature are discussed below.

Film Tourist Motivation

Dann (1981) provides an early summary of the main motivations driving tourism. Later, Croft (1989) turned specifically to the study of film-motivated tourism by exploring how the movie *Crocodile Dundee* was edited specifically to reshape the image of Australia abroad. Riley and Van Doren (1992) continued in this vein by exploring how *The Man from Snowy River* and the *Crocodile Dundee* and the *Mad Max* franchises helped to create a new international image of Australia. They proposed that these films increased tourism to Australia, at least in part, because “[e]ach setting demonstrated a unique [Australian] physical splendor” while also acknowledging that the actual increase to tourism was difficult to quantify (pg. 274). More recently, Jewell and McKinnon (2008) concluded that exposure to a location through film “becomes an additional layer to the ongoing and evolving changes within cultural landscapes” which can serve as an “incentive for an individual to travel” (pg. 160).

Experiments aimed at revealing the extent to which films can drive tourism usually show a film (or segments of a film) to an audience to determine how the subjects’ perception of the film’s location is influenced. In one study college students were exposed to the city of Vienna through the movie *Before Sunrise*. The study’s authors hypothesized that for “certain types of place-oriented movies, viewers are offered the opportunity to learn about the place by imaginatively participating in the place-related experiences of the characters” (Kim & Richardson [2003], pg. 221). They concluded that their subjects’ interest in visiting Vienna increased as a result of watching the film but that outcome was not influenced by the subjects “level of empathetic involvement with the film characters” (Kim & Richardson [2003], pg. 221).

² The Nevada film tax credit program was approved in 2013 by the Nevada legislature, four years after *The Hangover* debuted (Lang and Brown, 2014).

Using segments from the film *Lost in Translation*, set in Tokyo, Japan, Hahm and Wang (2011) conducted a similar experimental study. They found that their undergraduate subjects increased their interest in visiting Japan a result of exposure to the film, although this effect appeared to strengthen existing interest rather than create new interest. In their words, “the viewing of the film created a stronger intention to visit the destination in the near future” (pg. 176). Hudson, Wang, and Gil (2011) similarly found that undergraduate students who watched the *Motorcycle Diaries* exhibited an increased desire to visit the regions of South America depicted in that movie.

Other researchers have used surveys to explore the extent to which area’s tourism stems from film exposure. Im and Chon (2008) surveyed visitors to Salzburg, Austria, and determined that watching *The Sound of Music* “influenced visitors in selecting the film locations as their travel destination” (pg. 229). Busby and Klug (2001) interviewed visitors to Notting Hill in London, the location of a film by the same name. More than half of the visitors to Notting Hill had watched the movie *Notting Hill*, yet only about five percent of the respondents identified the film as the reason for their visit. Even though just a fraction of the total visitors cited the film as the reason for their visit, the authors noted that the other visitors who saw the film were likely influenced to some degree even if the film itself was not the main reason for most visitors to make the trip to Notting Hill.

Young and Young (2008) addressed the difficulty of determining the degree to which film influences tourism choices. They suggested that by aggregating evidence a researcher can determine the overall visitation impact of a film. Similar to the approach taken by Busby and Klug (2001), Young and Young (2008) chose to employ a questionnaire to be administered to subjects (visitors to the London Eye and to Oxford) at specific locations in a larger city. Moving beyond simple binary choices, they developed a fractional framework in which subjects were allowed to reveal the relative influence of a film on their travel decision. They then aggregated the amount by which each tourist was influenced by a film to see the overall impact. For example, if a film accounted for 20% of the motivation for the average tourist, then one could say that 20 out of every 100 visits are attributable to the film. By combining the influence of a film on many travelers, Young and Young posited the idea that a film may contribute to a significant increase in tourism even if no single visit was 100% influenced by a film.

In presenting this idea of film tourism fractionally, Young and Young touched on the question addressed in the other main vein of the film tourism literature: what is the overall impact of a film on tourism? For policy makers this is the more pressing question. If public funds are spent to encourage filming in a given location, it is important to know what increase in tourism may result from the increased exposure created by the film.

Quantifying Film Tourism

Research quantifying film-driven increases in tourism goes back more than two decades. Riley and Van Doren (1992) showed that *Deliverance*, *Dances with Wolves*, *Close Encounters of the Third Kind*, and *Field of Dreams* all increased tourism to the movies’ settings. Curiously, they found *Thelma and Louise* drove increased tourism to the filming location in Utah even though the movie was fictionally set in New Mexico. One commonality of these places is their size. Since each was a relatively small place, with relatively little tourism to the location before being exposed to international audiences via their respective films, the before-after comparison was relatively easy to interpret. Many of the studies completed in the two decades since continued to quantify film tourism impacts from movies and TV shows filmed in very small, often rural, communities.

Tooke and Baker (1996) analyzed the impact of four television series on the rural areas in the United Kingdom which they are each set. They found that these series attracted visitors to the locations featured on-screen. They further linked the increase in tourism to the popularity of the show. Connell and Meyer (2009) conducted a similar study interviewing visitors to a film location featured in the TV show *Balamory*

on the Isle of Mull in Scotland. Busby, Huang, and Jarman (2013), demonstrated that tourism to the small Cornish town of Padstow increased following the BBC TV series *Taste of the Sea*.

Riley, Baker, and Van Doren (1998) looked at the tourism impacts of 12 movies set in various places in the United States. As part of their selection criteria, Riley et al. (1998) choose successful films, emphasizing the importance of commercial success in stimulating measurable impacts on tourism. Nearly all of the locations they analyzed were small and rural areas, with the notable exception being the book depository in Houston that was featured in the movie *JFK*. Nonetheless, this last example is not measuring tourism at the larger level, but rather at a very local level within a larger urban area. In general, Riley et al. (1998) found that these popular films significantly increased tourism to their respective film locations.

Some studies that quantify the amount of film tourism have looked at the broader, national picture. Grihault (2003) is one such example of national case studies. Using percentage changes in annual visitor numbers, she showed that *The Beach* increased visits to Thailand and that *Lord of the Rings* increased visits to New Zealand. Grinhault (2003) also looked at some specific locations in England that were highlighted in *Harry Potter and the Sorcerer's/Philosopher's Stone*, but here again she used only the percentage changes in annual visitor numbers. A 2006 article in *Forbes* by Greenburg cited that traffic doubled to the Embassy of Kazakhstan's website in the months following the release of *Borat*, which was theoretically based in Kazakhstan. Mitchell and Stewart (2012) documented increased employment in Kazakhstan following the release of *Borat*, though their main focus was on the film tourism in New Zealand and Australia. Using visitor arrivals, they measured the tourism impacts in New Zealand from the *Lord of the Rings* trilogy and in Australia from the *Mad Max* and *Crocodile Dundee* franchises. With the exception of the third *Crocodile Dundee* movie, they found that tourism to the respective featured country increased following the release of each of these films.

RESEARCH QUESTION

While film has been shown to positively impact tourism in very small communities and at a national level, it has not yet been shown to impact tourism at the levels in between. This paper beings to fill that gap by asking what impacts, if any, occur in a non-rural yet sub-state entity featured as a film location. Many locations in Las Vegas, Nevada, were featured prominently in the 2009 major motion picture *The Hangover*, for example Caesar's Place, the Riviera, and the street in front of Atomic Liquors.

Using data from quarterly reports published by the Nevada Commission on Tourism, the sections below analyze how *The Hangover* impacted tourism to Las Vegas. In particular, three aspects of tourism are examined. First, the overall impact of the film on visitation numbers is estimated. Second, the impact on a key tourism demographic, convention attendees, is explored. Third, the impacts on gross gaming revenue are analyzed. The constellation of these three results paint a robust picture of the overall impacts.

MATERIALS AND METHODS

This study employs a time series approach to analyze how *The Hangover* impacted tourism to Las Vegas. The analysis roughly follows the methodology of Mitchell and Stewart (2012), adding a comparison to Washoe County in Northern Nevada as an extra control. Washoe County is home to the second largest city in Nevada – Reno – and contains a number of casinos in both Reno and along the north shore of Lake Tahoe in the town of Incline Village. The following equation is estimated for both Las Vegas and Washoe County from 2003 through 2014 using Autoregressive Moving Average (ARMA) terms where appropriate:³

³ ARMA terms were selected by comparing fit as determined by AIC and BIC. These values were nearly always in agreement. The ARMA terms are not reported herein, but can be supplied by the author upon request.

$$\ln(V_t) = \beta_0 + \beta_1 T_t + \beta_2 H_t + \beta_3 (T_t \times H_t) + \beta_4 R_t + \beta_5 PR_t + \beta_6 Q_2 + \beta_7 Q_3 + \beta_8 Q_4 + \varepsilon$$

(Equation 1)

Where: V_t represents the Visitor Volume in time t ;

T_t is a linear time trend to capture overall tourism trends;

H_t indicates when *The Hangover* opened, equal to zero prior to the third quarter of 2009 and one for every quarter thereafter;

$T_t \times H_t$ is a cross of the linear time trend and the indicator variable for *The Hangover* which allows for the film's impact to adjust over time;

R_t reflects the impact of the Great Recession, equal to one from fourth quarter of 2007 through the second quarter of 2009, and zero otherwise;

PR_t is an indicator allowing for differences in the post-recession period as compared to the pre-recession and recession periods; and,

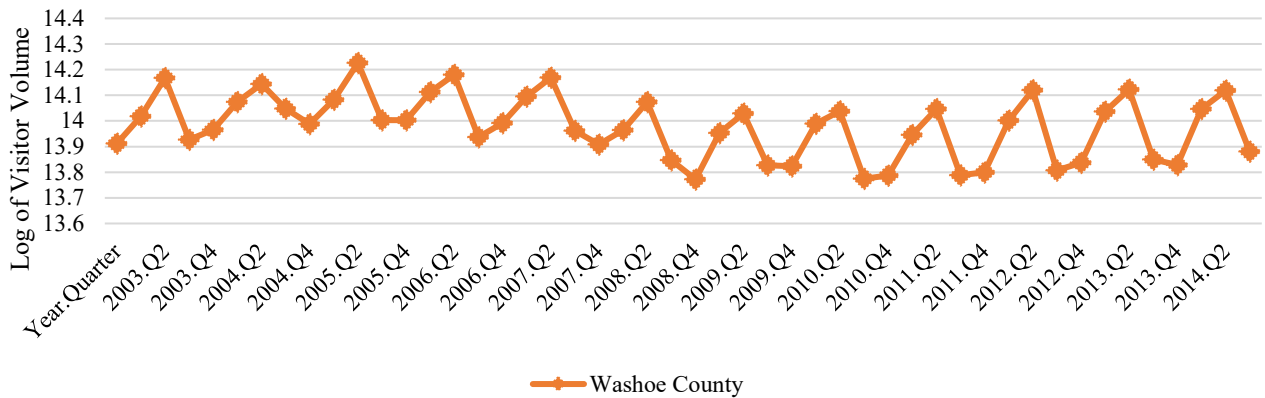
Q_2 , Q_3 , and Q_4 indicate when the quarter of observation is the second, third, or fourth quarter, respectively.

The data for the quarterly observations on visitor volume (V_t) were obtained from the Nevada Commission on Tourism. The log-form of visitor volume is used in the estimation to obtain a percentage change which allows for easier comparisons between the two regions. *The Hangover* opened nationally in US and Canadian theaters on June 5th, 2009, so the variable representing the opening of the film (H_t) changes from zero to one following the second quarter of 2009.⁴ The great recession variable (R_t) follows the dates set forth by the National Bureau of Economic Research's business cycle reference dates. As Graphs 1a and 1b show, these data exhibit seasonality, thus motivating the inclusion of the quarterly indicator variables. In spite of the evident seasonality in the data, Dicky-Fuller tests indicate that both series are stationary.



⁴ *The Hangover* opened earlier in Lithuania (June 2nd), and was open in much of Europe by the end of June, 2009. Opening dates in other nations continued through July and August of 2009. Opening dates were all obtained from the website IMDB.com.

**GRAPH 1B: LOG OF VISITOR VOLUME OVER TIME
FOR WASHOE COUNTY**



Using the same independent variables, this equation is also estimated using the natural logs of Convention Attendance (C_t) and Gaming Win (G_t) as dependent variables for both Las Vegas and Washoe County. With the exception of the Gaming Win in Washoe County, these series are also stationary as determined by Dicky-Fuller tests.

RESULTS

To determine the impact of *The Hangover* on Las Vegas tourism, Equation 1 is estimated using the natural logs of visitor volumes (V_t), Convention Attendance (C_t), and the Gaming Win (G_t) as dependent variables. For comparison, the same tourism statistics are also estimated for Washoe County. Since *The Hangover* portrays the visit of four friends to Las Vegas, overall visitor volume will be presented first.

Visitor Volume

Table 1 presents the equation 1 estimates for changes to visitor volume over time for Las Vegas and Washoe County. The trend variable shows that Las Vegas experienced relatively steady visitation from 2003 through 2014 while Washoe County experienced a small but significant decline.⁵ In both locations, seasonality is evident in their visitor volumes. Washoe County and Las Vegas both have increases in visitor volume in the second quarter as compared to the first quarter. The second half of the year is ‘low season’ for Las Vegas while the ‘high season’ for Washoe County is the spring and the summer. Increased visitation to Las Vegas in the first half of the year as compared to the latter half of the year highlights the importance of the relatively mild climate of Las Vegas – visitors from colder climates come to Las Vegas not only to partake in the entertainment and gaming attractions, they also come to enjoy the typically dry and sunny winter weather of the desert southwest.

As for the variable of most interest to this study, *The Hangover* led to a slight increase in overall tourism to Las Vegas. As expected for the control region, *The Hangover* had no impact on Washoe County. Interestingly, seasonality accounts for nearly twice as much variation in Las Vegas visitor volume than did the opening of *The Hangover*. This sheds some light on why the literature to date has overlooked the impact of film tourism on larger regions with pre-existing tourism: even if this type of region experiences an

⁵ While outside the scope of this paper, the downward trend of commercial gambling in Northern Nevada is an interesting phenomenon that deserves further explanation as to its causes and effects.

increase in tourism from a commercially-successful film, such an increase may be relatively small compared to the baseline and thus difficult to detect.

TABLE 1. VISITOR VOLUMES (NATURAL LOG)				
	Las Vegas		Washoe County	
Intercept	16.028 (0.04113)	***	13.825 (0.0534)	***
Trend	0.0006 (0.0022)		-0.0059 (0.0029)	**
<i>Hangover</i>	0.0166 (0.0074)	**	0.0166 (0.0505)	
Trend X <i>Hangover</i>	0.0038 (0.0038)		0.0066 (0.0043)	
Recession	0.0076 (0.0075)		0.0107 (0.0346)	
Quarter 2	0.0362 (0.0038)	***	0.1436 (0.0152)	***
Quarter 3	-0.0329 (0.0051)	***	0.2402 (0.0166)	***
Quarter 4	-0.0218 (0.0411)	***	0.0062 (0.0161)	
Wald Chi Sq.	770.91	***	480.83	***
Note: Standard Errors are given in parentheses, with significance noted by * at the 10% level, ** at the 5% level, and *** at the 1% level				

Convention Attendance

In order to better understand how tourism to Las Vegas was influenced by *The Hangover* it is important to consider the impacts on one of the largest identifiable groups of tourists to the area – people attending conventions. As indicated by Table 2, in the typical quarter from 2003 through 2014 about one in seven visitors to Las Vegas between came at least in part to attend a convention. In the most convention-heavy quarter (the first quarter of 2003), nearly one out of every four visitors to Las Vegas came for a convention. Even when convention attendance was at its smallest level as a percent of total visits (the third quarter of 2009), almost one out of every ten visitors to Las Vegas was still a convention visitor. Compared to Washoe County, convention attendance made up a significantly higher proportion of total visits to Las Vegas.

CONVENTION ATTENDANCE AS A PERCENT		
TABLE 2. OF VISITOR VOLUME, 2003 THROUGH 2014		
	Las Vegas	Washoe County
Mean	14.17%	6.40%
Median	12.86%	3.87%
Max	24.52%	20.95%
Min	9.50%	1.64%

Impacts on convention attendance need to be carefully considered when analyzing how a film such as *The Hangover* influenced overall tourism to the film's location. To do this, Equation 1 is estimated using the natural log of convention attendance as the dependent variable. The results of this estimation for both Las Vegas and Washoe County are given in Table 3.

In spite of the positive increase in overall tourism, Table 3 shows that convention attendance declined with the release of *The Hangover*.⁶ The decline in conference attendance is significant at the 10% level even after accounting for the drop in convention attendance from the Great Recession. Given that total visitor volume increased, non-convention tourism must have increased enough to more than offset the decrease in convention attendees.

⁶ Since conference locations are usually chosen years in advance, these numbers reflect the choices of individuals on whether or not to attend a conference in Las Vegas. Another study to analyze the lagged impact of *The Hangover* on the number of conferences booked in Las Vegas may help broaden the picture of the overall impact on conferences.

TABLE 3. CONVENTION ATTENDANCE (NATURAL LOG)				
	Las Vegas		Washoe County	
Intercept	14.5656 (0.0830)	***	11.6314 (0.3451)	***
Trend	0.0023 (0.0043)		0.0035 (0.0181)	
<i>Hangover</i>	-0.294 (0.0770)	***	-0.0943 (0.3081)	
Trend <i>Hangover</i>	X			
	0.0044 (0.0051)		-0.0184 (0.0215)	
Recession	-0.0828 (0.0481)	*	-0.2137 (0.2778)	
Quarter 2	-0.3549 (0.0465)	***	0.0684 (0.3055)	
Quarter 3	-0.4839 (0.00421)	***	-0.8342 (0.2078)	***
Quarter 4	-0.5515 (0.0427)	***	-1.1913 (0.2303)	***
Wald Chi Sq.	743.21	***	100.77	***
Note: Standard Errors are given in parentheses, with significance noted by * at the 10% level, ** at the 5% level, and *** at the 1% level				

One possible explanation for this statistically-detectable decline in convention attendance is that convention attendees responded differently to *The Hangover* than other visitors. Promoting Las Vegas as a mecca of gambling and drinking may have made it more attractive for the average tourist while simultaneously making it harder to justify Las Vegas as a venue for conducting business. It could be that the downward trend in convention attendance associated with *The Hangover* reflects resistance by boards of directors, supervisors, or spouses to the idea that attending a conference in Las Vegas is a legitimate business activity.

Gaming Win

Another measure of tourism that is unique to Nevada is gross gaming revenue, often referred to as the ‘gaming win.’ Estimating Equation 1 using the natural log of the gaming win as the dependent variable for both Las Vegas and Washoe County yields the results presented in Table 4.⁷

One of the most important highlights from Table 4 is that neither *The Hangover* nor the Great Recession had significant impacts on gross gaming revenues for either Nevada location. This finding is somewhat

⁷ Recall from Section III that the natural log of the gaming win for Washoe County was not a stationary series. However, since these data are not the main focus of this study, the estimates are included for comparison to keep the same structure as the previously presented results.

surprising given the positive portal of gambling in the film, where one of the major plot points has the main characters winning big playing blackjack.

The other important highlight is that seasonality continues to be present with the gaming win in Las Vegas highest in the first quarter. Even though the gaming win data for Washoe County is non-stationary, we see the opposite, with the summer (third quarter) bringing the highest win there. It's also interesting that the general decline of gaming in Northern Nevada is picked up in the trend variable. The only other estimate where the trend variable was significant was in the visitor volume estimation for Washoe County.

Table 4.		Gaming Win (Natural Log)		
		Las Vegas		Washoe County
Intercept		21.2606 (0.0956)	***	19.037 0.1177
Trend		0.0048 (0.0054)		-0.0132 (0.0064)
Hangover		0.0622 (0.0508)		0.0038 (0.0904)
Trend Hangover	X	-0.0064 (0.0088)		0.0091 (0.0101)
Recession		-0.0226 (0.0232)		0.1574 (0.2145)
Quarter 2		-0.0845 (0.0227)	***	0.0890 (0.0210)
Quarter 3		-0.0474 (0.0138)	***	0.1828 (0.0167)
Quarter 4		-0.0311 (0.0231)	***	0.0488 (0.0271)
Wald Chi Sq.		255.94	***	431.45
Note: Standard Errors are given in parentheses, with significance noted by * at the 10% level, ** at the 5% level, and *** at the 1% level				

DISCUSSION

As state legislatures spend more and more money on tax credits and rebates in order to attract film production to their states, there is an increased need to measure the potential economic gains from this activity. After the short-term economic gains from the actual filming are over, the remaining potential impacts depend on how the film influences tourism to the area. Previous studies have shown that films with box office success can translate to increased tourism to relatively rural areas and to nations as a whole; the impacts of films on tourism to larger sub-national/sub-state regions have yet to be quantified.

The results reported above suggest that *The Hangover* had a small, positive, and significant impact on overall tourism to Las Vegas. The estimated increase in visitor volume was less than the typical seasonal variation, though increased visitation in the typically slower third and fourth quarters may be at least partially offset by the film's impact. This increase in overall tourism is tempered by a reduced number of convention visitors to Las Vegas. This could be due to the fact that the image of the city as portrayed in the film is one that many businesses, industry trade groups, and other organizations may find difficult to justify to their respective governing bodies.

In spite of the film's favorable depiction of gambling, the gaming win in Las Vegas was not significantly impacted by *The Hangover*. The fact that the gross gaming revenue in Las Vegas was not changed by *The Hangover* is by itself important, but this fact is even more important when coupled with how the film impacted tourism. Increased overall tourism with no increase in gaming win implies that more and more people are coming to Las Vegas for entertainment other than gambling, such as shows, fine dining, or shopping.

The lack of an impact on gaming win is of heightened importance in light of the findings on how the film impacted the mix of tourism. In spite of the overall net increase in visitors, the loss of convention visitors is a potentially serious problem for Las Vegas as the season with the highest gaming win coincides with the season that experiences the highest amount of convention attendance. The possibility that the negative portrayal of the city reduced the desirability of Las Vegas as a conference location adds to the literature on how positive and negative portrayals in popular media might have differential effects, at least for some types of consumers.

In addition to adding to the body of film tourism literature, these findings have important implications for policymakers. A film that highlights a region can increase tourism to that region, though with a number of caveats. Perhaps the most important is that the film needs to be successful, which is incredibly difficult to predict prior to filming. Assuming that the film is successful, policymakers should know that the gains in some types of tourists may be at least partially offset by losses of already established tourism groups. Finally, even though the region may experience an increase in tourism, this increase does not necessarily imply that those tourists will have the same spending patterns as previous tourists, meaning that the region may have to find new ways to turn those visits into taxable revenues.

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