THE INFLUENCE OF FILM CRITICS ON MOVIE OUTCOMES

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ABSTRACT

This study complements previous research regarding the influence of word of mouth on the success of Hollywood movies. In the absence of a formula that studios can use to guarantee a predictable return on investment for movies, word of mouth has been shown to be the best determinant of a film's success. However, there are obviously other variables that play a role in this process. Therefore, as part of a series of studies intended to analyze the impact of these other variables, this study focuses on the influence of film critics on movie outcomes. Our findings show that film critics have a moderate influence on wide releases and a weak influence on limited releases based on reviews from Rotten Tomatoes. Also, negative reviews had more of an impact than positive reviews on both types of movies. This research further found that this moderate influence could have a significant impact on box office revenue.

INTRODUCTION

Despite the rise in big data, movie success is still unpredictable as films are influenced by a number of variables. In fact, industry analyst Harold Vogel states that on average six or seven out of 10 movies are unprofitable and one might break even (Vogel, 2011).

One variable that is the subject of much debate is the role of film critics. To that end, an array of studies has been conducted over the years to determine the extent to which film critics influence movie outcomes.

The majority of these studies have found that film critics have historically played a significant role in the success of movies (Terry, Butler & De'Armond, 2004). These studies have also found that critics can influence movies in various ways. Although, the way we consume media has changed dramatically since many of these studies were conducted. As a result, this study aims to provide an additional perspective to this field of study by evaluating the influence of Rotten Tomatoes on movie performance.

Rotten Tomatoes is the leading online aggregator of movie reviews by professional critics. The site uses one rating called the Tomatometer score which consists of the percentage of positive professional reviews. The best movies are then designated as Certified Fresh™ once they receive a Tomatometer score of 75% or higher and a minimum number of reviews. Although, a movie is designated as Fresh when at least 60% of its reviews are positive. Conversely, a movie is designated as Rotten should it fail to meet the 60% threshold (Rotten Tomatoes, 2018).

This paper will consist of a review of the existing literature on this subject, followed by a discussion of our methodology and findings. It will then provide an analysis of these findings in the context of previous research on this issue.

LITERATURE REVIEW

Research regarding the role of film critics has typically consisted of whether they serve as influencers or predictors. That is, influencers are defined as the degree to which critics will influence box office performance in the short term based on their reviews. The predictors are defined as their ability to predict movie success in the long term but not necessarily influence movie results in the short term.

Eliashberg and Shugan were the first to develop these concepts in 1997, and found that critics served as predictors but not influencers (Eliashberg & Shugan, 1997). However, other studies have found that critics can serve as both influencers and predictors. For instance, Basuroy, Chatterjee and Ravid found that both positive and negative reviews are significantly correlated with box office revenue within the first eight weeks (Basuroy, Chatterjee & Ravid, 2003). As a result, this finding confirms the dual role of critics.

Another study by Terry, Butler and De'Armond used Rotten Tomatoes ratings to determine their economic impact on movies. They found that a ten percent increase in a critical review translates into $7.8 million at the box office. Their findings suggest that critics serve as both influencers and predictors. Although, they state that they are likely more predictors than influencers. (Terry et al., 2004)

A study by Reinstein and Snyder (2005) examined the effects of the two popular film critics Siskel and Ebert, who were regarded as the most influential critics at the time. One of their goals was to better understand the influence of experts on consumer demand for experience goods. These are defined as goods for which the quality is uncertain prior to consumption.

They found weak evidence of the influence of critics on all of the movies they studied. However, they found that this influence varied across categories of movies and was strongest for dramas and narrowly-released movies. They stated that there was virtually no effect for movies with a wider release and those in the action and comedy genres (Reinstein & Snyder, 2005).

Moon, Bergey and Iacobucci (2010) later discovered, using Rotten Tomatoes, that film critics' early ratings could be an important quality signal. For instance, they found that critics' ratings could contribute significantly to movie revenue in the opening week. They also found that advertising spending on movies with high ratings could lead to sustained revenue.

In September of 2017, it was reported by *The New York Times* that studio executives were blaming Rotten Tomatoes for lackluster movie performances, especially after the worst summer in 20 years and a loss of billions of dollars at the box office (Barnes, 2017). However, Yves Bergquist, the Director of the Data & Analytics Project at USC's Entertainment Technology Center, subsequently

published a study which found that there was no correlation between Rotten Tomatoes scores and the box office returns of the 150 films in 2017 that earned more than $1 million (Bergquist, 2017).

Moreover, Bergquist analyzed both total gross and opening weekend performance. His results showed that there was a correlation coefficient of only .12 for box office returns. He found even less of a relationship with opening weekend performance with a correlation coefficient of .03 (Bergquist, 2017).

This study was completely reasonable given the samples it analyzed and its results were widely reported in high-profile publications. These outlets included *Variety, Entertainment Weekly, The Washington Post* and others.

Despite these findings, there is some evidence such as the Reinstein and Snyder study to suggest that critics reviews have different effects on mainstream and independent movies. Additionally, a study by a group of Dutch researchers found that reviews in newspapers had influence effects on art house movies and prediction effects on mainstream movies. Although, the effects in both cases were the result of the number and size of the reviews, and not the nature of the reviews (Gemser, Van Oostrum & Leenders, 2006).

While the Dutch study didn't find any correlation based on the nature of the reviews, it did find that these audiences were distinct. That said, we thought it would be worth exploring if there was a difference in the effect of Rotten Tomatoes scores on these two types of films.

That is, most of the studies had either analyzed all films released within a certain period or had used thresholds that wouldn't distinguish independent films from major motion pictures. In particular, the previous study by Terry, Butler and De'Armond used Rotten Tomatoes scores but their sample consisted of movies opening in at least 25 theaters or eventually reaching at least 100 theaters (Terry et al., 2004). The Moon, Bergey and Iacobucci study used movie releases by major studios as well (Moon et al., 2010).

We felt that using different samples – specifically, distinguishing between wide releases and limited releases – would provide different results. Therefore, our first hypothesis was that Rotten Tomatoes scores would likely demonstrate an influencer effect on wide releases but not on limited releases. We surmised that there wouldn't be evidence of an influence effect on limited releases given Bergquist's findings. We also thought it was likely that the audiences of limited releases were more discerning. Our second hypothesis was that the Rotten Tomatoes scores would show prediction effects similar to the influencer effects for these reasons as well.

The Negativity Bias

Previous research has found evidence of a negativity bias from critics' reviews. That is, negative reviews were found to hurt revenue more than positive reviews helped revenue. In particular, this bias was strongly supported in the first week but was found to diminish over time (Basuroy et al., 2003).

This is likely the result of our well-documented aversion to losses as first discovered by Daniel Kahneman and Amos Tversky. In 2002, Daniel Kahneman was awarded the Nobel Prize in economics for work he conducted with his colleague Amos Tversky on the development of an economic model called prospect theory. This theory countered traditional assumptions that people always make rational choices when it comes to economic decisions (Smith, 2002).

Specifically, the researchers found that people have a greater aversion for losses than they have an affinity for gains. As Kahneman writes in his best-selling book *Thinking, Fast and Slow*, many of the options we face in life are mixed with a risk of loss and an opportunity for gain (Kahneman, 2011).

As an example, Kahneman provides the following illustration of a mixed prospect. Suppose you are offered a gamble based on the toss of a coin. If the coin is tails, you lose $100. And, if the coin is heads, you win $150. You are then asked if you would find this gamble attractive and whether you would accept it.

Kahneman claims that most people would find this bet unappealing. This is because, in his words, "losses loom larger than gains." He also states that you can measure the extent of your loss aversion by simply asking yourself how much money it would take to balance an equal chance of losing $100.

Loss aversion manifests itself in a variety of ways. For instance, one of the most common investing mistakes consists of investors selling appreciating stocks prematurely and hanging on to depreciating stocks (Lehrer, 2009). As another illustration, a study of 2.5 million putts by professional golfers found that they were more successful putting for par than for birdie. This was thought to be the result of trying harder to avoid the loss of receiving a bogey, which is one stroke over par (Kahneman, 2011).

In addition, Antonio Damasio and George Lowenstein developed an investing game to illustrate this emotional reaction to losses. Participants were given the option of investing $1 or nothing based on a coin toss. A result of heads meant the participant would lose a $1 and a result of tails meant the participant would gain $2.50. The game continued for twenty rounds (Lehrer, 2009).

The rational choice would be to always invest as the value of each round is $1.25 (i.e., $2.50 x 50%) compared to $1 for not investing. In fact, there's only a 13 percent chance of losing money if one invests every time. However, the results showed that only about 60% of people invested every time and that they were especially averse immediately after losing a gamble (Lehrer, 2009).

It is thought that our brains evolved to be more sensitive to negative stimuli as a result of the need to keep us out of harm's way. Although, this negativity bias is evident in many aspects of our lives. This is especially true in social relationships. In fact, researchers have found that a specific ratio of positive to negative interactions is required for married couples to find their relationship satisfying. That ratio was found to be five to one (Estroff Marano, 2003).

Based on prospect theory and loss aversion, our third hypothesis was that there would be evidence of the negativity bias among wide releases. This was thought to be likely due to evidence in

previous research and the shortcut that Rotten Tomatoes provided to large audiences (Basuroy et al., 2003; Moon et al., 2010).

METHODOLOGY

Our methodology consisted of analyzing all wide releases and limited releases from 2015-2017. The source we used for our data was www.The-Numbers.com and the source we used for the film critics reviews was www.RottenTomatoes.com (The Numbers, 2018; Rotten Tomatoes, 2018).

To assess the influence of critics' reviews, we used a movie's domestic gross revenue for the first weekend. We used the first weekend figure because moviegoers have very little information about a movie before its release other than critics' reviews and the marketing material produced by the studios and filmmakers.

To gauge the predictive nature of reviews, we used a film's total domestic gross. We used the total domestic gross figures rather than the international gross figures as they corresponded to the opening weekend numbers we used to assess critics' influence.

As previously mentioned, the Rotten Tomatoes scores are based on the percentage of positive reviews a movie receives. According to Rotten Tomatoes, the reviews are aggregated among qualified critics. For instance, the requirements, which are posted on the company's website, state "Online critics must have published no less than 100 reviews across two calendar years at a single, Tomatometer-approved publication" (Barnes, 2017).

It's important to note that Rotten Tomatoes is owned by Fandango, which is owned by NBC Universal. However, despite being owned by a movie studio, Rotten Tomatoes asserts that it operates independently (Barnes, 2017).

We defined wide releases as those movies that were released in 600 theaters or more. Conversely, we defined limited releases as those that were released in less than 600 theaters. This is the standard used by the website Box Office Mojo, another popular box office reporting service (Box Office Mojo, 2018).

Our data set consisted of 393 wide releases from 2015-2017. We then conducted a correlation analysis between a movie's first weekend domestic gross and its Rotten Tomatoes score.

Correlations are evaluated on a scale of -.01 to .01, which is the equivalent of -100% to 100%. Negative numbers represent correlations with an inverse relationship. It is generally accepted that correlation coefficients of -0.5 to -1.0 and 0.5 to 1.0 indicate a strong association, -0.3 to -0.5 and 0.3 to 0.5 a moderate association, -0.1 to -0.3 and 0.1 to 0.3 a weak association and 0 no association.

But, this association is contingent on the correlation being statistically significant with a p value equal to or less than .05. This ensures a confidence level of 95% or greater.

The correlation yielded an r value of .32, which is considered to represent a moderate relationship. This correlation was also considered to be significant with a p value of less than .05. This means that this analysis has more than a 95% chance of being accurate.

We also conducted a test to see if there was any evidence of a negativity bias. First, we analyzed those movies with a Rotten Tomatoes rating of Rotten, which is a rating of less than 60%, and a rating of Fresh, which is 60% or greater. Those movies with a Rotten rating had an r value of .13 with a p value of .05. In addition, those movies with a Fresh rating had an r value of .14 with a p value of .08.

However, a p value of at least .05 is the standard to determine a significant confidence level (i.e., 95%). With a p value greater than .05, the Fresh correlation does not meet this standard but the Rotten correlation does. Therefore, these results indicate that there is a slightly larger association for Rotten reviews compared to Fresh reviews.

Although, we thought that the threshold for a Rotten score of less than 60% was especially low and wondered if a rating of less than 80% would have a disproportionate influence compared to a positive rating.

To that end, we conducted a correlation analysis of those movies with a rating of less than 80% and those with a rating of 80% or greater. For the movies under 80%, the results showed an r value of .25 with a p value of less than .05. The movies at 80% or greater had an r value of .03 with a p value of .75.

As a result, we can see that this redefinition of negative reviews had a significant difference compared to positive reviews. This is not surprising as it is consistent with earlier findings of a negativity bias among critics' reviews.

Moreover, having found evidence to suggest that film critics served as influencers, we wanted to see if film critics served as predictors as well. To test this assumption, we conducted a correlation analysis between a film's Rotten Tomatoes scores and its total domestic box office gross. This analysis found an r value of .37 with a p value of less than .05. These findings suggest that film critics serve as both influencers and predictors.

We also wanted to see if a negativity bias was evident in the total domestic gross box office numbers. Using the 80% threshold, this analysis also found a significant difference between positive and negative reviews. The negative reviews had an r value of .29 with a p value of less than .05, while the positive reviews had a r value of .12 with a p value of .28.

In regard to limited releases, we analyzed 707 films from 2015-2017. We found no relationship between critics' reviews and first weekend revenue as this analysis found an r value of .03 and a p value of .49. There was, however, a slight relationship with total domestic gross revenue consisting of an r value of .14 and a p value of less than .05.

Additionally, there was no evidence of a negativity bias among the first weekend data with an r value of .01 and a p value of .83 for negative reviews and an r value .06 and a p value of .22 for

positive reviews. The total domestic gross revenue analysis showed a slight influence of the negative reviews with an r value of .15 and a p value of less than .05 compared to the positive reviews with an r value of .03 and a p value of .55.

Theaters

Part of the disparity between the correlation analyses of the wide releases and the limited releases in the first weekend can likely be attributed to the lack of a normal distribution in the limited releases data set. In fact, 71% of the limited releases were shown in 10 theaters or less. Although, this sample included as many as 579 theaters. This wide variability resulted in a sample that was highly skewed.

To more accurately compare the data sets, we also conducted a correlation analysis based on the amount of revenue that each theater generated after the first weekend. Unfortunately, we couldn't conduct this type of analysis for total domestic gross revenue as there aren't comparable metrics.

The wide releases analysis found an r value of .33 with a p value of less than .05. The limited releases had an r value of .16 with a p value of less than .05.

As before, we were curious to know if a negativity bias was detectable in this data. Therefore, we again analyzed those movies with a rating of less than 80% and those with a rating of 80% or greater.

The wide releases had an r value of .26 and a p value of less than .05 for the movies under 80% and an r value of .03 and a p value of .77 for those at 80% or greater. The negative and positive results for limited releases respectively were an r value of .21 and a p value of less than .05 and an r value of .02 and a p value of .69.

Revenue Impact

We conducted a further analysis to see to what extent film critics' moderate influence had an impact on movie revenue. To assess this impact, we performed a t-test on box office revenue to determine the difference between the sample means of negative and positive reviews and whether they were statistically significant.

While both wide releases and limited releases were analyzed, only the sample means of the wide releases were found to have a statistically significant difference. That is, the films with positive reviews earned statistically more money than films with negative reviews. The revenue difference between movies with negative and positive reviews was an average of $23 million on opening weekend (i.e., $21 million versus $44 million) and $83 million for total domestic gross revenue (i.e., $59 million versus $142 million).

DISCUSSION

It's clear that movie studios have historically felt that film critics wielded significant influence in the industry. There's no better illustration of this than the invention of the film critic David Manning by Sony Pictures Entertainment (Basuroy et al., 2003; Terry et al., 2004). In 2001, after being challenged by Newsweek, the company admitted that David Manning from The Ridgefield Press was created by an employee to lavish praise on several Columbia Pictures films including "A Knight's Tale" and "The Animal" (Horn, 2001).

It has also been noted that studios have tried to avoid negative reviews by not offering advance screenings for film critics. In 2000, when advance screenings were not offered for *Get Carter* and *Autumn in New York*, Roger Ebert stated, "The studio has concluded that the film is not good and will receive negative reviews" (Basuroy, et al., 2003).

That said, how much influence film critics had and have is still subject to debate. For instance, based on our results it appears that film critics serve as both influencers and predictors to some extent. This is a reasonable assumption based on the ubiquity of Rotten Tomatoes scores. It was recently reported that the site attracts 14 million unique visitors a month and that Fandango, its parent company, attracts 60 million unique visitors a month. Moreover, they also appear in Google and iTunes searches (Barnes, 2017).

However, there are a few caveats to this research. First, it should be noted that causality cannot be determined from this analysis. Second, our findings are not entirely conclusive. This is due to several possible interpretations of the results.

For the wide releases, one interpretation could be that film critics reviews simply reflect the tastes of audiences. In fact, Yves Bergquist found that critics scores and audiences scores are strongly correlated (Bergquist, 2017).

Although, in light of evidence of the negativity bias in both a film's first weekend and total domestic gross, another interpretation could be that critics' reviews continue to influence audiences throughout the life cycle of the movie.

When using revenue per theater as the basis of analysis for both wide releases and limited releases, we can see that film critics likely have a moderate influence on wide releases and a slight influence on limited releases as well. However, we found evidence that negative reviews likely had more of an impact than positive reviews in both of these samples.

What's also interesting is the lack of statistical significance among movies with Rotten Tomatoes scores of 80% or greater. This is likely due to the influence of other variables. For instance, research has found that variables such as stars, budgets, sequels, awards, marketing and word of mouth all affect movie outcomes (Basuroy et al., 2003; Terry et al., 2004; Eagan, 2016; Eagan, 2017).

	Correlation	R Squared
Wide Releases	.33	.11
Negative Reviews	.26	.07
Positive Reviews	.03*	.001
Limited Releases	.16	.03
Negative Reviews	.21	.04
Positive Reviews	.02*	.0004

** Statistically insignificant*

Exhibit 1: First Weekend (Revenue Per Theater)

	Correlation	R Squared
Wide Releases	.37	.14
Negative Reviews	.29	.09
Positive Reviews	.12*	.01
Limited Releases	.14	.02
Negative Reviews	.15	.02
Positive Reviews	.03*	.001

** Statistically insignificant*

Exhibit 2: Total Domestic Gross Revenue

The charts in Exhibits 1 and 2 provide a summary of the statistics for both the first weekend and total domestic gross revenue. Along with the correlation coefficient (i.e., r value), these charts include the r squared statistic. This statistic is calculated in regression analysis and is the square of the correlation coefficient. This figure represents the degree to which one variable influences another.

As the charts illustrate, though there is a weak to moderate correlation between critics' reviews and movie outcomes, the r squared figures indicate that most of a movie's performance for both wide releases and limited releases is determined by other factors.

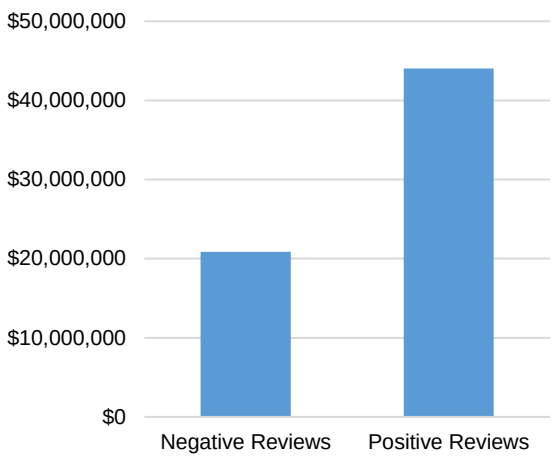

Exhibit 3: First Weekend Mean (Wide Releases)

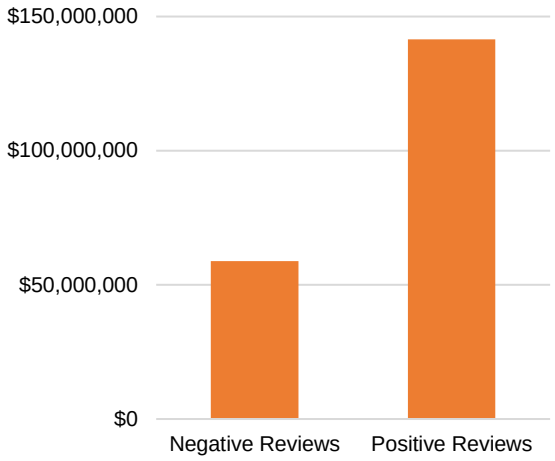

Exhibit 4: Total Domestic Gross Mean (Wide Releases)

In regard to the t-test referenced earlier, Exhibits 3 and 4 depicts the differences in the sample means between negative and positive reviews for wide releases. Again, these values were an average of $23 million for opening weekend revenue and $83 million for total domestic gross revenue.

This t-test helps shed further light on this subject by quantifying the influence of film critics. For example, our analysis of wide releases found that negative reviews explain about 7 percent and 9 percent of the variability for opening weekend and total domestic gross revenue based on the r-squared figures. This can translate into millions of dollars given the mean differences between the negative and positive reviews during these periods.

CONCLUSION

In sum, our findings show that film critics have a moderate influence on wide releases and a weak influence on limited releases based on reviews from Rotten Tomatoes. This applies to both opening weekend and total domestic gross revenue in each case. Also, negative reviews had more of an impact than positive reviews on both types of movies.

This research further found that this moderate influence could have a significant impact on box office revenue. In particular, the difference between negative and positive reviews on wide releases could translate into millions of dollars for both opening weekend and total domestic gross revenue.

Based on our analysis of Rotten Tomatoes scores and the results of similar studies, the weight of the evidence suggests that film critics moderately serve as both influencers and predictors. Moreover, these roles are more apparent among wide releases than limited releases. This study also confirms the existence of a negativity bias that occurs from critics' reviews in both categories of film.

As mentioned earlier, though we can't determine causality, the fact that a consistent relationship exists between critics' reviews and box office performance after the first weekend is noteworthy. That is, because moviegoers won't know if they like a film before they see it, they rely on such cues as marketing, critics' reviews and signaling properties such as a high-profile cast, elaborate sets and special effects (Lampel & Shamsie, 2000).

It has also been found that the higher the level of uncertainly consumers have about the quality of a product the more they are likely to rely on independent information providers. Hence, companies in the movie industry must find ways of leveraging the influence of opinion leaders early in the process to capitalize on the sales momentum and extend the life cycle of their films (Lampel & Shamsie, 2000).

These findings have other implications for studios and filmmakers as well. First, as Eliashberg and Shugan recommended in their groundbreaking study, movie critics should be consulted much like experts are in the development of new products (Eliashberg & Shugan, 1997). Moreover, this research confirms that negative reviews hurt more than positive reviews help movie revenue. As a result, studios and filmmakers should have more of an incentive to involve critics in their market research (Basuroy, et al., 2003).

Lastly, this study focuses on the aggregate scores of Rotten Tomatoes. As such, it does not measure the influence of individual critics. Thus, this research does have some limitations as previous research has shown that some film critics have more influence than others (Boatwright, Basuroy & Kamakura, 2007).

Some have lamented that the art of film criticism has been reduced to a movie score. In fact, director Brett Ratner characterized Rotten Tomatoes as "the destruction of our business" (Hibberd, 2017). Aggregating reviews also apparently creates pressure for critics to conform to the opinions of others (Gleiberman, 2018).

Nevertheless, the site offers us a glimpse of the impact of film critics on this process. It also provides insights on the influence of experts on experience goods including music, books, restaurants, etc.

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