The Impact of Film Releases on the Stock Returns of Hollywood Studios & an Empirical Analysis of the Factors affecting a Film's Performance

Arun George
Dr. Anuradha R

Abstract

The film industry of any country is hugely relevant to its economy. A majority of film studios in Hollywood are subsidiaries of companies that are listed on the New York Stock Exchange (NYSE). The study attempts to identify if the release of a film affects the capital market price movement of the company that owns the studio that released the film. A sample of 490 events were taken over a period of 7 years with a five day event window (-2,2) and 150 day estimation period (-162,-12). The study found no significant Cumulative Abnormal Return in the period. The study also identified four factors affecting a film's box office performance, namely, Opening Weekend Gross, Number of Screens, Production Budget and Rotten Tomatoes Score. A trend analysis of the major studios in Hollywood and their capital market parents were also conducted.

Keywords: *share price; factors affecting film; box office performance; studio film financing; film release; entertainment industry; event study; motion picture industry; film budget*

I. Introduction

Metonymy is a figure of speech in which a thing or concept is used to refer synonymously to something closely related to the thing or the concept. In that spirit Hollywood has, over the years, become a metonym for American Cinema in general. Hollywood, the sign that stands on the Mount Lee, Hollywood Hills, Santa Monica in Los Angeles, has over time come to be a cultural landmark for one of the major export industries for the United States of America. The American Film Industry has grown at a rapid pace over the years. Due to its exponential growth rate, it is impossible to not buckle under the weight of financial expectations without succumbing to mergers and/or acquisitions. Studio executives are now finding a more challenging role as decision makers. This is partly due to the fact that with time, the industry has become more finance facing, with emerging trends like securitization, equity funding and crowd funding. The changing market landscape has made it a necessity to study the industry as a purely transactional and financial enterprise. This study attempts to study the Cinema of America as an industry with real stakes, discounting all the cultural and social aspects of cinema. From a purely transactional perspective, the study attempts to establish and/or verify if a relationship exists between the box office performances of films and the share prices of the respective studios that have produced it. A study of this nature can have wide reaching implications for global cinema in two aspects. From the finance perspective, a more formal, market-facing approach to cinema brings with it a whole new set of possibilities such as risk management, innovative funding mechanisms, trend analysis and even better investment opportunities, resulting in transnational collaborations.

On the other hand, a more formal and secure approach to film production, a creative art form, will result in the rise in overall quality of cinema produced as newer avenues of funding will bring in fresh talent will put a stop to rising cartel-esque behavior by established industry titans. The various factors that affect the performance of a film is an area where enough research has not been carried out. The Opening Weekend Gross and the Total Domestic Gross of a film are accepted yardsticks for measuring the success of a film. In recent years, with the popularity of social media, the Rotten Tomatoes Score, which is a score assigned to films on the basis of critical valuations by over 100 film critics, could also play a major factor in predicting a film's box office returns. A trend analysis is an ideal way to identify the best performing companies in any given industry. In this study, a trend analysis of the six major studios in Hollywood is carried out.

II. Motivation for the Study

The exclusive nature of the film industry accounting practices has its own share of positive and negative aspects. On the one hand, it ensures continued wealth generation for those who have been engaged in the business for longer. Film funding is a high risk business area and any form of risk management should be appreciated and adopted. The film industry behaves like any other industry for most markets. With the advances made in information technology, it is almost criminal to not blend financial analysis of the industry with the latest technologies to enhance the decision making process. Mergers, demergers, amalgamations and co-productions are a part and parcel of the film industry, and more specifically, Hollywood. In studying the capital markets exclusively, this study aims to establish a causal relationship between a quantifiable performance indicator (which is box office revenue for studios) and the capital market performance of the respective listed studio. If such a relationship exists, it would be greatly beneficial for both the industry and potential investors. The resulting inflow of capital would enable the industry to greatly improve the various areas in which it is lacking.

III. Literature Review

Understanding the rich history and its storied survival requires a researcher to understand the structure of Hollywood. Johnston, in his 1926 paper titled "The Structure of the Motion Picture Industry" attempted the very same. Even from its nascent and formative years, The Motion Picture Industry of America was a titan in its own right. It accounted for a financial investment of 1.5 billion dollars in the year 1926. From the most reductive perspective, the industry consisted of three economic divisions: the producer (the manufacturer), the distributor (the wholesaler) and the exhibitor (the retailer) (Johnston, 1926). Estimates showed that theatre attendance in those days were upwards of 7 million per day. The percentage division of costs involved in producing a film those days was also something worth noting. Actor salaries accounted to 25% while Directors, cinematographers, scenarists and writers accounted for a combined 20%. The set design cost about 19% of the budget, while studio overheads cost 20%. Film stock itself cost about 5% of the budget while locations accounted for 8% and costumes accounted for the remaining 3%.

Oligopoly means the situation by which only a few buyers or sellers or both exist for a particular product or service in a market situation. This is problematic because it is an overt agreement to stifle competition and it results in higher prices and poorer quality of products. Hollywood suffered from an Oligopoly system of the Big Eight dominating the remaining twenty odd film producers. This is well chronicled in the 1949 paper titled "The Motion Picture Industry: United States v. Oligopoly" The Five Major film studios and the Big Eight Distributors had created a conducive environment around themselves to facilitate perpetuating price fixing mechanisms and have managed to elbow out competition continually over the course of 20

years. (McDonough & Winslow, 1949)This resulted in the Sherman Anti-Trust Act being invoked against Hollywood, with Paramount being the primary defendant.

To understand just how integral the Motion Picture Industry is to the United States, studies have been conducted to analyze the impact of the Motion Picture Industry on the Balance of Payments of the United States. Basti's 1970 paper titled "Impact of the Motion Picture Industry on the United States Balance of Payments" is one such study. The film industry plays an important role in the United States economy in terms both of employment and of its contribution to GNP. Furthermore, this industry is export-oriented. Currently it derives about 55 per cent of its annual income from abroad; probably no other major United States industry is so heavily dependent on foreign markets for its well-being. Even then, the American Motion Picture Industry has considerable competitive advantage in the form of a vast domestic market, superior technological know-how, a fully integrated worldwide marketing apparatus, and certain trade practices like block-booking that ensures that American film companies get the better deals (Basti, 1970).

When comparing the Industry structure that was prevalent at the time of the Paramount trial, we see that studios had engaged in large scale vertical integration. After the Paramount decrees, studios were not allowed to own theatre chains. This resulted in studios cutting back on the films produced and increasing their charges to achieve some level of profitability. This meant that admission prices went up without actually transferring any revenue to production or any developmental activities, resulting in an inflationary situation. This meant that audiences had to pay more for inferior quality pictures. This also meant that the distribution of revenue was for more equitable amongst the various participants involved in the film industry whilst being more dishonest towards the actual consumer involved in the equation (Waterman, 1982).

On the theoretical front, the paper has 4 key arguments regarding sequels, which include the strength of the parent brand affecting performance, the timing of the sequel affecting performance, the number of films will have an impact on performance and that if the sequel feels like a rehash of the parent film, the audience will not like it (Basuroy & Chatterjee, 2008). The paper found that sequels perform worse that parents in terms of box office revenue, the smaller the time gap between a parent and a sequel, the better will be the latter's performance. The paper also found that the number of films in a franchise has a positive impact on revenue and that audience is usually satiated by the first weekend, leading to drops of greater magnitude than non-sequel films. This would later be confirmed by another research paper by Dhar, Sun and Weinberg.

In 2009, Einav and Ravid, in their paper "Stock market response to changes in movies' opening dates" attempted to study the impact of announcement of change of dates for big budget productions. As established by other empirical studies, the motion pictures industry is a reasonably large contributor to the US economy. Using 302 events ranging from the years 1989 to 1995, as well as financial data ranging from production costs to box office revenues to market capitalization, the study found that on average, any change in date of a feature film release results in a negative market response (Einav L. &., 2009). The lack of transparency in Hollywood accounting has also been identified as a reason why the markets maybe a little skeptical about changes in release dates.

The key aspect that any film related project is concerned with is the revenue it generates. Pangarker and Smit studied this in 2013 with their paper "The determinants of box office performance in the film industry revisited". This makes the film industry similar to any other industry in the world. The determinants that lead to box office success have been discussed at length in various studies (Pangarker & Smit, 2013). One study found that production costs were the most important contributor to box office success. Higher the

production cost, higher would be the global box office revenue. Other determinants found by the study included release by a major studio, award nominations, sequels to successful films, while critical reception did not show a linear relationship.

While no literature exists that studies the impact of a film's release on the stock price movement of the studio's parent company's stock, an analogous example can be seen in Paul's 2016 paper titled "Do New Product Announcements Have an Impact on Stock Prices of Consumer Electronic Firms?". Consumer electronics firms have very active stocks and a study of their price movement in regards to the announcement of newer products is something that warrants a closer look. The study chose five Event windows of varying sizes (3 days, 5 days, 7 days, 11 days and 21 days) to study the events for 20 Consumer Electronics firms. It was found that three out of five event windows are shown to have positive CAAR (cumulative Abnormal Average Returns) Value suggesting that there are statistically significant differences in the Abnormal Return in the Event Window and otherwise (Paul, 2016). This suggests an impact of new product announcements on the Stock price movement of Consumer Electronics firms.

IV. Research Gap

Research regarding Hollywood is available in plenty on aesthetics, the art of filmmaking and more complicated social sciences and ethnographies. However, with the economics and business aspects of film, there is precious little research conducted. After careful review of the literature provided, the following research gap was identified.

- No research has been conducted to quantify the impact that a film's release has on the capital market.
- No research has been conducted to identify which of these are more significant and which ones contribute the most.
- No academic research has been carried out to identify how the industries fare against one another.

V. Need for the Study

With the increasing size of the film industry worldwide, it has become necessary for stakeholders to better understand the technicalities of the business. Hollywood is an irony, in that it offers the most information for a film industry, anywhere in the world but is also known for its opaque accounting practices. In this scenario, it is important to verify if there exists a relationship between the capital markets and Hollywood. There also exists the need to identify and measure the factors that affect the performance of a film. The easiest metric to analyze a film's performance is its Opening Weekend Gross and it's Total Domestic Gross. The factors that affect the performance of a film in these two metrics are relevant to understand in the current scenario.

VI. Methodology

Objectives of the study

The study was conducted with the following set of objectives. These objectives determine the scope and importance of study. The major objectives of the study were:

- To determine the impact of film releases on the share price of their respective listed studios.

- To identify various factors that affect the opening weekend and lifetime domestic collection of a film

Hypotheses of the study

After careful review of the existing literature, the researcher has arrived at the following hypotheses regarding the study.

$H_0$1: There is no impact of box film releases on the share price of the respective listed studio

$H_0$2: There is no impact of number of screens on opening weekend and lifetime domestic collection of a film

$H_0$3: There is no impact of production budget on opening weekend and lifetime domestic collection of a film

$H_0$4: There is no impact of Rotten Tomatoes Score on opening weekend and lifetime domestic collection of a film

Sampling Size and Techniques

For the purpose of this paper, a sample of seven studios from the United States was chosen that account for 93% of revenue generated. One studio that accounts for 3% of revenue could To further study the impact of box office revenue on share price, only the 10 highest grosser for each studio per year is studied. This would result in a total of 490 films across the 7 year span of the study. The seven companies chosen are: Paramount Pictures owned by Viacom, Universal Pictures owned by Comcast, Columbia Pictures owned by Sony, Warner Bros. Pictures owned by AT&T, Walt Disney Pictures owned by The Walt Disney Company, 20th Century Fox owned by 21st Century Fox and Lionsgate Films owned by Lionsgate.

Data Collection Method

The data collected is secondary in nature from accepted sources. The box office figures and opening day performance will be collected from boxofficemojo.com while the historical prices of the respective stocks on those days will be collected from NASDAQ and NYSE. Other supporting theoretical information will be collected from existing literature on the subject such as journals, magazines, articles, newspaper reports etc. The data will be collected for seven years beginning at 2010 and ending in 2016.

General Methodology

A one sample t test is conducted using Cumulative Abnormal Returns (CAR) values for a five day event window of (-2,+2) of ranging from two days before the release, the day of the release of a film and two days after it. The estimation period extends from (162,-12) for 150 days to effectively arrive at normal returns. Daily returns are calculated for the entire range and are compared with the estimated normal returns. The difference between the two results in the Abnormal Return. The cumulative abnormal return, when analyzed using a one sample t test should show a significance difference from zero, to have a statistically significant difference. To ensure robustness, a separate paired t test is also conducted to identify if there is a significant difference between the abnormal returns in the two days before the release of a film and two days after its release.

The two factors that have been chosen to study their impacts on share price movement is the number of screens where a film releases as well as its declared production budget. Correlation and regression is used

to identify if there exists a statistically significant correlation between the number of screens a film releases in and its opening weekend and total lifetime domestic collection or the production budget and the opening weekend and total lifetime domestic collection.

VII. Results and Discussion

The following tables display the results of the various analyses carried in the study.

Company	One Sample t Test		Paired Sample t Test	
	t value	Significance	t value	Significance
20th Century Fox	0.344	0.732	0.623	0.535
Universal Pictures	-1.080	0.284	1.219	0.227
Lionsgate	-0.638	0.526	-0.245	0.807
Sony Pictures Entertainment	0.823	0.413	1.302	0.197
Time Warner	-0.763	0.448	-1.066	0.290
Paramount Pictures	-1.909	0.060	0.760	0.450
Walt Disney	0.375	0.709	-0.254	0.800

Table 1.1: t Test Results for all seven companies.

Table 1.1 showcases the consolidated results of both One Sample t Tests as well as Paired Sample t Tests conducted on the Cumulative Abnormal Returns of each of the 7 studios. The table clearly shows that the t values are different from zero, although different from zero, is not statistically significant.

Table 1.2 showcases the correlation matrix of the factors affecting the Opening Weekend Gross of a film. Other than a few exceptions, it is seen that in 4 out of 7 cases, all factors are statistically significantly correlated with the Opening Weekend Gross of a film.

Rotten Tomatoes is a website in the business of review aggregation. The name is derived from the practice of audiences throwing rotten tomatoes as a result of a poor stage performance. The film's review affecting the performance of a film has been studied in various studies. Rotten Tomatoes aggregates the reviews from critics from its select pool of nearly 100+ "top critics". These top critics usually write for prestigious magazines and newspapers. Rotten Tomatoes assigns a normalized score to each film based on all reviews collected and gives it a "freshness rating."

Company	Particulars	RTS	Screens	Budget
20th Century Fox	Pearson Correlation	0.468	0.569	0.398
	Significance	0.000	0.000	0.001
Universal Pictures	Pearson Correlation	0.171	0.691	0.429
	Significance	0.156	0.000	0.000
Lionsgate	Pearson Correlation	0.242	0.588	0.592
	Significance	0.044	0.000	0.000
Sony Pictures Entertainment	Pearson Correlation	0.146	0.564	0.709
	Significance	0.227	0.000	0.000
Time Warner	Pearson Correlation	0.803	0.136	0.604
	Significance	0.000	0.268	0.000
Paramount Pictures	Pearson Correlation	0.105	0.574	0.660
	Significance	0.386	0.000	0.000
Walt Disney	Pearson Correlation	0.349	0.691	0.721
	Significance	0.003	0.000	0.000

Table 1.2: Correlation of Factors to Opening Weekend Gross

Company	Particulars	RTS	Screens	Budget	OWG
20th Century Fox	Pearson Correlation	0.557	0.595	0.436	0.930
	Significance	0.000	0.000	0.000	0.000
Universal Pictures	Pearson Correlation	0.943	0.234	0.671	0.324
	Significance	.000	0.052	.000	0.006
Lionsgate	Pearson Correlation	0.297	0.605	0.592	0.986
	Significance	0.013	0.000	0.000	0.000
Sony Pictures Entertainment	Pearson Correlation	0.245	0.564	0.646	0.919
	Significance	0.041	0.000	0.000	0.000
Time Warner	Pearson Correlation	0.302	0.811	0.620	0.914
	Significance	0.012	0.000	0.000	0.000
Paramount Pictures	Pearson Correlation	0.273	0.576	0.773	0.637
	Significance	0.022	0.000	0.000	0.000
Walt Disney	Pearson Correlation	0.415	0.713	0.711	0.964
	Significance	0.000	0.000	0.000	0.000

Table 1.3: Correlation of Factors to Total Domestic Gross.

Table 1.3 showcases the correlation matrix for the factors that affect the Total Domestic Gross of a film. In most of the cases, the factors chosen are shown to be significantly correlated at the 0.01 level.

Company Name	R Square	Adj. R Square	DW	Factor	Beta	t Value	Significance
20th Century Fox	0.451	0.426	1.941	Constant		-3.916	0.000
				RTS	0.37	3.888	0.000
				Screen	0.518	4.319	0.000
				Budget	-0.043	-0.348	0.729
Universal Pictures	0.512	0.49	1.715	Constant		-5.641	0.000
				RTS	0.185	2.142	0.036
				Screen	0.684	6.184	0.000
				Budget	0.017	0.156	0.877
Lionsgate	0.448	0.422	2.205	Constant		-2.722	0.008
				RTS	0.197	2.121	0.038
				Screen	0.296	2.281	0.026
				Budget	0.381	2.955	0.004
Sony Pictures Entertainment	0.525	0.504	1.491	Constant		0.148	0.883
				RTS	0.122	1.018	0.312
				Screen	0.12	1.415	0.162
				Budget	0.618	5.14	0.000
Time Warner	0.653	0.637	1.669	Constant		-6.852	0.000
				RTS	0.075	1.011	0.316
				Screen	0.741	7.187	0.000
				Budget	0.081	0.786	0.434

				Constant		-0.71	0.48
				RTS	0.013	0.14	0.889
				Screen	0.239	1.974	0.053
Paramount Pictures	0.467	0.442	1.459	Budget	0.497	4.065	0.000
				Constant		-3.129	0.003
				RTS	0.264	3.426	0.001
				Screen	0.258	1.87	0.066
Walt Disney	0.615	0.598	2.297	Budget	0.479	3.486	0.001

Table 1.4: Linear Regression Result of Factors Affecting Opening Weekend Gross

Table 1.4 showcases the Linear Regression Result for Opening Weekend Gross of all the studios. The factor that affects it the most is number of screens. The second most important factor that affects the opening weekend gross of a film is identified to be the Production Budget and lastly, it is the Rotten Tomatoes Score.

Company Name	**R Square**	**Adj. R Square**	**DW**	**Factor**	**Beta**	**t Value**	**Significance**
				Constant		-1.852	0.069
				RTS	0.163	3.465	0.001
				Screen	0.106	1.760	0.083
				Budget	0.006	0.108	0.915
20th Century Fox	0.893	0.886	2.013	OWG	0.791	14.448	0.000
				Constant		-0.430	0.685
				RTS	0.309	0.650	0.545
				Screen	0.522	0.519	0.626
				Budget	-0.190	-0.361	0.733
Universal Pictures	0.394	-0.09	3.415	OWG	0.217	0.246	0.815
				Constant		-1.765	0.082
				RTS	0.063	3.206	0.002
				Screen	0.036	1.305	0.197
				Budget	0.005	0.168	0.867
Lionsgate	0.977	0.976	1.616	OWG	0.947	37.739	0.000
				Constant		-1.400	0.166
				RTS	0.103	1.563	0.123
				Screen	0.114	2.443	0.017
				Budget	-0.061	-0.791	0.432
Sony Pictures Entertainment	0.863	0.854	2.191	OWG	0.888	13.321	0.000
				Constant		-2.405	0.019
				RTS	0.191	4.406	0.000
				Screen	0.186	2.317	0.024
				Budget	0.063	1.045	0.300
Time Warner	0.885	0.878	1.761	OWG	0.700	9.645	0.000

				Constant		-0.274	0.785
				RTS	0.161	2.173	0.033
				Screen	0.061	0.601	0.550
				Budget	0.570	5.136	0.000
Paramount Pictures	0.653	0.632	1.622	OWG	0.209	2.094	0.040
				Constant		-2.729	0.008
				RTS	0.101	3.121	0.003
				Screen	0.125	2.294	0.025
				Budget	-0.024	-0.409	0.684
Walt Disney	0.943	0.94	2.013	OWG	0.859	18.051	0.000

Table 1.5: Linear Regression Results of Factors affecting Total Domestic Gross of a film

Table 1.5 showcases the Linear Regression Results of Factors affecting the Total Domestic Gross of a film. It is found that Opening Weekend Gross is the factor that affects the Total Domestic Gross of a film the most. The second factor that affects it is the number of Screens in which a film is released. The third and fourth factors are the Production Budget and the Rotten Tomatoes score respectively.

VIII. Summary of Findings

From the findings of the study, an evaluation of the hypotheses yields the following outcomes.

$H_0$1: There is no impact of box film releases on the share price of the respective listed studio

On careful analysis of the results from the t Tests, Null hypothesis $H_0$1 has been accepted as there are no statistically significant results to reject this hypothesis. From the study, it is concluded that the release of a film has no statistically significant impact on the share prices of the respective studio shares.

$H_0$2: There is no impact of number of screens on opening weekend and lifetime domestic collection of a film

Based on the results of the correlation and regression analysis, it is found that number of screens in which a film releases has a statistically significant impact on the Opening Weekend Gross of a film as well as the Total Domestic Gross of a film. Therefore, the null hypothesis is rejected and the alternate hypothesis *$H'_0$2: There is an impact of number of screens on opening weekend and lifetime domestic collection of a film* is accepted.

$H_0$3: There is no impact of production budget on opening weekend and lifetime domestic collection of a film

Based on the results of the correlation and regression analysis, it is found the production budget of a film has a statistically significant impact on the Opening Weekend Gross of a film as well as the Total Domestic Gross of a film. While not as prevalent as the number of screens affecting the two, there is a statistically significant relationship that does exist on account of the Production Budget of a film. Therefore, the null hypothesis is rejected and the alternate hypothesis, which states that *$H'_0$3: There is an impact of production budget on opening weekend and lifetime domestic collection of a film*, is accepted.

$H_0$4: There is no impact of Rotten Tomatoes Score on opening weekend and lifetime domestic collection of a film

On the basis of the analysis that were carried out, it is observed that Rotten Tomatoes Score has a significant relationship with Opening Weekend Gross as well as Lifetime Domestic Gross of a film. As a result, the null hypothesis is rejected and the alternate hypothesis: *$H_0$4' There is an impact of Rotten Tomatoes Score on opening weekend and lifetime domestic collection of a film* is accepted.

IX. Conclusion

Hollywood is an industry that is notorious for its lax regulations as well as shadowy accounting practices. The findings of this study indicate that there needs to be clearer methods of regulation. Studios have been leveraging their position as market leaders and gaining advantages in the film industry, which is natural. However, the need for stricter declaration of Production Budgets, alongside the addition done to Marketing Budgets as well is needed to better study these cases. The need for a solid theoretical framework and a model by which the performance can be estimated has risen meteorically. The study was carried out with the intention to study the various factors that affect the performance of a film as well as to identify if the release of a film has an impact on the stock returns of the respective studios. The study has found that there is no statistically significant impact of a film's release on the stock returns of studios. On the other hand, the study was able to identify that the number of screens in which a film releases, the production budget as well as the Rotten Tomatoes Score all have an impact on the Opening Weekend Gross of a film. The Total Domestic Gross of a film is affected by the Opening Weekend Gross, the number of screens in which a film releases, its production budget as well as the Rotten Tomatoes Score it earns. Further study in these areas will be able to confirm these findings.

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