

Film Production Management in China: Film Box Office as Indicator

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Abstract

This studies the factors that influence the box office of Chinese film production management. Including economy, film type and film technology, were selected to propose hypotheses. The sample comes from top 20 films that have been released in China in the past five years. In the research process, these influencing factors are first quantified and coded, and descriptive, significance and correlation analysis are carried out on this basis. After that, the significance of the influencing factors and the box office was verified empirically through the regression method. The research found that the film box office must be affected by economic factors. The box office and the sound of films in film technology are significant, but the films produced in China are not. Based on the research results, this paper puts forward some suggestions. Film production should focus on the types of films and the use of film technology to increase the box office revenue. In addition, in the research of this paper, problems that were not paid attention to in the previous research were found. The sound of the film and the box office of the film presented significant. This will be the next step in the research direction.

Keywords: Film Box Office, Film Production Management, Indicator, Film Sound

Introduction

In terms of the entire film industry, film management, in fact, can be divided into macro and micro-management. Film macro-management, in fact, since the movie was born there. This mainly refers to the overall management of the development process of the film industry. This aspect can be divided into two main contents: first, as a commodity, under the role of the law of value in the field of market circulation, the macro-control between producers and consumers is caused by the relationship between interest and demand. This includes policies, regulations and directives issued by the government, as well as relevant legal constraints and industry self-discipline requirements. However, no matter from which aspect, macro-management of films should be the concrete embodiment of the ability of managing producers and creators to comprehensively master the management methods and coordinate the demands of various aspects. The micro-management of film mainly refers to the specific operation method in the whole process from construction investment to production, distribution and projection, which can also be understood as the management content in the production and operation of film.

With the development of the economy, the growing prosperity of the cultural industry, movie as the representation of the cultural industry entertainment products, it also showed an unstoppable trend of development. The amount of film box office is an important indicator to measure the success of a film. The analysis and research on the factors affecting the film box office provide an indispensable theoretical basis for the development of the film industry.

Although several studies exist that analyze the drivers of motion picture success (Suman Basuroy, et al 2003; De Vany & W. David Walls, 1999; Thorsten Hennig-Thurau, et al, 2006;

Donald Lehmann & Charles Weinberg, 2000; Ramya Neelamegham & Pradeep Chintagunta, 1999; Abraham Ravid, 1999), the extant literature almost exclusively addresses only the direct relationship between various “success factors” (e.g., star power, advertising) and movie success. Statistical analysis of motion picture markets has led to intriguing results, such as observing the evidence for a Pareto law for movie income (Sinha & Raghavendra, 2004), along with a log-normal distribution of the gross income per theater and a bimodal distribution of the number of theaters in which a movie is shown (Pan & Sinha, 2010). By analyzing historical data about 70 years of the American movie market, the movies with higher level of novelty (assigned based on keywords from the Internet Movie Database) produce larger revenue (Sreenivasan, 2013). Although the sales of the motion-picture industry in China have grown incomparably to any other country during the past decade, most research related to it has focused on discourse of the political or social contexts. The statistical results suggest that actor reputation, China-related contents and Chinese crew participation in the movie production, and release timing are significantly related to the box-office performance of foreign films in China (Jooyoung Kwak & Liyue Zhang, 2011). But, a little research has been done on the relationship between the picture, sound, direction and box office performance of a film.

Based on the literature review and the actual situation of the Chinese film market, this paper investigates the relationship between the types of films, film technology and production regions and the box office. At the same time, controlling variables such as GDP, resident disposable income, film production, number of screens and government policies were added. Through the study, to determine whether film type, technology, and production area affect the film box office.

Literature Review

Research Model for the Film Box Office

In the past, the study of film, composite film learn, medium of communication, management and economics, and other research methods, through to the effect the success of the film and its economic data to carry on the empirical analysis to achieve the research purpose, the study of factors affecting film still is one of the academic research hot spot. Study of contemporary western film began in the 1980 s, the study of factors affecting film started earlier, many scholars in films in North America.

American film economist Barry R. Litman and Linda S. Kohl (1989) has established the basic method and model for studying the box office. He divided the research methods of film box office into the communication method, which is to investigate the individual's movie-watching habits, and the economic method, which focuses on the use of some authoritative industrial data. Since it was difficult to obtain the data of the film's box office at that time, he took the rental income of the film as the dependent variable to measure the film's box office, and divided the independent variables affecting the film's box office into three parts: creativity, release/release time and film marketing. He used the hierarchical regression analysis method and obtained the regression equation of the film's box office. After Litman established the basic methods and models of film box office research, Scott Sochay took films released in North America from 1987 to 1989 as samples and studied the factors influencing film box office. On the basis of Litman model, Sochay further refined the independent variables, which can be divided into creative, distribution and film marketing. The dependent variables studied are rental income and the number of weeks of screenings. The screenings time dynamically reflects the product cycle of a film, and the independent variables increase the market concentration and reflect the market competition in different screenings. Therefore, the research model of film box office starts to change from static state to dynamic state. In Sochay's study, comedy

had a positive effect, while science fiction had no significant effect, which was inconsistent with the results of Litman's study. It also showed that the preferences of moviegoers were constantly changing, and the research on factors affecting the box office needed to consider timeliness.

Influencing Factor for the Film Box Office

In the following, we briefly review the existing streams of literature. Basically, three groups of movie-success drivers have been identified by extant research; namely movie characteristics, post-filming marketing studio actions, and non-studio factors. Movie characteristics discussed in the literature include the concepts of star power, director power, cultural familiarity, genre, and certification. Based on the omni-presence of stars in movie business media coverage, it is not surprising that several authors have found stars to positively influence movie revenues. However, the impact of stars on movie success remains a contested issue as other researchers question this relationship (Bruce A. Austin, 1989; Arthur De Vany & W. David Walls, 1999; Anita Elberse, 2005; S. Abraham Ravid, 1999). Regarding director power, to the best of our knowledge, no study has empirically supported a significant impact of a movie's director on the film's economic success. However, paralleling the argumentation from star power, such an impact seems plausible because of the director's ability to combine all creative aspects of a movie into an attractive mix. Whether a movie is a sequel or is based on a familiar story or other cultural element also appears to be relevant to movie success. Thorsten Hennig-Thurau, Mark B. Houston and Gianfranco Walsh (2006) view a sequel as a dimension of the broader concept of 'cultural similarity' (sometimes also referred to as 'symbolicity'), which describes a movie's potential to be categorized into existing cognitive categories by consumers to which the consumer has positive associations. Besides producing sequels, cultural familiarity can be fostered through remakes, the drawing on a TV series or other elements of popular culture (e.g., novels, comics, or computer games)(Bruce A. Austin, 1988). Finally, the analysis of the impact of a movie's genre and its certification on movie performance has led to contradictory findings (Hennig-Thurau T., Houston M. B. & Walsh G., 2007). Genres such as 'action' have been shown to have superior performance at the box office, which can be attributed to higher production values and other movie factors such as the participation of stars. However, a review of the literature suggests that research findings are not conclusive. Certifications impact both consumers' ability to attend a movie and their interest in the movie. While some authors have found that restrictive certifications weaken a movie's cumulative rentals or revenues (Barry R. Litman, 1983; Mohanbir S. Sawhney & Jehoshua Eliashberg, 1996), other studies show no significant impact of certifications (Jay Prag & James Casavant, 1994).

Turning to studio actions, the actions discussed in the literature include the movie's budget, advertising expenditures, timing, and the number of screens. A number of researchers have reported a positive correlation of movie budget with box office (Barry R. Litman, 1983; Barry R. Litman & Linda S. Kohl, 1989; Fred Zufryden, 2000). However, there has been less effort directed toward an understanding of the nature of this relationship (a noteworthy exception is Suman Basuroy, et al, 2003). The level of advertising associated with a movie's release has been shown to influence box-office success (Thorsten Hennig-Thurau, et al 2006; Donald R. Lehmann & Charles B. Weinberg, 2000; Jay Prag & James Casavant, 1994). However, since it is plausible that more advertising is allocated to potentially popular and successful movies, the lack of inter factor relationships in existing studies leaves questions about the causality of the relationship. Studios' distributional activities and more specifically, their timing policy have also been shown to correlate with movie box office.

In the late 1990s, the research on the factors affecting the box office gradually became a

hot topic in the western film industry, and the research conclusions were different from each other. The conclusions were summarized as follows:

The film type has a large and complex impact on the box office, and the research results in different periods are different. Action movies generally have a positive impact, which may be due to the use of high-tech and the joining of stars, while restrictive classification has a negative impact on the box office.

◆ Production cost, size, and schedule of distributors and other marketing factors will directly affect the film box office. Production cost is positively correlated with the film box office, while large distributors and summer holidays have a positive impact on the film box office.

◆ Independent third-party evaluation will affect the box office, that is, whether a film wins a prize has a great impact on the box office.

◆ The film box office is also influenced by the audience's evaluation of the film quality, especially the quality evaluation caused by word-of-mouth communication, that is, the audience's attention, the film score and click rate have an impact on the film box office.

The above research contents and results provide reference value for this paper to conduct quantitative research on the factors influencing the film box office and construct the indicator system of the factors influencing the film box office.

Research Methodology

In this study, macroeconomic index such as GDP, from The Central People's Government of the People's Republic of China (<http://www.gov.cn/shuju/index.htm>). The data is authoritative. In this study, data on the development of the film industry, from the National Bureau of Statistics of the People's Republic of China (<http://data.stats.gov.cn/easyquery.htm?Cn=C01&zb=A0A01&sj=2012>). The data is authoritative. The Data of Audience, Screen, Cinema & Policy were retrieved, etc. from Hong Yin' papers (2010-2019).

There are many types of movies and this article defines them five: Science Fiction Film, War Film, Comedy Film, Action Film, and Story Film. The technical indicators of a film are defined in this paper as Sound, Video, Cut, Special Effects, Adaptor, Director and Actor. Production areas are defined as: films made in China and those not made in China. As can be seen from Table 3.1, in the data collection process, each category is listed separately. If the film falls into this range, the value will be defined as 1, otherwise 0. Thus realized the data coding and the quantization.

Because these GDP Numbers are too large, in practice they are converted into the GDP logarithm.

$$y = \log_{10}(x)$$

x: GDP

Result

Data Analysis

China's GDP grew rapidly in the past decade, but PCDI grew slowly, as shown in Figure 1.

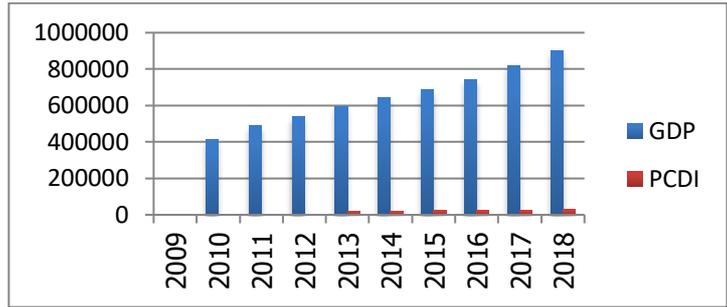


Figure 1. China's GDP & PCDI Trends Over the Past Decade

Note. GDP Unit: 100 Million CNY; PCDI Unit: CNY

As can be seen from Table 1, the box office of films has shown a growing trend in the past decade. The total box office has grown rapidly since 2015. The box office of films made in China produced rose slightly in 2011, but declined in 2012; Since 2015, the growth rate has been rapid.

Correlation Analysis

The analysis of the Box Office of the Top 100 films in the last five years can be seen.

The Box Office and the GDP show significant.

The Box Office and the Film Technology (Film Sound, and Special Effects) show significant.

The Box Office and the Film Production Area show significant.

The Film Special Effects and Film Sound show significant.

The Film Video and Film Sound show significant.

The Film Adaptor and Film Cut show significant.

The Film Director and Film Sound, Special Effects, Cut, Adaptor are show significant.

The Film Actor and Film Cut, Adaptor, Director all show significant.

Table 1. Data of China's film industry over the past decade

Year	Population (Ten Thousand)		GDP(100 Million CNY)		PCDI (CNY)	The number of Film Produced					Box Office (Billion CNY)		Audience (Million People)	Screen	Cinema	Policy
	Total Population	Urban Population	GDP	lg(GDP)	Feature Film	Cartoon	Scientific and Educational Film	Documentary	Special Film	Total Revenue	Domestic Box Office Receipts					
2009	133450	64512	-	-	-	456	27	52	19	4	106.65	62.06	2.01	4723	1687	1
2010	134091	66978	412119.3	12.9291	-	526	16	54	16	9	157.20	101.72	2.86	6256	2000	0
2011	134735	69079	487940.2	13.0979	-	558	24	76	26	5	177.47	131.15	3.70	9286	2800	0
2012	135404	71182	538580.0	13.1967	-	745	33	74	15	26	170.73	130.61	4.70	13118	3000	0
2013	136072	73111	592963.2	13.2929	18310.76	638	29	121	18	18	217.69	127.67	6.10	18195	3200	0
2014	136782	74916	641280.6	13.3712	20167.12	681	40	52	25	23	296.39	161.55	8.33	23592	4215	1
2015	137462	77116	685992.9	13.4386	21966.19	686	51	96	38	17	440.69	271.36	12.56	31627	5415	1
2016	138271	79298	740060.8	13.5145	23820.98	772	49	67	32	24	457.12	287.47	13.72	41179	7900	1
2017	139008	81347	820754.3	13.6179	25973.79	798	32	68	44	28	559.11	301.04	16.20	50776	8051	1
2018	139538	83137	900309.5	13.7105	28228.00	902	51	61	57	11	609.76	378.97	17.16	60079	9504	1

Note. I. There was a film Policy in this year, reach assign 1, otherwise 0.

II. The Data of Population, GDP & Per Capita Disposable Income retrieved from <http://www.gov.cn/shuju/index.htm>; The Data of Box Office & Film Produced Number retrieved from <http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0A01&sj=2012>; The Data of Audience, Screen, Cinema & Policy retrieved from Hong Yin (2010~2019).

Test Results

In the regression analysis, the film box office is still taken as the dependent variable. Meanwhile, in the significance and correlation analysis above, variables showing significance are selected as independent variables. Take other appeared variables as control variables.

Regression Analysis

In Table 2, R = 0.658. F indicates the significance of R, and Sig. F = 0.000 < 0.05, indicating that the overall interpretation of the model is significant. The coefficient of the independent variable Sig. Is significant and can be used.

Table 2. The Model Summary

Model	R	R ²	Adjusted R ²	Error of Standard Estimate	Change Statistics				
					R ² change	F change	df1	df2	Sig. F change
1	.658 ^a	.433	.370	6.46075	.433	6.810	10	89	.000

Table 3 shows that:

The Sig. = 0.041 < 0.05 of film sound is significant.

The Sig. = 0.005 < 0.05 of film special effects is significant.

The Sig. = 0.023 < 0.05 of China’s film production areas is significant.

However, the film type Sig. = 0.701 > 0.05 can’t show significance.

Table 3. Coefficient

Model		Unstandardized Coefficients		Standard Coefficient	t	Sig.	Collinear Statistics	
		B	Standard Error				Tolerance	VIF
1	(Constant)	-450.912	74.897		-6.020	.000		
	Sound	3.798	1.833	.211	2.073	.041	.617	1.622
	Special Effects	4.877	1.707	.283	2.858	.005	.648	1.543
	Areas	3.319	1.438	.205	2.308	.023	.810	1.234
	Video	-4.506	1.860	-.223	-2.422	.017	.754	1.327
	Cut	-4.523	1.992	-.215	-2.271	.026	.713	1.403
	Adaptor	-3.740	1.900	-.197	-1.968	.052	.634	1.578
	Director	1.611	1.976	.091	.815	.417	.509	1.964
	Actor	4.590	1.584	.282	2.897	.005	.672	1.488
	Film Types	-.575	1.496	-.032	-.385	.701	.926	1.080
	Lg(GDP)	33.940	5.521	.512	6.148	.000	.916	1.091

Interaction Regression

An interaction may arise when considering the relationship among three or more variables, and describes a situation in which the effect of one causal variable on an outcome depends on the state of a second causal variable (that is, when the effects of the two causes are not additive). Although commonly thought of in terms of causal relationships, the concept of interaction can also describe non-causal associations. Interactions are often considered in the context of regression analyses or factorial experiments. The elementary version:

$$y = c + ax_1 + bx_2 + d (x_1 * x_2) + \text{error}$$

Where the interaction term ((x₁ * x₂) could be formed explicitly by multiplying two (or more) variables.

In this paper, cross interaction regression studies two cross multiplying terms, namely

(China's Film Production Area * Film Sound) and (China's Film Production Area * Special Effects). It was used to test whether the films made in China also presented the significance of the hypothesis.

In Table 4, $R = 0.674$. F indicates the significance of R, and $\text{Sig. F} = 0.000 < 0.05$, indicating that the overall interpretation of the model is significant. The coefficient of the independent variable Sig. Is significant and can be used.

Table 4. The Model Summary

Model	R	R ²	Adjusted R ²	Standard Error of Estimate	Change Statistics				
					R ² change	F change	df1	df2	Sig. F change
1	.674 ^a	.454	.378	6.41653	.454	6.023	12	87	.000

Table 5 shows that: The Sig. = 0.076 of (China's Film Production Area)

Model		Unstandardized Coefficients		Standard Coefficient	t	Sig.	Collinear Statistics	
		B	Standard Error				Tolerance	VIF
1	(Constant)	-415.056	77.554		-5.352	.000		
	Sound	4.532	2.465	.251	1.838	.069	.336	2.975
	China's Film Production Area * Film Sound	-1.995	3.233	-.090	-.617	.539	.293	3.412
	Special Effects	1.541	2.526	.089	.610	.543	.292	3.428
	China's Film Production Area * Special Effects	6.823	3.802	.264	1.795	.076	.291	3.437
	Production Areas	1.724	1.827	.106	.943	.348	.495	2.021
	Video	-3.269	1.972	-.161	-1.658	.101	.662	1.511
	Cut	-4.492	1.980	-.213	-2.269	.026	.712	1.405
	Adaptor	-2.596	1.994	-.137	-1.302	.196	.567	1.762
	Director	1.358	1.980	.077	.686	.495	.500	2.000
	Actor	4.272	1.594	.262	2.680	.009	.655	1.527
	Film Types	-1.596	1.594	-.089	-1.001	.319	.804	1.244
	Lg(GDP)	31.384	5.701	.474	5.505	.000	.848	1.180

* Special Effects) is a bit of significant.

The (China's Film Production Area * Film Sound) Sig. = 0.539 > 0.05 can't show significance. Although, in the correlation analysis and the regression analysis, the film sound and the film box office present significance; But the sound of Chinese films does not feature prominently. Table 5. Coefficient

Discussion

The analysis of the Box Office of the Top 100 films in the last five years can be seen from the hypothesis test results that:

1 Film Technology and Film Box Office

In the regression research results of this paper, the significance of film technology (film sound, film special effects) and film box office is shown.

In the film crew, more money is spent on the production of the pictures and the labor of the actors. In the audience, more people pay attention to the picture, the story of the film. The actual situation is different from the hypothetical result, and the sound of the film has a significant impact on the box office.

It has been more than 100 years since the development of the film. Film sound and other film technologies have advanced with the influence of the world's technology. But, in fact, the progress of the sound of the film has been lagging behind the picture. The first film was made in 1895, it was silent. In 1927, the Jazz Singer was the symbol of the appearance of sound films in the history of world cinema. In 1953, 3D technology first appeared in the field of film. 5.1 surround technology, however, didn't appear until 1975. It can be seen that the sound technology of film has been more than 20 years behind film screen technology.

However, this study is a new discovery. The influence of film sound on film box office is higher than other film technologies. However, the sound of films produced in China has no significant impact on the box office, and the sound production level of Chinese films needs to be improved. In addition, the study also found that special effects have a significant impact on the box office of films produced in China. This result, however, does not apply to all films. It shows that Chinese films are different from foreign films in the production of special effects.

2 Film Type and Film Box Office

In the regression research results of this paper, the significance of film type and film box office is not obvious. This hypothesis is a failure, but in many previous studies, the film type does have an impact on the box office. The reasons are as follows: It is possible that the sample of this survey is different from that of other studies. It is possible that the impact of being high on the box office rankings is not significant. Therefore, in the following research, the sample database of the research can be reestablished to find out the reasons.

3 Economic Factors and Film Box Office

Through regression analysis, the relationship between box office and economic factors was verified by using GDP variables. The results show that the box office is always influenced by economic factors.

Conclusion

Research Summary

This paper reviews the literature and theories related to the film industry and the box office, as well as the factors influencing the box office. Based on the research results of experts and scholars, this study is based on the data of the 100 top 20 films that have been released in China in the past five years. Film genre and film technology were selected, and these indicators were quantified and coded for quantitative analysis. The research found that there are many factors affecting the box office. The box office must be affected by economic factors such as GDP. At the same time, the film sound of the film technology has a remarkable influence to the film box office.

Implication

In the film production management, the film box office is the economic embodiment of the final value of the film, and it is also an important way for film production companies to make profits. Clarifying the influencing factors of film box office can improve the theoretical research system of film box office and provide a basis for film enterprises to make decisions. The study of film box office can reduce the production risk of film enterprises. The research results of this paper can guide Chinese film producers to pay attention to the proportion of funds used in film production and raise the importance of film sound. At the same time, Chinese filmmakers should learn from the advanced experience of foreign film-making, pay attention to the choice of film types, and discover the tastes of the audience, so as to improve the profitability of the box office.

Limitation of the Study

In the research process of this paper, it is found that there are still many aspects that can be improved in the study of factors affecting the box office: The awards in this paper are the awards so far after the release of the film due to the limitation of the statistical time. In the future, if the awards can be counted at a fixed time after the release of each film and a database can be established, the research results will be more accurate.

Suggestions for Future Research

Based on the conclusions of empirical research, this paper puts forward the following Suggestions: The study found a significant relationship between the sound of a film and the box office, a finding that had not been found in previous studies. Moreover, there is no clear research on the relationship between the indicators of film technology and the box office, which may be a direction that can be studied in the next step.

The film-watching process is a complex physiology-psychological experience process. Therefore, in future studies, it is possible to explore whether the box office is influenced by the psychology of film audiences.

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