

Is There a Lipstick Effect in the Chinese Game Industry in the context of Big Data

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ABSTRACT

With the maturity of big data technology, traditional industries have accelerated the integration with big data, and many industries have undergone radical changes, so some traditional economics principles may become invalid. This paper mainly researches whether there is a lipstick effect in the current Chinese game industry. Based on the data from 2004-2020, this paper uses SPSS to make correlation analysis between the game industry development indicators and economic development indicator. Among these indicators, this paper will make specific analysis on the correlation between per capita disposable income and the real sales revenue of game market, and the correlation between GDP per capita and the real sales revenue of game market respectively. In this paper, correlation analysis, mapping analysis and factual analysis are done by using historical data. Since 2004, there have been three obvious economic recessions in China's economy. After excluding the special epidemic, it can be seen that the development of the game industry and the economic development were basically positively correlated during the other two recessions. Therefore, it is concluded that the lipstick effect is unlikely to exist in China's game industry today.

Keywords: *the lipstick effect, game industry, big data economy.*

1. INTRODUCTION

The lipstick effect was introduced during the Great Depression of the United States in the 1930s. It refers to the fact that in times of economic depression, people's income decreases and people usually consume less at this time. However, when people give up the purchase of houses, cars, travel abroad and other consumption of expensive goods, they will spend the free money in their hands to consume those substitutes for expensive goods -- "cheap non-essential things", which gives rise to the substitution effect. The substitution effect is far greater than the income effect of reduced consumption due to reduced income, hence the lipstick effect arises. Most scholars today believe that the lipstick effect is still widely present in China's entertainment industry, and even extends to other industries. The purpose of this paper is to study whether the lipstick effect exists in the current Chinese game industry. The conclusion is made by combining quantitative analysis of the data and specific analysis of the actual situation. This study can provide certain suggestions for the game industry in the current or future recessionary period. If the lipstick effect exists in the game industry, the game industry can be expanded moderately during the recessionary period,

and if it does not exist, the game industry needs to respond accordingly. This study is also applicable to investors and can provide them with some advice when investing. Since the industries in which the lipstick effect exists initially point to the entertainment industry, this paper will focus its analysis on the entertainment industry, among which tourism, film, game and cosmetics are four prominent representatives. Due to the particularity of the epidemic, tourism and movies were greatly impacted by restrictions on going out during the special economic depression in 2020. And the epidemic reduced the demand for social makeup. These three industries do not follow the normal economic operation rules, so they will not be analyzed here. Therefore, this paper chooses the Chinese game industry for specific analysis based on its relevant data from 2004 to 2020.

2. EXPERIMENTAL

2.1. Literature review

Some scholars believe that many entertainment industries have a lipstick effect, and industries can seize the opportunity to profit from. From economic theory, Shen Jiaqi used the perspective of microeconomics to

explain the operation principle of the lipstick effect, pointing out that when the economy is in normal times, lipstick goods belong to normal goods, while when the economy is in the doldrums, lipstick goods are similar to inferior goods. Subsequently, he explained that in times of economic depression, the substitution effect of lipstick goods is greater than or equal to the income effect, so the lipstick effect arises [1]. From the real situation, Jiang Rui believes that cultural consumption has the "lipstick effect" and shows a counter-cyclical nature in the financial crisis, which has become one of the conditions to promote the development of cultural industry [2]. Zhang Limei believes that the Chinese lottery could be the "lipstick" that benefits from the economic recovery [3]. Lu Man believes that the essence of live commerce perhaps is the lipstick effect [4].

However, some scholars believe that the development of certain industries does not benefit from the lipstick effect.

Based on the principal component factor analysis and binomial Logistic regression analysis with the economic data obtained from the questionnaire survey, Wu Yun concluded that Chinese female consumers would not reduce their consumption of cosmetics due to the economic slowdown. Therefore, it is verified from the side that there will not be an obvious "lipstick effect" when China's economic growth is slowing down [5]. By analyzing and modeling the growth and variables of movie box office, Li Jinyang concludes that the growth of Chinese movie box office is not due to the lipstick effect [6]. According to Zhu Keda, what exists in the cosmetics industry now is the "new lipstick effect", which refers to the promotion of the product by celebrities, which in turn generates a continuous fission, resulting in the hot sale of lipsticks and other makeup products. This interesting economic phenomenon could also be called the "seeding effect [7]." At present, most articles believe that the lipstick effect exists in different

industries in China, and few articles use quantitative tools to study this topic. This paper focuses on the quantitative analysis of macro and micro data, starting from the correlation between relevant industries and relevant economic indicators, and making detailed analysis by combining specific facts.

2.2. Method

In this paper, GDP, unemployment rate, per capita disposable income, per capita GDP and per capita disposable income of urban residents are selected to refer to the overall macroeconomic situation, and the actual annual sales revenue of China's game market (100 million yuan) is selected to refer to the development of China's game industry, so as to study whether the macroeconomic situation of China has an inverse influence on the domestic game industry.

This paper uses SPSS tool to do the linear regression of the above five economic parameters with the actual sales revenue of Chinese game market every year, and selects the economic parameters that really have research significance by checking the significance, error and correlation in the regression results. Finally disposable income per capita and GDP per capita are selected as the research objects. After examining the correlation between the two and the actual annual sales revenue of the game market, this paper will provide further analysis based on specific facts.

2.2.1. Per Capita Disposable Income and the Actual Annual Sales Revenue of the Chinese Game Market

This part uses SPSS to make regression analysis on per capita disposable income and actual sales revenue of the game industry, and judge the relationship between the two through charts.

Table 1. Anova^a

Model		Quadratic Sum	Df	Mean square	F	Sig
1	Aggregate	10249341.51	1	10249341.51	515.952	.000 ^b
	Residual	238378.934	12	19864.911		
	Regression	10487720.45	13			

a. A Dependent variable: Actual sales revenue of Chinese game market (100 million Yuan)
 b. B Predictive variable: (constant), National per capita disposable income

Table 2. The Model Summary

Model	R	R ²	Adjusted R ²	Error of standard estimate
1	.989 ^a	.977	.975	140.9429

Predictive variable: (constant), National per capita disposable income

Table 3. Coefficient^a

Model	Quadratic Sum		The standard coefficient	t	Sig
	B	Error of standard estimate			
1 constant	-1062.870	104.893		-10.133	.000
National per capita disposable income	.113	.005	.989	22.715	.000

First, pay attention to the “Anova” table, where significance SIG=0<0.05). This indicates that the established regression model holds. In the model summary, $R^2=0.977$, which shows the prediction error is small. The estimated equation is: $Y=-1062.870+0.113*x$, which shows all other things being equal, for every unit increase in per capita disposable income, the real sales revenue of the Chinese game market increases by 0.113 units per year.

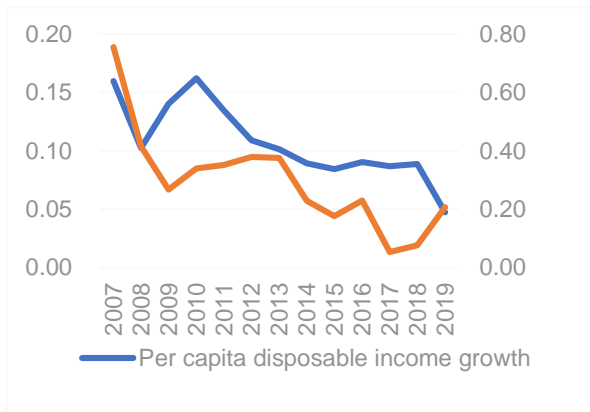


Figure 1 Per Capita Disposable Income and the Actual Annual Sales Revenue of the Chinese Game Market

From 2007 to 2020, China's economy has experienced roughly three recessions, in 2008 year, 2015, and 2020. As can be seen from the chart, except for the recession period in 2020, the growth rate of economic indicators of the remaining two recessions and the growth rate of actual sales revenue of the game market basically change in the same direction, and specific analysis will be made below with the actual situation and data. Under the impact of the subprime mortgage crisis in 2008, the global economy was depressed, and the growth rate of the per capita disposable income of Chinese residents and the growth rate of the actual sales revenue of Chinese game market dropped sharply. The plunge in stocks of major overseas listed game companies and the decline in players' spending power triggering a slide on earnings are inevitable. And the most serious is that the financial crisis makes small and medium-sized online game makers face cash flow problems, while asset valuation and P/E ratios are reduced [8]. 2015 was also a difficult

year for economic development, due to a series of events such as the US and Russia economic sanctions, the Greek debt crisis and the financial storm, the global economy fell into a trough. At the same time, China has been implementing a rough economy for many years and is facing problems such as irrational economic structure and low economic efficiency. As can be seen from the graph, the recession of economy has also affected the development of the game industry to some extent. In the first half of 2015, the actual sales revenue of China's game market reached 60.5 billion yuan, up 21.9% year-on-year, and this growth rate was the first decline since 2012. According to Lin Yongsong, president of Ali Mobile Business Group Jiuyou, overall, the Chinese game industry is still embarrassing in 2015. Affected by the overall economic situation, developers are under great pressure to survive, facing a slowdown in revenue on one side and huge development costs. In 2015, the game market began to shuffle. The economic slump caused by pandemic in 2020 is particularly special. As the epidemic has prevented consumers from going out to spend, consumption choices have been greatly reduced.

The negative impact of the epidemic is hedged by the "Stay at Home Economic", so the overall domestic game industry in 2020 not in the doldrums. The actual market sales revenue was 278.687 billion yuan, while the number of game users reached 665 million, up 3.7% year on year. But the damage of the epidemic to the industry cannot be underestimated.

As a result of the epidemic, the development of new products in the game industry has slowed down significantly, the business environment has deteriorated, and work efficiency has decreased [9].

2.2.2. GDP Per Capita and the Actual Annual Sales Revenue of the Chinese Game Market

This part uses SPSS to make regression analysis on GDP per capita and actual sales revenue of the game industry, and judge the relationship between the two through charts.

Table 4. Anova^a

Model		Quadratic Sum	Df	Mean square	F	Sig
1	Aggregate	10103345.66	1	10103345.66	315.422	.000b
	Residual	384374.785	12	32031.232		
	Regression	10487720.45	13			

Dependent variable: Actual sales revenue of Chinese game market (100 million Yuan)
 Predictive variable: (constant), per capital GDP

Table 5. The Model Summary

Model	R	R ²	Adjusted R ²	Error of standard estimate
1	.982 ^a	.963	.960	178.9727

Predictive variable: (constant), per capital GDP

Table 6. Coefficient^a

Model	Quadratic Sum		The standard coefficient	t	Sig
	B	Error of standard estimate			
1 constant	-1192.580	140.879		-8.465	.000
per capital GDP	.052	.003	.982	17.760	.000

First, pay attention to the “Anova” table, where significance SIG=0<.05). This indicates that the established regression model holds. In the model summary, =0.963, which shows the prediction error is small. The estimated equation is: $Y = -1192.580 + 0.052 * x$, which shows that when other conditions remain unchanged, the actual sales revenue of China's game market will increase by 0.052 units per year when per capita GDP increases by one unit.

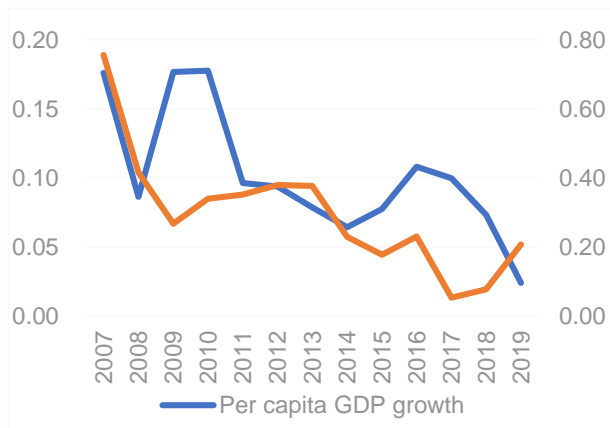


Figure 2 GDP Per Capita and the Actual Annual Sales Revenue of the Chinese Game Market

The above figure is about the relationship between GDP per capita and actual sales revenue in the Chinese game market and correlation between the growth rate of the two. The data analysis in the figure is similar to the analysis in 1), and will not be repeated here.

3. CONCLUSION

Through correlation analysis and specific factual analysis, it can be seen that during the economic depression, the development direction of China's game market is basically consistent with the economic operation, so it can be known that the lipstick effect is unlikely to exist in the game industry. Through the above analysis of the negative impact on the game industry under the economic recession, it is clear that when the economy is in the doldrums, the game industry also has to make relevant precautions and

countermeasures. This paper also has shortcomings, because the National Bureau of Statistics only carried out the survey of urban and rural integrated household income and expenditure and living conditions after 2013, the survey scope, survey method, and indicator caliber of per capita disposable income of residents before 2013 are different, so there may be some inaccuracy in the data, but this small error will not cause great bias in the quantitative results.

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