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The Impact of IP Holdings of Listed Gaming Companies on Investment Efficiency

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Abstract

Recent years, the game industry has developed continuously. Game Intellectual Property (IP), as an important element in the game, has a very high popularity in the market, which has attracted more and more companies to concentrate on game IP for investment. However, there is a lack of multi-dimensional empirical research on the impact of game IP holdings on the investment efficiency of enterprises. It is found that the positive impact of IP holdings on inefficient investment has not passed the significance test, indicating that simply increasing the scale of IP holdings cannot significantly aggravate or alleviate the problem of inefficient investment; Enterprise growth has a significant inhibitory effect on inefficient investment, and high-growth enterprises are more likely to realize rational allocation of resources. This paper proves that it is difficult to convert the value of game IP into investment income alone, and blindly hoarding IP can easily lead to information asymmetry and aggressive investment by management, which in turn leads to resource mismatch. Learning the results of enterprise IP investment through this empirical analysis can improve the vigilance of enterprises against IP bubble, which can help to avoid blind investment in IP and turn their investment eyes to other sustainable growth points.

Keywords

investment efficiency, investment behavior of game companies, IP holdings, information asymmetry theory

1. Introduction

The full form of IP is “Intellectual Property”, which refers to highly focused, influential, and can be reproduced, encompassing creative intellectual property in creation [1]. In the game industry, IP, like traditional IP, can be extended based on the original characters and images, and its influence can be improved through artistic processing, collaborations, and so on.

Popular game IPs often attract the attention of many companies. Some popular IPs receive a large amount of capital injection continuously. Meanwhile, high premium valuations have also inflated the IP economy. More and more game companies are using well-established IPs to entice investors to put in large amounts of money, and investors are also willing to believe that developing products based on reliable IPs is an excellent way to reduce investment risk.

However, as the market’s enthusiasm for IP investment expands continuously, it has led some people to pay attention to the efficiency of IP investment. In recent years, some overexploited IPs have lost the favor of

players, causing what was once extremely popular to no longer be hot. For example, the 'Need for Speed' series, once the top global racing game IP, has gameplay with no innovation and uneven quality under the publisher's 'spring festival goods' strategy, which made its reputation decline all the way. This study is based on analyzing the impact of IP holdings on the investment efficiency of gaming listed companies, specifically whether the continuous increase in IP holdings leads to efficient investment or inefficient investment, and whether higher IP holdings are more likely to result in overinvestment or underinvestment. Conducting such research can provide investors with a more scientific basis for decision-making, avoiding ineffective investments characterized by 'high IP input, low content output,' and breaking the industry misconception that 'a famous IP is guaranteed to be a big hit' [2]. It also corrects the industry's cognitive bias of 'IP-centrism,' breaking the information bubble that 'having an IP will automatically secure investment.' This can effectively address the long-standing problem in the industry where 'bad money drives out good money.'

2. Theoretical Basis and Research Hypotheses

From the perspective of information asymmetry theory, IP belongs to the typical category of intangible light assets, which are difficult to show in traditional financial statements in daily investments. Corporate investors and external investors often have information gaps, and investors generally only have fragmented information. Ha Thi Thu Nguyen and others pointed out that once speculative behaviors that exacerbate information asymmetry exist, they may lead to low investment efficiency [3]. While gaming companies acquire a large amount of IP through investment and acquisitions, because IP as an intangible asset is hard to quantify, it is more likely to exacerbate information asymmetry and ultimately lead to a decline in the company's investment efficiency.

The theory of intangible assets further supplements the cyclical characteristics of IP. Arrighetti, Alessandro also indicated that intangible assets go through an accumulation process, during which some heterogeneity phenomena may occur, with both underinvestment and overinvestment being possible [4]. Due to the longer investment cycle of intangible assets, listed gaming companies are more likely to exhibit heterogeneity in their pursuit of popular IPs, which in the short term manifests as underinvestment by the companies. Based on the principal-agent theory, the traffic bonus of popular IPs is significant. The management may be prompted to adopt more aggressive investment behaviors due to considerations such as industry reputation, and ignoring the compatibility between the IP and the company itself may lead to resource misallocation, ultimately leading to a decline in investment efficiency. Garcia, R., & Silva, M. empirically demonstrated that the scale of holding intangible assets is significantly negatively correlated with a company's investment efficiency. The higher the proportion of intangible assets and the larger the total holdings, the more severe the company's inefficient investments. D ue to its characteristics that are difficult to quantify, it exacerbates information asymmetry and principal-agent conflicts, ultimately resulting in underinvestment or overinvestment. Their results on industry heterogeneity also clearly indicate that compared to traditional physical industries, IP has a more pronounced positive effect on inefficient investment [5]. Anaka, S., & Sato, K analyzed the phenomenon of overinvestment caused by management blindly following the trend of popular IP due to information asymmetry for purposes such as performance evaluation, thereby neglecting the company's own R&D capabilities and leading to improper resource allocation [6]. Companies with high IP holdings generally exhibit phenomena of underinvestment or overinvestment. Based on the above theory, this paper proposes the following assumptions.

H1: The amount of IP holdings has a significant impact on the inefficient investment of listed gaming companies.

3. Research Design

This study chose 20 gaming companies as samples from A-shares during 2020-2025, excluding ST stocks, financial companies, and samples with missing key data. The samples come from the relevant financial report information in the Guotai An database. Missing data are discarded according to the case-by-case exclusion method.

3.1 Variable Definition

The explanatory variables in this paper are IP holdings (IP) and inefficient investment (UNIV). According to Liu Tian and Xiang Xianhu, under the constraints of current accounting standards, intangible assets other

than intellectual property are excluded from the financial accounting system, manifesting as off-balance-sheet intangible assets [7]. According to the provisions of the new accounting standards, only intellectual property intangible assets can be converted into intangible assets. Therefore, this paper uses the proportion of intangible assets to total assets to measure the amount of IP held. Inefficient investment is the absolute value of the non-zero residuals obtained from the Richardson model. The dependent variables in this article are overinvestment (OverInv), corporate growth (Growth), debt ratio (Lev), cash holdings (Cash), and the proportion of independent directors (Ind), and overinvestment in the Richardson model is defined as a residual greater than zero. The control variables in this article are executive compensation (Pay), administrative expense ratio (Adm), management shareholding ratio (M__SHDS), and major shareholder appropriation ratio (Orecta).

3.2 Model Setup

$$UNIV = \alpha_0 + \alpha_1 IP + \alpha_2 Growth + \alpha_3 Lev + \alpha_4 Cash + \alpha_5 Ind + \alpha_6 Pay + \alpha_7 Adm + \alpha_8 M\_SHDS + \alpha_9 Orecta + \varepsilon \quad (1)$$

4. Empirical Results Analysis

4.1 Descriptive Statistics

Table 1: Variable Distribution

Variable	(Mean)	(Std. dev.)	(Min)	(Max)
UNIV	0.1296374	0.1397566	0.0000664	0.802322
IP	0.031552	0.0388462	0.0000902	0.181546
Growth	2403.753	19078.76	-53.13565	151433
Lev	0.2883843	0.13453	0.0735399	0.6408477
Cash	0.2044957	0.1504963	0.0033083	0.6550932
Ind	41.23353	4.175627	33.33	50
Pay	15.51548	0.801928	14.07015	17.58481
Adm	2.715399	16.17122	0.014307	139.6461
M_SHDS	16.63286	14.63557	0	45.6544
Orecta	0.0225509	0.0376927	0.0004314	0.2210763

As shown in Table 1, inefficient investment (UNIV) is measured by the absolute value of the residuals from the Richardson model, with a mean of 0.1296, a standard deviation of 0.1398, a minimum value of 0.0001, and a maximum value of 0.8023, indicating that the overall level of inefficient investment among the sample firms is relatively low, but there are certain differences in investment efficiency among the firms. The effective average of IP holdings (IP) is 0.0316, with a standard deviation of 0.0388, reflecting that the IP holdings of sample listed gaming companies are generally low and relatively concentrated. The average corporate growth (Growth) is 2403.753, with a standard deviation as high as 19078.76, showing a huge disparity in extreme values. This indicates that the growth of sample enterprises is significantly differentiated, with some companies demonstrating outstanding growth potential while others face growth bottlenecks. The average asset-liability ratio (Lev) is 0.2884, with a standard deviation of 0.1345 and a range of 0.0735 to 0.6408, indicating that the financial leverage of the sample companies is generally conservative and the debt repayment risk is controllable.

The average cash holding level (Cash) is 0.2045, which aligns with the industry characteristic of higher cash reserves among A-share gaming companies. The administrative expense ratio (Adm) has extreme values (maximum 139.6461), and the minimum management shareholding ratio (M_SHDS) is 0, indicating that some companies' management does not hold shares, and there are differences in governance structures. The proportion of independent directors (Ind), executive compensation (Pay), and the proportion of other receivables (Orecta) all exhibit distribution patterns consistent with the characteristics of the gaming industry. In addition, some variables (such as UNIV and Growth) have missing observations, which is related to the sample selection of the Richardson model during the data matching process. Subsequent regression analysis uses balanced panel data to ensure the reliability of the results.

To test the impact of IP holdings on inefficient investment (underinvestment) of listed gaming companies, this paper sequentially constructs an OLS benchmark model (Model 1) and a fixed-effects panel model (Model 2), with the regression results shown in Tables 2 and 3.

Table 2: Baseline Regression

Variable	(1) OLS UNIV	(2) FE UNIV
IP	0.507(0.368)	3.921(2.718)
Growth	-0.00000379(0.00000245)	-0.00000341**(0.00000127)
Lev	-0.292(0.212)	-1.032(0.857)
Cash	0.154(0.242)	-0.0421(1.529)
Ind	0.00170(0.00588)	0.0112(0.00896)
Pay	-0.00396(0.0189)	-0.0294(0.128)
Adm	0.000172(0.000486)	0.0000992(0.000458)
M_SHDS	0.000687(0.00142)	-0.000977(0.00290)
Orecta	0.826(0.629)	2.796(4.895)
_cons	0.120(0.334)	0.241(1.985)
N	30	30

Table 3: Regression Analysis

Variable	Coefficient	Robust std. err.	Tvalue	P value
IP	3.921027	2.717624	1.44	0.18
Growth	-3.41E-07	1.27e-07	-2.68	0.023**
Lev	-1.032389	0.8573306	-1.2	0.256
Cash	-0.0420594	1.528777	-0.03	0.979
Ind	0.0112473	0.0089581	1.26	0.238
Pay	-0.0294034	0.1276255	-0.23	0.822
Adm	0.0000992	0.0004576	0.22	0.833
M_SHDS	-0.0009768	0.002902	-0.34	0.743
Orecta	2.796194	4.895118	0.57	0.58
_cons	0.2407542	1.984812	0.12	0.906
sigma_u	0.17207031			
sigma_e	0.07908151			

In Table 2, Model (1) presents the OLS benchmark regression results. The coefficient of the core explanatory variable, IP, is 0.507, with a t-value of approximately 1.38 and a p-value greater than 0.1, failing to pass the 10% significance level test. This indicates that, without controlling for individual heterogeneity, IP holdings have no significant effect on inefficient investment, which is inconsistent with the expectation of Hypothesis 1 in this paper. Among the control variables, firm growth has a t-value of about -1.55 and is not significant; the remaining control variables (Lev, Cash, Ind, etc.) are also not significant. The overall explanatory power of the model is limited, reflecting that the model specification is biased when individual effects are not controlled.

To control for firm-level individual heterogeneity (such as unobservable factors like corporate culture and governance models), this paper uses a fixed effects model (FE) for regression.

The coefficient of IP holdings (IP) is 3.921 (standard error 2.718), with a t-value of 1.44 and a P-value of 0.180, still failing to pass the 10% significance level test. This indicates that after controlling for individual fixed effects, IP holdings still have no significant impact on inefficient investment. Therefore, Hypothesis 1 of this paper, "IP holdings have a significant negative impact on underinvestment in listed gaming companies," is not yet supported by the data.

The coefficient of corporate growth (Growth) is -3.41e-07 (standard error 1.27e-07), with a t-value of -2.68 and a p-value of 0.023, which is significantly negative at the 5% level. This indicates that the higher the corporate growth, the lower the level of inefficient investment, which is consistent with the results of the correlation analysis, confirming the inhibitory effect of growth on corporate investment efficiency, that is, high-growth companies are more likely to allocate resources reasonably and reduce underinvestment.

The P-values of asset-liability ratio (Lev), cash holdings (Cash), proportion of independent directors (Ind), executive compensation (Pay), administrative expense ratio (Adm), management shareholding ratio (M_SHDS), and proportion of other receivables (Orecta) are all greater than 0.1, indicating no stable significant effect on inefficient investment.

In fact, because game IPs are intangible assets, their value is highly uncertain. Therefore, a high holding of IP by a company cannot guarantee efficient investment, resulting in data that cannot pass the 10% significance

test. It may also be because the game industry, compared to traditional physical industries, has a longer development cycle, making heterogeneity more likely, which leads to inefficient investment. Moreover, the experimental time span is not long, and in a short period, the holding of IP cannot quickly translate into effective investment returns, making the hypothesis invalid.

5. Suggestions

Based on the research results of this article, the following suggestions are proposed. Game companies should view the value of IP rationally and should not use it as the core basis for investment decisions. Companies should weaken the investment decision logic of 'only IP matters.' Game companies that pursue the quantity of popular IPs too much while neglecting content development are more likely to make inefficient investments. Gaming companies should place more emphasis on establishing an investment rating system centered on research and development capabilities, product quality, and operational efficiency. This is supported by Oguguo's findings: Oguguo conducted an empirical analysis of the operational data and investment behaviors of 200 gaming companies of different sizes, and the results indicated that IP assets themselves do not have the ability to be converted into operational benefits and investment returns; the realization of IP value relies more on the company's own research, development, and innovation capabilities [8]. This conclusion directly refutes the 'IP-only theory' and demonstrates that the realization of IP value requires enterprises to deeply integrate IP value with innovation capabilities and technology application. Enterprises can also avoid inefficient investments caused by blindly pursuing popular IP by comprehensively evaluating multiple aspects such as the IP lifecycle, content innovativeness, and market acceptance. Meanwhile, companies can also reduce agency costs and inefficient investments by strengthening their corporate governance. The research by Wang Y. and Li S. confirmed the inhibitory effect of corporate governance mechanisms on inefficient investments. It indicates that a reasonable equity balance structure effectively restrains the behavior of major shareholders in occupying funds, transferring benefits, and blindly leading investments, and can also reduce the agency conflicts between shareholders and minority investors. Kweh, Q. L.'s research verified the inhibitory effect of corporate governance mechanisms on inefficient investments. It showed that a reasonable equity balance structure effectively restrains major shareholders from occupying funds, transferring benefits, and blindly leading investments, and can also reduce agency conflicts between shareholders and minority investors. Kweh, Q. L. also pointed out that strengthening incentive and constraint mechanisms for management is crucial for improving corporate investment efficiency [9]. Therefore, companies should further optimize the board structure, strengthen the board's supervisory functions, and mitigate agency problems through reasonable management shareholding and compensation contracts. They can also try to establish a binding incentive mechanism that links managerial compensation stock closely with the company's long-term performance. At the same time, strengthen the supervision of major shareholders' use of funds to prevent the chaos of irrational investment expansion, reduce insider control and resource misallocation, thereby improving the overall investment efficiency and capital allocation effectiveness of enterprises.

Enterprises can also enhance investment efficiency through strengthening growth management by driving it with business growth. The core conclusion of Hsiung et al.'s research shows that the business growth of games is significantly positively correlated with investment efficiency. By focusing on extending core categories, promoting the layout in emerging overseas markets, or deepening the development of the entire IP industry chain, enterprises improve overall utilization efficiency, avoid the flow of funds to low-return, inefficient projects, and thereby directly suppress inefficient investment. Additionally, research has also shown that once the growth level crosses a critical threshold, the optimization effect of corporate capital allocation will be further amplified [10]. Therefore, game companies should focus on enhancing innovation and market expansion in their core businesses. Since high growth can significantly suppress investment efficiency, companies should allocate resources to projects with long-term growth potential, driving continuous improvement in investment efficiency through high-quality growth.

6. Conclusion

This article studies the relationship between IP holdings and inefficient investment caused by the low investment efficiency of gaming companies listed due to the 'IP-only theory' phenomenon. This article uses

data from Chinese listed gaming companies and finds that IP holdings have a significant effect on inefficient investment. It proves that a company's investment model should not focus solely on improving investment efficiency through a high IP ownership, but can also alleviate principal-agent problems by improving internal corporate governance, optimizing board structure, strengthening management incentives and constraints, and establishing reasonable management shareholding and compensation contracts. In the same time, IP should be combined with the company's innovation capabilities. However, this paper still has limitations. The sample size of companies selected in this paper is small, which may result in the results being accidental. In addition, this paper did not test for multicollinearity, which may lead to deviations in the judgment of the impact of each factor on investment efficiency, further weakening the rigor of the experiment. In the future, the sample design will be comprehensively optimized to overcome the shortcomings of small-sample studies, while extending the research period to enhance the rigor of the conclusions. Future research can further explore in-depth aspects. By introducing mediating variables such as management decisions and technological innovation, the specific pathways through which IP affects inefficient investment can be investigated, clarifying the logical relationship between the two. Additionally, different types of IP, such as original IP and licensed IP, can be discussed separately to make the research findings more precise.

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Conflicts of Interest

The authors declare no conflict of interest.

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