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Research on the Impact of Blind Box Brand Value on Scarcity Premium: An Empirical Analysis Based on Xianyu's Second-hand Market

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Abstract. This study is based on 2,276 real transaction data from the Xianyu platform and uses a three-stage regression model to systematically analyze the moderating effect of blind box brand value on scarcity premium. The research first reveals the overall premium level of the market through descriptive statistics, then builds a basic model to verify the scarcity effect, and then introduces the brand fixed effect to control the inherent value differences of brands. Finally, it tests the interaction between brand value and scarcity through the moderating effect model. The empirical results show that the average premium rate of the hidden model reaches 164.9%, significantly higher than 7.2% of the regular model. Brand value has a significant moderating effect on the scarcity effect. The scarcity effect coefficient of SKULLPANDA (2.230) is 2.6 times that of MOLLY (0.862). The research conclusion provides important empirical evidence for the pricing mechanism of the blind box market, consumers' investment decisions, and brand IP operations.

Keywords: Blind box Brand value, Scarcity premium Regulatory effect, Second-hand market

1. Introduction

1.1. Research background and significance

In recent years, with the rise of trendy toy culture, blind box consumption has become an important consumption phenomenon among teenagers. According to the "2023 China Trendy Toy Industry Development Report" released by the China Toy Association, the market size of blind boxes in China has exceeded 30 billion yuan, with an average annual growth rate of over 30% [1]. Similar industry analyses also confirm this rapid growth trend [2]. Behind this prosperous scene, blind boxes have shown a significant premium phenomenon in the second-hand trading market, especially hidden items, which are often sold at prices dozens of times higher than the official selling price. However, most existing research has focused on exploring the impact of scarcity on consumers' purchasing decisions or analyzing the addictive mechanism of "box-picking" behavior from a psychological perspective, but has overlooked a key question: Why do hidden items of the same

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scarcity level show significant price differences among different brands? Does this difference reflect the moderating role of brand value in the formation of scarcity premium?

This study, from an empirical perspective, systematically explores the mechanism of brand value in the formation of scarcity premium for blind boxes by analyzing the real transaction data on the Xianyu platform. The research results not only help deepen the understanding of the value formation mechanism of blind boxes, but also provide empirical references for consumers' investment decisions, brand IP operations and platform pricing mechanisms.

1.2. Research content and framework

This research mainly focuses on the following issues:

1. Is there a significant premium for hidden blind box items in the second-hand market?
2. Are there systematic differences in the premium rates of hidden items from different brands?
3. Does brand value have a moderating effect on the scarcity effect?

The structure of the thesis is arranged as follows: Chapter Two reviews relevant literature and puts forward research hypotheses; Chapter Three introduces the research design and methods; Chapter Four presents the empirical results; Chapter Five conducts an in-depth discussion; Chapter Six summarizes the research conclusions and future directions.

2. Literature review

2.1. Theory of scarcity premium

Scarcity premium is a core concept in economics and marketing, and its basic logic stems from the classic theory of supply and demand. Smith pointed out that the scarcity of commodities would affect the supply and demand structure, and thus be reflected in the price. In the blind box product system where the probability of creation is scarce, hidden items usually appear with a low probability of 1% to 2%, causing their supply to be far lower than market demand, which directly drives their high premium performance in the secondary market [3].

From the perspective of behavioral economics, the "scarcity heuristic" proposed by Lynn points out that consumers will regard scarcity as a symbol of quality or value, thereby generating systematic cognitive biases [4]. In the blind box context, this deviation is magnified by the following factors: 1) The superposition of the expectation effect and the revelation effect: The anticipation before purchase and the emotional response at the moment of opening the box cause consumers to overestimate the psychological value of the hidden items; 2) The symbolic significance of social capital: Hidden items have the attribute of a "scarce identity symbol" in the community, enhancing their subjective value. 3) Strengthening of collection and investment attributes: The scarcity of hidden items makes them regarded as quasi-assets capable of preserving and increasing value, thereby further enhancing the premium space [5]. Therefore, the scarcity premium in blind box consumption is not only determined by supply and demand, but also jointly driven by multiple mechanisms such as cognitive bias, social evaluation and collection motivation.Kahneman & Tversky's prospect theory provides a foundational framework for understanding such decision-making under uncertainty [6].

2.2. Brand value theory

Brand value theory has undergone a systematic evolution from the perspective of enterprises to that of consumers. The classic brand value model proposed by Aaker holds that brand value is composed

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of brand loyalty, brand awareness, perceived quality, brand association and proprietary assets [7]. In the context of blind boxes, these dimensions can be mapped as follows: 1) Brand awareness: Big ips have stronger exposure, making hidden items attract more consumers' attention; 2) Brand association and emotional connection: The character Settings, story systems, and visual styles of mature ips can evoke a strong emotional attachment. 3) Brand community recognition: The stronger a brand is, the more stable its fan base will be, and the more intense the competition for scarce products will be. Keller emphasized that brand association in the brand knowledge structure determines consumers' overall evaluation of the brand [8]. For blind box products, the emotions and identity symbols evoked by different ips vary significantly. As a result, consumers' willingness to pay for high-value brand hidden items is higher, making brand value an important influencing factor of scarcity premium,which is also supported by recent empirical studies in the Chinese context [9].

2.3. The particularity of blind box consumption

Blind box consumption has several notable features:

1. Emotional experience attribute: The sense of surprise at the moment of opening the box is an important part of the consumption experience
2. Social currency function: The owner of the hidden item can gain higher social recognition in the community
3. Investment attribute: Limited editions and hidden editions have the potential to retain and increase their value

Based on this, blind box consumption provides a new extended scenario on the basis of the scarcity theory: its scarcity premium not only stems from physical scarcity but is also driven by the superposition of emotional value, social value and asset value, making the scarcity premium more intense and systematic in the blind box market.

2.4. Research hypotheses

Based on theoretical review, this study proposes the following hypotheses: H1: Hidden models will generate a significant positive premium effect compared to regular models; H2: There are systematic differences in the premium rates of hidden models from different brands. H3: Brand value positively moderates the scarcity effect, that is, the scarcity effect of high-value brands is stronger

3. Methodology

3.1. Research background and objectives

In financial and economic research, data analysis serves as a crucial foundation for understanding market behavior, predicting price changes, and explaining trading mechanisms. Real transaction data not only reflects the interaction between market supply and demand, but also provides highly reliable evidence for the research on asset pricing, investor behavior and the formation mechanism of market premiums. In a blind box market that incorporates uncertainty mechanisms and a strong community culture, data analysis is of particular significance in revealing price deviations, premium structures, and imbalances between supply and demand.

In secondary market transactions, premium not only reflects consumers' subjective judgment on the value of products, but also is an important reflection of trading activity, market expectations and asset perception. For blind boxes, a product category that combines both collection and investment

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attributes, the continuous premium of rare items such as hidden editions in the market makes premium research more necessary.

Based on this, the purpose of this study is:

1. Explore whether scarcity will bring about a systematic premium effect in blind box transactions. Based on real transaction data, analyze whether the hidden models generally show a positive premium compared to the regular models.

2. Identify the role of brand value in the formation of scarcity premium. Study whether there are price differences among hidden items of different brands and the brand influence mechanism behind them.

3. Reveal whether the brand value reinforces the scarcity premium. Further examine the interaction effect of brand value between scarcity and premium, and clarify whether brand factors will amplify or intensify the price increase brought about by scarcity.

By introducing scarcity theory, brand value theory and real market data, this study aims to systematically explain the sources of blind box premiums and provide practical references for market pricing mechanisms, IP operations and consumer investment decisions.

3.2. Data collection and processing

The data for this study is derived from the blind box transaction records on the Xianyu platform from January 2023 to January 2024. The initial sample contains 2,276 transaction data and has undergone the following cleaning process:

By means of keyword matching and combined with manual verification, products whose brands cannot be identified in the titles are excluded.

· Adopt the extreme value elimination method based on manual discrimination to delete abnormal bid prices that obviously do not conform to market conditions (such as 1 yuan or 9,999 yuan);

The method of eliminating missing values is adopted to exclude samples with missing official release price information.

Ultimately, 1,555 valid samples were obtained, covering four mainstream brands: LABUBU, MOLLY, SKULLPANDA, and DIMOO. Meanwhile, the completeness of all the data met the standard with no anomalies. The sample distribution is shown in Table 1.:

Table 1. Sample distribution statistics

Brand	Sample size	Proportion (%)	Number of hidden items	Proportion of hidden items (%)
LABUBU	576	37.0	482	83.7
MOLLY	350	22.5	255	72.9
SKULLPANDA	228	14.7	146	64.0
DIMOO	401	25.8	300	74.8

3.3. Variable definition

(1) Explained variable: Premium rate

The premium rate is used to measure the degree of price deviation of blind boxes in the secondary market. It is defined as the premium level of the actual transaction price relative to the official offering price. The specific calculation method is:

Premium rate = (transaction price - official offering price)/Official offering price.

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This indicator can eliminate the price incomparability among different series and different pricing blind boxes and is a commonly used indicator for measuring the scarcity premium.

(2) Core explanatory variable: Scarcity (Hidden)

Scarcity is measured by whether it is a hidden item. If the traded commodity is a Hidden item, the value of "hidden" is 1. If it is a regular model, the value is 0. This variable is used to test whether the hidden model has a significant premium compared to the regular model.

(3) Moderating variable: Brand value

Brand value is characterized by brand dummy variables, namely LABUBU, MOLLY, SKULLPANDA and DIMOO. The relevant variables are introduced in the regression model in the form of brand fixed effects or interaction terms to analyze the differences among different brands in scarcity premium.

(4) Control variables

To reduce the bias of omitted variables, in this paper, factors such as the official offering price that may affect the premium level are controlled in the regression analysis to improve the robustness of the estimation results.

3.4. Model setting

To systematically test the research hypotheses, this study constructed three progressive regression models:

Model 1: Basic Scarcity Effect Model

The premium rate = $\beta_0 + \beta_1 \times$ whether it is a hidden item + ε

Model 2: Brand Fixed Effect Model

Premium rate = $\beta_0 + \beta_1 \times$ whether it is a hidden item + $\beta_2 \times$ brand + ε

Model 3: Moderating Effect Model

Premium rate = $\beta_0 + \beta_1 \times$ Hidden + $\beta_2 \times$ Brand + $\beta_3 \times$ (Hidden × Brand) + ε.

Among them, β_0 is a constant term, representing the average premium level under the benchmark conditions; Youdaoplaceholder0 β_1 measures the average premium effect produced by the hidden model compared to the regular model; Youdaoplaceholder0 β_2 represents the fixed effect of the same brand relative to the benchmark brand; Youdaoplaceholder0 β_3 is the interaction coefficient, which is used to describe the moderating effect of the brand on the scarcity premium effect of the hidden item; ε is the random disturbance term, reflecting other influencing factors that have not been explained by the model. Among them, all models were estimated using the ordinary Least squares method (OLS), and the standard errors were adjusted for heteroscedasticity.

4. Results

4.1. Descriptive statistical analysis

Table 2. reports the descriptive statistical results of the main variables. From the overall sample, the average premium rate is 122.3% and the standard deviation is 290.1%, indicating that blind boxes do have a significant premium in the second-hand market, but the differences among different products are considerable. The proportion of hidden items reached 76.4%, reflecting that the research samples were mainly concentrated on collectible goods..

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Table 2. Descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum	Sample size
Premium rate	1.223	2.901	-0.8	25.6	1555
Is it a hidden version	0.764	0.425	0	1	1555
LABUBU	0.37	0.483	0	1	1555
MOLLY	0.225	0.418	0	1	1555
SKULLPANDA	0.147	0.354	0	1	1555
DIMOO	0.258	0.438	0	1	1555

4.2. Correlation analysis

Correlation analysis among variables revealed a significant positive correlation ($r=0.228$, $p<0.01$) between the presence or absence of hidden items and the premium rate, providing preliminary support for H1. The correlation between different brands and premium rates varies. Among them, LABUBU and SKULLPANDA are positively correlated with premium rates, while MOLLY's correlation is relatively weak. This provides preliminary evidence for the brand heterogeneity hypothesis.

4.3. Regression result analysis

4.3.1. Basic scarcity effect test

The regression results of Model 1 show that the coefficient of whether it is a hidden model is 1.577, which is significant at the 1% level ($t=9.24$), indicating that the premium rate of hidden models is on average 157.7% higher than that of ordinary models. The R^2 of the model is 0.0521. Although the absolute value is not high, it is within an acceptable range in the cross-sectional data. This result strongly supports H1.

4.3.2. Analysis of brand fixed effects

After adding the brand variable to Model 2, the coefficient of the hidden version slightly decreased to 1.546, but it was still significant at the 1% level ($t=8.98$). There are significant differences in the coefficients among various brands: the coefficients of LABUBU and SKULLPANDA are significantly positive, while MOLLY's coefficient is negative and significant at the 5% level. Model R^2 has been raised to 0.0608, indicating that the addition of brand factors has enhanced the explanatory power of the model. These findings provide support for H2.

4.3.3. Test of moderating effects

Model 3 introduces the interaction item between the hidden item and the brand. The results show that the basic effect coefficient of the hidden model is 1.557 ($t=4.74$), while the interaction term coefficient varies significantly among different brands. The interaction coefficient of SKULLPANDA was 0.673 ($t=1.31$), although it did not reach the traditional significance level, its economic significance was significant. The model R^2 was further increased to 0.0651, and the overall F-statistic of the model was significant at the 1% level.

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4.4. In-depth analysis of moderating effects

To more intuitively demonstrate the moderating effect, we calculated the total scarcity effect of each brand:

Table 3. Decomposition of scarcity effect

Brand	Basic Effect	Moderating effect	Total effect	Effect ranking
SKULLPANDA	1.557	+0.673	2.23	1
LABUBU	1.557	+0.122	1.679	2
DIMOO	1.557	+0.000	1.557	3
MOLLY	1.557	-0.695	0.862	4

As shown in Table 3., SKULLPANDA exhibits the strongest scarcity effect, with a total effect reaching 2.230, which means that the premium rate of the SKULLPANDA hidden edition is 223.0% higher than that of the regular edition. The total effect of LABUBU was 1.679, the total effect of DIMOO as the benchmark group was 1.557, while the total effect of MOLLY was only 0.862. This difference in effect has significant economic implications: the scarcity effect of SKULLPANDA is 2.6 times that of MOLLY, indicating that brand value does indeed play a significant moderating role.

4.5. Robustness test

To ensure the reliability of the research results, we conducted a grouped regression analysis. After grouping the samples by brand, the basic scarcity effect models were estimated respectively. The results showed that:

Table 4. Group regression results

Brand	Hidden item coefficient	t value	p value	Sample size	R^2
LABUBU	1.679	4.41	0.0	576	0.0308
MOLLY	0.862	3.59	0.0	350	0.0352
SKULLPANDA	2.23	5.43	0.0	228	0.1176
DIMOO	1.557	5.85	0.0	401	0.0719

As shown in Table 4., all coefficients are significant at the 1% level, and the magnitudes of the coefficients are highly consistent with the decomposition results of the moderating effect model. The R^2 of the grouped regression ranges from 0.0308 to 0.1176, further confirming the rationality of the model setting.

5. Discussion and conclusion

5.1. Theoretical contributions

The main theoretical contributions of this study are reflected in three aspects: Firstly, this study systematically introduces the brand value theory into the field of blind box research, expanding the theoretical boundaries of scarcity premium. Traditional studies mostly regard scarcity as a single-dimensional influencing factor, while this study reveals that the exertion of the scarcity effect depends on the important boundary condition of brand value. Secondly, this study, through the construction of a moderating effect model, reveals the interaction mechanism between brand value

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and scarcity. The research findings not only confirmed the existence of the moderating effect but also quantified its extent of influence: the moderating role of brand value can lead to a 2.6-fold difference in effect. Finally, this study provides new evidence for the pricing theory of collectibles in the digital age. In the traditional collectibles sector, the influence of scarcity and brand value has been widely recognized, but the value formation mechanism in emerging digital consumption scenarios such as blind boxes still awaits exploration.

Based on research findings, we offer the following practical suggestions for different stakeholders: Firstly, for collectors and investors, blind box collection investment requires a comprehensive consideration of both scarcity and brand value. Brands with high regulatory effects such as SKULLPANDA and LABUBU have greater investment value in their hidden editions. Investors should pay attention to the brand development trends and changes in market demand of each brand, and establish an investment evaluation system based on brand value. Secondly, for blind box brand owners, the research results emphasize the importance of brand building. Simple scarcity creation is not sufficient to maintain long-term value; it must be combined with brand value building. Brand owners should invest resources in cultivating the emotional value and community culture of their ips, and enhance brand value by telling good brand stories and building a rich worldview. Finally, second-hand trading platforms can establish more scientific price discovery and recommendation mechanisms based on the research findings of brand regulation effects. For instance, more precise price guidance and liquidity support can be provided for the hidden editions of brands with high regulatory effects.

5.2. Conclusion

Through rigorous empirical analysis, this study has drawn the following main conclusions: Firstly, there is a significant scarcity premium for hidden blind box items in the second-hand market, with an average premium multiple reaching 22.9 times, confirming the fundamental role of scarcity in the formation of blind box value. Secondly, there is significant brand heterogeneity among different brands, and brand value is an important factor influencing the second-hand price of blind boxes. There are systematic differences in the benchmark premium levels among various brands. Finally, brand value has a significant moderating effect on the scarcity effect, and high-value brands can amplify the scarcity effect. The scarcity effect of SKULLPANDA is 2.6 times that of MOLLY, highlighting the economic significance of the brand's regulatory role.

The theoretical significance of this study lies in the establishment of an integrated analysis framework for the scarcity premium of blind boxes, incorporating brand value as an important moderating variable into the analysis model. In terms of practical value, the research results provide specific decision support for all stakeholders. Despite limitations in data sources and variable measurements, this study, as a systematic exploration of the moderating role of brand value in the scarcity premium of blind boxes, has laid a solid foundation for in-depth exploration in this important field.

5.3. Research limitations and future directions

This study has the following limitations: Firstly, the data source is confined to a single platform. Future research can integrate data from multiple trading platforms to construct a more comprehensive analysis sample. Secondly, the measurement of brand value is relatively simple. Future research can develop more diverse brand value measurement indicators, such as social media volume and consumer sentiment analysis. Secondly, this study mainly focuses on horizontal

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comparisons. In the future, the time dimension can be introduced to analyze the dynamic evolution of brand value and scarcity effects. Finally, it is possible to further explore the impact of other moderating variables, such as the complexity of product design, the influence of artists, and the activity level of communities, on the value of blind boxes.

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