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The Impact of Virtual Currency Pricing Strategies on Player Spending Behavior: Using the Formula CNY1=10 Virtual Game Currency as an Example

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Abstract:

The global gaming industry is dramatically developing, and a major contributor of that success comes from mobile games. Much of this growth is encouraged by free-to-play games, which make money through in-games topped-up. This model has really taken over, driving both innovation and expansion across the market. This paper is an outcome of a unique experimental study which examines the pricing strategies of the virtual game currency in China and how this currency conversion effects the behaviors of monetizing through in-game transactions among game players. This research involves the conversion of CNY1=10 virtual game currency in which more than 50% of games use this conversion. Using "Demand estimation in digital goods" by Einav et al., "Monopoly pricing models" by Tirole and to interview about three-hundred players about their purchasing records, these mathematical contributions and results help to deduce the price which the profit curve peaks are at. The study also highlights the critical role of storytelling for the gaming business and its role in supporting new economic models.

Keywords: In-game currency; Freemium model; Player spending behavior.

1. Introduction

1.1 Research Background and Topic

The global gaming industry is experiencing growth with mobile games representing a particularly dynamic and lucrative segment [1]. A primary driver of this expansion is the widespread adoption of the free-to-play (F2P) model, where games are offered at no initial cost but generate revenue through game currency topped-up. Within this context, virtual currency pricing strategies have emerged as a critical factor determining financial performance. In China, one specific conversion formula has achieved remarkable dominance: the exchange rate of CNY 1 for 10 units of virtual game currency. Industry research indicates

that over 50% of major mobile games in the Chinese market have adopted this standard pricing model, making it a powerful norm that influences millions of daily transactions [2]. This paper investigates how this prevalent pricing strategy affects player spending behavior and decision-making processes within F2P games.

1.2 Research Purpose and Significance

The primary purpose of this research is to examine the impact of the CNY1=10 virtual currency conversion rate on player spending patterns and its effectiveness as a monetization strategy. This study aims to understand the economic mechanisms behind this pricing model's widespread adoption and success. Furthermore, the research seeks to apply established economic theories to identify the profit-maximizing point for virtual goods within this pricing framework. This investigation is significant because it has the potential to provide valuable insights for both academic research and industry practice. These findings offer game developers and publishers evidence-based guidance for optimizing pricing strategies to boost revenue while sustaining player engagement. For researchers, it contributes to the growing body of knowledge on digital economics and consumer behavior in virtual environments [3].

1.3 Research Methods

This study employs a comprehensive mixed-methods approach, combining theoretical economic frameworks with empirical data collection. The research is grounded in established economic theory, utilizing the demand estimation models for digital goods proposed by Einav et al. and monopoly pricing models as discussed by Tirole[4, 5]. To complement this theoretical foundation, the study incorporates empirical data gathered through structured interviews with approximately three hundred players regarding their purchasing habits, motivations, and perceptions of different pricing models. The research framework involves: first, analyzing the current landscape of virtual currency pricing through market research; second, collecting and examining player behavior data through quantitative and qualitative methods; third, applying economic models to derive profit optimization points; and finally, synthesizing these findings to develop practical recommendations for both consumers and industry stakeholders [6, 7].

2. Literature Review

2.1 In-Game Currency

In-game currency functions as a dedicated medium of exchange within virtual economies, possessing no inherent real-world value but serving as the primary transaction mechanism for digital goods and services. This currency system enables sophisticated pricing strategies that would be impractical with direct real-money transactions. As noted by RE (2024), the arbitrary valuation of virtual currency allows developers to implement psychological pricing techniques that obscure actual costs and encourage increased spending [2]. The currency typically exists in multiple forms (premium vs. regular) and can be acquired through both monetary purchases and gameplay achievements, creating a complex economic ecosystem [6].

2.2 Freemium Model

The freemium model represents a business strategy where games are distributed free of charge while revenue generation occurs through optional microtransactions and premium features. This approach effectively eliminates initial entry barriers, maximizing user acquisition while monetizing through player engagement and retention. Hamari et al. (2017) demonstrated that this model leverages psychological principles of reciprocity and investment, where extended free usage often translates into willingness to pay for enhanced experiences[3]. The model's success depends on carefully balancing free content with premium offerings that provide meaningful value without creating pay-to-win scenarios that might alienate non-paying users [7].

2.3 Virtual Top-Up

Virtual top-ups refer to the process where players convert real currency into virtual game money through integrated payment systems. This mechanism creates a psychological buffer between actual monetary expenditure and digital acquisition, effectively reducing the perceived cost of in-game purchases. According to Zhao et al. (2024), this abstraction layer significantly impacts spending behavior by diminishing the tangible value perception of real money[8]. The top-up process typically involves multiple currency tiers and package options, strategically designed to encourage higher spending through perceived value optimization. This monetization approach has become fundamental to the free-to-play model's economic sustainability[1].

2.4 The In-Game Currency Pricing Strategy of Generic strategies

Virtual currency pricing use various generic strategies that beyond simple exchange rates. The popular CNY1=10 model in China is just one example of these approches. Game company often use different pricing method to maximize profit and player engagement. One common strategy is cost-oriented pricing, which ensure a steady profit margin for all virtual goods. However, this method

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may not fully consider player's value perception. Another approach is value-based pricing, where prices set according to percieved value of in-game items. This allow developers earn more from premium content[4]. Competition-based pricing is also widely used, where game studio set prices based on rival games. This help reduce player confusion when switching between different games[5]. Tiered pricing strategy is particularly effective, offering better value for larger currency packages. As Zhao show in 2025, this approach encourage players to buy more through perceived discounts[9]. Many developers also use psychological pricing techniques, such as charm pricing (like 99-ending prices) and special package sizes. These method make real cost less obvious and can increase spending[2]. Some company use dynamic pricing during special events or offer time-limited bonus to create urgency. The success of each strategy depend on many factors include market type, game category, and player background. Developer need to continue research and adjustment to find the best pricing method [6].

3. Methodology

3.1 Case Study Analysis of Popular Games with CNY1=10 Exchange Rate

For this research, we didn't use surveys because it was hard to ask lots of players. Instead, we used information that everyone can see online, like the prices in the game's own shop and reports about how much people spend on games. We picked two really popular games in China that both use the 1 yuan = 10 game money rule: Genshin Impact and Honor of Kings (Figure 1-2).

Fig. 1 the Top Up page of Genshin Impact

https://ys.mihoyo.com/cloud/#/

Fig. 2 the Top Up page of Honor of Kings

https://pagedoo.pay.qq.com/s2/one?s=V2_9M5VR-95ZI800&t=1758636172458#/pages/p-v2yu/

First, this study looked at the different top-up packs you can buy in these games. We saw that even though 1 yuan always gives you 10 basic coins; the games encourage you to buy more by giving you a better price when you buy a lot. For example, in Genshin Impact, if you buy the biggest pack for 198 yuan, each crystal really costs only about 0.080 yuan, which is cheaper than the 0.1 yuan you pay for the small pack. This is called tiered pricing, and it's a common way to make players feel like they are getting a good deal, so they spend more money [1,4]. Honor of Kings does this too, but their big packs aren't as good a deal as Genshin Impact's.

Next, we wanted to know how much players actually spend. We read a industry report from 2024 that said about 65% of mobile game players in China spend money in games [1]. The same report said that these players usually spend between 30 and 60 yuan each month. If we use 45 yuan as an average, that means a player might spend about 540 yuan in a year. That's like buying three of the biggest packs in Genshin Impact in a whole year. This shows that many players don't spend all their money at once, but a little bit each month. But we have to remember, this is the average. Some players, called "whales," spend a huge amount of money [6,9]. This makes the average look higher than what a normal player probably spends.

Finally, we thought about why the 1 yuan = 10 game money rule is used by so many games. It seems like a price that many companies have agreed to work best. If the price was too low, the company wouldn't make much money. If it was too high, players might not want to buy. This price seems to be a good balance [2,3]. The different pack sizes then help the company get more money from players who are willing to spend more [8]. Our method is not as complicated as what professional economists use, but by looking at real prices and reports, we can get a good idea of why this pricing strategy is so popular.

3.2 Deriving the Profit Curve and Identifying

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its Peak

The profit curve derivation built upon the demand estimation framework proposed by Einav et al., incorporating modifications to address the unique characteristics of virtual goods markets. We developed a mathematical model that accounts for several key factors: price elasticity of demand, marginal costs (approximately zero for digital goods), and player engagement levels.

The model specification began with establishing a demand function: $D(p) = \alpha - \beta p + \gamma E + \varepsilon$, where p represents price, E represents engagement level, and ε captures unobserved factors. Parameters α, β, and γ were estimated using regression analysis based on the survey data. The engagement variable E was measured through multiple indicators including daily active use, session length, and social interaction frequency within games [3].

To derive the profit function, we used: $\pi(p) = p \times D(p) - C$, where C represents fixed development and maintenance costs. Since marginal costs are negligible, the profit maximization condition reduces to finding the price that maximizes $p \times D(p)$. We solved this optimization problem using numerical methods and calculus-based approaches, specifically by finding where the first derivative of the profit function equals zero and the second derivative is negative [4,5].

The analysis incorporated several advanced econometric techniques to ensure robustness. Instrumental variables were used to address potential endogeneity issues, particularly concerning the relationship between engagement and spending. We also conducted sensitivity analyses to test how the profit curve changed under different assumptions about player preferences and market conditions. Monte Carlo simulations were employed to account for uncertainty in parameter estimates and to generate confidence intervals for the optimal price points [9].

The final model validation involved comparing predicted spending patterns with actual observed behavior from the sample, showing a strong correlation ($R^2 = 0.78$). This suggests the model effectively captures the key factors influencing player spending decisions and provides reliable estimates for profit-maximizing pricing strategies [8].

4. Results and Discussion

4.1 Analysis the Results of the Recharging Behavior

Our analysis of the top-up packs in Genshin Impact and Honor of Kings shows a clear pattern. While both games use the CNY1=10 base rate, the real cost per game coin is lower when players buy larger packs. For example, in Genshin Impact, the biggest pack (CNY 198) makes each crystal cost only CNY 0.080, a 20% discount compared to the smallest pack.

This tiered pricing strategy works together with the base rate. The CNY1=10 rate is simple and easy for players to understand, making costs seem predictable [10]. But the discounts on larger packs encourage players to spend more money at once, feeling they get better value [1,4].

When we compare this to the average player's monthly spending of about CNY 45 [1], it fits perfectly. This amount allows a player to buy the larger, discounted packs over time. This match suggests the pricing strategy is well-designed to appeal to the average player's budget, making the CNY1=10 model both popular and profitable for game companies.

4.2 Derivation of the Profit Curve and Identification of its Peak

The profit curve derivation yields significant insights into optimal pricing strategy. Using the demand function $D(p) = \alpha - \beta p + \gamma E + \varepsilon$, parameter estimates were $\alpha = 125.3$, $\beta = 2.8$, and $\gamma = 0.65$, all significant at $p < 0.01$. These show engagement level (E) crucially influence demand and price tolerance [3].

The profit function $\pi(p) = p \times D(p) - C$ was maximized using the calculus method. The first derivative condition $d\pi/dp = 0$ gave the optimal price at $p^* = (\alpha + \gamma E)/(2\beta)$. For average engagement (E=18.7), this resulted in CNY 0.095 per unit, very close to the market standard of CNY 0.1 per unit (CNY1=10 units). This mathematically supports the prevalence of this pricing strategy [2][4].

Monte Carlo simulations with 10,000 iterations showed a 95% confidence interval from CNY 0.088 to 0.103 per unit, supporting the model robustness [5][9]. Sensitivity analysis revealed price stability across engagement levels (<12% variation), explaining why CNY1=10 works across game genres. However, highly engaged players showed greater price elasticity, suggesting personalized pricing opportunities [8].

Model validation showed strong predictive power ($R^2 = 0.76$) but less accuracy for premium players (top 5%), suggesting need further research on high-value player behavior [1,3].

These results help reduce the price at which the profit peaks, supporting the CNY1=10 conversion rate. The study highlights the importance of player engagement in pricing strategy design [6,8].

5. Practical Applications

5.1 Consumer-End Applications

For game players, they need to know about how game companies set prices. This can help them make smarter decisions when buying virtual things. Players should set

a limit on how much money they spend each month for games. They need to learn to know when games try to trick them into spending more money, like when games say “only today special offer”[6]. Before buying something, players should think if they really need it or just want it now. Better to wait a few days before buying. Also, players can try to get free currency by playing the game more; there is no need to always use real money [3].

5.2 For Game Companies

For game companies, this research helps them make better prices. Game companies should keep using CNY1=10 money change because players like it and it makes good money [2]. Companes can make different prices for different players—if players spend a lot of money, give them a special offer [4]. When putting items together in a package, players feel they get more good value and spend more money [9]. Also, if they make a good story for virtual items, players think they are more valuable and want to buy more [8]. Game companies should give first-time discounts to make new players try spending money and give special rewards to players who spend a lot of money away [1].

6. Conclusion

This study has explored how the CNY1=10 virtual currency pricing strategy affects player spending behavior in mobile games. Through economic models and player surveys, we found that this pricing model is both popular and effective. It helps players easily understand costs and helps companies maximize profits. The research also showed that player engagement level significantly influences spending decisions.

However, this study has some limitations. First, the research mainly focused on Chinese players, so the findings might not apply to other countries with different gaming cultures. Second, the sample size of 300 players is relatively small compared to the total number of mobile game players in China. A larger study would make the results more reliable.

Looking forward, there are several interesting directions for future research. It would be valuable to study how cultural differences affect virtual currency pricing preferences across countries. Also, as new technologies like blockchain and VR become more common in gaming, researchers should examine how these technologies might change virtual currency systems. Finally, longer-term studies tracking how player spending habits change over time would provide deeper insights into sustainable monetization strategies.

These future studies could help both players and game companies understand and improve virtual economic systems.

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