

Monetizing game resale: Strategic pricing for digital platforms

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Abstract: Digital game platforms have flexible resale permissions and dynamic pricing. A dynamic pricing model with diverse user preferences and two-stage purchase behaviors is developed. Optimal strategies and market equilibria are compared under the resale-prohibited and resale-permitted modes. The results show that resale prohibition shifts platforms' focus from market penetration to profit maximization due to higher utility from delayed consumption. Under resale permission, platforms can set high prices for user resale or offer resale inventory at moderate prices. The operational modes are adjusted dynamically based on users' initial usage and resale valuation. When the user utility is low, resale expands market coverage. When the initial usage is high and the resale potential is low, margins can be protected by prohibiting resale. If the overall purchase intent is strong, both modes yield substantial returns. Games with lower initial usage value achieve broader early participation and higher profit, whereas high-enthusiasm games exhibit sharper segmentation.

Key words: game resale; dynamic pricing; mode selection; strategic users

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The shift to digitized content distribution has changed how game platforms operate. As physical carriers are replaced by digital distribution through platforms such as Steam, PlayStation Store, and Xbox Store, platforms gain greater control over content dissemination and pricing while redefining game ownership, as purchases now grant only a nontransferable license, eliminating users' resale rights^[1-2]. This has led to user dissatisfaction and growing criticism of pricing policies^[3].

Digital game resale allows users to transfer game access rights or licenses after initial use in exchange for payment^[4]. Unlike physical resale, however, digital resale is restricted by platform-imposed technical and con-

tractual controls. Thus, enabling resale licensing is a strategic choice^[5]. Some user organizations challenge the prohibition of resale^[6], while emerging platforms such as Robot Cache explore blockchain-based systems to support digital content resale. Thus, the decision to permit resale has become a key operational issue that influences pricing, market structure, and revenue models^[7].

Most digital game platforms currently prohibit the resale of games due to concerns over price control and copyright infringement^[1,8]. However, enabling resale may also increase revenue by attracting marginal users under certain conditions^[9-10]. Existing studies primarily examine direct monetization mechanisms, such as price discrimination^[11-13], software versioning^[14-15], and strategic consumer behavior^[16-17]. Research on secondary markets, such as used electronics^[18-19] and event tickets^[20], shows the importance of resale channels. Some studies have examined digital game trade-in or resale programs^[21-22], seller channel choices^[23], and the integration of primary and resale markets^[24]. However, few studies have examined how resale behavior influences platform pricing strategies, market structure, and the selection of operational modes. Flexible pricing helps platforms expand their user base and improve welfare^[13]. Recognizing user heterogeneity can also generate higher long-term revenue, even with limited pricing power^[25]. These insights suggest that resale influences initial purchase behavior and encourages secondary engagement.

This study develops a dynamic pricing model that integrates heterogeneous user preferences and two-stage purchase behaviors while comparing resale-permitted and resale-prohibited modes. We examine equilibrium strategies, profitability, and mode selection across various utility structures to provide a clearer framework for how resale influences platform pricing and market outcomes.

1 Model

A two-stage pricing model is considered. Users' valuation v follow a uniform distribution from $[0, 1]$. They purchase once and choose whether to buy in the first or second stage. The order of decisions is as follows: in the first stage, the platform sets price p_1 . Users then decide whether to buy early or wait. In the second stage, resale

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supply from early buyers enters the market. The platform then decides whether to issue extra inventory q and sets a second-stage price p_2 within the feasible equilibrium range. The platform releases additional inventory only when the endogenous resale supply cannot satisfy market demand. Users who purchase the product in the first stage receive a utility αv , where $1/2 < \alpha < 1$, and pay the price p_1 set by the platform. The parameter α captures the proportion of total valuation that users realized through first-stage consumption. Users with a higher α can be regarded as high-valuation users, or enthusiasts who value premium or early experiences.

In the second stage, first-stage buyers may choose to resell the product at the resale price p_2 . If they keep the product in the second stage, they can derive the remaining utility $(1 - \alpha)v$. Thus, users realize full valuation v only when they consume the product across both stages. If users decide to wait in the first stage, they can buy the product in the second stage at the resale price p_2 . In this case, they derive utility βv , where $\beta \in [0, 1]$ reflects the discounted valuation from deferred consumption. This discount is the result of several factors. First, late buyers lose the first-stage consumption experience, which includes the novelty and excitement of first use. Second, the social or time-sensitive engagement that frequently accompanies the release of a new digital game is weakened by delayed consumption^[26]. The intertemporal utility models in digital goods markets are in line with these effects^[1]. These users tend to be more price-sensitive and willing to trade immediacy for lower prices. To ensure consistency with the two-stage valuation structure, we assume that $\beta \geq 1 - \alpha$, which ensures that users who buy only in the second stage do not enjoy less utility than the residual value held by early buyers. In addition, we assume $\alpha \geq \beta$, which reflects that early buyers place greater value on immediacy and novelty compared to late buyers. This assumption is consistent with empirical observations showing that early-stage users generally obtain higher incremental utility from first consumption.

Together, these two assumptions capture both the excitement or novelty premium associated with early consumption and the diminished surplus value experienced by later buyers. They align with established models of sequential consumption and durable digital goods.

User utility functions and the corresponding user subsets are defined in Fig. 1. Let $J_1(v, p_1, p_2)$ denote the utility of a user with valuation v when considering purchase in the first stage. The user's utility is determined by the maximum value obtained from purchasing in the first stage and waiting to purchase in the second stage:

$$J_1(v, p_1, p_2) = \max \{ \alpha v - p_1 + J_2^B(v, p_2), J_2^W(v, p_2) \} \quad (1)$$

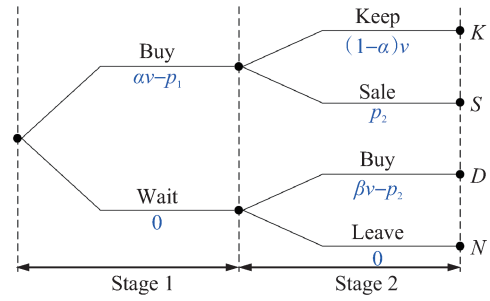


Fig. 1 User strategic choice and utility

where $J_2^B(v, p_2)$ is a user's second-stage utility when purchased in the first stage and chooses to resell or retain; $J_2^W(v, p_2)$ is the utility of a user who delays the purchase:

$$J_2^B(v, p_2) = \max \{ p_2, (1 - \alpha)v \} \quad (2)$$

$$J_2^W(v, p_2) = \max \{ \beta v - p_2, 0 \} \quad (3)$$

Under the resale-permitted mode, users primarily drive second-stage resale. In other words, first-stage buyers decide whether to resell, thereby generating the endogenous resale supply. In the second stage, the platform can strategically supplement this inventory by releasing additional quantities $q \in [0, 1]$ into the market. The resale price p_2 is an endogenous market-clearing price determined by the balance between resale demand and supply. We denote $D \subset [0, \bar{v}]$ as the set of users who delay purchasing and buy in the second stage. We denote $S \subset [0, \bar{v}]$ as the set of users who purchase in the first stage and resell in the second stage. That is, given prices p_1 and p_2 , these sets are expressed as

$$D(p_1, p_2) = \{ v | J_1(v, p_1, p_2) = J_2^W(v, p_2) = \beta v - p_2 \} \quad (4)$$

$$S(p_1, p_2) = \{ v | J_1(v, p_1, p_2) = v - p_1 + J_2^B(v, p_2) = \alpha v - p_1 + p_2 \} \quad (5)$$

We define $N \subset [0, \bar{v}]$ as the set of users who do not purchase, and $K \subset [0, \bar{v}]$ as those who buy in the first stage and retain the product in the second stage. These sets are expressed as

$$N(p_1, p_2) = \{ v | J_1(v, p_1, p_2) = J_2^W(v, p_2) = 0 \} \quad (6)$$

$$K(p_1, p_2) = \{ v | J_1(v, p_1, p_2) = \alpha v - p_1 - J_2^B(v, p_2) = v - p_1 \} \quad (7)$$

These user subsets enable a comprehensive characterization of market segmentation based on valuation and timing preferences under dynamic pricing and resale.

2 Analysis

In practice, many digital game platforms prohibit the resale of games. As digital content gradually replaces physical games, platforms gain greater control over content. To capture this, we develop a benchmark model that prohibits resale. This model helps examine the per-

formance of game platforms with and without the resale mode. Dynamic pricing strategies are analyzed across resale-prohibited and resale-permitted modes.

2.1 Benchmark: Resale-prohibited model

This section examines the operational setting in which resale is prohibited by digital game platforms. The PlayStation Store, Xbox Store, and Nintendo eShop restrict resale and sharing by linking individual user accounts to digital purchases. Thus, users strategically determine their consumption timing, weighing the immediate utility of early access against the potential benefits of delayed consumption.

Lemma 1 The platform's optimal pricing can be expressed explicitly as follows:

$$p_1^* = \begin{cases} \frac{1-\beta}{2-\beta} & 0 < \beta \leq \tilde{\beta}_1 \\ 1-\beta & \tilde{\beta}_1 < \beta \leq \tilde{\beta}_2 \\ p_1^+ & \tilde{\beta}_2 < \beta \leq 1 \end{cases}$$

$$p_2^* = \begin{cases} \frac{(1-\beta)\beta}{2(2-\beta)} & 0 < \beta \leq \tilde{\beta}_1 \\ \frac{\beta(1-\beta)}{2} & \tilde{\beta}_1 < \beta \leq \tilde{\beta}_2 \\ \frac{\beta}{2} & \tilde{\beta}_2 < \beta \leq 1 \end{cases}$$

where $p_1^+ \in [1-\beta, \bar{p}]$, $\tilde{\beta}_1 = (9 - \sqrt{33})/6$, $\tilde{\beta}_2 = 2/3$.

The user subsets N , D , K can be explicitly expressed as

$$N = \begin{cases} \left[0, \frac{1-\beta}{2(2-\beta)}\right) & 0 < \beta \leq \tilde{\beta}_1 \\ \left[0, \frac{1-\beta}{2}\right) & \tilde{\beta}_1 < \beta \leq \tilde{\beta}_2 \\ \left[0, \frac{1}{2}\right) & \tilde{\beta}_2 < \beta \leq 1 \end{cases}$$

$$D = \begin{cases} \left[\frac{1-\beta}{2(2-\beta)}, \frac{1}{2}\right] & 0 < \beta \leq \tilde{\beta}_1 \\ \left[\frac{1-\beta}{2}, 1 - \frac{\beta}{2}\right] & \tilde{\beta}_1 < \beta \leq \tilde{\beta}_2 \\ \left[\frac{1}{2}, 1\right] & \tilde{\beta}_2 < \beta \leq 1 \end{cases}$$

$$K = \begin{cases} \left[\frac{1}{2}, 1\right] & 0 < \beta \leq \tilde{\beta}_1 \\ \left[1 - \frac{\beta}{2}, 1\right] & \tilde{\beta}_1 < \beta \leq \tilde{\beta}_2 \\ \emptyset & \tilde{\beta}_2 < \beta < 1 \end{cases}$$

Lemma 1 describes that the platform adjusts pricing strategy and market structure under the resale-prohibited model based on the delayed consumption utility parameter β . As resale is infeasible, users make purchasing decisions by comparing utilities across the two stages. This

gives the platform stronger pricing control across both stages. When β is low, users gain limited utility from postponing consumption; Therefore, the platform adopts a penetration pricing strategy. It sets a low first-stage price to encourage early purchases. An increasing β reflects greater willingness to delay purchases. Thus, the platform gradually increases the first-stage price and stops early sales entirely once β exceeds a threshold. Meanwhile, the second-stage price rises with β as users become more willing to wait. In this case, the platform adopts a back-loaded revenue model that captures value from delayed demand. For example, based on the observed game valuation and market potential, platforms such as Steam may reduce early discounts or increase prices over time, thereby emphasizing profitability in the later stages of the product life cycle. The user segmentation structure (N, D, K) also evolves with β . As β rises, the set of non-participating users (N) diminishes, the proportion of second-period buyers (D) expands, and the share of early buyers (K) reduces. This transition shows a strategic shift by the platform toward monetizing delayed purchasing behavior as users assign greater value to waiting.

Proposition 1 Let $Q(\beta)$ denote the total mass of users. Then

- (1) $Q(\beta)$ increases strictly with β for all $\beta \in [0, \tilde{\beta}_2]$;
- (2) $Q(\beta)$ remains constant for all $\beta \in [\tilde{\beta}_2, 1]$, with $Q(\beta) = 1/2$.

As users' patience level β increases, platform demand first grows monotonically and eventually reaches saturation. For $\beta \in [0, \tilde{\beta}_1]$, the platform attracts marginal users by offering low first-stage prices, thereby encouraging even low-valuation users to purchase early through modest discounts. In this case, low-valuation users purchase early through modest discounts, resulting in initial market penetration. For $\beta \in [\tilde{\beta}_1, \tilde{\beta}_2]$, demand grows faster. The platform raises the first-stage price to earn profits from medium-valuation users by leveraging their greater willingness to wait. This marks a shift toward value capture. For $\beta \in [\tilde{\beta}_2, 1]$, the platform eliminates first-stage sales and targets high-valuation users in the second stage. In this case, demand stabilizes at $1/2$, thereby marking saturation. The platform adopts a value-harvesting strategy while shifting from market expansion to monetization.

These dynamics show that rising β drives market growth; however, its marginal contribution declines once the high-valuation users are fully captured. Platforms often use discounts to attract price-sensitive users early in a game's lifecycle. They raise prices later in the mid-to-late periods and focus on monetization by targeting high-paying users.

2.2 Resale-permitted model

As emerging game platforms explore the adoption of resale modes, examining optimal pricing strategies under a resale-permitted mode is essential. The platform develops pricing strategies based on different customer valuation preferences in this subsection.

Definition 1 The parameter space is defined as $P := \{(\alpha, \beta) \in (1/2, 1) \times (1 - \alpha, \alpha)\}$. This space can be divided into four mutually exclusive and collectively exhaustive sub-regions: R_1, R_2, R_3, R_4 .

Accordingly, the parameter space P , expressed over combinations of (α, β) , is divided into four sub-regions, denoted R_i . The specific parameter ranges for each region are $R_1 := \{\beta \in (0, (5 + \sqrt{5})/10), \max(1 - \beta, \beta) < \alpha < f_1(\beta)\}$, $R_2 := \{\beta \in (0.516, 1), f_2(\beta) < \alpha < f_3(\beta)\}$, $R_3 := \{\beta \in (0, 0.682), (1 - 2\beta + \sqrt{1 + 4\beta})/2 + 1/2 < \alpha < f_4(\beta)\}$, $R_4 := \{\beta \in (0, 0.522), f_5(\beta) < \alpha < 1\}$. Here,

$$f_1(\beta) = \begin{cases} \frac{1 - 2\beta + \sqrt{1 + 4\beta}}{2} & 0 < \beta \leq 0.682 \\ 1 - \beta + \sqrt{\beta - \beta^2} & 0.682 < \beta < \frac{5 + \sqrt{5}}{10} \end{cases}$$

$$f_2(\beta) = \begin{cases} \alpha_1^*(\beta) & 0.516 < \beta \leq 0.682 \\ 1 - \beta + \sqrt{\beta - \beta^2} & 0.682 < \beta \leq \frac{5 + \sqrt{5}}{10} \\ \beta & \frac{5 + \sqrt{5}}{10} < \beta \end{cases}$$

$$f_3(\beta) = \begin{cases} \alpha_2^*(\beta) & 0.516 < \beta \leq 0.522 \\ 1 & 0.522 < \beta \leq 1 \end{cases}$$

$$f_4(\beta) = \begin{cases} \alpha_3^*(\beta) & 0 < \beta \leq 0.516 \\ \alpha_1^*(\beta) & 0.516 < \beta \leq 0.682 \end{cases}$$

$$f_5(\beta) = \begin{cases} \alpha_3^*(\beta) & 0 < \beta \leq 0.516 \\ \alpha_2^*(\beta) & 0.516 < \beta \leq 0.522 \end{cases}$$

where

$$(1 - \alpha_1^*(\beta))^2(\alpha_1^*(\beta) + 3\beta) + \beta^2(3\alpha_1^*(\beta) - 4 + 2\beta) = 0$$

$$(\alpha_2^*(\beta))^2((\alpha_2^*(\beta))^2 + 3\alpha_2^*(\beta)\beta - 2\beta^2) - \beta^3(10\alpha_2^*(\beta) + 8\beta) = 0$$

$$(\alpha_3^*(\beta))^3(1 - \alpha_3^*(\beta))^2(\alpha_3^*(\beta) + 8\beta) + 2(1 - \alpha_3^*(\beta))\alpha_3^*(\beta)\beta^2(\alpha_3^*(\beta)(11 - 13\alpha_3^*(\beta) - 22\beta) + 12\beta) + \beta^4(9 + 38(\alpha_3^*(\beta))^2 - 2\beta(6 + \beta) - \alpha_3^*(\beta)(46 - 13\beta)) = 0$$

To help interpret the complex parameter conditions, the feasible set of (α, β) is shown in Fig. 2. It highlights each region and explains the structure of the parameter space.

Each region is characterized by a distinct equilibrium

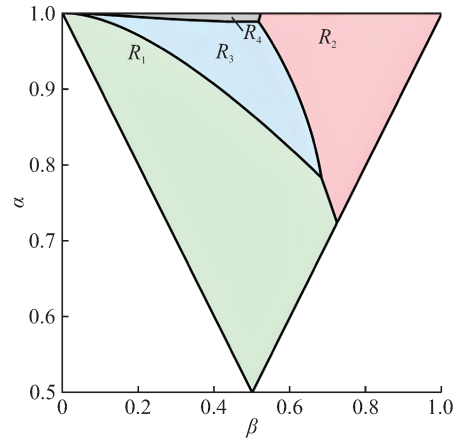


Fig. 2 Feasible region of parameters α and β for regions R_i

pricing and market segmentation strategy. These strategies reflect the platform's optimal response to different user utility structures. This division helps clarify equilibrium behaviors under different parameter conditions.

Lemma 2 The platform adopts distinct pricing and market strategies across regions, with partitions as shown in Fig. 2.

(1) For each region R_i , the optimal pricing can be explicitly expressed as

$$p_1^* = \begin{cases} \frac{1}{2}(2 - \alpha - \beta) & (\alpha, \beta) \in R_1 \\ p_1^{++} & (\alpha, \beta) \in R_2 \\ \frac{(1 - \alpha)(3\beta + \alpha)}{2\beta} + \frac{\alpha - \beta}{2} & (\alpha, \beta) \in R_3 \\ \frac{(\alpha - \beta)(\alpha + 2\beta)}{2(\alpha + \beta)} & (\alpha, \beta) \in R_4 \end{cases}$$

$$p_2^* = \begin{cases} \frac{1 - \alpha}{2} & (\alpha, \beta) \in R_1 \\ \frac{\beta}{2} & (\alpha, \beta) \in R_2 \\ 1 - \alpha & (\alpha, \beta) \in R_3 \\ \frac{(\alpha - \beta)\beta^2}{2(\alpha + \beta)(\alpha + 3\beta)} & (\alpha, \beta) \in R_4 \end{cases}$$

where $p_1^{++} \in [\alpha, \bar{p}]$.

(2) The user subsets N, D, K can be explicitly expressed as

$$N = \begin{cases} \left[0, \frac{1 - \alpha}{2\beta}\right] & (\alpha, \beta) \in R_1 \\ \left[0, \frac{1}{2}\right] & (\alpha, \beta) \in R_2 \\ \left[0, \frac{1 - \alpha}{\beta}\right] & (\alpha, \beta) \in R_3 \\ \left[0, \frac{(\alpha - \beta)\beta}{2(\alpha + \beta)(\alpha + 3\beta)}\right] & (\alpha, \beta) \in R_4 \end{cases}$$

$$D = \begin{cases} \left[\frac{1-\alpha}{2\beta}, \frac{1}{2} \right] & (\alpha, \beta) \in R_1 \\ \left[\frac{1}{2}, 1 \right] & (\alpha, \beta) \in R_2 \\ \left[\frac{1-\alpha}{\beta}, \frac{1-\alpha+\beta}{2\beta} \right] & (\alpha, \beta) \in R_3 \\ \left[\frac{(\alpha-\beta)\beta}{2(\alpha+\beta)(\alpha+3\beta)}, \frac{\alpha+4\beta}{2\alpha+6\beta} \right] & (\alpha, \beta) \in R_4 \end{cases}$$

$$S = \begin{cases} \emptyset & (\alpha, \beta) \in R_1 \\ \emptyset & (\alpha, \beta) \in R_2 \\ \left[\frac{1-\alpha+\beta}{2\beta}, 1 \right] & (\alpha, \beta) \in R_3 \\ \left[\frac{\alpha+4\beta}{2\alpha+6\beta}, 1 \right] & (\alpha, \beta) \in R_4 \end{cases}$$

$$K = \begin{cases} \left[\frac{1}{2}, 1 \right] & (\alpha, \beta) \in R_1 \\ \emptyset & (\alpha, \beta) \in R_2 \\ \emptyset & (\alpha, \beta) \in R_3 \\ \emptyset & (\alpha, \beta) \in R_4 \end{cases}$$

Lemma 2 shows the optimal pricing and market segmentation strategies of the platform across the parameter space (α, β) . In region R_1 , the platform sets a moderate first-stage price and a low second-stage price to achieve price-based market stratification and encourage early purchases for moderate-valuation users. In contrast, more price-sensitive users tend to delay their purchases. Thus, the platform can capture demand from both groups across both periods. In region R_2 , the platform sets a high first-stage price (with $p_1^* \geq \alpha$) and a lower second-stage price. This discourages early purchases, shifts demand to the later period, and allows the platform to extract surplus from low-valuation users who delay their purchases. Region R_3 reflects a focus on high-valuation users, with the platform setting a high first-stage price to capture their willingness to buy. Meanwhile, the resale mode allows low-valuation users to buy the product in the second stage through peer-to-peer transactions. This design helps in intertemporal price discrimination while expanding market coverage. In region R_4 , the platform sets intermediate p_1 and p_2 to attract early-stage users to resell while preserving second-period sales potential. In this case, the platform encourages resales to achieve indirect profits through price arbitrage. This strategy uses low initial prices to induce resale and earns indirect profits from low-value or tail-end users. Together, these region-specific strategies show how the platform optimizes pricing and market coverage by leveraging user heterogeneity and resale dynamics.

Proposition 2 Strategic transitions occur across parameter regions, with partitioned regions, as shown in Fig. 2.

(1) In R_1 (low α and low β) and R_2 (high α and high β), resale does not occur.

(2) In R_3 (moderate α and moderate β), resale arises endogenously as a market extension.

(3) In R_4 (high α and moderate β), the platform promotes resale to expand market coverage indirectly.

When α and β are low, the platform has limited profit potential from high pricing or resale mode. Here, resale is not encouraged and modest revenue is earned from medium and high-valuation users only. Conversely, when both α and β are high, early-stage users appreciate immediate access, and resale becomes economically attractive. Resale, however, poses a risk of profit erosion due to user arbitrage. To mitigate this risk, the platform sets a high first-stage price to directly target second-stage users while preserving margin integrity. At moderate α and β , the platform can benefit from early-stage users' resale behavior to reach lower-valuation users. This strategy encourages wider market penetration while keeping prices stable. When α is high and β is moderate, high-value users accept a higher price, and moderate β makes resale attractive. The platform aims to attract high-valuation users with a premium first-stage price and strategically adjusts the second-stage price to encourage resale, which allows indirect access to price-sensitive users. By creating controlled arbitrage, the platform can extract value from the lower end of the market without actually discounting the product.

Proposition 3 When α and β are moderate (in R_3), the resale supply balance is $S = D$, whereas when β is moderate and α is high (in R_4), the resale supply balance is $S + q = D$.

Proposition 3 captures the platform's dynamic supply-demand structure. Early buyers are willing to resell in case of moderate overall user utility; then the resale supply naturally matches second-stage demand. Without the platform's intervention, the resale market endogenously achieves complete user coverage. However, when the early user utility α is high, and β remains moderate, early buyers tend to retain the product rather than resell. Thus, a rise in the opportunity cost of resale leads to insufficient secondary market supply. To avoid demand leakage and capture second-stage direct sales revenue, the platform supplements the market by releasing additional volume q . For example, on the Steam marketplace, owners retain certain high-value digital items, such as rare CS:GO skins, which limits secondary supply. In response, the platform occasionally releases inventory through drop mechanisms or limited-time boxes,

corresponding to the platform's release q .

We varied α to represent different game types to examine how early-stage consumption utility affects platform policies and market outcomes. α is set as 0.60, 0.80, 0.95. A low value of α (i. e. , $\alpha = 0.60$) corresponds to games with limited initial heat, typically niche games or with a low brand influence. A moderate value of α (i. e. , $\alpha = 0.80$) reflects mainstream releases with stable but low initial demand. A high value of α (i. e. , $\alpha = 0.95$) is an indication of a blockbuster launch with a significant early-access value (such as Black Myth: Wukong).

Figs. 3 and 4 show how α affects optimal prices p_1^* , p_2^* , and platform profit π^* . The results indicate that a smaller α leads to a higher profit level. If the premium for early consumption is lower, the platform moves toward a wider user acquisition, leading to lower p_1^* and broader participation in the first stage. This pattern creates a stepwise structure in p_1^* as β increases. The thresholds of β that trigger price adjustments decrease as α increases. This indicates that platforms with high α must adjust their first-stage pricing more aggressively. For p_2^* , we observe a regime shift, that is, when β is low (e. g. ,

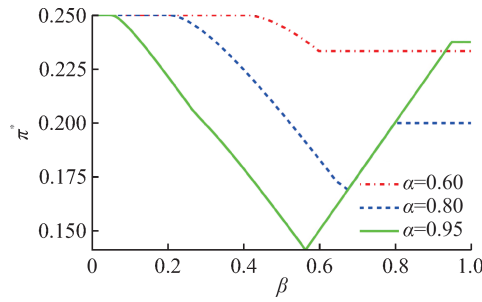


Fig. 3 Impact of different α values on profit

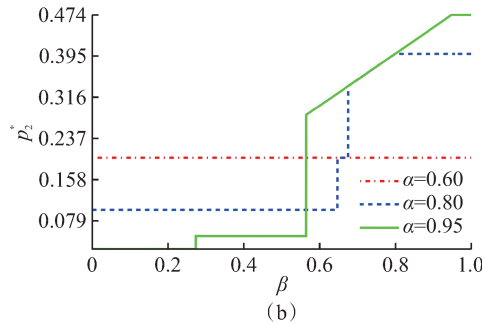
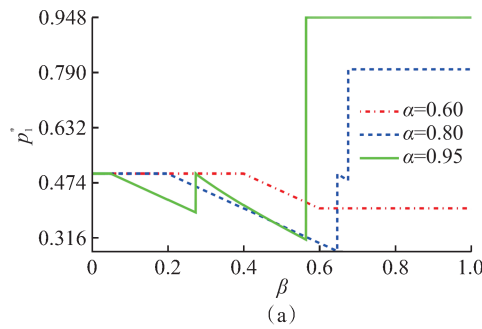


Fig. 4 Impact of different α values on optimal prices. (a) p_1^* ; (b) p_2^*

$\beta < 0.56$), a higher α reduces resale prices because strong early-stage users crowd out late buyers; if β is high ($\beta > 0.62$), stronger early-stage utility induces greater willingness to pay in the second stage, pushing p_2^* upward. These results reflect real decisions of the platform. This implies that niche games depend on low entry prices to create demand, whereas highly anticipated games support stronger intertemporal price differentiation.

Fig. 5 shows how α reshapes the user segment (N , D , S , and K) composition. As α increases, the number of early non-buyers (N) reduces, while both delayed pur-

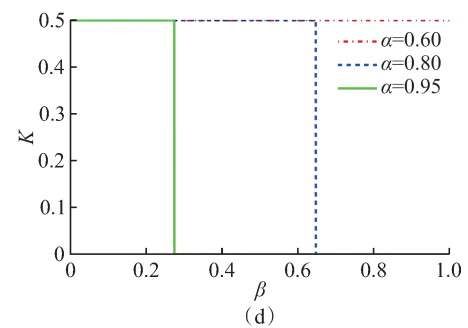
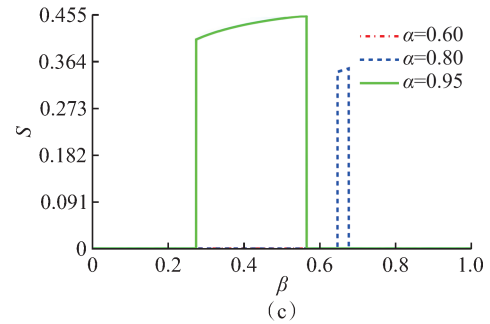
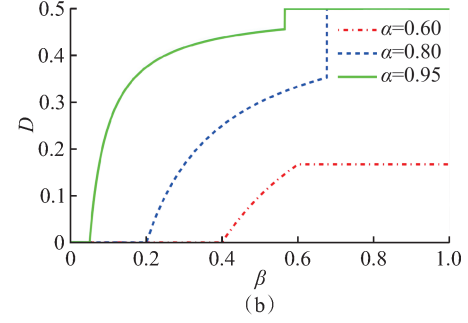
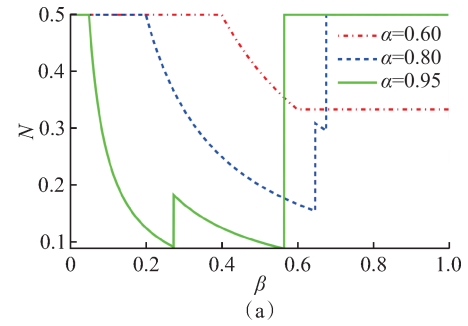


Fig. 5 Impact of different α values on user quantity. (a) User segment N ; (b) User segment D ; (c) User segment S ; (d) User segment K

chasers (D) and resale participants (S) increase, and the group of committed early buyers (K) remains largely stable. These structural shifts occur in separate steps as β increases, indicating users' sensitivity to delayed consumption. Moreover, the thresholds of β at which segment transitions occur decrease as α increases. Thus, high-enthusiasm games produce sharper segmentation responses to changes in β , consistent with industry patterns. Blockbuster sales show a clear stratification between early-stage users and bargain-seeking late buyers. By contrast, mid-tier games show smoother transitions across user groups.

The platform must change strategies under different (α, β) , that is, trade-offs between direct revenue generation and expanding user penetration through resale. Resale serves as a tool rather than a risk. The platform's strategy evolves from static price discrimination to resale permission and eventually to resale incentives as user utility increases, aligning with user behavior.

3 Model Selection and Comparison of Strategies

To determine the platform's optimal operational mode, we compare the profits under resale-permitted and resale-prohibited modes across varying user utility structures. The choice of platform mode is driven by the interaction between α (value derived from initial use) and β (value associated with delayed consumption or resale). The results are summarized as follows.

Proposition 4 Platform mode selection varies across utility structures (Fig. 6).

- (1) If both α and β are low to moderate, the platform prefers the resale-permitted mode.
- (2) If α is high and β is low to moderate, the platform prohibits resale.
- (3) If both α and β are high, the platform can choose whether to allow resale flexibly.

When α and β are low to moderate, purchasing early- or late-users derive limited utility from the product. The

platform cannot capture substantial profit through direct pricing strategies due to weak willingness to pay. In such cases, resale can ease the platform's monetization pressure and facilitate wider market participation through customer transactions. Resale mechanisms can increase participation among price-sensitive users and widen the market rather than deepening value extraction. For example, some small or independent game platforms (e.g., Itch.io) allow users to share or resell games at a low price or in bundles and even support a "pay what you want" model. These strategies promote indirect resale and reduce entry barriers. The game platform can attract more marginal users and create a large initial user base.

If α is high and β is low or moderate, the initial consumption of early-stage users is high. The platform can generate a significant surplus through first-stage pricing. However, resale in this context may cannibalize the platform with low-priced resale products (i.e., the market is eroded by secondary resale). To maintain pricing power and reduce cannibalization, the platforms prohibit resale and improve early monetization strategies. Game platforms, such as the PlayStation Store and Nintendo eShop, restrict resale and instead offer exclusive content and limited-time pricing to extract surplus from high-valuation users. Thus, prohibiting resale secures user payment willingness, protects price integrity, and maximizes profit margins.

If both α and β are high, users are willing to pay. The platform may adopt a flexible strategy, pursuing high-margin direct sales or enabling resale, to increase user engagement while maintaining price stability. For example, Steam permits the resale of items—such as CS:GO skins—on its marketplace while managing supply through item drops. The platform can therefore dynamically adjust its resale policy based on user behavior and optimize long-term profitability through hybrid monetization.

4 Conclusions

(1) In the resale-prohibited mode, the platform adjusts prices according to users' delayed consumption utility β . A low β leads to lower first-stage prices to encourage early adoption, while a higher β lowers early discounts and increases second-stage prices. This shift allows for a transition from early market penetration to later-stage surplus extraction as users become more willing to delay purchases.

(2) Pricing and user behavior evolve dynamically in the resale-permitted mode. The platform can choose between high resale prices from users or moderate prices complemented by platform supply, depending on whether the resale supply meets second-stage demand. If α and β

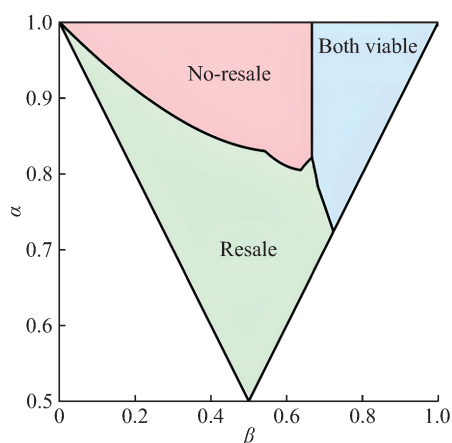


Fig. 6 Optimal mode selection across utility structures

are moderately low and resale markets are balanced, resale by users increases the coverage without intervention. If α is greater and the resale supply is insufficient, the platform must add a second-stage supply. Games with smaller α attract more early engagement and higher profits, whereas high-enthusiasm games show stronger segmentation, leading to hybrid strategies combining user resale and platform provision.

(3) The optimal performance under both modes is compared to provide three scenarios. When the initial usage value and resale utility are low, the possibility of resale helps capture revenue from marginal users. If the initial value is high but the resale utility is limited, a resale ban prevents cannibalization and preserves early-access premiums. If both are high, a strong willingness to pay supports high profitability in both modes, which allows for gains through community engagement, loyalty programs, or exclusive content.

(4) Overall, resale is neither universally beneficial nor harmful; it is a flexible strategic tool. Platforms should determine whether to allow resale and adjust pricing based on user utility structures, willingness to pay, and supply-demand conditions, thereby supporting the design of effective strategies for digital content pricing and user segmentation.

References

- [1] SHILLER B R. Digital distribution and the prohibition of resale markets for information goods[J]. *Quantitative Marketing and Economics*, 2013, 11(4): 403-435.
- [2] ZOU D C, GU M L, LIU D P. When ownership and copyright are separated: Economics of non-fungible token marketplaces with secondary markets[J]. *Decision Support Systems*, 2024, 183: 114247.
- [3] ORLAND K. French consumer group sues for right to resell Steam games [EB/OL]. (2015-12-22) [2025-05-14]. <https://arstechnica.com/gaming/2015/12/french-consumer-group-sues-for-right-to-resell-steam-games/>.
- [4] KING D L, DELFABBRO P H, GAINSBURY S M, et al. Unfair play? Video games as exploitative monetized services: An examination of game patents from a consumer protection perspective[J]. *Computers in Human Behavior*, 2019, 101: 131-143.
- [5] TRAPOVA A, FAVA E. Aren't we all exhausted already? EU copyright exhaustion and video game resales in the Games-as-a-Service era[J]. *Interactive Entertainment Law Review*, 2020, 3(2): 77-93.
- [6] MARIEZ J S, GODFRIN L. UFC-Que Choisir v. Valve: Game over for a second-hand dematerialized video game market in France [EB/OL]. (2024-10-30) [2025-05-14]. <https://ipkitten.blogspot.com/search/label/right%20of%20distribution>.
- [7] KOISO-KANTTILA N. Digital content marketing: A literature synthesis[J]. *Journal of Marketing Management*, 2004, 20(1/2): 45-65.
- [8] HANSPACH P. Analysing exclusive dealing in two-sided markets: Marketplaces for video games available for purchase[J]. *Journal of European Competition Law & Practice*, 2023, 14(4): 254-263.
- [9] BAI X M, CHOI T M, LI Y J, et al. Implementing trade-in programs in the presence of resale platforms: Mode selection and pricing[J]. *Production and Operations Management*, 2023, 32(10): 3193-3208.
- [10] BELHADJ N, LAUSSEL D, RESENDE J. Marketplace or reselling? A signalling model[J]. *Information Economics and Policy*, 2020, 50: 100834.
- [11] LIN S. Two-sided price discrimination by media platforms[J]. *Marketing Science*, 2020, 39(2): 317-338.
- [12] YAO C Z, MO Y N. How does cross-platform externality impact pricing strategies? A two-stage discriminatory pricing model analysis[J]. *Managerial and Decision Economics*, 2024, 45(3): 1454-1479.
- [13] MU Y R, ZHONG W J, MEI S E, et al. Pricing strategy selection for content platforms considering cash subsidies[J]. *Journal of Southeast University (English Edition)*, 2024, 40(1): 105-110.
- [14] BHARGAVA H K, KIM B C, SUN D. Commercialization of platform technologies: Launch timing and versioning strategy[J]. *Production and Operations Management*, 2013, 22(6): 1374-1388.
- [15] LI P P, MEI S E, ZHONG W J. Fee or subsidy? Pricing strategies for digital content platforms with different content and advertising[J]. *Managerial and Decision Economics*, 2023, 44(8): 4482-4506.
- [16] YOON Y, KIM H, CHOI J, et al. Click, sign-up and purchase: Consumer responses to real-time mobile promotions along the consumer decision journey[J]. *International Journal of Advertising*, 2025, 44(6): 1040-1065.
- [17] YAN L, LI P, MEI S, et al. Effect of advertising targeting fit and consumer privacy protection on the profits of media platforms[J]. *Journal of Southeast University (English Edition)*, 2023, 39(2): 194-203.
- [18] PANG C, LI G, JIANG L. Leveraging strategic consumer behavior in consumer-to-consumer resale: From economic and environmental perspectives[J]. *Omega*, 2023, 120: 102924.
- [19] KIM A, SAHA R L, KHERN-AM-NUAI W. Manufacturer's "1-up" from used games: Insights from the secondhand market for video games[J]. *Information Systems Research*, 2021, 32(4): 1173-1191.
- [20] SU X M. Optimal pricing with speculators and strategic consumers[J]. *Management Science*, 2010, 56(1): 25-40.
- [21] ZHENG B, CAI Y J, LI S J. Trade-in and resale in a platform supply chain: Manufacturer's choice of selling strategies[J]. *Transportation Research Part E: Logistics and Transportation Review*, 2025, 193: 103836.
- [22] DONG X P, XIAO L. The impact of resale market on video games: Boosted revenue and better player engagement[C]//2023 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM).

- Singapore, 2023: 1374-1378.
- [23] ESENDURAN G, HILL J A, NOH I J. Understanding the choice of online resale channel for used electronics [J]. *Production and Operations Management*, 2020, 29 (5): 1188-1211.
- [24] ZOU T X, JIANG B J. Integration of primary and resale platforms[J]. *Journal of Marketing Research*, 2020, 57 (4): 659-676.
- [25] WANG Y, MEI S E, XU R Z, et al. Effects of online advertising and consumer engagement on a social media platform [J]. *Journal of Southeast University (English Edition)*, 2023, 39(4): 426-434.
- [26] ISHIHARA M, CHING A T. Dynamic demand for new and used durable goods without physical depreciation: The case of Japanese video games [J]. *Marketing Science*, 2019, 38(3): 392-416.

数字游戏二手交易的货币化:平台战略定价分析

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摘要: 数字游戏平台在二手交易权限和动态定价方面具有更大灵活性。本文构建了一种包含异质偏好和二阶段购买行为的动态定价模型,对比了禁止与允许二手交易下的平台最优策略与市场均衡。结果表明,在禁止二手交易模式下,延迟消费效用的增加促使平台从市场渗透转向利润最大化。允许二手交易时,平台可能通过高价引导用户转售,或以适中定价策略提供二手库存。平台应依据用户初始使用和二手交易潜力动态调整模式。效用较低时,允许二手交易来提高市场覆盖;初始效用较高但二手潜力较低时,禁止二手交易可保护利润;整体购买意愿较强时,2种模式均能带来回报。低初始使用价值的游戏更易获得早期参与和更高的利润;高热度游戏则呈现更明显的用户分化。

关键词: 游戏二手交易;动态定价;模式选择;战略消费者

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