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A Model of Forward-Looking Behavior and Pricing in the Emerging Webtoon Market

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Abstract

As the internet market environment matures, online markets providing various types of contents have flourished. The webtoon market is one such rapidly growing sector. Based mainly in Asia, the webtoon market emerged as comics originally produced in the form of print publications were transferred to digital format. In this study, I analyze purchasing patterns in the webtoon market taking into account the forward-looking behavior of consumers. A forward-looking consumer compares the utility of present and future purchasing decisions by considering their own discount rates on future purchase utility as well as expectations on future price reductions. This comparison strongly influences when consumers will purchase the goods in question.

In the webtoon market, serial episodes are provided weekly and consumers can choose to read the next episode for free when it is released, or read it in advance by paying a fee. This study suggests a theoretical decision model that takes into account the forward-looking behavior of consumers, the serial nature of webtoons, and the uniqueness of the early access model. The study utilizes the assumption that each consumer is heterogeneous in terms of expected utility for the next episode, and discount rates of future purchase utility.

The current study provides a theoretical explanation of the seemingly unreasonable behavior of customers who continue to purchase the latest preview, even though this behavior results in lower net utility compared to when they wait continuously for the next free episode. Based on this understanding, an optimal price for early access is derived mathematically with the assumption that the distribution of heterogeneous consumers follows a uniform distribution. If the distribution of consumer heterogeneity is known, an actual optimal price could be determined through this model. A key mathematical finding of this model is that

that an intertemporal price discrimination strategy, at any degree of price discrimination from an arbitrary single price, outperforms a uniform pricing strategy in terms of revenue.

The significance of this study is as follows. First, it provides a logical explanation of consumer behavior in the webtoon market, which could also be utilized to aid the understanding of other serial online content markets. Second, it provides a theoretical, mathematical basis for pricing decisions in the webtoon and other similar markets. Further empirical studies are needed to fully validate the finding of this paper.

Keyword **:** Online contents market; Webtoon; Pricing; Forward-looking consumers; intertemporal price discrimination

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1. Introduction

With the development of information technology, the importance of the online marketplace has grown. The environment of the online marketplace has created new business opportunities for existing industries. Thus, new consumer behaviors can be observed. The content market, which provides intangible goods and services (e.g., entertainment, games, music, comics) to consumers, has been rapidly growing. The online environment has become the new center of this market. Many consumers no longer wait in front of the television to watch their favorite shows, subscribe to newspapers, and purchase CDs to listen to music. Instead, they use the VOD service to watch TV programs at the time they want, search the internet for news articles, and pay a monthly fee to use a music streaming service. Some consumers watch advertisements to use a free service. Others are willing to pay additional money to use free services more conveniently (e.g., without advertisements). These changes in consumer behavior can be attributed to the thriving internet environment.

The 'webtoon' market, the subject of this study, is a new online marketplace for comics. In the past, comics have traditionally been sold as tangible publications. Now, comics are being published online in the form of regular online serial content, called webtoons. Providers regularly upload serial episodes of comics, while consumers wait until the next episode is released on the online platform every week.

1.1. Webtoon Business

Webtoons refers to a series of cartoons that are regularly published (i.e., one episode per week), through an online platform. More specifically, a new episode of a webtoon series is uploaded every particular day of the week for free.

By providing free webtoon episodes, providers obtain more user traffic to their websites and earn advertisement revenue from free users. This is similar to what newspapers want to achieve by publishing comics in their newspapers. The free webtoon is the most basic revenue model in the webtoon market. That being said, there are also other revenue alternatives, summarized in the table below.

Table 1. Webtoon Revenue Models

	Week t	Week t+1
Free Webtoon	EP_1, EP_2, …… , EP_t*: free EP_t is newly uploaded	EP_1, EP_2, …… , EP_{t+1}: free EP_{t+1} is newly uploaded
Paid Webtoon	EP_1, EP_2, …… , EP_s: free EP_{s+1}, EP_{s+2}, …… , EP_t: paid EP_t is newly uploaded	EP_1, EP_2, …… , EP_s: free EP_{s+1}, EP_{s+2}, …… , EP_{t+1}: paid EP_{t+1} is newly uploaded
Early Access*	EP_1, EP_2, …… , EP_t: free EP_{t+1}, EP_{t+2}: paid (early access) EP_t is newly converted for free EP_{t+2} is newly uploaded early access	EP_1, EP_2, …… , EP_{t+1}: free EP_{t+2}, EP_{t+3}: paid (early access) EP_{t+1} is newly converted for free EP_{t+3} is newly uploaded early access

∗ EP_t: t^{th} episode
∗ When two early access episodes are available each week

1) Free webtoon: Provides every episode for free
2) Paid webtoon: Provides several episodes for free and charging a fee for all other episodes
3) Early access: Provides each episode for free, while charging a fee for early access to a fixed number of subsequent episodes before they are released.

In this study, I analyze consumer purchasing behavior in the webtoon market focusing on the early access model, which is the most common and

profitable model. There are two reasons why this model is merits further investigation. First, the early access model combines the advantages of the other two revenue models. Consumers whose willingness to pay is low will stay in the market to enjoy free episodes. This way, the model generates user traffic and advertisement revenue comparable to the free webtoon model. It also gains additional profit by selling early access to consumers who are either impatient of have a high willingness to pay. Due to this advantage, many providers have gradually adopted this model. However, there is a lack of understanding on this widely used model. Second, a better understanding of this model can support the pricing decision of the webtoon market as well as other similar markets (e.g., VOD services). There are as of yet no clear principles that guide the pricing decisions of managers in such businesses. The implications gained from the current research have practical implications to these rapidly growing businesses.

1.2. Forward-looking Consumers

The current study aims to explain the purchasing behavior of consumers in the webtoon market, and to develop a pricing strategy to increase the profit of the providers, under the assumption that consumers are forward-looking. 'Forward-looking' behavior refers to strategic decisions of consumers made based on future price variation or changes in market conditions. For example, myopic consumers will purchase a product right away, if their expected utility gain from purchasing the product (u_i) is higher than the price in a given moment (p_t). Forward-looking consumers, on the other hand, decide when to purchase products based on their knowledge of future price reductions, aiming to obtain a higher utility gain.

Figure 1.1 Purchasing decision of myopic consumer *i*

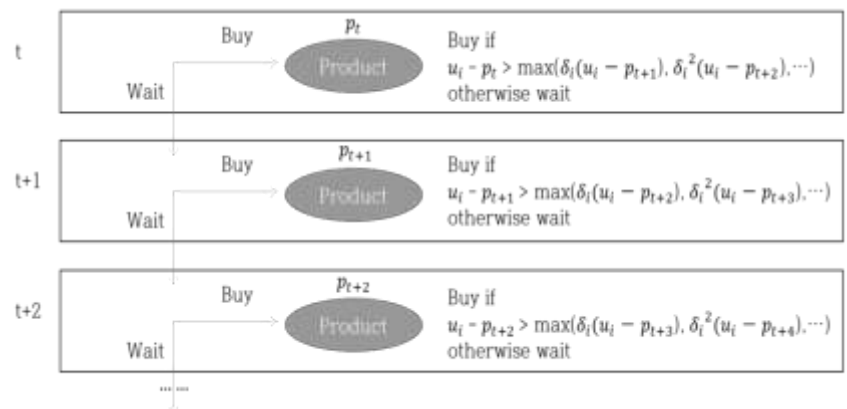


Figure 1.2 Purchasing decision of forward-looking consumer *i*

u_i: Expected utility gain of consumer i, δ_i: Discount rate of consumer i , p_t: Price at t

This study has three main goals. The first is to propose a theoretical model that explains the purchasing behavior of customers in the webtoon market, under the assumption that consumers are heterogeneous and forward-looking. The proposed model illustrates that the decision rule of consumers varies with the time required to wait for a paid episode to be released for free. An explanation of why consumers continuously purchase episodes after their initial purchase is then

provided. The second goal is to lay theoretical foundations for managerial decision-making involving pricing. Based on the model of consumer purchasing behavior created in the first part, I establish an optimal pricing determination scheme for the webtoon business. In this scheme, an optimal price can be found when the information on the distribution of consumer heterogeneity is given. The third goal is to demonstrate that providers can earn higher revenue if they adopt a price discrimination strategy, rather than a uniform pricing strategy. Providers currently offer early access for subsequent episodes at a pre-determined uniform price. Using the proposed model, I mathematically prove that an intertemporal price discrimination strategy outperforms a uniform pricing strategy for maximum revenue, and that any degree of price discrimination from an arbitrary single price p always increases the profit.

2. Literature Review

2.1. A Revenue Model for Digital Goods

Webtoon business is a relatively new business, one that is rapidly growing mostly in the Asian market recently. Thus, studies have not been actively done on this market as yet. There are but few studies currently, and most of these are limited to browsing the characteristics of the webtoon market as a new media and do not focus on the business models and consumer behavior in that market. However, consumer behavior and revenue models in all of the digital goods markets have been extensively studied, and these studies closely relate to the webtoon market. Establishing the best revenue or pricing model for digital goods is one of the most important issues of the Internet era, but it requires an understanding of what is different about digital goods from normal commodities.

The challenge of choosing the best revenue model for online business has thus inspired intensive research in marketing, economics, and the information systems field.

Firms can earn advertising revenue that generated from user traffics by providing free online content, charging customer for access to that content or combining multiple revenue sources. Studies on the revenue model for online business show that there exists a basic trade-off between advertising models and charging for content. This trade-off is because charging for content will reduce viewership and thus decrease advertising revenue. Many studies have been conducted on this particular trade-off to show how it works in various digital goods markets. Pauwels and Weiss (2008) showed that moving from a free model to a charging model can be profitable for online content providers who are targeting marketing professionals. In order to alleviate the tradeoff, models that combine those two revenue sources based on their consumer characteristics have also emerged rapidly; therefore, studies on these new models also have been undertaken.

Prasad et al. (2003) focused on consumer heterogeneity regarding the willingness to pay for content and showed that combining two revenue models and offering options to the consumer can be the best strategy. With heterogeneous consumers, some providers offer the option for consumers to pay a higher price and view fewer advertisements. Lambrecht and Misra (2013) quantified the trade-off between two revenue models and proved that firms can increase their profits by adjusting the amount of paid content they offer as a result of consumer heterogeneity and the wiliness to pay. Further, firms may offer a free-version that limits their period of use or functionality to expand the consumer base (gain more advertising revenue) while still providing full or upgraded services to consumers who want advanced quality with a fee. This revenue model called ‘Freemium’ and

studies on this model have been actively done as well. (Cheng and Tang 2010, Arora et al 2017).

However, the webtoon early access revenue model differs from other models covered by the previous research efforts. First of all, there is no direct tradeoff or there is just a weak tradeoff between charging for content and gaining advertising revenue. This model distinguishes free users from paying customers based on the consumers' willingness to pay and discriminates between them in terms of wait time. There is no incentive for free customers to leave the market since they can enjoy all the content just a few weeks later. Secondly, contents consumed by free users are exactly the same for paid users. In this regard, I do not consider this trade-off as a proper amount of paid content or as a difference between free and paid versions in this study. This study only focuses on maximizing revenue from selling content. These two differences make this study unique, and new studies on the revenue model like this one that discriminate between consumers by wait time are likely to be done actively in the future.

2.2 Forward-looking Behavior of Consumers and Intertemporal Price Discrimination

Pricing strategy is one of the most important parts of decision- making for firms and one of the most difficult at the same time. Many studies have been undertaken to figure out how to optimize their pricing strategy, and the scope of this line of study has been extremely broad. Studies on pricing in light of strategic (forward-looking) consumer behavior are one important part of the pricing research, and my paper closely relates to this focus.

The forward-looking behavior of consumers has been investigated by researchers since 1972 (Coase, 1972). Generally speaking, such behavior hurts a

firm's profits and weakens its monopoly power. These consumers act more strategically and wisely than do certain myopic consumers. They also try to maximize their intertemporal utility by choosing the optimal amount of time to make a purchase. Consumers expect and wait for future price reduction, and providers are forced to drop their price to the same level as their marginal cost. Stokey (1979) proved rigorously that price discrimination can be unprofitable for providers. Landsberger and Meilijson (1985) proved that intertemporal price discrimination dominates if the consumer's discount rate on time is higher than that of the provider.

Besanko and Winston (1990) analyzed the intertemporal pricing problem for a monopolist. They considered a discrete-time price path and presented a theoretical model to explain the dynamic pricing of monopolistic sellers against forward-looking consumers to show that underestimating the rationality of consumers negatively affects a firm's profit. Nair (2007) empirically investigated optimal pricing over time for monopolistic firms versus forward-looking consumers. He recommended using a structural model to compute the dynamic sequence of prices in a monopoly market, namely, the U.S. market, for console video games. These two papers deal with monopolistic firms' selling durable goods to forward-looking consumers and provide a background for setting an optimal pricing policy. Both papers assume a monopoly condition, wherein consumers only purchase one unit of the product, and there is no second-hand market.

Su (2007) presented a model that divided consumer group into four groups, different from each other in terms of two dimensions, namely, (1) Strategic (forward-looking) versus myopic and (2) high valuation versus low valuation. This paper proves that the joint heterogeneity of valuation and the degree of patience plays an important role in explaining the structure of optimal pricing policies. In

my current study, I also assume two dimensional heterogeneity just as Su (2007) does. However, I assume those two dimensional heterogeneities follow a joint uniform distribution, unlike the work of Su, and it thereby divides the consumers into four distinct groups.

3. Model

3.1 Understanding Consumer Purchasing Behavior in Webtoon Market

A purchasing decision for each unreleased episode in the webtoon market is just one simple case of forward-looking decisions in the context of intertemporal price discrimination in the durable goods markets. That is, in a single decision, consumers simply choose whether to purchase the product (i.e., an unreleased episode) now or to wait. The future price is pre-determined (i.e., zero at a fixed future time), rather than dynamically changing over time. On the other hand, a series of purchasing decisions is a special case of forward-looking consumer behavior, because consumers in this market make subsequent purchasing decisions after their initial purchase, rather than just leaving the market as consumers do in the durable goods market.

Due to the structural difference of the webtoon market, as compared to the durable goods market, which arises from the product's serial nature, a state-dependency exists in the decision rule of consumers. In this model, I illustrate that the decision rule of consumers varies with the waiting time. I also explain why habitual purchasing occurs in this market.

Figure 2 shows how episodes are released every week on the webtoon platform. Usually, webtoon platforms provide three early access episodes every

week but I assume in this model that only two early access episodes exist per week. I also assume that consumers always read the new free episode in the week that it is uploaded, which seems reasonably close to real consumer behavior. When there are two early access episodes each week, we will call the first one (EP_{t+1} at week t) early episode 1 ($\mathrm{EE1_t}$) and the second one (EP_{t+2} at week t) early episode 2 ($\mathrm{EE2_t}$). Consumers can choose to enjoy the free episode and wait a week for the next one for free, or to purchase an early access episode with a small fee. They make this decision every week.

The market largely consists of two major consumer groups. One group of consumers only reads the new free episode each week (EP_t at week t). The other group of consumers purchases $\mathrm{EE2_t}$ every week, after purchasing both EE1 and EE2 in their first purchase.

	Free episodes	Early Access Episode 1 (price p)	Early Access Episode 2 (price p)
Week t	$EP_1 - EP_t$	EP_{t+1}	EP_{t+2}
Week t+1	$EP_1 - EP_{t+1}$	EP_{t+2}	EP_{t+3}
Week t+2	$EP_1 - EP_{t+2}$	EP_{t+3}	EP_{t+4}

Figure 2 Early Access Model in the Webtoon Business (two early episodes)

What is interesting in this situation is that the weekly utility gain of the latter group is lower than that of a situation wherein they do not purchase early episodes, but they purchase early episode every week.

Let us assume that a consumer's valuation is their expectation for the next episode and is constant over time. When individual *i* from the second group, who expects that he/she will gain *u* from reading one episode, purchases both early access episodes, the gain of $\underline{i}$ in that week is $u + (u - p) + (u - p)$. This is larger than the utility of when individual *i* does not purchase the episodes, if $(u - p)$ is larger than 0. However, in the following weeks, individual *i*'s weekly gain is $(u - p)$, which is always lower than *u.* Therefore, the behavior of these consumers seems to be unreasonable, and merits further investigation.

This behavior can be understood by combining the assumption of forward-looking consumers in Figure 1.2 with the structural feature of the early access model in Figure 2. Consumers do not compare $u - \mathrm{p}$ with u, but with the discounted expected utility δu. This is because consumers discount future utility relative to present utility .When consumers are heterogeneous in valuation and in patience about waiting, their choice rules can be expressed as follows.

(1) State 1 (when individual *i* considers purchasing $\mathrm{EE1_t}(EP_{t+1}$ in week $t)$)

$$\begin{cases} purchase\ EP_{t+1}\ (go\ to\ state\ 2\ in\ week\ t) & if\ \ u_{i,t+1} - p\ >\ \delta_i u_{i,t+1} \\ wait\ one\ week\ (go\ to\ state\ 1\ in\ week\ t+1) & otherwise \end{cases}$$

(2) State 2 (when individual *i* considers purchasing $\mathrm{EE2_t}(EP_{t+2}$ in week t))

$$\begin{cases} purchase\ EP_{t+2}\ \ (go\ to\ state\ 3\ in\ week\ t) \\ \qquad\qquad\qquad\qquad if\ \ u_{i,t+2}\ - p\ >\ \max(\delta_i(u_{i,t+2} - p), {\delta_i}^2 u_{i,t+2}) \\ wait\ one\ week\ (go\ to\ state\ 1\ in\ week\ t+1) \quad otherwise \end{cases}$$

(3) State 3 (after individual *i* purchases $\mathrm{EE2_t}(EP_{t+2}$ in week $t)$)

$\{go\ to\ state\ 2\ in\ week\ t+1\ \ (because\ the\ next\ episode\ does\ not\ yet\ exist.)$

where:

u_{it} = expected utility of individual i from EP_t $(i = 1,2,3, \dots, n, t = 1,2,3, \dots, T)$

δ_i = discount rate of individual i $(\delta_i \in [0,1))$

Because of the structural nature of the serial content market, the choice of the consumer is not only affected by the differences across the individuals, but also by the waiting time.

For example, when individual i considers purchasing $\mathrm{EE1_t}$ (EP_{t+1} in week t), individual i compares the expected utility from the purchase $(u_{i,t+1} - p)$ with the discounted future utility of reading EP_{t+1} for free $(\delta_i u_{i,t+1})$. That is, the consumers choose whether to read the next episode now with a fee or read it for free one week later. In the case of $\mathrm{EE2_t}$ (EP_{t+2} in week t), individuals have to wait two weeks to read EP_{t+2} for free. This is the reason why the choice rule in State 2 is different from that of State 1. When individual i considers purchasing $\mathrm{EE2_t}$, individual i compares the utility from purchasing EP_{t+2} this week $(u_{i,t+2} - p)$ with the larger of the utilities of waiting one and two weeks $(\max(\delta_i(u_{i,t+2} - p), {\delta_i}^2 u_{i,t+2}))$. Since the prices of early access are the same and $\delta_i \in [0,1)$, the comparison between $u_{i,t+2} - p$ and $\max(\delta_i(u_{i,t+2} - p), {\delta_i}^2 u_{i,t+2})$ is exactly the same as with the comparison between $u_{i,t+2} - p$ and ${\delta_i}^2 u_{i,t+2}$. The decision rule reflecting this is as follows.

(1) State 1 (when individual *i* considers purchasing $\mathrm{EE1_t}(EP_{t+1}$ in week $t)$)

$$\begin{cases} purchase\ EP_{t+1}\ \ (go\ to\ state\ 2\ in\ week\ t) & if\ u_{i,t+1} - p > \delta_i u_{i,t+1} \\ wait\ one\ week\ (go\ to\ state\ 1\ in\ week\ t+1) & otherwise \end{cases}$$

(2) State 2 (when individual *i* considers purchasing $\mathrm{EE2_t}(EP_{t+2}$ in week $t)$)

$$\begin{cases} purchase\ EP_{t+2}\ \ (go\ to\ state\ 2\ \ in\ week\ t+1) & if\ u_{i,t+2} - p > {\delta_i}^2 u_{i,t+2} \\ wait\ one\ week\ (go\ to\ state\ 1\ in\ week\ t+1) & otherwise \end{cases}$$

The purchasing decision of the latter group purchasing EP_{t+2} each week may seem unreasonable, since they only obtain $u_{i,t+2} - p$, rather than u_{it} each week. However, with the forward-looking consumer assumption, this decision can be explained. For example, for their first purchasing decision, customers purchase $\mathrm{EE1_t}$ and $\mathrm{EE2_t}$ if $u_{i,t+1} - p > \delta_i u_{i,t+1}$ and $u_{i,t+2} - p > {\delta_i}^2 u_{i,t+2}$. They obtain utility in that week of $(u_{it} + u_{i,t+1} + u_{i,t+2} - 2p)$, which is greater than u_{it}. In the next week, their decision in state 2 is the choice between reading an episode with a fee now and waiting two weeks to read it for free. If they decide to wait, they will get zero utility for two weeks and gain $u_{i,t+3}$ two weeks later, a choice that does not seem to be preferred by consumers.

In addition, if the valuation for the next episode ($u_{it} = u_i$) is constant over time for the consumers, those who have a utility $u_{i,t+1} - p > \delta_i u_{i,t+1}$ purchase $\mathrm{EE2_t}$ with $\mathrm{EE1_t}$ every week, because $\delta_i u_{i,t+1} > {\delta_i}^2 u_{i,t+2}$ is always true for them. This is because when $u_{i,t+1} - p > \delta_i u_{i,t+1}$ is true, $u_{i,t+2} - p > {\delta_i}^2 u_{i,t+2}$ is also true. Even if there is some variation in valuation for each episode, these consumers are still highly likely to keep purchasing early access options.

When $u_{i,t+1} = \frac{p}{1-\delta_i}$, the consumer in state 1 is indifferent to purchasing either $\mathrm{EE1_t}$ or waiting one week. The consumer in state 2 is indifferent to purchasing $\mathrm{EE1_t}$ or waiting one week, when $u_{i,t+2} = \frac{p}{1-\delta_i{}^2}$. The indifferent condition for states 1 and 2 are:

$$u_i^{1^*} = \frac{p}{1-\delta_i} \quad \text{and} \quad u_i^{2^*} = \frac{p}{1-\delta_i{}^2} \tag{1}$$

$u_i^{1^*}$: the point where i is indifferent to either purchasing $\mathrm{EE1_t}$ or waiting

$u_i^{2^*}$: the point that i is indifferent to either purchasing $\mathrm{EE2_t}$ or waiting

and:

$$u_i^{2^*} < u_i^{1^*} \left(since,\ u_i^{2^*} = u_i^{1^*} \times \frac{1}{1+\delta_i} \text{ and } \delta_i \in [0,1) \right) \tag{2}$$

In equation (2), the minimum utility necessary for a purchase in state 2 is always lower than that of state 1, which means that $\mathrm{P}(Purchase|State\ 2)$ is always bigger than $\mathrm{P}(Purchase|State\ 1)$. Thus, with the assumption of forward-looking behavior on each purchasing decision, consumers are highly likely to continue purchasing every week once they make their initial purchase. This result corresponds with the real market situation where most consumers repeatedly purchase $\mathrm{EE2_t}$ every week after they made a first purchase. With this choice model, the unreasonable purchasing behavior of early episode buyers and habitual purchasing of consumers can be explained.

3.2. Optimal Price Determination in uniform pricing

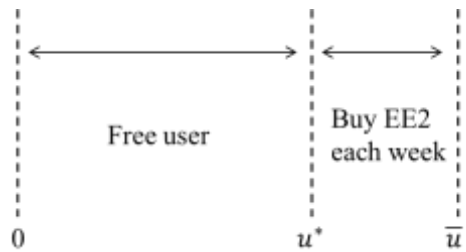
Besanko and Winston (1990) and Nair (2007) investigated a monopolistic firm selling zero marginal cost durable goods. These papers assume heterogeneous consumers on valuations, uniformly distributed on $[0, \overline{u}]$, for a simple two-period model. The model briefly outlines the company's optimal dynamic pricing and consumer decision-making process in the market. Following this approach, the current study proposes an optimal price determination scheme for early access of the webtoon and recommends pricing strategy changes.

Under the uniform pricing strategy that the overwhelming majority of webtoon platforms use, the price of early access is predetermined and singular, regardless of the waiting time that it takes for a paid episode to be released for free. In this section, I delineate the optimal price determination scheme for the uniform pricing strategy. For simplicity of analysis, I assume that the heterogeneity of consumers in a valuation follows a uniform distribution and does not vary over time, which means $u_{it} = u_i$ for all *t.* Moreover, I assume that there is no entrance of additional consumers in the market after the webtoon starts. Many existing works assume that forward-looking consumers have a homogeneous discount rate due to several limitations. In this section, I make two separate cases, based on whether the discount rates of consumers are heterogeneous or not.

(1) When consumers are heterogeneous in valuation

Valuations for the next episode (u_i : expected utility gain of individual *i*) are considered to be heterogeneous and patience (δ : discount rate on future utility) is considered to be homogeneous. For all consumers, $u_i - p > \delta u_i, u_i - p > \delta^2 u_i$ is satisfied. That is, when u_i is uniformly distributed on $[0, \overline{u}]$ and $u^* = \frac{p}{1-\delta}$, consumers who satisfy $u_i \in [u^*, \overline{u}]$ purchase EE1 and EE2 during the first week

and continuously purchase EE2 each subsequent week. The remaining consumers do not purchase the early access option at all. The optimization problem for the whole period is approximately the same as the maximization problem for one period as the running period of the webtoon grows longer. Therefore, the optimal price and the maximum revenue are as follows.



$$p^* = \arg max_p \left[p \times (\overline{u} - \frac{p}{1-\delta})\right] = \overline{u} \times \frac{1-\delta}{2} \ (where\ \delta \neq 1\ )$$

$$\pi^* = p^* \times \left(\overline{u} - \frac{p^*}{1-\delta}\right) = \overline{u}^2 \times \frac{1-\delta}{4}$$

$$\left(\frac{\partial \pi}{\partial p} = \overline{u} - \frac{2p}{1-\delta} = 0, \frac{\partial^2 \pi}{\partial p^2} < 0\right)$$

(2) When consumers are heterogeneous in valuation and patience

If consumers are heterogeneous in both valuation and patience (δ_i), for all consumers such that $u_i - p > \delta_i u_i$, inequality $u_i - p \geq {\delta_i}^2 u_i$ is satisfied.

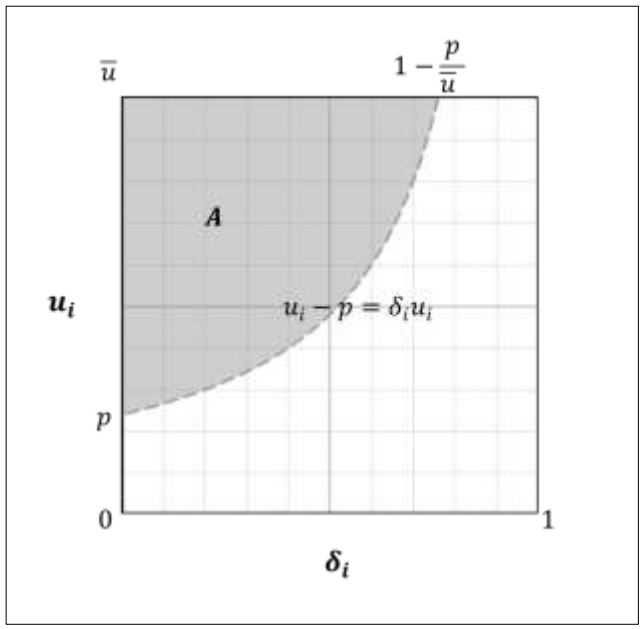


Figure 3 Demands for Early Access in Two Types of Heterogeneity

A in Figure 3 is the weekly demand of $EE2_t$. The consumers pay to use the website when $(u_i, \delta_i) \in$ A. Demand **A** and revenue π are:

$$A = \int_0^{1-\frac{p}{\bar{u}}} \left(\bar{u} - \frac{p}{1-\delta}\right) d\delta = \bar{u} - p + p \times log\frac{p}{\bar{u}},$$

$$\pi = \left[\left(\bar{u} - p + p \times log\frac{p}{\bar{u}}\right) \times p\right]$$

The optimal price p^* and maximum revenue for each week are:

$$p^* = arg\ max_p\ (A * p) == arg\ max_p\ \left[\left(\bar{u} - p + p * log\frac{p}{\bar{u}}\right) * p\right] \fallingdotseq 0.28467 \times \bar{u}$$

$$\left(\frac{\partial \pi}{\partial p} = \bar{u} - p + 2p * log\frac{p}{\bar{u}} = 0\,, \qquad \frac{\partial^2 \pi}{\partial p^2} < 0\right)$$

$$\pi(p^*) \fallingdotseq 0.1018 \times \bar{u}^2$$

In this chapter, I explained the consumer purchasing behavior in webtoon business by modeling the strategic behavior of consumers. First, I explain why paid users repeatedly purchase early episodes each week even though it seems that their weekly utility gain is lower than that of when they do not purchase early episodes at all. The reason of this habitual purchase is explained by the integration of forward-looking consumer characteristics, the characteristic of webtoon as serial contents, and the unique profit model of early access. Second, based on this model, I confirm that providers can optimize the price of early episodes in a uniform price setting, taking into account consumer heterogeneity in valuation and patience. While this paper assumes uniform distribution for two types of heterogeneity, the results can be used to make decisions in the real market when information on the exact distribution of consumer heterogeneity is available.

4. Price Discrimination

4.1. Optimal price determination in price discrimination

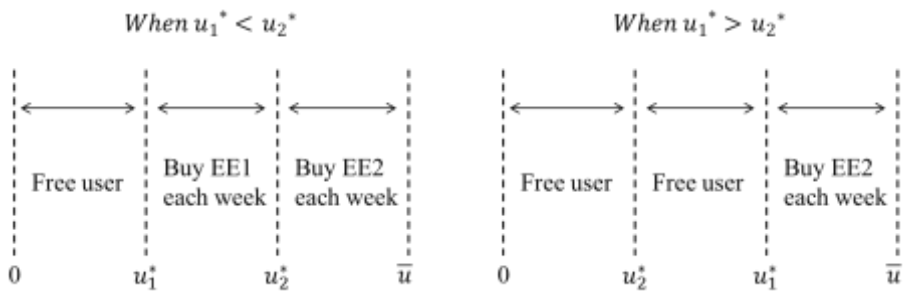
In 3.1, the minimum utility necessary to make a purchase in state 2 is always lower than that of state 1. This finding implies that the price discrimination may yield higher profits and that consumers will pay more in state 2, as their gains are higher in state 2 when the prices are the same. Based on this implication, I demonstrate mathematically that the price differentiation strategy in the market can bring greater benefits to the providers of webtoon.

(1) When consumers are heterogeneous in valuation

Let the price of $\mathrm{EE1_t}$ be p_1 and the price of $\mathrm{EE2_t}$ be p_2. Individual *i* buys $\mathrm{EE1_t}$ each week when $u_i - p_1 > \delta u_i$ and $u_i - p_2 < \delta(u_i - p_1)$. Individual *i* buys

$EE2_t$ each week (buys EE1 in the first week) when $u_i - p_1 > \delta u_i$ and $u_i - p_2 > \delta(u_i - p_1)$. That is, where ${u_1}^* = \frac{p_1}{1-\delta}$ and ${u_2}^* = \frac{p_2 - \delta p_1}{1-\delta}$, consumers purchase $EE1_t$ when $u_i \in [{u_1}^*, {u_2}^*)$ and consumers purchase $EE2_t$ each week when $u_i \in [{u_2}^*, \overline{u}]$

The demand for each early episode is:



Consequently, the optimal price $({p_1}^*, {p_2}^*)$ and maximum revenue $\pi({p_1}^*, {p_2}^*)$ are:

i) When ${u_1}^* < {u_2}^*$ $(p_1 < \frac{p_2}{1+\delta})$

$$\pi = p_1 \times \left(\frac{p_2 - \delta p_1}{1-\delta} - \frac{p_1}{1-\delta}\right) + p_2 \times \left(\overline{u} - \frac{p_2 - \delta p_1}{1-\delta}\right) \ (where\ \delta \neq 1\ )$$

$$\therefore {p_2}^* = 2{p_1}^*, \ \ {p_1}^* = \overline{u} \times \frac{1-\delta}{3-\delta}$$

$$\left(from\ \frac{\partial \pi}{\partial p_1} = \frac{p_2 + \delta p_2}{1-\delta} - \frac{2p_1 + 2\delta p_1}{1-\delta} = 0, \quad \frac{\partial^2 \pi}{\partial {p_1}^2} < 0\ ,\right.$$

$$\left.\frac{\partial \pi}{\partial p_2} = \frac{p_1 + \delta p_1}{1-\delta} + \overline{u} - \frac{2p_2}{1-\delta} = 0\ and\ \frac{\partial^2 \pi}{\partial {p_2}^2} < 0\right)$$

Then,

$$\therefore \pi^* = {p_1}^* \times \left(\frac{{p_2}^* - \delta {p_1}^*}{1-\delta} - \frac{{p_1}^*}{1-\delta}\right) + {p_2}^* \times \left(\overline{u} - \frac{{p_2}^* - \delta {p_1}^*}{1-\delta}\right) = {\overline{u}}^2 \times \frac{1-\delta}{3-\delta}$$

ii) When ${u_1}^* > {u_2}^*$ $(p_1 > \frac{p_2}{1+\delta})$

$\pi = p_2 \times \left(\overline{u} - \frac{p_1}{1-\delta}\right)$ $(where\ \delta \neq 1)$

(First order condition fails; optimal point is a corner solution)

$\therefore {p_2}^* = (1+\delta){p_1}^*, \qquad {p_1}^* = \overline{u} \times \frac{1-\delta}{2}, \qquad {p_2}^* = \overline{u} \times \frac{1-\delta^2}{2}$

$\therefore \pi^* = {p_2}^* \times \left(\overline{u} - \frac{{p_1}^*}{1-\delta}\right) = \overline{u}^2 \times \frac{1-\delta^2}{4}$

The maximum revenue and optimal price in the determination of the price are:

$\pi^* = \max\left(\overline{u}^2 \times \frac{1-\delta}{3-\delta}, \overline{u}^2 \times \frac{1-\delta^2}{4}\right) = \overline{u}^2 \times \frac{1-\delta}{3-\delta}$ $(when, \delta \neq 1)$

$\therefore ({p_1}^*, {p_2}^*) = \left(\overline{u} \times \frac{1-\delta}{3-\delta}, 2\overline{u} \times \frac{1-\delta}{3-\delta}\right)$

$\therefore \pi({p_1}^*, {p_2}^*) = \overline{u}^2 \times \frac{1-\delta}{3-\delta}$

The maximum revenue in the price discrimination policy is higher than that of uniform pricing in 3.2., since $\overline{u}^2 \times \frac{1-\delta}{3-\delta} > \overline{u}^2 \times \frac{1-\delta}{4}$, when $\delta \neq 1$.

(2) When consumers are heterogeneous in valuation and patience

If consumers are heterogeneous in both valuation and patience, consumers in Figure 4 purchase $\mathrm{EE1_t}$ when $(u_i, \delta_i) \in$ A and consumers purchase $\mathrm{EE2_t}$ each week when $(u_i, \delta_i) \in$ B (Figure 4), where

$A = \{u_i, \delta_i | u_i - p_1 > \delta_i u_i \; and \; u_i - p_2 < \delta_i (u_i - p_1)\}$ and

$B = \{u_i, \delta_i | u_i - p_1 > \delta_i u_i \; and \; u_i - p_2 > \delta_i (u_i - p_1)\}$

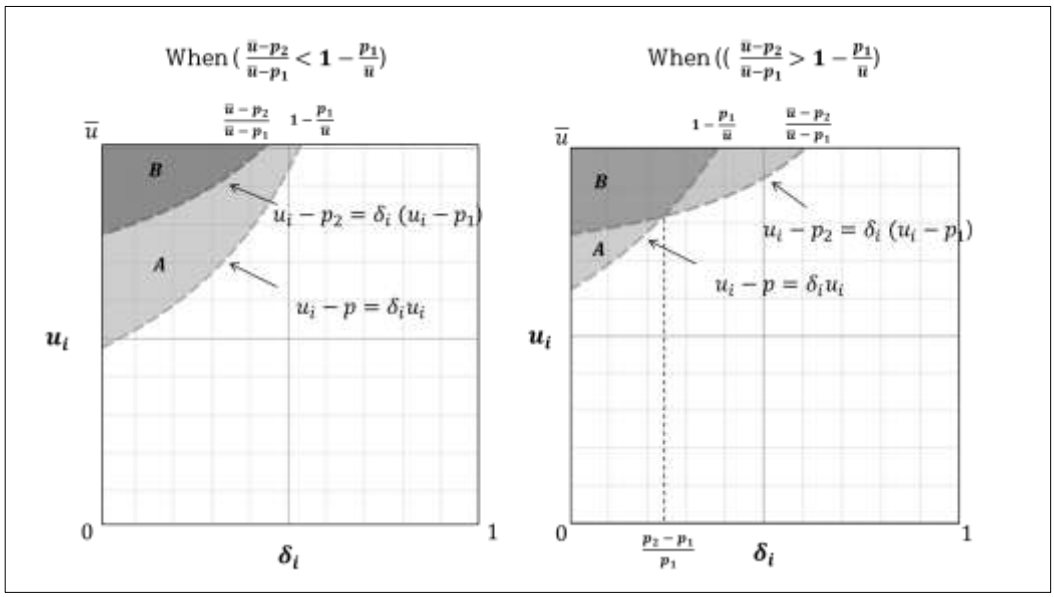


Figure 4 Demands for Early Episodes with Price Discrimination

Considering Two Types of Heterogeneity

Hence, Demand A, B and Revenue π are:

$$A = \bar{u} - p_1 + p_1 * log\frac{p_1}{\bar{u}} - B$$

$$B = \int_0^{\frac{\bar{u}-p_2}{\bar{u}-p_1}} \left(\bar{u} - \frac{p_2 - \delta p_1}{1-\delta}\right) d\delta \times I\left(\frac{\bar{u}-p_2}{\bar{u}-p_1} < 1 - \frac{p_1}{\bar{u}}\right) +$$

$$\left[\int_0^{\frac{p_2-p_1}{p_1}} \left(\bar{u} - \frac{p_2-\delta p_1}{1-\delta}\right) d\delta + \int_{\frac{p_2-p_1}{p_1}}^{1-\frac{p_1}{\bar{u}}} \left(\bar{u} - \frac{p_1}{1-\delta}\right) d\delta\right] \times I\left(\frac{\bar{u}-p_2}{\bar{u}-p_1} > 1 - \frac{p_1}{\bar{u}}\right)$$

$$= \left[(\bar{u} - p_2) + (p_2 - p_1) \times log\left(\frac{p_2 - p_1}{\bar{u} - p_1}\right)\right] \times I\left(\frac{\bar{u}-p_2}{\bar{u}-p_1} < 1 - \frac{p_1}{\bar{u}}\right)$$

$$+ \left[(\bar{u} - p_2) + p_1 \times log\frac{p_1}{\bar{u}} - (2p_1 - p_2) \times log\left(\frac{2p_1 - p_2}{p_1}\right)\right] \times I\left(\frac{\bar{u}-p_2}{\bar{u}-p_1} > 1 - \frac{p_1}{\bar{u}}\right)$$

$$\pi = B \times p_2 + A \times p_1 = B \times (p_2 - p_1) + (\bar{u} - p_1 + p_1 * log\frac{p_1}{\bar{u}}) \times p_1$$

Optimal price $(p_1{}^*, p_2{}^*)$ and maximum revenue $\pi(p_1{}^*, p_2{}^*)$ are:

$$(p_1{}^*, p_2{}^*) = arg\ max_{p_1,p_2}\ [\mathrm{B} \times p_2 + \mathrm{A} \times p_1]$$

$$\left(from\ \ \frac{\partial \pi}{\partial p_1} = \overline{u} - p_2 + 2(p_2 - p_1) \times \log\left(\frac{p_2 - p_1}{\overline{u} - p_1}\right) = 0, \quad \frac{\partial^2 \pi}{\partial {p_1}^2} < 0 \right.$$
$$\left. \frac{\partial \pi}{\partial p_2} = 2(p_1 - p_2) \log\left(\frac{p_2 - p_1}{\overline{u} - p_1}\right) + \frac{(p_2 - p_1)^2}{1 - \overline{u}} + 2p_1 log p_1 = 0, \quad \frac{\partial^2 \pi}{\partial {p_2}^2} < 0 \right)$$

$$\therefore (p_1{}^*, p_2{}^*) \fallingdotseq (0.1967\bar{u}, 0.4254\bar{u})$$

$$\therefore \pi(p_1{}^*, p_2{}^*) \fallingdotseq 0.1608\bar{u}^2$$

$$\left(\text{when } \frac{\overline{u} - p_2}{\overline{u} - p_1} < 1 - \frac{p_1}{\overline{u}}\right)$$

As compared with 3.2, we can observe that the maximum revenue in the price discrimination policy is higher than that of the uniform pricing policy.

(3) Price optimization in a common distribution.

We find the optimal price solution with the assumption of a uniform distribution. If a distribution of u_i follows $\mathrm{F}(u)$, and (u_i, δ_i) follows $\mathrm{F}(u, \delta)$, F being arbitrary distributions, the optimal prices for these consumers are:

i) When δ_i is constant across individuals

$$(p_1{}^*, p_2{}^*) = arg\ max_{p_1,p_2}\left[p_1 \times \left(\mathrm{F}_u\left(\frac{p_2-\delta p_1}{1-\delta}\right) - \mathrm{F}_u\left(\frac{p_1}{1-\delta}\right)\right) + p_2 \times \left(1 - \mathrm{F}_u\left(\frac{p_2-\delta p_1}{1-\delta}\right)\right)\right] \times I\left(p_1 < \frac{p_2}{1+\delta}\right) + [p_2 \times (1 - \mathrm{F}_u\left(\frac{p_1}{1-\delta}\right))] \times I\left(p_1 > \frac{p_2}{1+\delta}\right)$$

ii) When δ_i is heterogeneous across individuals

$$(p_1{}^*, p_2{}^*) = arg\ max_{p_1,p_2} \mathrm{B} \times p_2 + A \times p_1 \qquad = arg\ max_{p_1,p_2}(p_2 - p_1) \times \left[\int_0^{\frac{\bar{u}-p_2}{\bar{u}-p_1}}(1 - \mathrm{F}_u\left(\frac{p_2-\delta p_1}{1-\delta}\middle|\delta\right))d\mathrm{F}_\delta \times I\left(\frac{\bar{u}-p_2}{\bar{u}-p_1} < 1 - \frac{p_1}{\bar{u}}\right) + \left\{\left(\int_0^{\frac{p_2-p_1}{p_1}}(1 - \mathrm{F}_u\left(\frac{p_2-\delta p_1}{1-\delta}\middle|\delta\right))d\mathrm{F}_\delta + \int_{\frac{p_2-p_1}{p_1}}^{1-\frac{p_1}{\bar{u}}}(1 - \mathrm{F}_u\left(\frac{p_1}{1-\delta}\middle|\delta\right)d\mathrm{F}_\delta\right)\right\} \times I\left(\frac{\bar{u}-p_2}{\bar{u}-p_1} > 1 - \frac{p_1}{\bar{u}}\right)\right] + p_1 \times \int_0^{1-\frac{p_1}{\bar{u}}}(1 - \mathrm{F}_u\left(\frac{p_1}{1-\delta}\middle|\delta\right)d\mathrm{F}_\delta$$

4.2. Price discrimination from an arbitrary single price *p*

In 4.1, the maximum revenue in the price discrimination case is mathematically proven to be higher than the maximum revenue in the uniform pricing case, the strategy currently adopted by most providers. These results suggest that it would be profitable to employ price discrimination strategies. In this section, I present additional evidence for the superiority of the price discrimination strategy by demonstrating that any degree of price discrimination from an arbitrary single price p increases the revenue. Discounting the price for $\mathrm{EE1_t}$ and increasing

the price for $EE2_t$ from a single arbitrary price are both found to be profitable situations.

(1) Price discount for $EE1_t$

Under an arbitrary uniform price p when $\frac{p}{1-\delta} \leq \overline{u}$, suppose that the price for $EE1_t$ is discounted by ε when $0 < \varepsilon \leq p$; that is, (p_1, p_2) is $(p - \varepsilon, p)$. We can verify that the price discount on $EE1_t$ is always profitable.

i) When consumers are heterogeneous in valuation

Weekly revenue is:

$$\pi(p-\varepsilon, p)$$
$$= \left(p \times \left(\overline{u} - \frac{p-\varepsilon}{1-\delta}\right)\right) \times I\left(\varepsilon < \frac{\delta}{1+\delta}p\right)$$
$$+ \left((p-\varepsilon) \times \left(\frac{p-\delta(p-\varepsilon)}{1-\delta} - \frac{(p-\varepsilon)}{1-\delta}\right) + p \times (\overline{u} - \frac{p-\delta(p-\varepsilon)}{1-\delta})\right)$$
$$\times I\left(\frac{\delta}{1+\delta}p < \varepsilon < p\right)$$

Difference in revenue when compared with the uniform price p is:

$$\pi(p-\varepsilon, p) - \pi(p, p)$$
$$= \left(p \times \frac{\varepsilon}{1-\delta}\right) \times I\left(\varepsilon < \frac{\delta}{1+\delta}p\right) + \left(\frac{(1+\delta)(p-\varepsilon)\varepsilon}{1-\delta}\right) \times I\left(\varepsilon > \frac{\delta}{1+\delta}p\right)$$

$\therefore \pi(p-\varepsilon, p) - \pi(p, p) \geq 0$ for all ε when $0 < \varepsilon \leq p$

ii) When consumers are heterogeneous in valuation and patience

Weekly revenue is:

$$\pi(p-\varepsilon,p)$$
$$= \left[\varepsilon \times \left((\bar{u}-p)+(p-\varepsilon)\times log\frac{p-\varepsilon}{\bar{u}}-(p-2\varepsilon)\times log\left(\frac{p-2\varepsilon}{p-\varepsilon}\right)\right)+(p-\varepsilon)\right.$$
$$\left.\times\left(\bar{u}-(p-\varepsilon)+(p-\varepsilon)*log\frac{(p-\varepsilon)}{\bar{u}}\right)\right] \times I\left(\varepsilon < p-\overline{u}+\sqrt{u(u-p)}\right)$$
$$+\left[\varepsilon \times \left((\bar{u}-p)+\varepsilon\times log\frac{\varepsilon}{\bar{u}-\mathrm{p}+\varepsilon}\right)+(p-\varepsilon)\right.$$
$$\left.\times\left(\bar{u}-(p-\varepsilon)+(p-\varepsilon)*log\frac{(p-\varepsilon)}{\bar{u}}\right)\right] \times I\left(p-\overline{u}+\sqrt{u(u-p)}<\varepsilon<p\right)$$

$\therefore \pi(p-\varepsilon,p)-\pi(p,p) \geq 0$ is also true for all ε when $0<\varepsilon\leq p$

(2) Price increase for $EE2_t$

Under an arbitrary uniform price p, when $\frac{\mathrm{p}}{1-\delta} \leq \overline{u}$, suppose that the price for $EE2_t$ is increased by ε when $0<\varepsilon\leq\overline{u}-p$; that is, (p_1,p_2) is $(p,p+\varepsilon)$. We can verify that any price increase for $EE2_t$ is profitable.

i) When consumers are heterogeneous in valuation

Weekly revenue is:

$$\pi(p, p+\varepsilon)$$

$$= \left((p+\varepsilon) \times \left(\overline{u} - \frac{\mathrm{p}}{1-\delta}\right)\right) \times I(\varepsilon < \delta p)$$

$$+ \left(p \times \left(\frac{p+\varepsilon-\delta p}{1-\delta} - \frac{p}{1-\delta}\right) + (p+\varepsilon) \times \left(\overline{u} - \frac{p+\varepsilon-\delta p}{1-\delta}\right)\right)$$

$$\times I(\delta p \leq \varepsilon < (u-p)(1-\delta)) + \left(p \times \left(\overline{u} - \frac{p}{1-\delta}\right)\right)$$

$$\times I\big((u-p)(1-\delta) < \varepsilon\big)$$

Difference with the revenue from the uniform price *p* is:

$$\pi(p, p+\varepsilon) - \pi(p,p) = \left(\varepsilon \times \left(\overline{u} - \frac{\mathrm{p}}{1-\delta}\right)\right) \times I(\varepsilon < \delta p) + \left(\varepsilon \times \left(\overline{u} - \frac{p+\varepsilon-\delta p}{1-\delta}\right)\right) \times I(\delta p < \varepsilon < (u-p)(1-\delta)) + 0 \times I\big((u-p)(1-\delta) < \varepsilon\big)$$

$\therefore \pi(p, p+\varepsilon) - \pi(p,p) \geq 0$ for all ε when $0 < \varepsilon \leq u - p$

ii) When consumers are heterogeneous in valuation and patience

Weekly revenue is:

$$\pi(p, p+\varepsilon)$$

$$= \left[\varepsilon \times \left((\bar{u} - p - \varepsilon) + p \times log\frac{p}{\bar{u}} + (p-\varepsilon) \times log\left(\frac{p-\varepsilon}{p}\right)\right) + p \right.$$

$$\left. \times \left(\bar{u} - p + p * log\frac{p}{\bar{u}}\right)\right] \times I\left(\varepsilon < \frac{(u-p)p}{u}\right)$$

$$+ \left[\varepsilon \times \left((\bar{u} - p - \varepsilon) + \varepsilon \times log\frac{\varepsilon}{\bar{u} - p}\right) + p \right.$$

$$\left. \times \left(\bar{u} - p + p * log\frac{p}{\bar{u}}\right)\right] \times I\left(\frac{(u-p)p}{u} \leq \varepsilon < u - p\right)$$

$\therefore \pi(p, p+\varepsilon) - \pi(p, p) \geq 0$ for all ε when $0 < \varepsilon \leq u - p$

In this chapter, I mathematically proved that price discrimination strategy in a given market allows providers to gain greater profits than that of when they choose a uniform price strategy, with the assumption of a uniform distribution of consumer heterogeneity. This has important implications for providers, as it shows that the profitability of the webtoon platform can be improved with simple, slight modification of its pricing system.

5. Conclusion

This paper contributes to the literature by presenting a plausible explanation for consumer choice behavior in the webtoon market. It takes into account the serial nature of webtoon contents as well as the forward-looking behavior of consumers in the context of intertemporal price discrimination. I investigate the seemingly unreasonable behavior of habitual purchase and illustrate that the decision rule of consumers varies with the waiting time that it takes for a paid episode to be released for free. This preliminary model can serve as the foundation of future research for this newly developing market.

By identifying and taking into account consumer heterogeneity in valuation and patience, I also establish a comprehensive price optimization scheme. This scheme provides a basis for additional empirical research on price optimization in the webtoon market. One line of future research could be to apply the proposed model to estimate the true distribution of heterogeneous consumers, which is assumed to be uniformly distributed in this paper, and find the optimal price in the real market. Also, the mathematically proven superiority of price discrimination may provide strategic implications for managerial decisions involving pricing in this business, as well as for that of other serial content markets (e.g., VOD services).

The strength of the proposed model is that it is very simple and intuitive. At the same time, it accurately captures consumer behavior in this market. While the model is effective in this sense, it may not fully reflect complex consumer decisions. Therefore, it may be worth investigating if there are further conditions to be added in order to increase the explanatory power of the model.

Some possible conditions are as follows. Firstly, consumers may collectively take future successive purchases into consideration when they make a choice on an early episode. Secondly, error term and fluctuation in expected utility of each episode is disregarded in this study for the sake of simplicity. Consumers anticipate the utility of next episode differently by taking the flow of the webtoon into account. Therefore, valuation on a next episode is heterogeneous not just across individual, but also over time. Adding individual error term may also be helpful in comprehensively understanding the consumer behavior in this market. Lastly, more consideration could be given to the behavior of newly entering and exiting consumers in the webtoon market.

While the results of the paper clearly show that price discrimination will increase profit, in the actual market, most suppliers are choosing to adhere to a uniform price. The reasons for such a phenomenon could be that the suppliers are unaware of the benefits of price discrimination, especially seeing that the market is relatively young, or it could be that there are complex issues involved in the actual decision-making process that the current model needs to include. Considering the elements above may yield a better understanding of real-life practices, upon which more accurate, practical implications could be gained.

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국문초록

웹툰 시장에서의 미래 지향적 행동 모델과 가격 결정

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인터넷 시장 환경이 성숙함에 따라 다양한 종류의 온라인 컨텐츠 시장이 활성화 되고 있다. 온라인 컨텐츠 시장의 일종인 웹툰(Webtoon) 시장은 인쇄 출판물의 형태로 공급되던 만화가 인터넷 시장으로 그 자리를 옮겨감에 따라 새로이 등장하여, 아시아를 중심으로 급격하게 성장하고 있다. 본 연구에서는 웹툰 시장에서의 소비자 구매 행동을 소비자의 전략적인 (Forward-looking) 의사결정 특성을 고려하여 풀어보았다. 전략적인 소비자는 현재의 구매 행위와 미래 시점의 구매를 미래 시점의 가격 인하, 미래 효용의 현재 가치 할인 등을 고려하여 비교하여 선택한다. 이러한 행동은 소비자가 물건을 언제 구매할 것인가와 밀접한 관련이 있다.

주간 연재물의 형태로 컨텐츠가 제공되는 웹툰 시장에서 소비자는 아직 무료 공개 되지 않은 다음 에피소드를 소정의 금액을 지불하고 미리 볼 수 있다. 소비자는 매 기마다 다음 에피소드를 미리 볼 것인지 무료가 될 때까지 기다릴 것인지 선택을 내리게 된다. 본 연구에서는 소비자의 전략적 (Forward-looking) 의사결정, 연속 연재물로써의 웹툰의 특성, 그리고 '미리 보기'라는 수익 모델의 특수성을 고려한 이론적 의사결정 모형을 제시하고 있다. 이에 각 소비자가 다음 에피소드에 대한 예상 효용과 미래

효용에 대한 현재 가치 할인율의 측면에서 이질적이라는 가정을 도입하였다.

본 연구에서는 이러한 모형을 통해 유료 고객이 무료로 에피소드를 감상할 때보다 매 기 얻는 효용이 적음에도 불구하고 높은 확률로 지속적으로 최신의 미리 보기를 구매하게 되는 현상을 이론적으로 규명하였다. 뿐만 아니라 이질적 소비자의 분포가 균등 분포를 따른다는 가정하에 미리 보기의 최적 가격을 구함으로써 웹툰 미리 보기 가격 결정의 이론적 기반을 제공하였다. 이를 통해 소비자 이질성에 대한 분포를 알 수 있으면 공급자가 해당 모델을 통해 최적의 가격을 찾을 수 있음을 주장하고 있다. 마지막으로 본 연구는 이러한 시장에서 가격 차별화 전략 하의 최대 이익이 단일 가격 전략 하의 최대 이익보다 더 높으며, 현재의 단일 가격에서 임의의 가격 차별을 시행할 때에 항상 더 높은 수익을 얻을 수 있음을 수학적으로 증명하였다.

본 연구는 첫째, 연재물 형태의 온라인 콘텐츠 시장에서의 소비자 행동에 대한 설명을 미래 지향적 소비자 특성을 고려한 모형을 통해 설득력 있게 제시하였다는 점, 둘째, 이러한 시장에서의 컨텐츠 가격 결정을 위한 이론적 기반을 수학적 증명을 통해 제시함으로써 추후의 실증 연구를 위한 기틀을 마련하였다는 점에서 의미가 있다.

주요어: 온라인 콘텐츠 시장; 웹툰; 가격 결정; 전략적 소비자; 시점 간 가격 차별;

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