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Financing as a Marketing Strategy

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This paper investigates the issues concerning a film producer that finances production costs not only by the conventional funding from an institutional investor, but also by "Internet funding," financing through the Internet from so-called netizen investors. In Internet funding, netizen investors engage in word-of-mouth activities. Assuming that information asymmetry exists between the producer and investors, we investigate how the Internet funding size varies with the word-of-mouth effect, the monitoring effect of the institutional investor, and the bargaining power of the producer over investors. When the producer has no bargaining power, the Internet funding size is determined by balancing the word-of-mouth effect with the monitoring effect by the institutional investment. If there is no word-of-mouth effect, there may be no Internet funding, because netizen investors interpret Internet funding as an indicator of a negative profit. When the producer has high bargaining power, full Internet funding is possible if the information asymmetry of the film quality is resolved. We discuss how information asymmetry can be resolved by the monitoring of the film quality, the producer's reputation, or the insurance on investment returns. Our model helps to capture several interesting aspects of Internet funding in the Korean film industry.

Key words: Internet fund; word of mouth; monitoring; bargaining power; film production
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1. Introduction

Internet funding refers to financing through the Internet from many small individual investors, so-called netizen investors (see Perold and Bhow 2000 for an example). One noteworthy aspect of Internet funding is that a firm can use it for the purpose of marketing as well as financing. Netizen investors can engage in word-of-mouth (WOM) activities that lead to the stimulation of the market demand for the business in which they invest. Although Internet funding has recently received a lot of attention, the amount of funding still remains small in general. This paper attempts to find answers to the following questions: What is the optimal amount (proportion) of Internet funding? Should the producer finance fully through the Internet? What are main determinants for optimal Internet funding size?

In the film industry, the WOM effects of Internet funding can be potentially significant. Being consumers of the film they financially support, netizen investors actively and positively talk to others about the film, thereby stimulating the demand for it. Followed by Japan, for example, Korea has pioneered Internet funding to finance film production. As shown in Appendix A, most of the Korean films listed in Table A.1 finance a relatively small fraction of the film production cost. This observation casts doubt on whether film producers use Internet funding for financial purposes. In fact, Internet funding is often discussed in relation to marketing functions in practice. A lot of cases of Internet funding in the Korean film industry are reported to be initiated mainly for the purpose of marketing rather than financing (*Economic Review* 2005). A Korean newspaper once reported how aggressively netizen investors engaged in WOM activities with respect to the film they invested in (Dong-A Ilbo 2001). Kim and Seog (2006) find evidence for the WOM effect of Internet funding.

Internet funding for the WOM effect would grab more of the market's attention for the following reasons. It induces WOM activities on the Internet, so-called eWOM activities, as well as those in offline settings. As information technology rapidly advances, eWOM activities spread quickly and widely (Dellarocas and Narayan 2006, Liu 2006, Mayzlin 2005). It is reported that awareness created by eWOM is an effective predictor of sales (Dellarocas and Narayan 2006, Liu 2006). Recently, people are becoming more likely to be engaged in eWOM activities. For example, 33 million American Internet users reviewed or rated someone or something as part of an online rating system (Lenhart et al. 2004).

Thus, it is worthwhile to develop knowledge about Internet funding for the WOM effect. This knowledge helps marketing managers find an efficient way to promote the market demand for their products. However, as we mention later, little research has been conducted to explain how Internet funding is related to the WOM effect. Although a very large volume of research exists that concerns WOM by consumers, its findings do not seem to fully shed light on netizen investors' WOM and its effects.

This paper considers the Internet funding models in the context of the film industry. Traditionally, producers have financed production costs from a small number of institutional (or large) investors, including major studios. Producers can benefit from Internet funding in several ways when compared with financing from institutional investors. First, because the number of investors is large in Internet funding, investment risks are diversified, which leads to cost-efficient financing (see Chapter 7 of Brealey et al. 2006). Second, unlike large institutional investors, small investors will not have incentives to monitor the film production, which provides the producer with more freedom in film making.[1] Third, Internet funding can also help to increase film revenue through WOM by netizen investors as discussed above.

Among these benefits, this paper concerns the effect of WOM on Internet funding.[2] We investigate how the Internet funding size is determined when a film producer can finance production costs not only by the conventional funding from an institutional investor, but also by Internet funding. We assume that information asymmetry exists between the producer and investors regarding film quality and efforts of the producer. However, the institutional investor is assumed to be able to monitor the producer more efficiently than the netizen investors. Under these assumptions, this paper presents the following findings.

When the producer has no bargaining power so that he cannot participate in profit sharing, and when the WOM effect does not increase as the fund size increases, netizen investors are not willing to invest in the film that seeks Internet funding. On the other hand, a film in which investors are willing to invest never seeks Internet funding. As a result, no Internet funding is possible. On the other hand, netizen investors will participate in Internet funding when the WOM effect increases as the fund size increases. In this case, the optimal funding size is determined by balancing the WOM effect of Internet funding with the monitoring effect by the institutional investor. The Internet funding size is lower when a smaller number of netizen investors are needed to create the WOM effect, or when greater monitoring by the institutional investor is needed.

When the producer has bargaining power high enough to share a large proportion of the profit, full financing through Internet funding is possible. In this situation, monitoring the producer is not needed as long as information asymmetry is resolved with respect to the film quality. The information asymmetry can be resolved, for example, by a third party's endorsement of the film quality, the producer's reputation, or the system to insure a certain level of return on netizen investment.

This study sheds light on how to formulate the strategy to benefit from WOM. For example, once an innovative product is launched, early adopters engage in WOM activities to persuade laggards to purchase the product. In this diffusion process, it is difficult to obtain a sufficient number of early adopters to maximize the WOM effect. It is sometimes very expensive to find those who could be early adopters and effectively promote them to engage in WOM activities. If applicable, however, inducing target buyers to invest in the business may be an efficient way to obtain early adopters. In this respect, the present study helps to determine how to obtain early adopters to promote market demand.

This study also points to a more general fact, that financial activities can be instrumental in achieving marketing objectives. An example of our results is the well-documented initial public offering (IPO) underpricing phenomenon. One possible reason for this underpricing is to achieve a marketing objective. Underpricing attracts more investors in the IPO, which leads to a higher concern for the firm and its products (Ritter and Welch 2002). Firms have the incentive to underprice their IPO stocks if the marketing effect is greater than the losses due to underpricing. In another case, a firm may make important suppliers become its shareholders. As shareholders, the suppliers will align their interests with those of the firm, making it unlikely that they will supply their products to competitors of the firm (see the example of Autodaq.com in Zingales 2000).

The remainder of this paper is organized as follows. Section 2 provides a literature review. Then, a simple model of Internet funding is developed for

[1] This is a result of a free-riding problem (Grossman and Hart 1980). This lack of monitoring, however, will eventually impose costs to the producer, because rational investors will take it into account in investment decision making. This aspect will be intensively investigated in this paper.

[2] Although other advantages may contribute to the popularity of Internet funding, the marketing effect has not received attention in marketing or finance literature. This paper should be understood as a work to emphasize the WOM effect, not to deny other advantages.

the situation in which the producer has no bargaining power (§3). The model is extended to the case in which the institutional investor has priority in revenue-sharing arrangements (§4). Then, we investigate how the reputation and bargaining power of the producer can increase the Internet funding size (§5). Section 6 discusses the results of the analyses. Section 7 concludes the paper.

2. Literature Review

An extensive literature review indicates that researchers in both marketing and finance have paid little attention to the aforementioned issues. Thus, this study contributes to both literatures because it deals with the case that financing itself is directly used as a marketing strategy. The following is to summarize major research streams concerned with both marketing and finance.

In marketing, a significant volume of research has been conducted to investigate firm/shareholder values or performance measures as related to marketing activities in diverse situation (e.g., Anderson et al. 2004, Bolton 2004, Fornell et al. 2006, Gruca and Rego 2005, Joseph and Richardson 2002, Narayanan et al. 2004, Srivastava et al. 1998). However, other issues related to both marketing and finance have received little attention in the marketing literature. In finance, the relationships between financial and other functional activities have been investigated since Modigliani and Miller (1958) (e.g., Jensen and Meckling 1976, Myers and Majluf 1984, and Brander and Lewis 1986, among others). However, the main focus has been that financial contracts lead to incentive distortions or opportunistic behavior by decision makers, which, in turn, affects the firm's functional activities. Few studies on finance focus on the fact that financing plays a role in marketing. Thus, this study contributes to the literature in both marketing and finance because it deals with the case in which financing itself is *directly* used as a marketing strategy.

Another related strand of literature is concerned with the WOM effect in the film industry.[3] The WOM effect is believed to have a significant effect in the film industry, because a film is a cultural and experience product, and the major portion of revenue is earned during the first few weeks of its exhibition (Bayus 1985, De Vany and Walls 1999, Faber and O'Guinn 1984, Liu 2006, Neelamegham and Chintagunta 1999). In general, marketing efforts are known to be positively related to the box office performance (Sochay 1994, Prag and Casavant 1994). Moreover, the WOM effect is potentially significant on the Internet, because information spreads rapidly and the interactions among netizens are extensive (Mayzlin 2005). This literature provides a background for the assumption that Internet funding can be used as a WOM tool in the film industry.

3. A Simple Model

We present a model of film production where a producer needs to finance the production costs, C. In §§3 and 4, we assume that the producer has no bargaining power, so that all the profit of a film is distributed to investors. Section 5 will consider the case in which the producer has some bargaining power. The financial success of a film depends on the quality (q) of the film and the efforts (e) made by the producer. Quality is of the scenario, directors, and staffs. We assume that both quality and efforts are not observable by investors, ex ante.

The film may have good quality (type G) or bad quality (type B). The ex ante probability of good quality is denoted by p_0. Given its type, a film may generate high (H) or low (L) revenues. Without the WOM effect that will be considered later, the realized revenue of the film, V, can have one of the four values denoted by V_{GH}, V_{GL}, V_{BH}, or V_{BL}, depending on the level of the film quality and the realized revenue.[4] We assume that $V_{GH} > V_{GL}$, $V_{BH} > V_{BL}$. The effort of the producer affects the probability of high revenue, which is denoted by r. We assume that the higher the effort, the greater the probability of high revenue. We consider two types of investors, an institutional investor and netizen investors. All investors are assumed to be risk neutral.[5]

The film-financing game proceeds as follows. A producer has a film to make (stage 1). He first finances the production costs from the institutional investor (stage 2), then from netizen investors through Internet funding for the remaining portion (stage 3).[6] Once financing is successful, the producer makes the film that generates revenues (stage 4). The revenue is affected by the film quality, the producer's effort,

[3] The WOM effect is an important marketing factor in other industries (for example, see Rust and Chung 2006, Van den Bulte and Joshi 2007). The characteristics of the film, such as its short life cycle and cultural significance, have attracted intensive research in the market literature (see Eliashberg et al. 2006).

[4] The revenue V can be interpreted as the revenue *net of* the producer's effort costs. Thus, the producer is already paid for his effort, thereby making his profit zero without further profit sharing.

[5] This assumption rules out the diversification advantage of Internet funding mentioned in the introduction.

[6] This financing order reflects the actual financing process. This ordering can be endogenously developed because netizens will not invest unless the institutional investor commits to the investment, as will be clear later. Committing to the investment is technically equivalent to investing first.

and the WOM effect. The earned revenue is distributed to the producer, the institutional investor, and netizen investors based on the contracts (stage 5). We assume that the market for Internet funding is competitive, so that netizen investors are passive in that they will participate in investment as long as they earn fair returns. The fair returns are assumed to be zero throughout this paper. On the other hand, the institutional investor is active in that she will determine her investment share a, and costs m for monitoring the quality and the producer's effort. Contracts are determined by the negotiations between the producer and the institutional investor (in stage 2).

The monitoring of quality revises the probability of good quality from p_0 to p or p_L, where $p_L < p_0 < p$. For analytic convenience, we assume that p_0 is too low for the institutional investor to invest in the film, so that the institutional investor considers investment only when the revealed probability is p. However, netizen investors do not directly observe the information.[7]

The monitoring of the producer's effort by the institutional investor can affect the probability of high revenue. For this, we assume that the probability of high revenue of a film is a function of the monitoring cost: $r = r(m)$ is the probability of high revenue under monitoring costs m.[8] This assumption allows us to work directly with monitoring costs instead of dealing with efforts. We assume that $r(0) = 0$, $r'(m) > 0$, and $r''(m) < 0$. Because the monitoring activity occurs during production, the netizen investors cannot directly observe m (thus, $r(m)$) at the time of funding.

Netizen investors may collectively invest in the remaining share of $1 - a$. The share of each netizen investor is very small. Unlike the institutional investor, netizen investors have no incentive to monitor the producer, because their share of the film is too small to benefit from the monitoring, which is a typical free-riding problem (see, e.g., Grossman and Hart 1980).

Even though small netizen investors do not monitor the producer's effort, they may affect the revenue of the film through WOM. To capture this idea, let us represent the WOM effect by $k(a)$.[9] We assume that the WOM effect amplifies the revenue in a multiplicative manner, so that $k(a)V$ is the realized revenue under the presence of the WOM effect $k(a)$. Although the WOM effect may exhibit diverse patterns depending on circumstances, we simplify our analysis by assuming that the WOM effect is nonnegative, and is nondecreasing as the share of netizen investors, $1-a$, increases (or equivalently, nonincreasing as the share of the institutional investor, a, increases). Technically, we assume that $k(a) \geq 1$, where $k'(a) \leq 0$, $k''(a) \leq 0$.[10] Note that $k(a) = 1$ for all a if the WOM effect does not exist.

The realized profit of the film is denoted by $\pi = k(a)V - C$, given a, q, and e. Then, the expected profit from the film is: $E(\pi) = k(a)E(V) - C$, where $E(V) = p[rV_{GH} + (1-r)V_{GL}] + (1-p)[rV_{BH} + (1-r)V_{BL}]$. Note that the probability of high quality is assumed to be p, because the institutional investor is willing to invest only in that case.

As a benchmark, let us first find the second-best outcome, given the relationship between monitoring and the probability of high revenue.[11] By solving the maximization problem of total profit $kE(V) - C - m$ given the monitoring technology $r(m)$, we obtain the second-best solutions: $a^{SB} = 0$, and m^{SB} satisfies $kr'W - 1 = 0$, where $W = p(V_{GH} - V_{GL}) + (1-p)(V_{BH} - V_{BL}) > 0$.

Intuition for this result is clear. The WOM effect is maximized by $a = 0$, and the monitoring level is determined by balancing its benefits and costs. The following analysis shows that this second-best outcome is not obtained in general.

Now, let us first consider the institutional investor's problem. Assuming the participation of netizen

[7] Even though the netizen investors do not directly observe the information, they can infer the information if the institutional investor invests.

[8] A more complete analysis would require an explicit modeling of the relationship between monitoring and efforts. However, because our focus is on the relationship between a WOM effect and monitoring in Internet funding, we simply reflect the standard results of the moral hazard literature into $r(m)$, without explicitly modeling that issue.

[9] Even though we simplify our analysis by expressing the WOM effect as a function of a, the details of the WOM effects can be complicated. For example, the WOM effect may depend on the number of investors and their invested amounts. WOM may also interact with other marketing activities of the producer. Moreover, consumers may disregard the recommendations of netizen investors once they take into account the netizen investors' WOM activities. In this case, the WOM effect will be small or even negative. Although these issues are important, they are beyond the scope of this paper.

[10] The assumption of the global concavity of $k(a)$ is solely for analytic convenience. As we will see later, the assumption leads to the global concavity of $ak(a)$, which is convenient, but not crucial, for our results. What we need is that an optimal interior solution a to the maximization problem of §2.1 exists in the area of concave $ak(a)$, which holds even if $ak(a)$ is not globally concave.

[11] Note that our problem involves two information problems, the producer's effort and the monitoring of the institutional investor. Because we treat the information problem in the producer's effort as given, and focus on the monitoring incentives, a second-best solution is one that maximizes the total profit, given the information problem in the producer's effort.

investors, the institutional investor will solve the following problem:[12]

$$\begin{aligned}\max_{\{o\le a\le 1,\, m\}} U(a, m) &\equiv aE(\pi) - m\\ &= a[kE(V) - C] - m. \qquad (1)\end{aligned}$$

Let us define (a^*, m^*) as the solution to this problem. For an interior solution, we have the following first-order conditions (FOCs):

$$\begin{aligned} U_a &= 0, \qquad [k + ak']E(V) - C = 0;\\ U_m &= 0, \qquad akr'W - 1 = 0. \end{aligned} \qquad (2)$$

We may obtain corner solutions ($a^* = 0$ or 1) if $U_a \le 0$ at $a = 0$, or $U_a \ge 0$ at $a = 1$. We assume that m^* satisfies the second FOC for $a^* > 0$.[13] It is obvious that $m^* = 0$ for $a^* = 0$. It is important to note that a higher proportion of investment by the institutional investor is associated with a higher monitoring level and a higher profit of the film (see [B.1] in Appendix B for a formal proof). This is because the institutional investor will increase her investment and monitoring of the producer's effort when the film becomes more profitable.

Next, turn to the netizen investor's problem. Suppose that the institutional investor determines (a^*, m^*) as discussed above. If (a^*, m^*) is to be obtained in equilibrium, netizen investors should provide the remaining share $1 - a^*$ of the funds. Whereas each individual netizen investor will invest an infinitesimal share, the sum of profits for individual netizen investors is $(1 - a^*)E(\pi)$. Now, an individual netizen investor will invest if $E(\pi) \ge 0$. That is, the netizen investor invests if and only if $k^*E(V^*) - C \ge 0$, where $k^* \equiv k(a^*)$ and $E(V^*) \equiv E(V)$ under a^* and m^*.

On the other hand, the institutional investor will invest if $a^*[k^*E(V^*) - C] - m^* \ge 0$ or, $a^*[k^*E(V^*) - C] \ge m^* \ge 0$. Thus, netizen investors have incentives to invest as long as the institutional investor is willing to invest. The following proposition summarizes the findings regarding the existence of Internet funding.

Proposition 1. (i) *Internet funding exists as long as the institutional investor, ignoring the netizens' decision, is willing to invest partially in the film* (*i.e.*, $0 < a^* < 1$).

(ii) *If the WOM effect of the Internet fund does not increase as the fund size increases, then Internet funding cannot exist*.

(iii) *If the WOM effect of the Internet fund increases only at finite points*, *then Internet funding may exist only at those finite points*.

Proof. See Appendix B.

Proposition 1(i) is clear because netizen investors are willing to invest as long as the institutional investor invests. Proposition 1(ii) reports an interesting finding when the WOM effect is constant ($k'(a) = 0$). Intuitively, when it is constant, or does not increase as the fund size grows, the increase in Internet funding may only lower the profit of the film as the institutional investor's incentives for monitoring decreases. As a result, as long as the film is profitable, the institutional investor will invest fully. Therefore, the opportunity for Internet funding exists only if the film is not profitable. Knowing this, netizen investors refuse to provide funds.

Proposition 1(iii) shows that if the WOM effect increases only at finite points, i.e., $k(a)$ is a step function, then Internet funding may exist only at those finite points.[14] A step function is composed of horizontal lines with jumps. Thus, in each of these horizontal lines, the WOM effect arises only at the ends of the horizontal line. According to Proposition 1(ii), Internet funding is possible only at the end of each horizontal line. Proposition 1(iii) points to the finding of the WOM literature that the WOM effect generally needs a critical mass, or a tipping point (see Buchanan 2002, Rogers 1995). Simply put, when the informed population is less (more) than the tipping point, the WOM effect will disappear (be present). Such a tipping point can be considered as a jump point in a step function. Therefore, Proposition 1(iii) implies that Internet funding may arise only at the tipping point. If the Internet facilitates the word-of-mouth effect, then we may suppose that the tipping point is low in Internet funding (see Mayzlin 2005). Then the Internet funding will be low, even if it exists.

4. Priority of the Institutional Investor in Revenue-Sharing Arrangements

It is often the case that the institutional investor has priority in revenue sharing. Moreover, unlike the institutional investor, netizen investors may not participate in the sharing of full profits generated by the film, which include TV and video rights and the sales from original soundtrack albums. Reflecting this priority, we assume that the institutional investor receives portion t of the revenue, which may differ from a.[15] Now, the utilities of

[12] Note that we formulate the problem such that the utility of the institutional investor is maximized, because we assume that the producer has no bargaining power in this section.

[13] Under the usual assumption that $r'(0)$ is very high and $\lim_{m\to\infty} r'(m) = 0$, we can guarantee that there exists a unique m satisfying the second FOC, for $a > 0$.

[14] When $k(a)$ is a step function, the assumption of differentiability is applied piecewise.

[15] Unlike in the previous section, it is, in principle, possible that the institutional investor may deceive the netizen investors by

the institutional investor and netizen investors become $tkE(V) - aC - m$, and $(1 - t)kE(V) - (1 - a)C$, respectively. We continue to hold the assumption that the producer has no bargaining power so that all the profit of a film is distributed to investors.

Two cases may exist in revenue-sharing arrangements. First, t is a function of a, which is exogenously given. In this case, the revenue-sharing rule is assumed to be determined by the forces outside of the institutional investor's control, such as social norms or competition. The institutional investor will determine a, considering its effect on t. Second, t as well as a may be endogenously determined by the institutional investor. As t increases, ceteris paribus, netizen investors' profit will decrease, whereas the institutional investor's profit increases. The institutional investor should consider this trade-off in determining t, because netizen investors will invest only if their profits are nonnegative.

4.1. Exogenous Revenue-Sharing Arrangements

We assume that t is a function of a, which is exogenously given, and is public information. Let $t = t(a)$, where $t(a) \geq a$, $t(0) = 0$, $t(1) = 1$; $t'(0) \geq 1$, $t'(1) \leq 1$; $t'' \leq 0$. These assumptions are justified by the following observation. The institutional investor has bargaining power over the netizen investors only if she invests a positive amount ($t(0) = 0$). The bargaining power enables her to appropriate netizen investors' pro rata revenue share ($t(a) \geq a$). The marginal appropriation is great (small) where the netizen investors' share is large (small) ($t'(0) \geq 1$, $t'(1) \leq 1$). For simplicity, we assume that $t'(a)$ is decreasing in a ($t''(a) \leq 0$).

Now, let us consider the institutional investor's decision. Ignoring the netizen investors' decision, the institutional investor will solve the following problem:

$$\underset{\{a,\, m\}}{\mathrm{Max}}\, U(a, m) = t(a)kE(V) - aC - m. \tag{3}$$

Let us define (a^{**}, m^{**}) as the solution to this problem. For an interior solution, we have the following FOCs:

$$\begin{aligned} U_a &= 0, \qquad [t'k + tk']E(V) - C = 0;\\ U_m &= 0, \qquad tkr'W - 1 = 0. \end{aligned} \tag{4}$$

Similar to §3, we can show that, for interior solutions, the institutional investor will increase the investment in and monitoring of the film in the relevant range when the film is more profitable (see Appendix B). Thus, a higher share for the institutional investor indicates a higher monitoring level and a higher profit of the film.

On the other hand, the total profit of netizen investors is $(1 - t)kE(V) - (1 - a)C$. Thus, individual netizen investors invest if and only if

$$\begin{gathered} (1-t)kE(V) - (1-a)C \geq 0 \quad \text{or}\\ (1-t)/(1-a) \geq C/[kE(V)]. \end{gathered} \tag{5}$$

Note that the institutional investor participates in investing if and only if

$$\begin{gathered} tkE(V) - aC \geq m \quad \text{or}\\ t/a \geq C/[kE(V)] + m/[akE(V)]. \end{gathered} \tag{6}$$

Comparison between (5) and (6) shows that if the difference between $t(a)$ and a is large, the interest of institutional investors and netizen investors is more likely to be incongruent, so that (5) may not hold, even if (6) holds. In this case, netizen investors do not want to invest even if the institutional investor is willing to invest. Although the interest congruency also depends on variables such as C, k, and $E(V)$, the following observations can be noted.

Lemma 1. (i) *Netizen investors do not necessarily want to invest even if the institutional investor is willing to invest.*

(ii) *Netizen investors will not invest if the institutional investor does not invest.*

(iii) *Netizen investors are willing to invest if the investment share of the institutional investor is sufficiently high.*

Proof. See Appendix B.

If (5) does not hold for $0 < a^{**} < 1$, then the institutional investor's decision cannot be fulfilled in equilibrium. In this case, the institutional investor should change her decision. Because (a^{**}, m^{**}) does not necessarily hold in equilibrium, let us denote (a^p, m^p) for the equilibrium share and monitoring. Then, we have the following results.

Proposition 2. *When the institutional investor has an exogenous privilege in the revenue sharing ($t = t(a)$), the following statements hold in equilibrium.*

(i) *The institutional investor's share a^p is a^{**} (the solution to Problem* (3)) *if a^{**} satisfies both* (5) *and* (6).

(ii) *The institutional investor's share a^p is less than one and different from a^{**}, if a^{**} satisfies* (6) *but not* (5). *No Internet funding exists when $a^p = 0$.*

(iii) *The institutional investor's share a^p is zero, if a^{**} does not satisfy* (6). *In this case, no Internet funding exists.*

Proof. See Appendix B.

Lemma 1 and Proposition 2 show that netizen investors' investment decisions critically depend on the institutional investor's. Netizen investors are willing to invest when the institutional investor takes a

investing in a film with a low expected profit, because the profit share is different from the cost share. However, we rule out this possibility by assuming that the institutional investor does not cheat, simplifying the analysis.

high proportion of investment, because it indicates that the film is profitable and the appropriation by the institutional investor is not great. As described in the previous section, netizen investors will not invest if the institutional investor does not invest at all. The producer cannot finance the film cost fully from Internet funding. Note that the Internet funding is possible even if the WOM effect of the Internet fund is constant. This is because the revenue-sharing portion t varies exogenously depending on the investment share a. Even if a film is profitable, full investment does not necessarily maximize the institutional investor's utility if the revenue share does not increase sufficiently enough to offset the increase in investment costs. As a result, the institutional investor may not invest fully in a profitable film, even if the WOM effect is constant.

4.2. Endogenous Revenue-Sharing Arrangements

We consider the case in which the institutional investor determines t, independently of a. This case is more applicable than the case of exogenous revenue-sharing arrangements where netizen investors have no bargaining power at all, because the revenue-sharing rule is determined by the bargaining power. Now, we may state the problem of the institutional investor as follows:

$$\begin{aligned} \max_{\{a,\,m,\,t\}} \quad & tkE(V) - aC - m \\ \text{s.t.} \quad & (1-t)kE(V) - (1-a)C = 0 \\ & tkr'W - 1 = 0. \end{aligned} \tag{7}$$

The first constraint implies that the profit of netizen investors is zero. Note that netizen investors will invest if and only if the profit is nonnegative; $(1-t)kE(V) - (1-a)C \geq 0$. This profit, however, cannot be strictly positive in equilibrium, because the institutional investor can increase her profit by increasing t. Therefore, in equilibrium, we have $(1-t)kE(V) - (1-a)C = 0$, which still attracts netizen investors. The second constraint is the FOC where the institutional investor selects m, given t and a, to maximize her own profit. This constraint takes into account the opportunistic behavior in monitoring.[16] Let us denote the solution for the problem by (a^{ep}, m^{ep}, t^{ep}). By plugging the first constraint into the objective function, the problem can be simplified as follows:

$$\begin{aligned} \max_{\{a,\,m,\,t\}} \quad & kE(V) - C - m \\ \text{s.t.} \quad & tkr'W - 1 = 0. \end{aligned} \tag{8}$$

The Lagrangian is derived as follows, where μ is the Lagrange multiplier to the constraint:

$$\begin{aligned} L = {} & kE(V) - C - m \\ & + \mu[\{kE(V) - (1-a)C\}r'W/E(V) - 1]. \end{aligned} \tag{9}$$

An interior solution should satisfy the following FOCs:

$$\begin{aligned} L_a &= k'E(V) + \mu(k'E(V) + C)r'W/E(V) = 0, \\ L_m &= kr'W - 1 + \mu[kE(V)^2 r''W + (1-a)CW \\ & \quad \cdot (r'^2 W - r''E(V))]/E(V)^2 = 0. \end{aligned} \tag{10}$$

The profit of the institutional investor becomes $tkE(V) - aC - m = kE(V) - C - [(1-t)kE(V) - (1-a)C] - m = kE(V) - C - m$. Even if her profit is $kE(V) - C - m$ in equilibrium, the result is not a second-best one, because she will opportunistically select m after t and a are determined (as implied by the constraint). The following results are obtained from the FOCs.

Proposition 3. *When the institutional investor has an endogenous privilege in revenue sharing, the following statements hold in equilibrium.*

(i) *Internet funding exists if the institutional investor invests (less than fully) in the film* $(0 < a^{ep} < 1)$.

(ii) *If the WOM effect of the Internet fund does not increase as the fund size increases, then Internet funding does not exist.*

(iii) *If the WOM effect of the Internet fund increases only at finite points, then Internet funding may exist only at those finite points.*

Proof. See Appendix B.

Because the solution to problem (8) always satisfies the nonnegative profit condition for netizen investors, Internet funding exists as long as $0 < a^{ep} < 1$. In addition, Internet funding may also exist for $a^{ep} = 0$ if the participation of the institutional investor as a monitor is public information at the time of funding.[17] This is because the institutional investor may have the incentive to monitor $(m^{ep} > 0)$ even though $a^{ep} = 0$, because she can still participate in profit sharing.[18]

[16] If the institutional investor can commit to her monitoring strategy, then this second constraint is not needed. In general, however, monitoring after funding provides her with the incentives to opportunistically select a monitoring level.

[17] The caveat that the participation of the institutional investor as a monitor is public information at the time of Internet funding is crucial. Note that the institutional investor will not monitor the producer if the revised probability of high quality is p_L. Therefore, $a = 0$ does not necessarily imply that $m > 0$. Because netizens cannot observe the revised probability, there is a possibility that the producer has incentives to deceive netizens if netizens believe that there will be monitoring. In this case, rational netizens may not invest when $a = 0$. This concern leads to the consideration of the reputation of the producer and the monitor in the next section.

[18] This case may look awkward because it implies the institutional investor still has full bargaining power without investing at all. In principle, however, it is possible because monitoring itself provides great values. We will discuss this issue in the next section.

Interestingly, the Internet funding is still not possible if $k(a)$ is a constant (Proposition 3(ii)). The intuition is as follows. Note first that the profit for the institutional investor is $kE(V) - C - m$, which is equal to the total profit. Given m, this profit is not affected by a because $k(a)$ is constant. Because full profit sharing provides the institutional investor with the full incentive to monitor the producer, it is optimal to set $a = 1$, as long as the film is profitable. However, in this case, Internet funding does not exist. Proposition 3(iii) is a general case of Proposition 3(ii), implying that Internet funding may arise only at the tipping point. Because this case is the same as Proposition 1(iii), please refer to the discussion following Proposition 1 for its intuitions and implications.

5. Third-Party Monitoring, Reputation, and the Bargaining Power of the Producer

So far, we have assumed that the institutional investor has full bargaining power and all profits are distributed to investors. The producer plays a passive role in profit sharing. Capturing the fact that the producer generally recoups his payoff before distributing profit,[19] this assumption allows us to focus on the interest incongruence between the institutional investor and netizen investors. This case is plausible, for example, when the producer is an entrant or has not produced a successful film. However, the producer can have bargaining power if he is recognized as a profitable film maker. In addition, the aforementioned case of endogenous revenue-sharing arrangements allows the institutional investor to have full bargaining power even if her investment share is zero or very small. Being theoretically possible, it is unrealistic to assume that an investor with a zero share has full bargaining power.

In general, the producer and the institutional investor are likely to share profit based on their relative bargaining power, whereas netizen investors make zero expected profits. For this, let us consider the case of endogenous revenue-sharing arrangements, and suppose that the institutional investor and the producer share the profit net of the share of netizen investors.

Let us denote $s = (s_1, s_2)$, where $0 \le s_1, s_2 \le 1$, for the linear sharing rule between the producer and the institutional investor, which is determined based on their relative bargaining power.[20] By this sharing rule, $s_1(tkEV - aC) - s_2 m$ is the share for the institutional investor, the remaining $(1 - s_1)(tkEV - aC) - (1 - s_2)m$ is the share for the producer.[21] We assume that (s_1, s_2) is public information at the time of Internet funding. It is reasonable to suppose that s_1 and s_2 have the same sign; $s_2 > 0$ if and only if $s_1 > 0$.[22]

Now we need to consider the incentive effect of the sharing rules on the producer's effort. Recall that the probability of the high revenue was a function of monitoring costs only, $r(m)$, in previous sections. However, this probability is affected by the sharing rules. Because the marginal effect of the producer's effort on the profit share of the producer is through $(1 - s_1)(tkEV - aC)$, we may presume that s_2 does not directly affect the producer's effort.[23] Thus, the probability of the high revenue can be denoted by $r(m, s_1)$. With this notation, note that $r(m) = r(m, 1)$. We assume that $r_m = \partial r(m, s_1)/\partial m \ge 0$, $r_{s1} = \partial r(m, s_1)/\partial s_1 \le 0$. In words, the probability of the high revenue increases as the institutional investor monitors more and the profit share of the producer $(1 - s_1)$ becomes higher.

We assume that the maximum of $r(m, s_1)$ is obtained at $s_1 = 0$, regardless of m. In this assumption, $s_1 = 0$ implies that the producer takes all increases in the profit that follows the increases in the producer's effort. Therefore, the producer maximizes the probability of high revenue when $s_1 = 0$, even without the monitoring of his effort.

Given that $s_1, s_2 > 0$, a second-best solution $(a^{SB'}, m^{SB'})$ is obtained as follows: $a^{SB'} = 0$; and $m^{SB'}$ solves $kr_m W - 1 = 0$.[24] Now the producer (not the institutional investor) finds a solution (a^s, m^s, t^s) to the following problem:

$$\begin{aligned} \max_{\{a,m,t\}} \quad & (1 - s_1)[tkE(V) - aC] - (1 - s_2)m \\ \text{s.t.} \quad & (1 - t)kE(V) - (1 - a)C = 0 \\ & s_1 tkr_m W - s_2 = 0, \end{aligned} \tag{11}$$

[19] In this interpretation, we can consider V as the revenue net of the producer's costs.

[20] We avoid the explicit modeling of determination of the sharing rule. In principle, the precise sharing rule will be also endogenously determined by each party's bargaining power and states of nature, among others, which is beyond our concern. We simply presume that the relative bargaining power exogenously determines the sharing rules.

[21] Even though contract theory says that the optimal contract should be more complicated than this linear rule, the linear sharing rule is commonly used in practice. This discrepancy between theory and practice is well recognized in the contract literature (see Holmström and Milgrom 1987). However, we do not deal with this issue, because it is beyond our concern.

[22] That $s_1 > 0$ and $s_2 = 0$ implies that the institutional investor participates in profit sharing with all monitoring costs imposed on the producer. That $s_1 = 0$ and $s_2 > 0$ implies that the institutional investor incurs monitoring costs without participating in profit sharing. Neither case is reasonable or interesting.

[23] However, s_2 can indirectly affect the effort of the producer because it affects the monitoring level.

[24] The solution $(a^{SB'}, m^{SB'})$ is none other than the second-best solution (a^{SB}, m^{SB}) of §2, except that r' is replaced by r_m.

where the constraints represent the participation of netizen investors and the optimal monitoring selection of the institutional investor.[25] From the constraints, we have $t = [kEV - (1-a)C]/(kE(V))$ and $s_2 = s_1 t k r_m W$. By plugging the expressions for t and s_2 into the objective function, the problem can be simplified as

$$\begin{aligned}\operatorname*{Max}_{\{a,m\}}&(1-s_1)[kE(V)-C]\\ &-\{1-s_1 r_m W[kE(V)-(1-a)C]/E(V)\}m. \quad (12)\end{aligned}$$

FOCs to this problem are

$$L_a = (1-s_1)k'E(V) + s_1 r_m W[k'E(V)+C]m/E(V) = 0,$$

$$\begin{aligned}L_m = {}&(1-s_1)kr_m W - (1-s_1 r_m W[kE(V)-(1-a)C]/E(V))\\ &+ s_1 r_m Wm[kr_m WE(V) - r_m W(kE(V)\\ &-(1-a)C)]/E(V)^2 = 0.\end{aligned} \quad (13)$$

From the FOCs, we can find several interesting points. First, the second-best outcome is not obtained: $a^s \neq 0$, and m^s does not satisfy $kr_m W - 1 = 0$, in general. Second, the Internet funding may not exist when $k' = 0$. With $k' = 0$, FOC becomes $L_a = s_1 r_m WCm/E(V) \geq 0$. Thus, $a^s = 1$, implying that there is no funding from netizen investors. Therefore, when the WOM effect of the Internet fund does not increase as the fund size increases, then the opportunity for investment will be given to netizen investors, only if the film is not profitable.

Third, if s_1 is low enough, then we have $L_a \leq 0$ and $a^s = 0$, implying that 100% Internet funding is optimal. When the bargaining power of the producer is sufficiently high, the producer can finance fully through netizen investors. In this case, the institutional investor does not make an investment, but still monitors the producer's effort. Thus, the institutional investor should be interpreted as a third-party monitor. Netizen investors may be willing to fully invest in the film, because the institutional investor monitors the producer's effort. Moreover, as a high share of the profit motivates the producer to make a greater effort, the need to monitor the producer's effort decreases. If, in addition, $ts_1 = s_2$, then the second constraint becomes $kr_m W - 1 = 0$, satisfying the second-best condition. With such (s_1, s_2), the equilibrium outcome coincides with the second-best outcome. In general, however, the equilibrium outcome will be different from the second-best outcome.

[25] Note that, for equilibrium, the solution should further pass the nonnegative profit conditions for both the producer and the institutional investor, which holds when the probability of high quality is p.

Proposition 4. *Suppose the profit-sharing rule (s_1, s_2) is linear as described above and is public information at the time of funding, where $s_1, s_2 > 0$.*

(1) *If the WOM effect of the Internet fund does not increase as the fund size increases, then Internet funding cannot exist.*

(2) *If the producer has high bargaining power (small s_1), then full Internet funding is possible. In this case, the institutional investor may play the role of a third-party monitor.*

Proof. See the text above. □

An extreme but interesting case can be found if the producer has full bargaining power, or $s_1 = s_2 = 0$. In this case, the second constraint is not needed. The producer solves the following problem:

$$\begin{aligned}&\operatorname*{Max}_{\{a,m,t\}} \; tkEV - aC - m\\ &\quad \text{s.t.} \;\; (1-t)kE(V) - (1-a)C = 0.\end{aligned} \quad (14)$$

Equivalently,

$$\operatorname*{Max}_{\{a,m\}} kEV - C - m. \quad (15)$$

The solutions are $a^s = 0$, $m^s = 0$ because $L_m = kr_m W - 1 = -1 < 0$, for $r_m(m, 0) = 0$. The producer can raise 100% of the required funds from netizen investors. In addition, the profit of the film is also maximized across the sharing rules: The revenue is maximized because $r(m, s_1)$ is maximized with $s_1 = 0$. The monitoring cost is minimized because full profit sharing provides the producer with the full incentive to maximize the probability of the high revenue, regardless of the monitoring of the efforts.

However, there is a critical caveat to this conclusion. Recall that the above analysis implicitly assumes that the probability of high quality is high (p). This assumption is satisfied when the institutional investor is involved as a monitor because she monitors the producer's effort only if the film has a high probability of high quality. However, when the producer has full bargaining power, there is no monitoring of quality because the institutional investor is not involved. Therefore, the producer may have the incentive to deceive the investors if they believe that the probability of high quality is p, when the true probability is p_L. This is a typical information asymmetry problem as pointed out by Akerlof (1970).[26]

Let us briefly discuss several solutions for this problem, suggested in the economics literature (Kreps 1990, for example). First, the problem may be resolved by independent and reputable individuals/institutions that monitor the film quality. The results of the monitoring should be available to investors at the time

[26] This type of credibility problem of signals in marketing can also be found, for example, in decisions on placing sale signs (see Anderson and Simester 1998).

of funding. Another solution is for the producer to build up his reputation regarding film quality. Even though reputation is not built in a short period of time, once built up, it will resolve the information asymmetry problem.[27] In addition, there are also contractual solutions. For example, insurance can work as a solution in which the producer guarantees a minimum payoff for investors. If the guarantee level is high enough, the producer will not have the incentives to deceive investors because a large portion of losses will be imposed on him (see Seog 2006 for the signaling role of insurance).[28] In fact, any contractual mechanism that transfers the risk of the film's financial failure to the producer will effectively resolve the information asymmetry problem.

6. Discussion

The findings of this study explain why the Internet funding size is generally low in the Korean film market. (The average funding size is 7.7%, as shown in Table A.1 in the appendix.) Most film producers are small, with very low bargaining power.[29] In general, institutional investors maintain high bargaining power over these producers. Given that the WOM effect has a low tipping point on the Internet, the proportion of Internet funding should be low, as predicted by our models in §§3 and 4.[30] This study also supports the conventional belief that one of the main purposes of Internet funding is marketing rather than financing, as noted in the introduction.

Our analysis may explain why the film, *A Good Lawyer's Wife*, was able to raise a high proportion of Internet funding (over 70% of the production costs; see Table A.1 in Appendix A). First of all, the success of the Internet funding is mainly attributed to the reputation of the producer (see the discussion following Proposition 4 in §5). It is well recognized that the producer has enjoyed a high reputation for film quality and performance in the Korean film market. Another interesting feature of this successful Internet funding was that the producer offered insurance to guarantee the return of 70% of the invested amount. As shown in the discussion following Proposition 4, insurance reduces the information asymmetry problem. In sum, the offer of insurance and the reputation of the producer contributed to the success of Internet funding.[31]

Our results provide insights into the phenomenon that Internet funding plays a more important role in the music industry—-involving pop song albums, concerts, and musicals—than in the film industry. According to the data available to the authors, the average Internet funding size in those areas is over 33%, which is much higher than 7.7% for the film industry. We believe that the difference comes from the fact that, compared with the film industry, the characteristics of the singers, the producer, and the repertories of the musicals are relatively well known, at least to their fans. This reduces the information asymmetry problem, leading to the larger Internet funding.

Recall that we mentioned in §1 several potential benefits from Internet funding. However, the low proportion of Internet funding implies that the cost efficiency following risk diversification is not a main reason for Internet funding, because risk is hardly well diversified with such a small funding size. It also implies that the freedom of film making is not an important reason for Internet funding, because the producer can hardly enjoy much freedom with such a high proportion of investment from institutional investors. Although we do not deny that risk diversification and the freedom of film making may help explain why the producer prefers Internet funding, our analysis indicates that the WOM effect seems to be an important rationale for the current patterns of Internet funding.

Because establishing a good reputation is difficult, a reliable monitoring system seems to be crucial for full Internet funding. New producers especially may find it very difficult to finance their films from existing institutional investors, possibly because of a limited capital pool. Internet funding, if possible, is a way to enlarge the capital pool. Although new producers may be the ones that need Internet funding most, the very lack of information about them also prevents netizen investors from investing in their films. Once an independent and reliable monitoring system

[27] In our notation, when p_0 is high enough for a producer, then there is no need to monitor the quality of his film.

[28] An interesting case can be found if the producer has wealth too limited to fulfill the guarantee promise. In this case, insurance firms can play important roles in resolving this problem. Insurance firms will guarantee this promise with the exchange of proper insurance premiums. Insurance firms will also work as monitors, because losses are now imposed on them.

[29] According to the Korean Film Council (http://www.kofic.or.kr), more than 1,500 producers are enrolled, although fewer than 100 films are produced a year. Fewer than 10 producers make more than one film a year. In addition, active producers closely interact with distributors who are also main institutional investors.

[30] There is another force to lower the tipping point in the Korean film case. As an initial stage of Internet funding, its success gained a lot of media attention (see Appendix A). By reducing the funding size, the film may enjoy a quick success in funding, which increases the possibility of media attention.

[31] Note that the same producer also recently succeeded in fully financing another film, *Hello Brother*, by Internet funding in 2004, for the first time in history (not included in Table A.1 in the appendix). Internet funding for this film offers insurance that guarantees 80% of invested amount.

is established, we expect that Internet funding will become an effective financing tool, as well as a marketing one.[32]

7. Conclusion

This paper investigates the issues concerning a film producer that finances production costs not only by the conventional funding from an institutional investor, but also by Internet funding. We find that netizen investors contribute to achieving the marketing objective of a firm by creating the WOM effect, which broadens the scope of the WOM research in marketing. In the existing literature, those who engage in WOM activities are consumers. Netizen investors are a new type of people who engage in WOM activities in that they are not only consumers, but also investors. Thus, the WOM activities of netizen investors would be different from those of consumers. For example, netizen investors would more actively promote the product than those who merely consume the product. Therefore, the understanding of the WOM activities of netizen investors will help develop the marketing strategies of a firm. These strategies would save the marketing cost, while boosting sales more quickly. As Internet funding spreads globally, the importance of these strategies becomes more apparent.

Our analysis is limited in several aspects. First, the risk attitude of investors is ignored for analytic convenience. Although we believe that consideration of the risk attitude will not substantially change our main arguments, it may provide additional explanations for some aspects in film financing. For example, institutional investors may want netizen investors to invest to reduce their risk exposure, even if there is no WOM effect. Second, we assume that the WOM effect is (weakly) positively related with the size of Internet funding. In reality, the WOM effect is a complex function of diverse factors. There is a possibility that the WOM effect is negative if, for example, aggressive WOM creates antipathy.[33] When the WOM effect is negative, it is obvious that no Internet funding exists for profitable films. However, more complicated cases can be found if we allow more realistic assumptions. For example, the WOM effect may depend on the number of investors and their invested amounts. WOM may also interact with other marketing activities of the producer. Moreover, consumers may disregard the recommendations of netizen investors once they take into account the netizen investors' WOM activities. Comprehensive considerations of consumers' reactions and the characteristics of netizen investors may be interesting topics for future research.

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Appendix A. Brief Description of the Internet Funding in the Korean Film Industry

The recent success (or, the "renaissance") of Korean films has received much attention from the media. The market share of Korean films in Korea was 50.1% (2001), 48.3% (2002), 53.5% (2003), 59.3% (2004), and 59.0% (2005) (Korean Film Council 2005).[34] These numbers are compared with around 20% of market share in 1990.

The success of Korean films is attributed to several causes (Samjong KPMG Group 2002). First, the Korean government has played an important role in improving film production and distribution circumstances. Second, a large amount of capital has flowed into the film industry. Third, the introduction and growth of multiplex theatres such as "CGV" and "Megabox" has increased the number of screens. Fourth, it is often mentioned that Internet funds have contributed to the success of Korean films. With the development of the Internet, we have been able to observe a new form of funding in the film industry (called "Internet funding"), funding through the Internet. The first Internet fund was established by Intz.com for a wrestling comedy film called *The Foul King* in 1999. Internet funding was considered a good investment opportunity after the success of *The Foul King*. Internet funding has been popular since 1999. About 8.5 billion won (approximately $8.5 million) was invested in about 50 films through Internet funds as of 2003.

Internet funds are said to have contributed to the success of Korean films in the following ways. One way has been through the media attention given to Internet funds. Because the rate of return on Internet funds for successful films was over 100% for a short investment period (for example, *Joint Security Area* in 2000, *My Sassy Girl* in 2001, and *Friend* in 2001), the success of netizen investments as well as the success of Korean films garnered media attention.

Second, there is a direct marketing effect from the Internet funds. Netizens who are frequent users of the Internet discuss and share their concerns and emotions with each other. In this way, netizens advertise the films that they like. As a result, a rapid word-of-mouth effect seems to exist among netizens (Mayzlin 2005). Another marketing effect is through the media attention given to the quick closing of the funding process. In many cases, funding is on a first-come-first-served basis. As a result, the process is closed as soon as the fund supply meets the fund demand. In some

[32] For example, the monitoring system may resemble the evaluation system for listing of new firms on the NYSE or the NASDAQ.

[33] We thank the referees for pointing out the possibility of negative effects and the credibility issues of WOM.

[34] These numbers are calculated based on the numbers of viewers in Seoul.

Table A.1 Selected Internet Funding: Year of Release, 2000–2003

Title	Year of release	Funding agent company	Production costs	Netizen funding	Internet funding ratio (%)	Net rate of return
The Foul King	2000	Intz Fund	120,000	10,000	8.33	1.75
Die Bad	2000	Intz Fund	13,000	560	4.31	0.3
Joint Security Area	2000	Intz Fund	300,000	10,000	3.33	3.66
The Legend of Gingko	2000	Intz Fund	450,000	10,000	2.22	−0.11
Tears	2000	Enterfund	35,000	4,000	11.43	−0.85
Libera Me	2000	Enterfund	450,000	10,400	2.31	−0.24
Jakarta	2000	Enterfund	170,000	10, 000	5.88	−0.11
Dream of Warrior	2000	Hans Global	270,000	33,000	12.22	−0.96
My Sassy Girl	2001	Goosdaq	220,000	10,000	4.55	2.58
Indian Summer	2001	Goosdaq	300,000	10,000	3.33	−0.09
My Wife Is a Gangster	2001	Unitel	270,000	20,000	7.41	3.95
My Boss, My Hero	2001	Enterfund	300,000	70,000	23.33	1.93
Guns & Talks	2001	Enterfund	300,000	15,000	5.00	0.82
Failan	2001	Enterfund	270,000	25,000	9.26	−0.42
Friend	2001	Enterfund	350,000	10,000	2.86	3.36
Kick the Moon	2001	Daum	320,000	15,000	4.69	1.03
Sorum	2001	Daum	210,000	25,000	11.90	−0.74
One Fine Spring Day	2001	Daum	320,000	15,000	4.69	0.08
My Beautiful Girl, Mari	2001	Enterfund	400,000	10,612	2.65	−0.88
2009-Lost Memories	2001	Enterfund	900,000	10,000	1.11	−0.14
Resurrection of the Little Match Girl	2002	Enterfund	1,100,000	10,000	0.91	−0.96
Over the Rainbow	2002	Enterfund	350,000	11,045	3.16	−0.31
Oasis	2002	Enterfund	320,000	15,859	4.96	1.04
Conduct Zero	2002	Enterfund	430,000	9,033	2.10	0.67
Sex Is Zero	2002	Enterfund	400,000	13,000	3.25	2.27
A Good Lawyer's Wife	2003	Myung Films	285,000	200,000	70.18	0.89
A Tale of Two Sisters	2003	Enterfund	410,000	25,000	6.10	0.63
Reversal of Fortune	2003	Enterfund	398,000	13,362	3.36	−0.47
Wonderful Days	2003	Enterfund	1,000,000	30,000	3.00	−0.33
Lost in the South Mission: Going Home	2003	Enterfund	450,000	30,000	6.67	−0.53
Old Boy	2003	Enterfund	460,000	20,000	4.35	2.05
Average					7.7	

Sources. Various Internet funding agent companies.
Notes. Unit: 10,000 won for the production cost and Internet fund (W1,000 = $1, roughly). Some films are not listed because of insufficient data. We list only the Internet funding for production of Korean films. There are also cases of Internet funds for marketing and distribution of films and for musicals and music albums.

cases, the funding process is closed in less than one minute (for example, it took only 10 seconds or fewer for *Guns & Talks* in 2001 and *Kick the Moon* in 2001). The quick closing received much attention from the media because it reflected the popularity of Korean films.

Another interesting fact on Internet funding is that the funding size is small relative to the total production costs (see Table A.1). On average, the Internet fund proportion is less than 10% of total production costs. One exception is *A Good Lawyer's Wife* (2003). The Internet fund proportion of this film is greater than 70% (Korea Film 2003).[35] The same producer also succeeded in raising 100% of Internet funding for a film, *Hello Brother*, in 2004 (not shown in Table A.1). Following Korea, Japan also launched its first Internet funding for a film, *Shinobi*, in 2004 (Film 2.0 2005).

[35] There is also another exception for the Internet funding of *A Good Lawyer's Wife*. Funding was made after the film was produced. This is compared with other films for which Internet funding was made before film production.

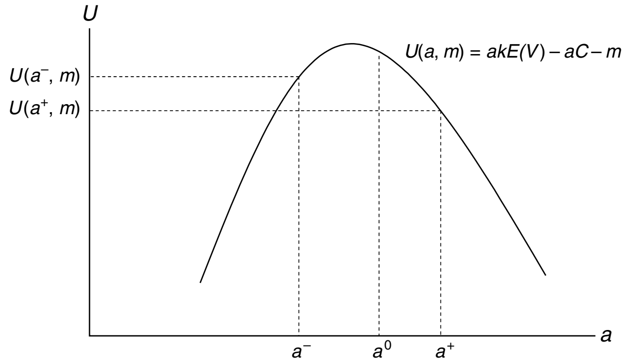
Appendix B. Technical Presentation for Results of the Text

[B.1] Proof that a higher share by the institutional investor is associated with a higher monitoring level and a higher profit of the film in §3:

Let us denote $m(a)$ for m that satisfies the second FOC of (2), given a, in the institutional investor's problem. Let $F(a) \equiv k + ak'$. Note that $F(0) = k(0) \geq 1$, $F(1) = k(1) + k'(1)$, and $F'(a) = 2k'(a) + ak''(a) \leq 0$. $F(a)$ is decreasing in a. Therefore, to satisfy the first FOC of (2), the optimal a should be higher for higher $E(V)$. For the second FOC of (2), note that $r'(m)$ decreases in m. For a high value of ak, r' should be low, implying that m should be high for the second FOC to hold. Because $d(ak)/da = F(a)$, we know that the sign of $d(ak)/da$ is positive for low a, but is not clear for high a. However, the following lemma shows that we can restrict our attention to the area of positive $d(ak)/da$.

Lemma B1. *Define a^0 by $d(ak)/da\,|_{a=a^0} = 0$. For any m and $a^+ \geq a^0$, there exists $a^- < a^0$ s.t. $U(a^-, m) > U(a^+, m)$.*

Figure B.1 **Nonoptimality of $a > a^0$**



Note. $U(a, m)$ is evaluated given m.

Proof. Because ak is increasing for $a < a^0$ and decreasing for $a > a^0$, there is $a^- < a^0$ s.t. $a^- k(a^-) \geq a^+ k(a^+)$ for $a^+ > a^0$. Thus, $U(a^-, m) = a^-[k(a^-)E(V) - C] - m > a^+[k(a^+)E(V) - C] - m = U(a^+, m)$. Last, at $a = a^0$, a marginal decrease of a will not change ak, while decreasing investment costs by C, which increases utility. □

Lemma B1 is depicted in Figure B.1. Lemma B1 allows us to focus on the area where ak is increasing in a. In this area, an increase of a will increase m, which is an intuitive result. Note that a^0 can be smaller or larger than one. Now we can show that (a^*, m^*) become higher for films with higher profits.

Lemma B2 (Comparative Statics). *Let us define s, a positive constant, as a scale parameter.*

(i) *Consider the scaled V, sV. Then, a^* and m^* are higher for higher s, ceteris paribus.*

(ii) *Consider the scaled C, sC. Then, a^* and m^* are higher for lower s, ceteris paribus.*

(iii) *Suppose $V_{GH} - V_{GL} > V_{BH} - V_{BL}$. Consider the scaled p, sp. Then, a^* and m^* are higher for higher s, ceteris paribus.*

(iv) *Consider the scaled monitoring efficiency, r', sr'. Then, a^* and m^* are higher for higher s, ceteris paribus.*

Proof. (i) FOCs with s become

$$U_a = 0, \qquad [k + ak']sE(V) - C = 0;$$
$$U_m = 0, \qquad akr'sW - 1 = 0.$$

For a higher s, sEV is higher. Thus, FOCs imply $k + ak'$ and akr' should be lower, which are followed by higher a and m.

(ii) FOCs with s become

$$U_a = 0, \qquad [k + ak']E(V) - sC = 0;$$
$$U_m = 0, \qquad akr'W - 1 = 0.$$

For lower s, $(k + ak')E(V)$ should be lower and akr' should be the same, which are followed by higher a and m.

(iii) Higher p implies higher $E(V)$ and W. From FOCs, $k + ak'$ and r' should decrease, which results from higher a^* and m^*.

(iv) From FOCs, higher r' requires higher m given a, which results in higher $E(V)$. Higher $E(V)$, in turn, requires lower $k + ak'$, or higher a. Note that higher a will require even higher m.[36] □

[B.2] Proof of Proposition 1.

(i) See the text.

(ii) When $k(a)$ is constant, the FOC for a of (2) becomes $kE(V) - C = 0$. Because this FOC does not depend on a, the decision rule is that $a^* = 0$ if $kE(V) - C < 0$; $a^* = 1$ if $kE(V) - C > 0$, for given m. Therefore, the optimal decision rule is either $(a^* = 1, m^* = m(1))$ if $kE(V) - C - m^* > 0$, or $(a^* = 0, m^* = 0)$, otherwise. Because $a^* = 0$ indicates that $kE(V) - C < 0$, netizen investors will have no incentives to invest in the film. Although $a^* = 1$ indicates that $kE(V) - C > 0$, netizen investors cannot invest because there is no additional fund needed.

(iii) Suppose that $k(a)$ has a jump at a_J. For technical purposes, we assume that a (negative) jump occurs at a_J^+; $k(a_J) > k(a_J^+)$, so that $k(a)$ is a step function with the left continuity. In this case, it is easy to see that the optimal share will be 0, 1, or a_J, because the same logic as (ii) applies for each interval of $[0, a_J]$ and $(a_J, 1]$. When there are multiple jumps, the repeated application of the same logic shows that the optimal share will be one of 0, 1 and jump points. □

[B.3] Proof that a higher share by the institutional investor indicates a higher monitoring level and a higher profit of the film in the exogenous revenue-sharing model in §4: First, note that $d(tk)/da = t'k + tk'$, and $d(t'k + tk')/da = t''k + 2t'k' + tk'' = (-) + (-) + (-) < 0$. Note also that, at $a = 0$, $t'k + tk' = t'(0)k(0) > 0$. On the other hand, at $t = 1$, $t'k + tk' = t'(1)k(1) + k'(1)$ can be positive or negative. Similar to the simple model in §3, we can restrict our attention to the area of positive $d(tk)/da$.

Lemma B3. *Define a^0 by $d(tk)/da\,|_{a=a0} = 0$. For any m and $a^+ \geq a^0$, there exists $a^- < a^0$ s.t. $U(a^-, m) > U(a^+, m)$.*

Proof. Apply the same logic as Lemma B1. □

Thanks to Lemma B3, we will focus on the area in which tk is increasing in a. A higher a induces a higher m. The following corollary shows comparative statics results are similar to Lemma B2.

Lemma B4 (Comparative Statics). *Let us define s, a positive constant, as a scale parameter.*

(i) *Consider the scaled V, sV. Then, a^{**} and m^{**} are higher for higher s, ceteris paribus.*

(ii) *Consider the scaled C, sC. Then, a^{**} and m^{**} are higher for lower s, ceteris paribus.*

(iii) *Suppose $V_{GH} - V_{GL} > V_{BH} - V_{BL}$. Consider the scaled p, sp. Then, a^{**} and m^{**} are higher for higher s, ceteris paribus.*

(iv) *Consider the scaled monitoring efficiency, r', sr'. Then, a^{**} and m^{**} are higher for higher s, ceteris paribus.*

Proof. Apply the same logic as Lemma B2. □

[B.4] Proof of Lemma 1.

(i) Obvious because (6) does not imply (5).

(ii) Obvious, because $a^{**} = 0$ implies $kE(V) - C < 0$.

(iii) For a near 1, $t(a) \approx a$ and $m > 0$. Note that institutional investor invests iff $tkE(V) - aC \geq m$. Because, for

[36] These arguments can be formally proved by the usual total differentiation technique.

a near 1, $tkE(V) - aC - m \approx a[kE(V) - C] - m$, we have $a[kE(V) - C] > 0$. Therefore, $(1-t)kE(V) - (1-a)C \approx (1-a) \cdot [kEV - C] > 0$, so that netizen investors are willing to invest. □

[B.5] Proof of Proposition 2.

(i) Obvious.

(ii) Suppose that a^{**} satisfies (6). First, note that $a^{**} < 1$, because $a^{**} = 1$ would satisfy (5). It is also easy to see that $a^p < 1$, because (6) implies (5) at $a \approx 1$ from Lemma 1(iii), and that the profit is higher at $a = 1 - \varepsilon$ than at $a = 1$, because profit is decreasing where $a > a^{**}$. Now, because a^{**} is the unique optimal solution to problem (3), the institutional investor's profit becomes lower as the distance between a and a^{**} is larger. Thus, the institutional investor will select a, as close to a^{**} as possible, while making the netizen investor's profit nonnegative. Therefore, such a will be obtained when the netizen investor's profit hits zero from negative. Then, the institutional investor's profit becomes $tkE(V) - aC - m = kE(V) - C - [(1-t)kE(V) - (1-a)C] - m = kE(V) - C - m$. If this profit is positive, then a is in equilibrium ($a^p = a$). If not, $a^p = 0$ is in equilibrium. It is obvious that Internet funding is not possible when $a^p = 0$.

(iii) Obvious. □

[B.6] Proof of Proposition 3.

(i) Obvious.

(ii) With $k'(a) = 0$, the first-order condition for the institutional investor becomes $L_a = \mu C r' W / EV > 0$. Thus, $a^{ep} = 1$ is optimal once the institutional investor invests. Because the institutional investor invests in the film as long as it is profitable, $a^{ep} = 0$ indicates a negative profit.

(iii) This result follows from the repeated application of the same logic as (ii) to each constant interval (see also Proposition 1). □

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