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Entry Selection

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Abstract
It is well-known in the IO literature that incumbent firms may want to deter entry by behaving as if they are efficient. In this paper we show that incumbents may sometimes prefer to encourage entry by mimicking the behaviour of a less efficient firm for the following reason.
If the incumbent cannot deter potential efficient entrants, he may want to elicit entry by an inefficient firm who would not enter if he knows that the incumbent is efficient. The presence of the additional firm in the market prevents further entry. The incumbent then faces a less efficient competitor in the long run.

Keywords: Duopoly competition, entry deterrence, signalling weakness

JEL classification: D43, D82, L11

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1 Introduction

It is well-known in the IO literature that incumbent firms may prefer to engage in costly activities to deter entry. Such activities include signals of efficiency, overinvestment in capacity or process innovation (marginal cost reduction) or more central (competitive) location choices. Milgrom and Roberts (1982) and Kreps and Wilson (1982) were the first to show that if the incumbent's cost is not observed by the entrant, an inefficient incumbent may discourage entry by mimicking an efficient one. Suppose that entry is profitable only if the incumbent is inefficient. In that case, a pooling equilibrium is possible in which both the efficient and inefficient incumbent set the same price corresponding to the profit-maximizing price of a low-cost incumbent. The pre-entry price does not carry any information on the post-entry profits of the entrant and thus the entrant takes its entry decision on the basis of its prior beliefs on the probability of entry. This argument has been developed later on to incorporate other signals of strength, such as predatory pricing (LeBlanc, 1992; and Milgrom and Roberts, 1982) and advertising (Bagwell, 2007; and Bagwell and Ramey, 1988).

In this paper we show that in some cases the incumbent may find it profitable to do the opposite, namely to signal high-cost to encourage entry. Thus, instead of signalling strength, the incumbent signals weakness. The rationale is that the entry of one firm may deter the entry of another firm because of the increased level of competition. By encouraging an inefficient firm to enter, the incumbent firm faces higher costs in the short run (consisting of the costs of the inducement and that of earlier competition), but in the long run his profits are higher due to less efficient rivals and thus less fierce competition. In this sense, the incumbent firm does not actually try to promote entry, but rather he attempts to *select entry*.

Choosing one's competitors has already received some attention in the literature, but we have not come across a paper that would use a signalling mechanism for this purpose. Ashiya (2000) studies a model with spatial differentiation where the incumbent offering multiple varieties faces two potential entrants, an efficient and an inefficient one. When an inefficient entrant turns up earlier, the incumbent can invite its entry by restricting the number its varieties. The entry of a weak entrant 'fills up' the product space and makes future entry unprofitable. By inviting a weak competitor rather than introducing more product varieties, the incumbent solves a commitment problem inherent to spatial entry deterrence: after entry, the incumbent would have an incentive to withdraw additional varieties which would undermine the whole entry-deterring strategy. Rockett (1990) shows that a patent holder may want to give a license to a less efficient firm in order to prevent a more efficient firm from becoming its competitor when the patent expires. Creane and Konishi (2009) show that the incumbent can reduce the number of competitors by making some of them more efficient via technology transfer. The incumbent selects a competitor that is efficient enough to induce exit of other competitors, but not efficient enough to reduce the incumbent's profits too much. Ideas related to entry selection have been explored by Hadfield (1991) and Crampes and Hollander (1993). Hadfield (1991) shows that an incumbent may use franchising to pre-empt future entry. It prefers franchisees to independent competitors because it has more influence on their retail price and can capture a part of their profits. Crampes and Hollander (1993) show that an incumbent may apply 'umbrella pricing', i.e. choose an above-monopoly price in order to increase the status-quo profits of a competitor, in order to discourage it from developing a superior technology. For the same reason, a firm might want to license its technology to a competitor (Gallini, 1984).

The paper is structured as follows. In Section 2 we develop a signalling model in which entrants are uncertain about the efficiency of the incumbent. We find conditions under which an efficient incumbent prefers to attempt entry selection by mimicking an inefficient incumbent in Section 3. In Section 4 we carry out some comparative statics and welfare analysis. In Section 5 we summarize our findings and discuss some ideas for further research.

2 The model

In this section we consider an infinitely repeated entry model with imperfect information. Firms maximize the expected net present value of their life-time profits. Each firm k may be one of two types i_k, namely inefficient ($i_k = H$) with high production costs and efficient ($i_k = L$) with low production costs. Initially, at period $t = 1$, there is one firm, Firm 1, acting as a monopolist in the market and choosing its quantity. At the start of each period $t > 1$ a potential market entrant $k \geq 2$ arrives, labelled by its period of arrival. The potential entrant decides whether to enter incurring a sunk cost E, or stay out of the market in which case his profits are normalized to zero. Then, the incumbents and the new entrant, compete by choosing quantities. We assume no fixed costs[1]. We will call the incumbent and any firms which entered the *active firms*.

At the beginning of period 1, each firm knows only its own cost level but not that of other firms. We assume that Firm 1 is efficient with probability ϕ. For a potential entrant this probability is ρ. The prior beliefs of the firms about the cost levels of the other firms correspond to these probabilities. After the market entry stage, the type of each active firm becomes common knowledge to all active firms. Apart from their different cost levels and their periods of arrival, the firms are homogeneous.

The model described above defines a repeated game with imperfect information. Let the history of the game at time t be denoted by h_t, where the history includes for each previous period ($\tau < t$) the entry decision in that period as well as the quantities selected by the then active firms. Let h_t^e be the same as h_t except that it includes the entry decision at time t as well. The strategy of any firm k at any time t consists of

[1]Consequently no firm ever wants to exit the market once it has entered. Thus we can leave exit considerations out of the model.

- his entry decision $D^k(h_t) \in \{\text{Enter, Stay Out}\}$, if $k = t > 1$ for each history h_t of the game, and
- his quantity $q_t^k(i_k, h_t^e) \in \mathbb{R}_+$, for each period $t \geq 1$ and each game history h_t^e.

The profits which active firms earn in a period is determined by their chosen quantities in that period.

We describe a Bayesian Perfect Nash equilibrium of this game. At each point in time, firms maximize the net present value of their expected life-time profits with respect to their strategies taken the strategies of the other firms as given and discounting future profits at the rate δ, $\delta \in (0,1)$. Moreover, the firms update their beliefs about the types of the other firms according to Bayes rule, where in equilibrium beliefs are consistent with the strategies of the firms.

The above model builds on the seminal limit pricing model by Milgrom and Roberts (1982) to allow for an analysis of entry selection. The main differences with the original model are that first, in the current model there are not just one, but many potential entrants; second, firms face an infinite time horizon. The first modification needs no further motivation, because it is crucial to model entry selection. The second modification guarantees that every entrant faces the same time horizon to pay off his entry costs.

The following notation will be used in the analysis. The set of active firms in the market at time t after the entry decision is made is denoted by

$$N_t = \{k \in N : k \text{ is active at time } t, \text{ after firm } t \text{ has made its entry decision}\}.$$

Consider some firm $k \in N_t$, then his competitors can be labeled by $1, ..., |N_t|-1$.[2] Let j_ℓ denote the type of competitor ℓ, $\ell = 1, ..., |N_t| - 1$. Let $q_{ij_1...j_{|N_t|-1}}$ be the equilibrium quantity of a type i firm in a one-stage oligopolistic market game, given its competitors of type $j_1, ..., j_{|N_t|-1}$. The corresponding profits of the firm shall be denoted by $\pi_{ij_1...j_{|N_t|-1}}$. Thus, q_{HL} denotes the quantity of an inefficient firm when its only competitor is efficient, and q_{HLL} the triopoly quantity of an inefficient firm that competes with two efficient firms. Further, let q_{LasH} and π_{LasH} denote stage-game monopoly quantities and profits of an efficient firm who sets a quantity that would be chosen by an inefficient monopolist. We make the following assumptions regarding profits: $\pi_{iL} < \pi_{iH}$, $\pi_{ij_1} > \pi_{ij_1j_2}$, $\pi_{Lj_1..j_n} > \pi_{Hj_1..j_n}$, $\pi_{LL} > \pi_{HH}$, and $\pi_{LasH} < \pi_L$. Finally, the assumption of no fixed costs implies $\pi_{ij_1...j_{|N_t|-1}} \geq 0$. All of these assumptions are quite intuitive and for instance satisfied in a one-stage Cournot oligopoly with homogeneous products or a Bertrand oligopoly with symmetrically differentiated products.

Since we are interested in the possibility of entry selection, we focus solely on pooling equilibria, where an efficient incumbent mimics an inefficient one, thereby introducing a positive probability of inefficient entry which then blocks efficient entry.

[2] By symmetry between firms of the same type, the order is not relevant for our purposes.

3 Pooling equilibrium

The pooling equilibrium we investigate has the following structure. In period $t = 1$, an efficient incumbent mimics an inefficient firm, after which at the beginning of period 2, the first arriving entrant enters the market regardless of its type. The reason is that the probability that the incumbent is inefficient is high enough so that the expected future profits of even an inefficient entrant are higher than entry costs. This is then sufficient to block entry of all subsequently arriving firms. From period 2 onwards, firms set quantities that maximize their profits in a one-stage market game. For such a pooling equilibrium to exist, a number of conditions has to be satisfied. The necessary and sufficient conditions are the market entry constraints of a first inefficient entrant, the non-entry constraint of an efficient second entrant, the incentive-compatibility constraint of an efficient incumbent to mimic an inefficient firm and an incentive compatibility condition for an inefficient incumbent not to mimic an efficient firm. We discuss these conditions in turn. After that we present the proposition showing the existence of the entry selection equilibrium

3.1 Inefficient first entrant

Since entry selection relies on attracting inefficient entry, an inefficient entrant should prefer to enter if he has no additional information on the incumbent's type. That means that the probability that the incumbent is inefficient must be sufficiently high. On the other hand, he should prefer to stay out if he believes that the incumbent is efficient.

We first formalize the first condition. Without additional information on the incumbent's type and without subsequent entry by another entrant, the per period profits of an inefficient Firm 2 are $\phi \pi_{HL} + (1 - \phi) \pi_{HH}$. The present value of these future profits has to outweigh the costs of entry. So, the market entry constraint is

$$\frac{\phi \pi_{HL} + (1 - \phi) \pi_{HH}}{1 - \delta} \geq E. \tag{1}$$

The second condition requires that entering the market with a known efficient incumbent yields the entrant a negative present value, so

$$\frac{\pi_{HL}}{(1 - \delta)} \leq E. \tag{2}$$

Since $\pi_{HH} > \pi_{HL}$ there exist such parameter values that both conditions are satisfied.

3.2 Efficient second entrant

In the considered pooling equilibrium, an efficient entrant enters if and only if he faces a single incumbent. Recall that $\pi_{LH} > \pi_{LL} > \pi_{HH}$. Hence, if an inefficient firm is willing to enter if he observes a single inefficient firm (Condition (1)), an efficient firm would always enter if he observes a single incumbent, regardless of the incumbent's type. On the other hand, an efficient firm should not be willing to enter if there are multiple incumbents. The highest present value of a potential efficient entrant's profits amounts to $\pi_{LHH}/(1-\delta)$. He will not enter if this amount is lower than the entry costs E. Thus, the non-entry constraint of an efficient second potential entrant is

$$\frac{\pi_{LHH}}{1-\delta} \leq E. \tag{3}$$

3.3 The efficient incumbent

An efficient incumbent should prefer to copy the quantity of an inefficient incumbent rather than to maximize short-run monopoly profits. Suppose that an efficient Firm 1 chooses not to reveal his low costs. Then, entry takes place in the second period and the expected total discounted profits are

$$\Pi_I^{mimicking} = \pi_{LasH} + \frac{\delta}{1-\delta}\left(\rho\pi_{LL} + (1-\rho)\,\pi_{LH}\right).$$

Suppose now that Firm 1 acts according to its type, choosing the price of a low-cost monopoly. Then, in each period $t > 1$, efficient entry takes place with probability ρ, in which case the incumbent earns π_{LL} forever. With probability $1-\rho$ no entry takes place, because Condition (2) ensures that an inefficient entrant prefers to stay out if he believes that the incumbent is efficient. Let V^M denote the net present value of being a monopolist at the beginning of a period. Then, the incumbent's total discounted profits at $t = 1$ are:

$$\Pi_I^{revealing} = V^M = \pi_L + \delta\left[\frac{\rho\pi_{LL}}{1-\delta} + (1-\rho)\,V^M\right].$$

This gives:

$$\Pi_I^{revealing} = \frac{\pi_L}{1-\delta\,(1-\rho)} + \frac{\delta\rho\pi_{LL}}{(1-\delta)\,(1-\delta\,(1-\rho))}.$$

Comparing $\Pi_I^{revealing}$ and $\Pi_I^{mimicking}$ and rearranging terms we get the following incentive compatibility constraint of the incumbent:

$$(\pi_L - \pi_{LasH}) + \frac{\delta\,(1-\rho)}{(1-\delta\,(1-\rho))}\,(\pi_L - \pi_{LH}) \leq \frac{\rho\,(1-\rho)\,\delta^2}{(1-\delta)\,(1-\delta\,(1-\rho))}\,(\pi_{LH} - \pi_{LL}). \tag{4}$$

This condition can be interpreted in terms of three effects of mimicking on Firm 1's profits. First, mimicking an inefficient entrant leads to an immediate direct loss in profits equal to $\pi_L - \pi_{LasH}$. Second, it it may lead to entry of an inefficient entrant and loss of monopoly profits equal to $\pi_L - \pi_{LH}$. This negative effect can occur from the second period onwards (hence the δ) and occurs with probability $(1-\rho)$. The effective discount factor of this loss is $\delta\,(1-\rho)$ namely the basic discount factor times remaining a monopolist for another round if he reveals his type.

The benefit of mimicry is that the long-run competitor may be inefficient instead of efficient, which increases profits from π_{LL} to π_{LH}. The effective discount factor of this positive effect can be derived as follows. The benefit of mimicry starts at the earliest in the third period, namely if the first efficient potential entrant arrives then (if Firm 2 is efficient, mimicry yields no benefits). The probability that the benefit starts in a period $t > 2$ is equal to $\rho (1-\rho)^{t-2}$. Its total discounted value is then $\delta^{t-1} (\pi_{LH} - \pi_{LL}) / (1-\delta)$. Hence, the expected discounted value of the third effect can be written as

$$\lim_{T\to\infty} \sum_{t=3}^{T} \rho (1-\rho)^{t-2} \frac{\delta^{t-1} (\pi_{LH} - \pi_{LL})}{1-\delta} = \frac{\rho (1-\rho) \delta^2}{(1-\delta)(1-\delta(1-\rho))} (\pi_{LH} - \pi_{LL}).$$

3.4 Inefficient incumbent

Another necessary condition is that an inefficient Firm 1 should not want to deviate from the quantity that maximizes his current profits in order to mimic an efficient incumbent to discourage entry. Such a deviation is certainly unprofitable if even at zero signalling costs an inefficient Firm 1 would not want to be seen as efficient. This is the case if the expected medium-run profit gain due to delayed entry is lower than the expected long-run loss due to a higher probability of an efficient competitor, or

$$\frac{(1-\rho)\delta^2\rho}{(1-\delta)(1-\delta(1-\rho))} (\pi_{HH} - \pi_{HL}) \geq \frac{\delta(1-\rho)}{(1-\delta(1-\rho))} (\pi_H - \pi_{HH}),$$

which is derived analogously to condition 4. Simplifying and rearranging we get

$$\frac{\pi_H - \pi_{HH}}{\pi_{HH} - \pi_{HL}} \leq \frac{\delta\rho}{(1-\delta)} \tag{5}$$

Now we are ready to state a proposition on the existence of a pooling perfect Bayesian Nash equilibrium.

3.5 Entry selection equilibrium

In this section we first construct an entry selection equilibrium in this game, using the Conditions 1 to 5. Then we show by means of a numerical example that this type of equilibrium exists.

Proposition 1 *Let Conditions 1 to 5 be satisfied. There exists a pooling perfect Bayesian Nash equilibrium, such that:*

- *At* $t = 1$, $q_1^1(i) = q_H$ *for* $i = L, H$
- *At* $t = 2$, *Firm 2 enters regardless of its type. Firm 1 sets* $q_2^1(i_1, h_2^e) = q_{i_1 i_2}$ *and Firm 2 sets* $q_2^2(i_2, h_2^e) = q_{i_2 i_1}$.
- *At* $t \geq 3$, *Firm* $k = t$ *stays out of the market. Firm 1 and Firm 2 set the same quantities as in period* t.

Proof. We show this by constructing such a pooling perfect Bayesian Nash equilibrium. First we specify the equilibrium strategies of the firms. Second we show that these strategies lead to the outcome described in the proposition. Third, we formulate a set of beliefs. Fourth , we show that the strategies are optimal given the strategies of the other agents and their beliefs. Together this implies that the formulated beliefs and strategies form a pooling perfect Bayesian Nash equilibrium.

1. Consider the following profile of strategies

$$\text{(i) Firm 1: } \begin{cases} q_t^1(H, h_t^e) = q_H & \text{if } |N_t| = 1 \\ q_t^1(L, h_t^e) = q_H & \text{if } |N_t| = 1 \text{ and } q_\tau^1 = q_H \quad \forall \tau < t \\ q_t^1(i_1, h_t^e) = q_{i_1, j_1, \ldots, j_{|N_t|-1}} & \text{if } |N_t| \geq 2 \end{cases}$$

$$\text{(ii) Firm } k = t : \begin{cases} \text{Enter if } |N_{t-1}| = 1 \text{ and} \begin{cases} \text{either } i = L, \\ \text{or } i = H \text{ and } q_\tau^1 = q_H \quad \forall \tau < t \end{cases} \\ \text{Stay out otherwise.} \end{cases}$$

$$\text{(iii) Firms } 1 < k \leq t : \begin{cases} q_t^k(i_k, h_t^e) = q_{i_k, j_1, .. j_{k-1}, j_{k+1}, \ldots, j_{|N_t|-1}} & \text{if } k \in N_t \\ q_t^k(i_k, h_t^e) = 0 & \text{otherwise} \end{cases}$$

Bullet (i) describes the quantity choice of the initial incumbent, (ii) the entry decision of the current potential entrant and (iii) the quantity choice of all entrants in the competition stage.

2. Now we show that this strategy profile leads to the outcome as described in the proposition. Since in period 1 $|N_t| = 1$ by assumption, the outcome in this period follows directly from (i) As $q_1^1 = q_H$ and $|N_1| = 1$, (ii) implies that Firm 2 enters in period 2 no matter what its type is. This implies $|N_t| \geq 2$ for $t \geq 3$, which in combination with (ii) means that all firms with $k \geq 3$ stay out of the market. As a result, only Firms 1 and 2 are active in the market, choosing quantities according to (i) and (iii), namely $q_t^1(i_1, h_t^e) = q_{i_1 i_2}$ and $q_t^2(i_1, h_t^e) = q_{i_2 i_1}$ respectively for any $t \geq 2$.

3. A perfect Bayesian equilibrium requires a complete set of beliefs, which are correct in equilibrium and follow, where possible, Bayes' rule off the equilibrium path. In this step we formulate the beliefs. Let the current period be t.

Firms active in the market know each other's type by assumption. So their beliefs of each other's types is correct.

We now formulate the beliefs on non-active firms. Non-active firm τ, $\tau < t$, is efficient with probability ρ if $|N_{\tau-1}| \geq 2$ and with probability 0 if $|N_{\tau-1}| = 1$. This is correct since no information is gained by the entry decision if there are already multiple active firms (since both types stay out), while only an efficient would always enter if there is a single incumbent (recall that the inefficient firm prefers to stay out if he believes that the incumbent is efficient). Any firm which still has to make his entry decision is efficient with probability ρ, as no new information on their type is revealed.

Finally we formulate the beliefs on active firms by firms outside the market. If $|N_{t-1}| = 1$, then the incumbent is believed to be efficient, unless he behaved as an inefficient firm for all $\tau < t$. In the latter case the probability that he is efficient is believed to be ϕ. This is consistent with the formulated strategies. If $|N_{t-1}| > 1$, then active firm τ is believed to be efficient if he acts as an efficient firm immediately after entry, and inefficient otherwise. As all firms act according to their type when multiple firms are active, these beliefs are correct. This completes the set of beliefs.

4. Now we demonstrate the optimality of the strategies. We begin with the entry decision, and then we consider the output decisions. For efficient firm t, $t \geq 2$, by Conditions (1) and (3) it is optimal to enter if and only if $|N_{t-1}| = 1$, which is his strategy. For inefficient firm $t \geq 2$, by Conditions (1), (2) and (3) given their beliefs it is optimal to enter if and only if both $|N_{t-1}| = 1$ and the incumbent acted as an inefficient firms at all times $\tau < t$.

Suppose that there are multiple active firms in the market and consider active firm k. Note that current actions do not affect future profits. This is because: (i) the future output choices of the other firms are not conditioned upon past output choices; (ii) future entry does not take place anyhow; and (iii) active firms cannot fool each other about their type. Hence, the quantities of the active firms are optimal. Finally, for the incumbent, by Conditions (4) and (5) it is optimal – regardless of his type – to act as an inefficient firm before any entry takes place.

Hence the formulated strategies and beliefs form a Perfect Bayesian Nash equilibrium. ■

Now we show by a numerical example, for which all Conditions of Proposition 1 are strictly satisfied, that such an entry selection equilibrium exists for a positive range of parameters.

Proposition 2 *There exists a positive range of parameter such that Conditions 1 to 5 are satisfied.*

Proof. We prove this by a numerical example for which each condition holds with inequality. Consider a standard Cournot stage game with the following parameters

inverse demand function	$P(Q) = 100 - Q$
marginal cost inefficient firm	$c_H = 25$
marginal cost efficient firm	$c_L = 20$
Probability of efficiency	$\rho = \phi = 0.8$
Discount factor	$\delta = 0.95$
Entry costs	$E = 11000$

The reader can verify that Conditions 1 to 5 are all strictly satisfied for these parameter values. We conclude the proof by observing that payoffs are continuous in all of these parameters. ■

4 Comparitive statics and welfare analysis

Mimicking an inefficient incumbent becomes more attractive when the probability that an incumbent is inefficient, $1-\phi$, increases. The effects of increasing the chance that a potential entrant is efficient, ρ, is ambiguous. Suppose that $\rho = 0$; then, all entrants are inefficient and there is nothing to be gained from mimicking. Similarly, mimicking is pointless if $\rho = 1$, in which case all entrants are efficient. Intuitively, an increase in ρ makes mimicking less costly by reducing the expected time in which the incumbent would have been a monopolist, but on the other hand it decreases the chance that it will be succesful in attracting an inefficient entrant. An increase in δ has ambiguous consequences as well. A higher δ increases incentives to enter. This on the one hand makes it more likely that mimicking will encourage inefficient entry, but it can make it redundant if an inefficient firm finds it profitable to enter even if the incumbent is efficient. It makes it also less likely that an earlier inefficient entry will discourage later efficient entry.

Does a large difference in efficiency make mimicking more likely? To examine this, we assume Cournot competition with linear demand and costs. Under these conditions the benefits from mimicking, $\boldsymbol{\pi}_{LH} - \boldsymbol{\pi}_{LL}$, increase, while on the cost side $\pi_L - \pi_{LasH}$ increases and $\pi_L - \pi_{LH}$ decreases. The net effect of an increase in efficiency levels is therefore ambiguous as well.

Finally, let us examine the effect of entry selection on social welfare. Let $SW_{j_1 \ldots j_k}$ denote social welfare when there are k active firms of types $j_1, ..., j_k$, who all play the stage game Nash equilibrium strategy. Moreover, let SW_{LasH} the per-period social welfare under an efficient monopolist signalling inefficiency. Denote also by SW_E future expected social welfare if efficient entry took place in one of the previous periods and by SW_{NE} social welfare if no entry took place in any of the previous periods. Suppose that the monopolist is efficient and reveals his type. Then

$$\begin{aligned} SW_{NE} &= SW_L + \delta\rho SW_E + \delta(1-\rho) SW_{NE} \qquad (6) \\ SW_E &= \frac{1}{1-\delta} SW_{LL} \end{aligned}$$

Substituting and solving for SW_{NE} gives

$$SW_{NE} = \frac{SW_L}{(1-\delta(1-\rho))} + \frac{\delta\rho}{(1-\delta)(1-\delta(1-\rho))} SW_{LL}.$$

Because in period 1 no entry has yet taken place we have $SW_{NE} = SW^{reveal}$, where the latter denotes the total discounted expected social welfare in case of an efficient incumbent revealing his type.

Similarly, if the efficient monopolist hides his type, then

$$SW^{mimic} = SW_{L_{as}H} + \frac{\delta\rho}{1-\delta} SW_{LL} + \frac{\delta(1-\rho)}{1-\delta} SW_{LH}$$

That means that the welfare effect of mimicry is equal to:

$$\begin{aligned} SW^{mimic} - SW^{reveal} &= SW_{LasH} - SW_L - \tfrac{(1-\rho)\delta^2\rho}{(1-\delta)(1-\delta(1-\rho))}(SW_{LL} - SW_{LH}) \\ &\quad + \tfrac{\delta(1-\rho)}{(1-\delta(1-\rho))}(SW_{LH} - SW_L). \end{aligned}$$

The welfare effect of mimicry can be described in terms of three effects, similar to those describing the incumbent's incentive compatibility constraint. First, there is a short-run welfare loss due to a higher price that the incumbent sets in the first period to mimic an inefficient firm. Second, there is a long-run expected welfare loss due to a positive probability that the entrant will be inefficient. Finally there is an effect due to the possibly earlier entry. This effect can be positive (due to a lower price under a duopoly in the second period) or negative (due to less efficient production).

5 Discussion and conclusions

In this paper we presented a signalling model of entry selection in which an efficient incumbent pretends to be inefficient in order to attract entry of an inefficient entrant and in this way prevent future entry of an efficient entrant. The idea of entry selection has earlier appeared in the literature, but using different mechanisms. The present model could be extended to allow for more types of entrants. One may expect, as in the article of Creane and Konishi (2009), that the incumbent will choose an entrant that is not too efficient, but efficient enough to discourage further entrants. Given that the literature on the topic is scarce, it may be worthwhile to explore other possible mechanisms of attracting weak competitors who discourage further entry, for instance via investment decisions.

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