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Is Setting Up Barriers To Entry Always Profitable For Incumbent Firms?

Serkan Dilek[a*] , Seyfi Top[b]

[a] *Kastamonu University, Kuzeykent Campus, Kastamonu, Turkey*
[b] *İstanbul Arel University, Sefakoy Campus, Istanbul, Turkey*

Abstract

Barriers to entry have been subject to so many studies examining competition conditions and markets in industrial and micro economics literature. Markets with no entry barriers realize better performance and in these markets long run equilibrium actualized when average total costs equal to price. Generally firms can set up higher prices than their average total costs when entry is not free. Therefore incumbent firms prefer to set up entry barriers and avoid competition. However in two-sided markets new entrants can provide benefits to incumbent firms. So, in these conditions incumbent firms chose to reduce or eliminate barriers to entry. We examined this type of markets and their effects to market equilibrium and incumbent firms.

Keywords: Barriers To Entry, Two-Sided Markets, Network Externality, Competition

1. Introduction

According to widespread wisdom, profits in an industry decrease as the number of firms increases. Generally this is true. If the number of firms in an industry is restricted, incumbent firms can obtain excess profits in an oligopoly or monopoly market. Therefore incumbent firms usually set up barriers to entry and deter potential entrants from starting business in an industry. There are many types of barriers including absolute cost advantage, product differentiation, economies of scale etc. Though some barriers are sourced from the characteristics of market (such as economies of scale) there are some barriers to entry which can be created by incumbents who want to discourage new entrants and reduce potential competition. Brand loyalty, advertisements, distribution channels are some of barriers that can be adjusted

* *Corresponding author Tel +90 366 280 21 35 e-mail adress:serkan.dilek@gmail.com*

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by incumbents. The purpose of the present study is to query, if setting up barriers is profitable for incumbents and in which conditions they can't prefer to deter new entrants.

The article proceeds in the following manner. First we briefly review literature about barriers to entry in industrial and micro economics. We examined the general conditions, the results, reasons of the game between incumbent and new entrant firms. Second we reviewed previous studies about two-sided markets. Then, we explained why incumbents can benefit from new entrants in two-sided markets and chose the induction in barriers to entry instead of increasing it. Third we summarize the results. This study is aimed to be contribution to literature and starting point for next studies.

1. LITERATURE REVİEW

Barriers to entry occupied an important place in micro economic theory and industrial economics. The long run equilibrium of the firm is at the point at which it is a long run average total costs equal price in perfect competition markets. If price is bigger than average total cost, potential entrant firms will recognize excess profits and enter competition game. After new entrants, the equilibrium profits and prices decrease to normal level. In shortly, firms will have no excess profits in perfect competition markets because of free entries in long run. However, in monopolies and oligopolies, it is not free to enter a market. Therefore incumbent firms in monopolies or oligopolies continue to earn excess profits in long run. Potential entrant firms can't enter markets freely, because of the existence of barriers to entry in these markets. Generally barriers to entry are higher in pure monopoly or tight oligopoly markets. Main oligopoly models -such as Cournot, Bertrand, Stackelberg- study about the game of incumbent and new entrant after one firm decide to enter a market (Varian, 1992: 262). Barriers to entry also effect long run growth performances of whole economy (Büttner, 1995). Because of these characteristics many industrial economists interested with in entry barriers and market equilibrium (Elzinga and Mills, 1996: 810; Aidis and Adachi, 2007:391).

Monopolies generally prefer to set up a barrier to entry, because they want to continue to get excess profits in both short and long run. The first definition of barriers to entry was done by Bain (1956). A barrier to entry is a factor that reduces motivation and ability of potential entrants to enter a new market although they know excess profits of incumbent firms in this market. Also barriers to entry can be thought of a cost of a firm that is seeking to enter a market or decides to enter a market (Karakaya, 2002: 380). Gable and others (1995: 211) made another definition of barriers to entry by saying that they refer to deterrents or obstacles preventing new firms from engaging in production or sale of products or services.

According to the theory that mentions that barriers affect the market performance, there are many empirical studies about entry barriers (Niu and others, 2011; Karakaya and Stahl, 1989; Campos and Iooty, 2007:346-363; Burke and To, 2001). Some studies have different results than the traditional economic theory. Burke and To (2001) studied on interesting model in which reduction in entry barriers have no decreasing effect on industry price. In this model incumbent firms buy-off potential entry through higher wages. If employees of incumbent firm enter a market by constructing a new firm their salaries can

be increased. In short run, the result is increased salaries and no entry. In long run, incumbent firm limit the number of employees because of entry threat and increase salaries. So long run equilibrium is realized as higher prices and lower output. The study of Burke and To (2001) is a good example that shows reduced entry barriers can be resulted as decreased output.

There are two types of barriers to entry which are called endogenous and exogenous barriers. Exogenous barriers are those, which are borne from the structure of market conditions and cannot be controlled by incumbent firms. But endogenous barriers are created and maintained by incumbent firms (Gable and others, 1995: 211). Greer (1992) made different classification. According to this classification barriers to entry are divided into two groups which are structural (technical) and behavioural (strategic). Structural (technical) barriers came from Bain (1956)'s study. They include

a) Absolute cost advantage from incumbents because of patents, secret production methods etc.

b) Product differentiation advantages of incumbents and

c) Economies of scale advantages.

Behavioural (strategic) barriers are set up by incumbents to deter potential entrants. Examples of behavioural barriers are increased advertising scale, predatory pricing and new arrangements. Porter contributed to literature by classifying entry barriers in six types (Johansson and Elg, 2002; pp.395). These types are economies of scale, product differentiation, customer switching costs, capital requirements, government policy and access to distribution channels. We can list most popular barriers to entry that are studied in literature are shown in Table 1.

Table 1. List of Barriers to Entry

Cost advantage of incumbents	Product differentiation of incumbents	Capital requirements
Customer switching costs	Access to distribution channels	Government policy
Advertising	Number of competitors	Research and Development
Price	Technology and technological change	Market concentration
Seller Concentration	Divisionalization	Brand name, trademark
Sunk costs	Selling Expenses	Incumbent expected reaction to market entry
Possession of strategic raw materials		

Source: Niu and Others, 2011: 70.

We studied on which market conditions and types, incumbents don't want to increase endogenous barriers to entry. Suppose that incumbent firm is moving with a motivation of higher profits. If his sales and profits increase with the new entrant firm, he will not be against the new entrant. In this condition incumbent firm does not want to increase the endogenous barriers but wants to encourage entrants by decreasing them. We examined if incumbent sellers prefer to encourage rivals in two-sided markets.

2. INCUMBENT AND ENTRANT FIRM

Now we will show how new entrant firm increases profit of incumbent firm by using algebraic method. For simplicity we neglect exogenous barriers to entry and study only on endogenous barriers to entry. Suppose that we have two periods. In first period market style is monopoly and in second period it

is duopoly. If incumbent firm is active in monopoly its demand will be equal to market demand at the same time. So we can show its total revenue by equation (1) in first period. P denotes price and q denotes demand quantity. If we neglect total cost the profit will be equal to Total Revenue (TR).

$$TR_t = \pi_t = p.q \qquad (1)$$

In second period new entrant firm participate to market and the firms share market demand. We suppose that each firm share demand equally. So demand for both incumbent and entrant firm is q/2. We neglect again total cost and new profit function for both firms will be like in (2).

$$TR_{t+1} = \pi_{t+1} = p.\frac{q}{2} \qquad (2)$$

As it is seen in (1) and (2), profit for incumbent firm decreases. While the market demand is constant, number of firms increases. But what will happen if a new entrant does some magic and increases total sales in market? In this condition we use coefficient k to show the increase in total demand. If k is equal to 0, the contribution of new firm to market demand is zero. If it is 1, market demand increases %100. Also inhabitant's profit does not change ($TR_{t+1} = TR_t = p.q$).

$$TR_{t+1} = \pi_{t+1} = p.\frac{q(1+k)}{2} \qquad k\geq 0 \qquad (3)$$

In which conditions we have k coefficient such that it is positive integer? Let's search about the difference of revenues in first and second period.

$$TR_t - TR_{t+1} = \Delta TR = pq - p.\frac{q(1+k)}{2} = pq[1-\frac{(1+k)}{2}] = \frac{pq-kpq}{2} \qquad (4)$$

It is also equal to difference between profits in first and second period, in which conditions we will get the result which is at least zero.

For which extra amount of total demand, incumbent firm will give up setting barriers to entry? Here we assume that incumbent firm has enough power to set up barriers to entry in a market. The difference between the demand of incumbent firm before and after new firm was calculated as $\frac{pq-kpq}{2}$. If $\frac{pq-kpq}{2}$ gets positive value then we can say that incumbent firm has more total revenue (TR) in first period (when the market is monopoly). On the contrary if $\frac{pq-kpq}{2}$ gets negative, it is obviously clear that the incumbent firm has more Total Revenue (TR) in second period (when rival firm comes to market). As the value of $\frac{pq-kpq}{2}$ gets bigger, incumbent firm will clearly understand that its profit is bigger before the entrance and it will set up barriers to entry.

3. TWO-SIDED MARKETS

First suppose that the market is two-sided. Two-sided markets differ from classical market types and have been studied since last decade (Rochet and Tirole, 2003; Armstrong, 2006; Chakravorti, 2003). In these types of markets both buyers and sellers benefit from the number of opposite sides. We mean that buyers will be more wealthy if there are more sellers and vice versa. Classical examples for that type of markets are dating clubs, credit card markets, shopping malls, video games, browsers, operating systems, newspapers, TV networks etc (Rochet and Tirole, 2003: 993-994). For instance, in credit card market consumers (buyers) interest with the number of merchants (sellers) who accept credit cards as payment tools. Also merchants take into consideration the number of consumers who are willing to use credit cards for their payments (Chakravorti, 2003: 51).

In two-sided markets there are three actors including buyers, sellers and platforms (Rochet and Tirole, 2003; pp.993) (in credit card market also financial institutions which are called as issuer and acquirer are another actors (Chakravorti, 2003: 51)). In our study we are not interested in competition between platforms but deal with competition between sellers in two-sided markets. Also we neglect multihomeness which occurs when a consumer subscribe more than one platform (Rochet and Tirole; 2003: 54). In other words we suppose that every consumer chooses only one good and subscribes only one platform. Generally platforms have right to decide the number of sellers or buyers. But we assume that platforms do not restrict the number of sellers or buyers. They just determine prices, get profits and have no power and willingness to consider about the number of sellers. In addition to this, sometimes there can be constraint on the number of sellers as it is in shopping malls. The numbers of shops in a mall are constrained with the physical place in mall building. We ignore these kinds of constraints; shortly our assumption is that there are no constraints on the number of sellers.

Under these conditions what is the impact of new firms on a market? If new entrant starts business in a market then consumers will benefit from the number of sellers. Consumer's utility enhances because of increased selection facilities. So consumers, who are outside the market, will find it profitable to be active in a market. As a result incumbent firm will witness that the number of consumers and demand are not constant but increasing. New entrant will bring new consumers to market. As new entrant firm contributes to total consumer number, coefficient k becomes bigger. The value of k coefficient depends on new firms' potential. Consequently if incumbent firm see that the new firm makes enough contribution to total demand then it will not set up barriers.

We can witness this situation in everyday's life. For example; consider about an incumbent shop which is active in a shopping mall. If a new and famous firm starts business in same shopping mall, then some customers will decide to visit this mall. Their only aim is to search if there is something good to buy for them in new shop. However if they visit shopping mall, they will see other shop's (incumbents) showcases. Probably they will like some of the goods which are on sale and buy them. Briefly it will be witnessed that total demand in shopping mall increases and incumbent firms earn more by selling more goods. Therefore other shops will be satisfied because of this new firm's entry.

Proposition: In two-sided markets if there is no multihomeness and numbers of sellers are not restricted by any reason, then incumbent sellers will find profitable not to deter entries but to encourage new entrants.

Proof: First we remind our assumptions. We suppose that all of buyers are singlehome. Namely, they only buy or use one good. Additionally, decision about the number of sellers or buyers is not restricted by platform administration and there is no constraint on the number of sellers. Also the goods of merchants are not homogeneous but rivals.

We should make connections between utility and number of sellers. If utility of sellers increase with the increase in number of sellers then we will prove that incumbent sellers benefit from the increase in sellers. So incumbent firms will not deter but encourage entry of other sellers.

We introduce utility functions of buyers and sellers which was studied by Armstrong (2006: 672). For simplicity we studied on monopoly platform as Armstrong did. If first agent is seller then U_1 will denote utility function of seller. In this case U_2 denotes utility function of buyers.

$$U_1 = \alpha_1 n_2 - p_1 \qquad (5)$$

$$U_2 = \alpha_2 n_1 - p_2$$

Coefficients α_1 and α_2 measures the benefits of agents who enjoys from interacting with the other group. p_1 and p_2 are prices for interacting in platform. Platform administration only set up prices to participate platform but doesn't restrict the numbers of sellers or buyers. For simplicity we suppose that platform charged fixed prices to both sellers and buyers. Let this price be p.

$$U_1 = \alpha_1 n_2 - p \qquad (6)$$

$$U_2 = \alpha_2 n_1 - p$$

Equations (6) make connections with utility function of agent and numbers of other agents. However we need the connection between utility function and numbers of sellers. So, we should try to find equations that connect utility and number of sellers. The equations will be in the form of $U_1=f(n_1)$.

Also number of buyers and sellers depends on the utility functions. According to Armstrong (2006: 672) they can be defined mathematically as

$$n_1 = \theta(u_1) \qquad (7)$$

$$n_2 = \theta(u_2)$$

We said that first agents are sellers and second agents are buyers. From the equation (6) utility functions of buyers are $U_2 = \alpha_2 n_1 - p$. Let n_1 and n_2 be linear functions. So, they can be defined mathematically as

$$n_1 = \lambda_1 . U_1 + \lambda_2 \qquad (8)$$

$$n_2 = \lambda_3 . U_2 + \lambda_4$$

λ_1 and λ_3 are coefficients that define contribution of one unit of extra utility to the number of sellers and buyers. Numbers of sellers and buyers can't be negative number so λ_1, λ_2, λ_3 and λ_4 are positive integers. Number of buyers can be written by using equations (6) and (8).

$$n_2 = \lambda_3 . (\alpha_2 n_1 - p) + \lambda_4 = \lambda_3 \alpha_2 n_1 - \lambda_3 p + \lambda_4 \qquad (9)$$

With the help of equation (9) we can write $\lambda_3 \alpha_2 n_1 - \lambda_3 p + \lambda_4$ instead of n_2 then this provides us to eliminate n_2 in equations (6). Although seller's utility depends on the number of buyers we will see that it also depends on the number of sellers. Let's use equations (6) and (9) to find U_1 in terms of n_1.

$$U_1(n_1) = \alpha_1 (\lambda_3 \alpha_2 n_1 - \lambda_3 p + \lambda_4) - p \qquad (10)$$

Sellers are rational agents who want to maximize their utility or profits. (10) is a function with one variable. Prices are fixed so utility function has only one variable (n_1). If we calculate derivatives of (10) with respect to n_1 we will find the slope of utility function of seller.

$$dU_1 / dn_1 = \alpha_1 \lambda_3 \alpha_2 \qquad (11)$$

As it is seen in (13) if number of sellers increase, the utility of other sellers increase, too. It is valid for all sellers including incumbent sellers. In this condition the increase in utility of sellers is constant and is equal to $\alpha_1 \lambda_3 \alpha_2$. Briefly the new firms have positive impact on utility of incumbents, so incumbents can decide to encourage entries in a market. Also it is clear that (11) has positive result. Therefore U_1 is increasing function. In addition to this, equation (11) does not depend on the variable n_1 and it is obvious that equation (10) is linear function.

These results explain why shops in a shopping mall prefer rival shops and do not worry about competition. Although traditional economic theory says that new rivals increase competition and decrease utility and profit of incumbent firm, equation (11) shows that in two-sided markets incumbent's benefit can increase because of the new entrant firms.

Conclusion

Traditional economic theory gives importance to entry barriers for the impact of them to market equilibrium. Micro economic theory says that as competition and number of rival firm increases, price decreases and utility of incumbent firms decreases. In long run because of free entry and exit, prices will equal to average costs. Therefore incumbent firms generally do not want more rivals and agree to deter entries. Critical question is that if in some conditions deterring bad for incumbent firms? We searched the answer of this question in our study by thinking about new market type (two-sided markets) which has been searched since the beginning of 2000's. We enjoyed previous studies about two-sided markets (especially Armstrong (2006)) and show that incumbent sellers benefit from new entrant firms and they see that new entrant firms increase both market and firm demand together. Because of that reason incumbents prefer to encourage entries, not to set up barriers in two-sided markets. While we are studying we used mathematical methods. This result is contradicting with traditional economic theories that mention about the damaging impacts of new entrant firms.

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