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ORIGINAL ARTICLE

To compete or to take over? An economic analysis of new sellers on e-commerce marketplaces

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Abstract The rise of e-commerce has inspired entrepreneurs to start their businesses online. E-commerce platforms, such as eBay, Amazon Marketplace, and Taobao, feature low barriers of entry to their sellers, as there is very low cost involved in entering an online marketplace and becoming a seller. In the meantime, we observe that many sellers choose to incur a much higher cost and enter the marketplace by taking over an existing seller's account. We identify an interesting problem faced by entrants to online marketplaces: should they enter as new or should they take over another seller? Entrants' decisions are complicated by several factors, including the reputation of the existing seller, the entrant's capability, and the information asymmetry between the entrant and the incumbent. We develop an economic model to study the interactions between an entrant and an incumbent in an e-commerce marketplace. We discover that reputation plays an important role in the entrant's competition-takeover decision. Our findings carry useful insights for e-commerce platforms in understanding the impact of entrants on the existing community of sellers.

Keywords Online reputation · Competition · Electronic commerce · Analytical modeling · Economics of IS

1 Introduction

E-commerce has experienced fast development the past decade. As reported in an article in the *Wall Street Journal* in 2016, online consumers make more purchases on the web than in stores (Stevens 2016). With the rise of e-commerce platforms,

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such as Amazon Marketplace, eBay, Taobao, etc., entrepreneurs have the opportunity to start their online businesses simply by creating a seller's account on these platforms. In the meantime, we also observe people buying and selling eBay seller accounts through online classifieds for thousands of dollars.[1] For Taobao.com, the largest e-commerce market in China, there are various websites where people trade Taobao seller accounts.[2] In this study, we identify a unique issue faced by new entrants to these e-commerce markets. For a new seller who plans to join an e-commerce platform, there are two strategies available: enter the market as a new seller by creating a seller's account, or taking over an existing seller's established account. We discuss the incentives behind a seller's choice to compete or to take over.

In this study, we examine three different effects that shape a seller's decision. The reputation associated with an existing account is the main incentive for a seller to choose a takeover rather than competition. A good reputation gives the account holder an advantage in their power to set prices. Online marketplaces feature a critical difference, the anonymity of the trading parties, which separates it from traditional commerce. The time and spatial separation between buyers and sellers results in a high level of uncertainty on the consumers' side about the transaction quality (Dewan and Hsu 2004; Jin and Kato 2006; Ghose 2009). Online reputation systems have been adopted by e-commerce platforms to provide additional information about sellers' past transaction records and to facilitate future transactions. It has been discovered that sellers with a high reputation enjoy a price premium comparing to those with low reputation (Ba and Pavlou 2002).

Also, a seller's own capability determines whether he will choose to compete or not. We model the seller's capability as the cost of production. When an entrant has a higher cost of production than the incumbent seller, competition may be dominated by takeover because the payoff from competition tends to be relatively low. Another interesting factor that we investigate is the information asymmetry between the entrant and the incumbent. The information about the entrant's capability is not known to the incumbent unless the entrant chooses to enter and to compete. In the meantime, the entrant has an informational advantage over the incumbent as she can infer the incumbent's capability from the observed reputation. Therefore, the incumbent's expectation of the entrant's capability plays a critical role in the incumbent's pricing strategies, as well as the entrant's choice to compete or to take over.

Our study is also applicable to takeovers beyond e-commerce. In particular, we make the observations that takeovers of firms with well-established reputations often occur at high prices. In 2005, eBay spent US$2.6 billion to purchase Skype, the company that provides a free program with the same name for voice communications. In 2006, Google took over YouTube, the video sharing site, for US$1.65 billion. More recently, Facebook made a US$19 billion acquisition of WhatsApp, an instant messaging application for smartphones. At the time of eBay's takeover, many criticized eBay's CEO, Meg Whitman, for failing to keep finances

[1] http://omaha.olx.com/ebay-account-for-sale-almost-10-years-old-850-positive-feedback-99-9-8500-iid-5352572.

[2] See http://www.taopuwang.com/, http://www.ymaiwang.com, and http://www.5pao.com.

under control, arguing that to hire a developer to write a Skype-like program would be much cheaper. Similar arguments have been heard over the years in acquisitions such as these.

In this paper, we investigate this puzzling phenomenon in the online marketplaces using a game theory model. We compare two strategies, competition and takeover, from the perspective of a new entrant entering a market with an existing incumbent. Our study provides justifications for the entrants' takeover decisions from the perspectives of incumbent reputation and market competition. Our main results show that reputation plays an important role in driving firms' takeover decisions.

The remainder of the paper is organized as follows. In Sect. 2, we survey the related literature. Section 3 describes the model setup. Section 4 presents the model analysis. We discuss the implications of our results in Sect. 5 and conclude the paper in Sect. 6.

2 Literature

Several studies have investigated the interaction between competition and takeover (or predation). Saloner (1987) studies two competing incumbents, of which one had the potential to take over the other in the next period. The acquirer, anticipating the takeover, would expand quantity in the competing period to show or pretend that it is a low-cost player, so as to get better terms in the takeover. One key difference from Saloner (1987) is that this paper allows for choices between competing and taking over, while in Saloner's model, competition between the two firms is set and not a choice by the firms. By considering takeover and competition as exclusive choices by the entrant, this paper can focus on the decision-making process before a takeover, which potentially allows for study of the optimal timing of a takeover.

Chen (2001) investigated mergers of upstream and downstream producers, and showed that competitors in the downstream product market bear an increase in input cost and thus adopt a different pricing strategy. This paper again takes as given the integration decision, and puts little focus on what motivates the two producers to merge, and whether they take into consideration the competitive effects when they make the merge decision. Malmendier and Tate (2008), on the other hand, focus on why some firms make acquisitions and buy other firms; they attribute the fact to CEO overconfidence, meaning that acquirers are willing to pay to take control because their CEOs believe they can do better than others. While partly explaining the phenomenon of acquisition, the above paper admits other possible factors that induce takeover/acquisition, for example, the reputation consideration.

Recent research in reputation has viewed it as more of an asset. Tadelis (2002) studies reputation as an asset that can be traded among a group of agents for money. The reason is that a good reputation brings about benefits in terms of consumers' high willingness to pay, and, in order to get these benefits, agents have to and are willing to compensate the reputation seller. Xu et al. (2016) further show that it is possible to motivate sellers to purchase an online reputation that suits their own capability in running an online business. Our model takes a similar course

suggesting that eBay was willing to pay 2.6 billion because eBay people expect benefits from Skype's huge user base as well as its good reputation in voice communication.

This study is also related to the vast literature on reputations in e-commerce platforms. E-commerce platforms have the objective of matching buyers and sellers, and their revenues are closely related to the transactions conducted on their platforms (Chen et al. 2016). Online reputation systems have been developed to increase consumers' trust with the shopping environment and to influence their purchase decisions. Scott (2004) develops a multi-dimensional scale of risk perceived in the online business environment and identifies several types of risks involved in online transactions. Kim (2012) shows that consumers' trust has a positive impact on their satisfaction, which in turn influences their purchase intention. Holsapple and Sasidharan (2005) also shows that trust is a critical factor that determines consumers' decisions to accept or reject an online shopping platform. Wang et al. (2008) studies a model for evaluating trust associated with transactions on e-commerce websites by differentiating transaction amounts in the computation of trust values. You and Sikora (2014) discuss several different reputation systems and compare their effects in mitigating the adverse effects of strategic behaviors by online sellers.

Our study also emphasizes the importance of transaction risk and sellers' reputations in consumers' purchase decisions, and we examine potential sellers' reactions to such effects of online reputation. We contribute to the literature by explaining sellers' competition-takeover choices from the unique perspective of online reputation. With online reputation playing a crucial role in online consumers' purchase decisions, it in turn affects sellers' choices to take over or to engage in competition.

3 Setup

The model consists of a one-period game between two risk-neutral players, an incumbent (he) and an entrant (she). An incumbent is the only producer existing in the market, while an entrant has both the interest and the ability to operate the same business. The entrant has two options in order to enter, called competition and takeover. In the case of competition, the entrant enters the market with her own firm and faces competition from the incumbent, in terms of both price and quantity.

An important assumption needed here is no barrier to entry. There are two reasons for this assumption. First, in online marketplaces, for example eBay, Amazon Marketplace, and Taobao, entry is indeed easy. Anyone can start an online store by spending a few minutes creating a new seller account and listing some products to sell, although a successful business depends on the number of eyeballs attracted or, as we explain later, the reputation of the seller. This leads to our second reason for the assumption, which is to isolate the effect of reputation in one's competition-takeover decision. The entry barrier can potentially affect the entrant's decision. For example, if the barrier is high enough, the entrant would rather pay a

high price and buy out the incumbent. Thus, by eliminating this impact, this setup can better capture the role of reputation.

A traditional production model is employed. A producer is characterized by a vector $(c_\theta, q_\theta, p_\theta)$, where $\theta \in \{E, I\}$ represents the entrant and the incumbent respectively. Each producer incurs a per unit production cost c_θ to produce q_θ units of products, and the price s/he is able to charge is denoted as p_θ. Product costs are exogenously given parameters, with c_I being common knowledge, while c_E may not be common knowledge depending on the entrant's competition-takeover choice.

The incumbent, who has already established a name with a history in the market, may have an advantage over the entrant, who is new to the market. This advantage is captured by the incumbent's reputation r_I. Correspondingly, let r_E be the entrant's reputation, if she enters with a new firm. Both r_E and r_I are essentially beliefs on the consumers' side regarding the quality, reliability, or other aspects of products. One interpretation of reputation is that, users, through self-experience or word of mouth, gradually form an opinion regarding the incumbent's products or services. A positive opinion leads to a high r_I, while a negative opinion leads to a low r_I. For the entrant, since users have no information about her, their opinion is set to neutral, r_E, which could be higher or lower than r_I.

In the next section, we analyze two scenarios: one where the entrant competes, and one where she takes over.

3.1 Competition

As mentioned earlier, reputation is essentially beliefs on the consumers' side, and these beliefs will eventually be reflected in the demand as well as the price for each player. Also, in competition, two competitors' prices and demands are interdependent. More specifically, one's demand decreases with one's own price but increases with the rival's price since they are competing for the same pool of consumers. Thus, p_I increases q_I on the one hand but decreases q_E on the other. To capture both the impact of reputation and the competition effect, the model has a demand curve as the following:

$$q_I = r_I - bp_I + dp_E, \tag{1}$$

$$q_E = r_E + dp_I - bp_E. \tag{2}$$

The reputation effect is captured by r_I and r_E, while the competition effect is reflected through p_I and p_E. Obviously, reputation and the rival's price have positive effects on demand, while self-price has a negative effect on demand. Coefficients b and d are elasticities of demand regarding one's own price and the rival's price. Since the two firms are different only in reputation, and, in the current way it is modeled, the effect of reputation is separate from that of price, we assume that the market reacts to their prices in the same pattern, meaning that they share the same b and d. However, as an extension, it may be interesting to consider different coefficients for the incumbent and the entrant.

Notice that, if both players raise their prices by 1, both should have a reduced demand. In other words, the assumption $b > d$ is needed. Also, the total demand in the market is $q_I + q_E = r_I + r_E + (d - b)p_I + (d - b)p_E$. This brings about an alternative interpretation of reputation in this setting; that is, the reputation determines the total potential demand. A certain number of consumers can be attracted by firms' reputation. However, the competition between the firms can also decrease the size of realized demand in total. This is intuitive because, if both firms in the market produce attractive or high-quality products, more consumers are willing to give them a try, although consumers with a low willingness-to-pay are screened out after the price is set. For the remaining consumers with high willingness-to-pay consumers, whether to buy from the entrant or the incumbent depends on their relative prices.

We use a profit function in the form $\pi = q(p - c)$. The objectives for both the incumbent and the entrant, respectively, can be expressed as

$$\max \pi_I = q_I(p_I - c_I), \tag{3}$$

$$\max \pi_E = q_E(p_E - c_E). \tag{4}$$

We solve for an equilibrium by deriving the first-order conditions for both players' objectives.

Lemma 1 *In an equilibrium with competition, the entrant's and the incumbent's equilibrium prices and profits are as follows:*

$$p_I = \frac{bc_I + r_I + \frac{d}{2}c_E + \frac{d}{2b}r_E}{2b - \frac{d^2}{2b}}, \tag{5}$$

$$p_E = \frac{bc_E + r_E + \frac{d}{2}c_I + \frac{d}{2b}r_I}{2b - \frac{d^2}{2b}}, \tag{6}$$

$$\pi_I = \frac{b[2br_I + dr_E - (2b^2 - d^2)c_I + bdc_E]^2}{(4b^2 - d^2)^2}, \tag{7}$$

$$\pi_E = \frac{b[2br_E + dr_I - (2b^2 - d^2)c_E + bdc_I]^2}{(4b^2 - d^2)^2}. \tag{8}$$

We further derive the equilibrium level of demand for each player as

$$q_I = \frac{b[2br_I + dr_E - (2b^2 - d^2)c_I + bdc_E]}{4b^2 - d^2}, \tag{9}$$

$$q_E = \frac{b[2br_E + dr_I - (2b^2 - d^2)c_E + bdc_I]}{4b^2 - d^2}. \tag{10}$$

Several interesting implications can be generated from the above results. First, to ensure that the entrant produces a positive quantity in equilibrium her production cost has to be relatively low. Specifically, it requires that $c_E < \frac{2br_E + dr_I + bdc_I}{2b^2 - d^2}$. We consider as a benchmark and suppose that the entrant is a monopoly with reputation r_E and cost c_E. It is easy to see that her production in equilibrium is $\frac{r_E - bc_E}{2}$, for which positivity means $c_E < \frac{r_E}{b}$. Note that the condition $\frac{r_E}{b} < c_E < \frac{2br_E + dr_I + bdc_I}{2b^2 - d^2}$ holds with positive probability. Therefore, there are cases when the entrant can do better by competing than being a monopoly. This contradicts the idea that being a monopoly is always beneficial to a firm. We attribute this result to the fact that more sellers attract more buyers to join an e-commerce marketplace and sellers' profits improve through the increased number of transactions.

Second, the fact that the entrant may produce a quantity of zero has an implication for an entry-deterrence game. When the incumbent has a low cost of production and the entrant herself incurs a very high cost of production, she may find it not profitable to enter at all. Also, both the entrant and the incumbent benefit from each other's reputations, which indicates that reputation has a positive externality. This is easy to see because, in our setup, a reputation can be interpreted as the group of consumers attracted by that firm/player. The larger the total number of consumers, the more surplus can be extracted from consumers.

Below, we turn to the case of takeover and analyze the entrant's profit as well as the takeover price.

3.2 Takeover

Suppose now the entrant offers to take over the incumbent. If the takeover succeeds, the entrant becomes a monopoly in the market. What is more, the entrant does not need to build a new firm, but inherits the incumbent's firm (with her production cost) and reputation in the product market. As a result, she generates a demand $q_M = r_I - bp_M$, conditional on a successful takeover. In practice, when an entrant takes over a seller account on eBay or Taobao, the reputation associated with the account as well the account name, by which the consumers recognize the seller, remain the same.

The opposite situation could also happen, where the entrant uses a new name while exercising its monopoly power. In particular, when the incumbent is recognized as disputable in the product market, the entrant would be better off using a new name and building up its own reputation. However, that case is not the focus of this paper. In this paper, we want to focus on the case where the incumbent has a well-established reputation, and that reputation is what makes taking over a potential option to consider for the entrant. Thus, I make the following assumption.

Assumption Once the entrant takes over the incumbent, she can continue with the incumbent's reputation.

Based on the assumption and analysis, the entrant's profit as an monopoly can be calculated as $\pi_M = \max q_M(p_M - c_I)$, where $q_M = r_I - bp_M$.

Lemma 2 *When the entrant takes over the incumbent, the entrant's equilibrium price and profit becomes:*

$$p_M = \frac{bc_I + r_I}{2b}, \tag{11}$$

$$\pi_M = \frac{(r_I - bc_I)^2}{4b}. \tag{12}$$

We can also derive the equilibrium demand for the entrant in the case of takeover as

$$q_M = \frac{r_I - bc_I}{2}. \tag{13}$$

Our analysis so far has assumed that the entrant takes over the incumbent's account successfully. We next analyze the takeover price as a compensation to the incumbent to ensure a successful takeover. The incumbent is willing to sell his firm only when he is at least as well off as if he competes with the entrant. Another important assumption is needed to assist the analysis.

Assumption In the case of takeover, the entrant's cost of production c_E is not revealed to the incumbent. However, it is common knowledge that c_E is uniformly distributed on $[c_E^L, c_E^H]$.

Recall that in the competition case both c_I and c_E are treated as public information. Although we assume different information structures of cost in two cases, there is no contradiction between the two. Whenever the entrant decides to compete, she first has to build a firm of her own. During this process, information regarding her production cost may be revealed. For example, the average education level of the employees can be a strong indicator of her ability and can be easily observed by the incumbent. However, these possible indicators are not available in the case of takeover, where the entrant simply makes an monetary offer to the incumbent. In fact, the entrant would like to hide her cost and utilize this asymmetric information as shown below.

It is worth noticing that making a takeover offer is itself a signal of c_E. The reason behind is that, by taking over, the entrant inherits c_I from the incumbent and gives up her own c_E. This tradeoff is more appealing when c_E is high and when the entrant is less competent in starting a new business. Thus, we focus on an equilibrium where an entrant with a low c_E chooses to compete while an entrant with a high c_E chooses to take over the incumbent instead. There also exists a marginal entrant with c_E^* who is indifferent between taking over and competing.

Thus, the offered takeover price should be the incumbent's expected profit from competition, which is denoted as p_T. When the incumbent receives the takeover offer, as a second-mover, he realizes that this entrant must find competition less profitable, which means her cost $c_E \in [c_E^*, c_E^H]$ and uniformly distributed with density $\frac{1}{c_E^H - c_E^*}$. p_T can be formally expressed as follows.

$$p_T = \frac{1}{c_E^H - c_E^*} \int_{c_E^*}^{c_E^H} \frac{b[2br_I + dr_E - (2b^2 - d^2)c_I + bdc_E]^2}{(4b^2 - d^2)^2} dc_E$$

$$= \frac{b^3 d^2}{(c_E^H - c_E^*)(4b^2 - d^2)^2} \int_{c_E^*}^{c_E^H} (c_E - A)^2 dc_E$$

$$= \frac{b^3 d^2}{3(4b^2 - d^2)^2} \left[(c_E^* - A)^2 + \left(c_E^* - A\right)\left(c_E^H - A\right) + \left(c_E^H - A\right)^2\right],$$

where $A = \frac{2br_I + dr_E - \left(2b^2 - d^2\right)c_I}{bd}$.

Define π_T as the entrant's profit in a successful takeover, so it equals the monopoly profit net the takeover price:

$$\pi_T = \pi_M - p_T. \tag{14}$$

4 Competition-takeover decision-making

In this section, we identify several factors that might affect the entrant's competition-takeover decision by comparing π_E with π_T. Recall that c_E^* has to satisfy the condition $\pi_E|_{c_E = c_E^*} = \pi_T|_{c_E = c_E^*}$. Given c_E^*, for any $c_E > c_E^*$, the entrant's competition profit decreases while the takeover profit stays the same, and, thus, takeover is preferred. On the other hand, if the entrant has a lower production cost than c_E^* she generates a competitive profit higher than $\pi_T|_{c_E = c_E^*}$, which leads to a choice of competition instead of takeover. We interpret c_E^* as the probability of a successful takeover. As the cutoff value c_E^* increases, it is less likely for an entrant to choose to take over. On the other hand, if the equilibrium c_E^* is low, then, with a high probability, the entrant has a cost above c_E^* and chooses to take over.

4.1 The reputation effect

As is the focus of this paper, we have discovered that both players' reputations in the product market play a very important role in the competition-takeover decision-making process.

Proposition 1 *The entrant is more likely to choose competition, instead of takeover, when r_E is high.*

To see this, notice that the entrant's takeover profit is independent of r_E, since if she choose to buy out, she does not have to use a reputation for being new, but utilizes the incumbent's reputation instead. On the other hand, the entrant's competition profit increases with r_E, in which case the more the consumers value a new firm, the more demand the entrant can expect. Thus, r_E has a positive impact on the entrant's preference for competition. In other words, if consumers put a high

value on a new reputation, the entrant tends to compete with the incumbent. Note that consumers value a new reputation more when the e-commerce platform has a high level of trust and a low level of transaction risk.

Intuitively, between competition and takeover, the entrant faces a tradeoff between r_E and r_I, because she has to give up r_E in order to buy out the incumbent. If r_E is high, the entrant incurs a large opportunity cost in terms of reputation if she chooses to take over, which makes takeover less attractive. What is more, with a high r_E the entrant can get a decent profit by competing with the incumbent, and meanwhile, avoiding paying the takeover price, which again makes takeover less likely to happen.

The effect of the incumbent's reputation r_I is less straight forward.

Proposition 2 *The entrant's profit increases in the incumbent's reputation r_I in both the competition and takeover scenarios.*

A high r_I may bring a benefit to the entrant whether she competes or takes over. When the entrant chooses competition, her profit increases not only in her own reputation, but in the incumbent's reputation, which we interpreted previously as the positive externality of reputation. In the equilibrium of a successful takeover, the entrant inherits the incumbent's reputation, and it is straightforward to see that r_I has a positive effect on the entrant.

However, if r_I is too high in the case of takeover, the incumbent may not be willing to give up his firm unless the takeover price is very high. Thus, we expect that the entrant prefers a medium level of incumbent reputation. Overall, when the incumbent has a very high reputation, the entrant prefers to compete, while when the incumbent's reputation is medium or low, the entrant's choice may vary with different levels of r_I. This result carries a counter-intuitive insight that, the entrant may prefer to take over an incumbent with a medium level of reputation than an incumbent with a very high reputation.

4.2 The cost effect

The cost structures of both the incumbent and the entrant matters in the latter's competition-takeover decision.

Proposition 3 *The entrant prefers takeover when her production cost is relatively high.*

The proof is straight forward. First, notice that if the entrant takes over, her cost c_E does not matter. However, if she competes, her competitive profit decreases with the cost c_E, which is intuitive. Based on these two facts, as c_E increases, π_E decreases while π_T stays the same. Thus it can be concluded that a high-cost entrant prefers takeover to competition. The cutoff c_E^* that we discussed in the separating equilibrium illustrates this result: takeover happens in the region $c_E > c_E^*$, while competition happens in the rest.

It is worth noticing that the takeover price does depend on the distribution of c_E, however, it is unrelated to the realized c_E. This means that, all entrants with $c_E > c_E^*$ pay the same takeover price. So, as other parameters $\{b, d, r_E, r_I\}$ changes, choices

of those with extremely high c_E are less sensitive, while those with c_E slightly above c_E^* may change their mind with the environment.

As for the incumbent's cost, c_I, the impact is more intriguing. The entrant does benefit from a high c_I if she competes. However, if she takes over, she will face a tradeoff between monopoly profit and takeover price. The higher the c_I. the less profit the entrant can get as a monopoly; however, she also bears a lower cost of becoming a monopoly. But it is clear that, if the incumbent has a very high cost, indicating an incompetent monopoly, the entrant prefers to compete with him, since she recognize an advantages over him in terms of cost.

4.3 The information effect

The uncertainty on the incumbent's side regarding the entrant's cost structure also affects the entrant's decision. It is worth pointing out that the lower bound on c_E has no effect on the decision, while the upper bound, c_E^H, has a direct impact on the decision. The explanation for this is that, under the current setting, the incumbent cares about low-cost entrants in competition, while he cares about high-cost entrants in takeovers. However, in competition, the entrant's cost is revealed after she makes the competition decision, and the cost becomes an exogenous parameter for the incumbent, while in takeover, the possibility of a low-cost entrant is zero. Hence, c_E^L does not play a role at all. This may crucially depend on the assumption of common knowledge regarding c_E in competition. Under other situations, where this assumption does not hold, the value of c_E^L will matter through the determination of c_E^*.

5 Managerial insights

By 2014, the number of merchants on Amazon has climbed to more than 2 million, while the number on eBay has been 25 million for a few years (Soper 2015). Large e-commerce platforms continue to attract potential sellers to join their marketplace as they grow. E-commerce platforms, such as eBay and Amazon, are also two-sided platforms and are heavily influenced by network effects. As the number of sellers increases, the platform benefits substantially. On the one hand, the platform can gain more commission from the enlarged pool of sellers. On the other hand, the large number of sellers can attract more buyers to the platform, which in turn generates more transactions on the platform.

Our study takes a unique perspective to look at the growth of sellers on e-commerce marketplaces. While there is no doubt that, with the rise of e-commerce, many entrepreneurs have been encouraged to join e-commerce platforms, it is unclear whether these potential online sellers lead to a healthy growth of the seller community in e-commerce. As we have shown in the above analysis, some entrants prefer taking over an existing seller instead of joining the market as a new seller. With takeover, an e-commerce marketplace may experience cannibalization instead of growth in their pool of sellers.

Our results suggest that, for an e-commerce platform with relatively low risk, meaning that consumers place a high level of trust on sellers with a new reputation, new entrants prefer to join the market by creating new seller's accounts, and thus the pool of sellers increases on the platform. On the other hand, when consumers have a low level of trust in new accounts on an e-commerce platform, potential sellers are more likely to choose takeover, which hinders the growth of the seller community.

The competition-takeover decision also has an influence on the competitiveness of an e-commerce market. When the entrant chooses to take over the incumbent, the market becomes less competitive. On the other hand, if the entrant decides to enter with a new reputation, the competition in the marketplace is intensified. Our study shows that when the trust level on the e-commerce platform is high, the platform tends to be more competitive and vice versa.

Overall, our study carries several important insights to e-commerce platforms. The competition-takeover decision influences both the platform's growth and its competitiveness. Also, the trust environment on an e-commerce platform not only affects consumers' purchase decisions, but indirectly impacts the sellers' and potential sellers' pricing strategies and payoffs. The owners of e-commerce platforms therefore have to cope with such interactions between their potential sellers and existing sellers, and take into consideration the potential sellers' competition-takeover strategy in their design of the platforms' trust environment.

6 Conclusion

In this study, we are interested in a real-life scenario where an entrant can choose between competition and takeover in order to enter a e-commerce marketplace. We develop and analyze a model of an entrant's competition-takeover choice and offer implications on how reputation, production cost, as well as information affect the decision-making process. Findings from this paper shed managerial insights on understanding the growth of e-commerce marketplaces as well as the importance of the reputation systems used by these marketplaces. Our results can also be applied to companies' acquisition and competition decisions when they are new to a market in offline settings.

This study can be extended in a few potential directions. One shortcoming of the current model is that players are confined in a one period game. As a result of this, the entrant's competitive profit is based on her reputation for being new. However, it would be more realistic if we allow for a longer time horizon, so that the entrant can develop her reputation over time, though maybe at a cost. In that case, if the entrant has a deep pocket, and can invest a lot to promote herself, she may be more inclined to compete, since she can beat the incumbent by building up a good reputation quickly. Another interesting case with longer horizon is a repeated game where each incumbent at the beginning of each period faces an entrant. In other words, when an entrant decides to buy out the incumbent, she has to take into account the fact that, if she becomes the new incumbent, she may be taken over or may have to compete with another entrant in the next period. One can expect that a steady state equilibrium can be derived in this scenario.

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