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Mergers under endogenous minimum quality standard: a note

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Abstract

We introduce merging strategies and endogenous MQS, borrowed from Ecchia and Lambertini (1997), in Scarpa (1998). MQS induces the low-quality firm to exit the market and leads to a monopoly arising from the bilateral merger of the high-quality firms

1 Introduction

The literature on minimum quality standard (MQS) has not considered the possibility that firms merge. We extend the Bertrand triopoly model of Scarpa (1998), by allowing mergers and an MQS as in Ecchia and Lambertini (1997). Ecchia and Lambertini (1997) show that an MQS is welfare increasing, because it makes price collusion more difficult. We show, instead, that when endogenous horizontal mergers are allowed, an MQS becomes a welfare reducing device. This is because the two highest quality firms merge and become a monopoly, with the lowest quality firm exiting.

We add two initial stages to the timing in Scarpa (1998). In the first stage the regulator chooses wether to introduce an MQS; in the second stage, firms decide whether to merger; in the third and fourth stage, firms compete in quality and price, respectively.

We first show that a merger between the lower quality firms, although regulated by an MQS, reduces both consumer surplus and welfare. This merger shuts down the lowest quality firm and increases differentiation between the two remaining qualities. All consumers are worse-off with the increase in aggregate profit being larger than the reduction in consumer surplus. Then we show that such a merger never occurs in equilibrium, because a merger between the two higher quality firms is the most profitable. The two highest quality firms prefer merging under an MQS because the regulated quality will be sufficiently high to induce the lowest quality firm to exit the market. When an MQS is introduced, the merger between the two highest quality firms would increases both consumer surplus and welfare then it would be preferred by the regulator, thought the lowest quality firm would gain a negative profit. However, it never occurs in equilibrium because the low-quality firm exits after the announce of an MQS. Since no bilateral merger involving the low-quality firm occurs, an MQS induces the two high-quality firms to monopolize the market. On the other hand, absent regulation a monopoly-merger among the three firms arises and induces the same welfare and consumer surplus than the equilibrium under an MQS. Our result is in line with Ecchia and Lambertini (1997). Both papers study the effect of an MQS on an element, collusion in their case and horizontal relations in ours, that is usually considered by the antitrust authorities competition reducing. Endogenizing the merging strategy allows us to show that an MQS may reduce competition becomes a welfare reducing instrument.

2 The model

Scarpa (1998) considers a two-stage triopoly with vertically differentiated qualities (q_i, with $i = 1, 2, 3$ and $q_3 < q_2 < q_1$). Each firm supplies one quality and each consumer consumes one product. Each firm i produces x_i. The costs are $c_i = \frac{(q_i)^2}{2}$ with profit $\pi_i = p_i x_i - c_i$. Consumers are differentiated according to their quality preference θ that is uniformly distributed over $[0, 1]$, with $\widetilde{\theta}_i$ be the marginal consumer; that is, the lowest consumer type that buys quality i.

Utility of consuming product i is $U = \theta q_i - p_i$.

We add two initial stages to the timing in Scarpa (1998): in the first, the regulator chooses wether to apply a MQS, in the second firms decide i) whether to merge and the firm to merge with, or ii) exit the market (if the expected profit is negative), they compete in quality and price respectively in the third and the fourth stage.

Merging strategy entailing that: i) firms merge when the profit of the new merged entity (insiders' joint profits) is higher than the sum of the profits gained by each insider without the merger, ii) each firm chooses the insider that allows the highest profit for the merged entity.[1] We call insider each merging firm and outsider the not merging one. As in Motta (1993) each merged entity sets qualities and prices to maximize the insiders' joint profits. The equilibrium is subgame perfect.

3   The equilibrium of the model

We only focus on mergers between firm 1 and 2, called high-quality merger, and between firm 2 and 3, low-quality merger. The reason for this choice is that in reality mergers among firms whose qualities are close are more likely to occur.[2] Such a merging behavior could be usually referred in reality to as a "merger of equals". Both firms' single brands are surrendered and a new company (the new merged entity) is issued in their place. Since mergers are endogenous we cannot ex ante exclude a monopoly merger in equilibrium. Let $\Pi_{i,j}$, with $i \neq j$, be the merged entity's profit. We report the equilibrium in Scarpa (1998):

$$q_1^* = 0.2526, q_2^* = 0.0497, q_3^* = 0.0095 \tag{1}$$

$$p_1^* = 0.1060, \ p_2^* = 0.0091, \ p_3^* = 0.0009 \tag{2}$$

$$x_1^* = 0.5225, \ x_2^* = 0.2721, \ x_3^* = 0.1136 \tag{3}$$

$$\pi_1^* = 0.0235, \ \pi_2^* = 0.0012, \pi_3^* = 0.00005 \tag{4}$$

$$\widetilde{\theta}_1^* = 0.477, \ \widetilde{\theta}_2^* = 0.204, \ \widetilde{\theta}_3^* = 0.094 \tag{5}$$

$$CS^* = 0.0443, \ W^* = 0.0691 \tag{6}$$

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[1] We do not explicitly introduce the analysis of an efficient splitting profit mechanism among insiders, however when the merged entity's profit is higher than the sum of the profit each insider gains without the merger, then it is always possible a splitting profit mechanism making each merger profitable.

[2] EasyJet-Go Fly and Ryanair-Buzz are examples of low-quality mergers, while Delta-Northwestt, Alitalia-Airone and Lufhtyansa-Brusselles Airlines are example of high-quality mergers.

3.1 Low-quality merger: 2 and 3.

The equilibrium values are the following:

$$q_1^L = 0.2533, q_2^L = 0.0483, q_3^L = 0 \tag{7}$$

$$p_1^L = 0.1076, \ p_2^L = 0.0102, \ p_3^L = 0 \tag{8}$$

$$x_1^L = 0.5250, \ x_2^L = 0.2625, \ x_3^L = 0 \tag{9}$$

$$\pi_1^L = 0.0244, \ \Pi_{2,3} = 0.00153 \tag{10}$$

$$\widetilde{\theta}_1^L = 0.4748, \ \widetilde{\theta}_2^L = 0.2125 \tag{11}$$

$$CS^L = 0.0433, \ W^L = 0.0692 \tag{12}$$

Where CS^L and W^L respectively denote consumer surplus and welfare. This merger increases the differentiation between high-quality products and is profitable for the insiders and the outsider. This scenario replicates the same results without regulation in Motta (1993) and Barbot (2007) because the new merged entity finds it profitable to eliminate the low-quality insider and the consumer surplus does not depend on its level. Since the high-quality firm is not affected by the low quality and the joint profit of 2 and 3 is maximized when the lowest quality is zero, then a regulator that maximizes welfare optimally chooses to eliminate the low quality. All consumers are worse-off, in particular, i) consumers with preferences lower than $\widetilde{\theta}_2$ are not covered after the merger, ii) consumers in the range $\widetilde{\theta}_1^L - \widetilde{\theta}_2^L$ after the merger receive a lower quality at a higher price, iii) consumers in the range $\theta_1^* - \widetilde{\theta}_1^L$, that after the merger switch from q_2^* to q_1^L, receive a higher quality but at a higher price, and iv) consumers of the highest quality, with and without the merger, receive a higher quality at a higher price.[3] In such a regulated merger the increase in the aggregate profit offsets the reduction in consumer surplus. See Figure 1.

3.2 High-quality merger: 1 and 2.

The equilibrium values are:

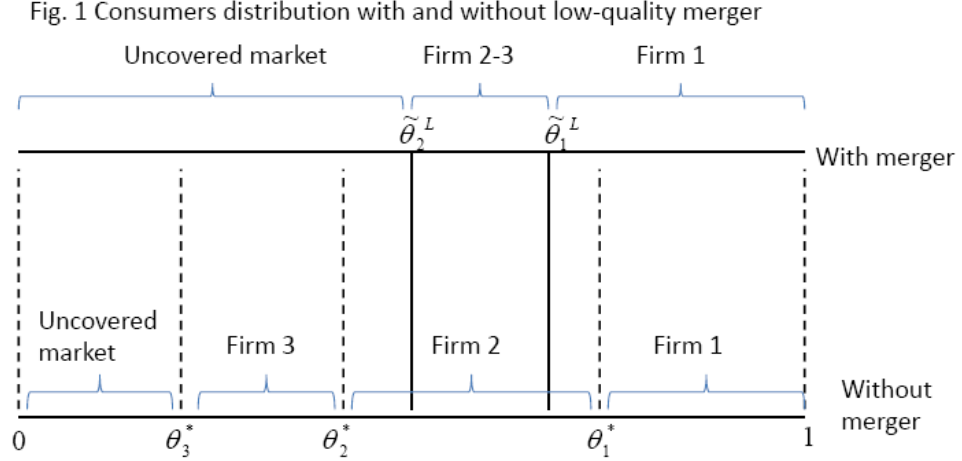$$q_1^H = 0.25, q_2^H = 0.11198, q_3^H = 0.09275 \tag{13}$$

$$p_1^H = 0.08113, \ p_2^H = 0.01212, \ p_3^H = 0.00502 \tag{14}$$

$$\Pi_{1,2} = 0.06717, \ \pi_3^H = -0.0027 \tag{15}$$

$$CS^H = 0.06256 \quad W^H = 0.06448 \tag{16}$$

$$\widetilde{\theta}_1^H = 0.5, \ \widetilde{\theta}_2^H = 0.36945, \ \widetilde{\theta}_3^H = 0.05414 \tag{17}$$

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[3] For instance, for point iii) it is straightforward to see that $\int_{\widetilde{\theta}_1^L}^{\theta_1^*} \left(\theta \left(q_1^L \right) - p_1^L \right) - \int_{\widetilde{\theta}_1^L}^{\theta_1^*} \left(\theta \left(q_2^* \right) - p_2^* \right) = -0.035349$

Fig. 1 Consumers distribution with and without low-quality merger

This merger is profitable, however MQS induces a low quality higher than the unregulated one by leading to a strong reduction in the differentiation between the high qualities and a slight increase in the differentiation between the low qualities. Although such a merger increases the market coverage the regulated quality is so high that the low-quality firm obtains a negative profit therefore it would leave the market.

3.3 Monopoly mergers

When firm 3 exists the market the high-quality merger leads to a monopoly in which the MQS is applied to firm 2. The merger between 1 and 2 leads to:

$$p_1^M = \frac{1}{2}q_1 \quad p_2^M = \frac{1}{2}q_2 \tag{18}$$

$$q_1^M = 0.25, \ q_2^M = 0 \tag{19}$$

$$\Pi_{1,2}^M = 0.03125 \tag{20}$$

$$CS^M = 0.03125, \ W^M = 0.0625 \tag{21}$$

This merger is clearly profitable and all consumers are worse-off: i) half consumers are now out of the market, ii) consumers that consume the highest quality even after the merger pay more for a lower quality. However, if the regulator did not announce the MQS, then firms would always choose a monopoly merger. Since the consumers surplus is only affected by the high quality, then any monopoly (arisen from a three-firm or a bilateral merger) induces the same

quality. Thus the results with and without regulator are the same of (19) and (21).[4]

Proposition 1 *In equilibrium only monopoly mergers occur with and without MQS.*

A merger involving the low-quality firm never occurs because firm 2's strategy of merging with the high-quality firm is strictly dominant. For the high-quality firms (1 and 2) a bilateral merger under an MQS is more profitable than a bilateral merger without regulation. Moreover, without regulation they prefer a monopoly merger to a bilateral merger. Since no bilateral merger with firm 3 occurs, an MQS induces the low-quality firm to exit the market and leads to a monopoly. Thus in equilibrium the monopolization of the market occurs with or without a MQS.

4 Conclusions

When endogenous mergers are allowed, if a welfare maximization regulator chooses an MQS as in Ecchia and Lambertini (1997) in Scarpa's (1998) model, then the market ends up being monopolized and the lowest quality firm exits.

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[4]Our results confirm Scarpa (1998) in the matter of the relation between the efficient number of firms and the lowest quality.

References

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