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A COMMENT ON EFFICIENCY GAINS AND MYOPIC ANTITRUST AUTHORITY IN A DYNAMIC MERGER GAME*

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Abstract: This paper relaxes the Motta & Vasconcelos' (2005) short-term assumption that firms' capital is fixed. We demonstrate that, contrary to the conclusion of that article, in the best interest of consumers, even when firms have large economies of scale, long-term forward-looking Antitrust Authorities must block firms' merger plans whenever profits of firms are positive.

JEL classification: D43; L13; L25; L41

Keywords: Mergers; Antitrust policy; Economies of scale

1. INTRODUCTION

It is well known that, from a technical point of view, when firms have economies of scale, efficiency is higher once the market is more concentrated (*e.g.*, Farrel and Shapiro, 1990). Being certain that efficiency enhancement increases firms' profit, due for firms market power increasing, its effect on consumer welfare is uncertain. A theoretical debate is going on whether efficiency enhancements might be both beneficial to firms and to consumers (see, Noel, 1997; Padilla, 2002; Motta, 2004, chapter 4; Motta & Vasconcelos, 2005).

Being Antitrust Authorities (AAs) goal the best interest of consumers, they must block those mergers that induce a reduction in consumer welfare, *i.e.*, "a price increase in that market" (US Merger Guidelines, 1997, section 4).

In this paper I show that, on long-term, efficiency gains induced by firms merger are negative to consumers. By relaxing Motta & Vasconcelos' (2005) short-term assumption

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that firms' capital is fixed, I conclude that in the best interest of consumers, long-term forward-looking AAs should always block firms' merger plans (whenever profits are positive).

2. LONG-TERM FORWARD-LOOKING ANTITRUST AUTHORITIES

We will use Motta & Vasconcelos' (2005) assumptions excluding the one "the total quantity of capital available in the industry is normalised to one".

The market demand is (where Q is firms' total output e p the market price):

$$p = 1 - Q \tag{1}$$

The cost function of a firm that owns k capital and produces q units of output is:

$$c(q,k) = \frac{\alpha}{k} q + 4kf, \quad q \geq 0, k \geq 0, \alpha \geq 0, f > 0 \tag{2}$$

This cost function has implicit a Cobb-Douglas production function with two production factors (capital and "labour"), that "labour" unitary price is one and that firms have large economies of scale:

$$q(k,l) = \frac{1}{\alpha} k\, l \tag{3}$$

Consumer welfare decreases when market price increases.

Firms compete *à la* Cournot.

Although short-term market analysis (where firms' capital is fixed, Motta & Vasconcelos, 2005, 2. Basic model) and the market path to long-term market equilibrium are important to firms, forward-looking AAs concern will be on the post-merger long-term market equilibrium (when capital of firms is adjustable): these AAs have a higher forward-looking time horizon than those in Motta & Vasconcelos (2005).

From these assumptions, we will analyse a merger game where two firms, from a total of N+1 firms, $N \in \{1, 2, \ldots\}$, intend to merger.

When there are N firms in the market, each firm maximizes its profit by solving the first condition of optimisation (a 2x2 equation system):

$$\begin{cases} \dfrac{d\pi_N}{dq_N} = 0 \\ \dfrac{d\pi_N}{dk_N} = 0 \end{cases} \Leftrightarrow \begin{cases} 1 - 2q_N - (N-1).q_N - \dfrac{\alpha}{k_N} = 0 \\ \dfrac{\alpha}{k^2} q_N - 4f = 0 \end{cases} \tag{4}$$

Since – 2 – α / k_N < 0 and 2 α / k_N^3 > 0, the solution (q_N, k_N) maximizes the profit of the firm:

$$q_N = \frac{\left(1 + N + \dfrac{\alpha^3}{8f}\right) + \sqrt{\left(1 + N + \dfrac{\alpha^3}{8f}\right)^2 - (1+N)^2}}{(1+N)^2} \tag{5}$$

$$k_N = \sqrt{\frac{4f}{\alpha} \frac{(1+N)^2}{\left(1 + N + \dfrac{\alpha^3}{8f}\right) + \sqrt{\left(1 + N + \dfrac{\alpha^3}{8f}\right)^2 - (1+N)^2}}} \tag{6}$$

Comparing the ante-merger market price, $p_{N+1} = 1 - q_{N+1}$ (when there are $N + 1$ firms), with the market price post-merger, $p_N = 1 - q_N$ (when there are N firms), we conclude that market price is always lower when there are more firms in the market:

$$N\, q_N > (N+1)\, q_{N+1} \Leftrightarrow 1 - N\, q_N < 1 - (N+1)\, q_{N+1} \Leftrightarrow P_N > P_{N+1} \tag{7}$$

This result is important because it is contra-intuitive and it is contrary to Motta & Vasconcelos (2005). Assuming that capital is variable, under no circumstances efficiency enhancements that results from the existence of economies of scale benefit consumers.

But it is unfeasible to have a countless number of firms in the market because the long-term market equilibrium requires that firms' profit is nonnegative:

$$\pi_N(q_N, k_N) = \left(1 - N\, q_N\right) q_N - \frac{\alpha}{k_N} q_N - 4\, k_N f \geq 0 \tag{8}$$

As $1/\alpha$ is the technological level (see expression 3) and 4 f the financial cost of capital, firms' total profit is decreasing with α, and with f. Although not obvious, the firms' total profit is also decreasing with N.

Lets define functions $\bar{f}_N(\alpha) : \pi_N = 0$ that limit the sub-domain of (α, f) where profit of firms is nonnegative (when there are N firms in the market). Being firms' total profit decreasing with α, with f and with N, then those functions $\bar{f}_N(\alpha)$ are asymptotic to ordinates axis, do not cross each another and $\bar{f}_N(\alpha) > \bar{f}_{N+1}(\alpha)$. In the sub-domain between $\bar{f}_N(\alpha)$ and $\bar{f}_{N+1}(\alpha)$ it is feasible to have at most *N* firms (with nonnegative profit).

As consumers' welfare increases with *N*, the forward-looking AA should block all mergers attempt whenever firms profit is positive (see fig. 1).

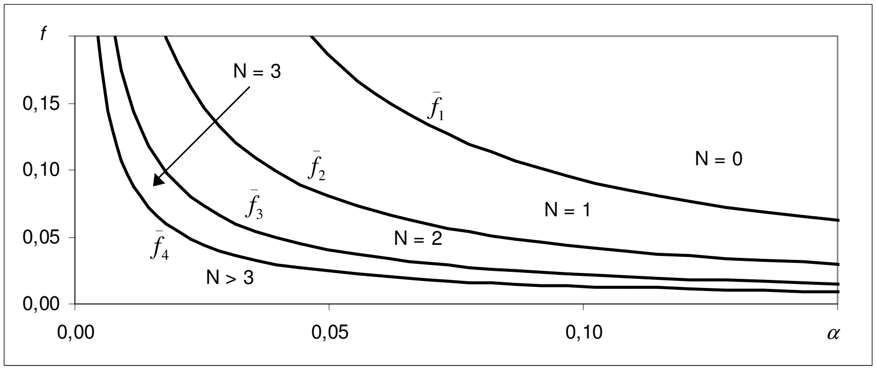

Fig. 1. Equilibria of the game with forward-looking AAs

3. Conclusion

Motta & Vasconcelos (2005) conclude that when firms have economies of scale there are situations where an increase in market concentration may lead to improvement in consumer welfare. Nonetheless, we show in this paper that this result depends critically on Motta & Vasconcelos' (2005) assumption that firms' capital is fixed. By relaxing this assumption, it results that, even when firms have large economies of scale, in the best interest of consumers, forward-looking Antitrust Authorities should always block firms' merger plans whenever pre-merger firms total profits are positive.

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