



# Foreign competition and social efficiency of entry<sup>☆</sup>

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## ABSTRACT

We consider social efficiency of firm-entry in the presence of foreign competition. If the labour markets are competitive, entry is insufficient for the domestic country if the transportation cost is low and the marginal costs of the domestic firms are sufficiently higher than the marginal cost of the foreign firm. In the presence of a domestic labour union, entry is always socially insufficient for the domestic country. Hence, the anti-competitive entry-regulation policy may not be justified in an industry facing foreign competition, and it may depend on the transportation cost, the marginal cost difference between the firms and the domestic labour market structure.

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## 1. Introduction

In an influential paper, Mankiw and Whinston (1986) show that free entry with scale economies is socially excessive in the oligopolistic markets.<sup>1</sup> This result, often called “excess-entry theorem”<sup>2</sup>, provides a justification for anti-competitive entry regulation, and has attracted attention of the researchers for a long time.<sup>2</sup> As Vives (1988) suggests, whether entry is excessive or insufficient is not of purely academic interest. In many countries, governments take actions to foster or deter entry into particular industries. For example, in the post-war period, preventing excessive entry was a guiding principle in the Japanese industrial policy (see, for example, Suzumura, 1995; Suzumura and Kiyono, 1987). Komiya (1975) pointed out the industries such as petrochemicals and certain other chemical industries with a tendency to

develop excessive competition, and it appears that the excessive-entry theorem can justify this phenomenon.

Although the literature examining social efficiency of free entry is quite large and provides several important insights, the previous papers focus on closed economies.<sup>3</sup> However, in this era of globalization, it is fair to say that the policy makers should also take into account the effect of foreign competition while designing competition policies. This limitation of the excess-entry literature motivates us to examine social efficiency of domestic entry in the presence of foreign competition.

In what follows, we show in Section 2 that, in the presence of competitive labour (or in general, input) markets, entry in the domestic country is socially insufficient if the transportation cost is low and the marginal costs of production of the domestic firms are sufficiently higher than the foreign firm's marginal cost of production.<sup>4</sup>

Our “insufficient entry” result complements the recent concern on the “excess-entry” theorem, and shows that entry can be insufficient in

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<sup>1</sup> Under excessive entry, social welfare reduces with entry. If entry is insufficient, social welfare increases with entry.

<sup>2</sup> See, Von Weizsäcker (1980), Perry (1984), Suzumura and Kiyono (1987), Okuno-Fujiwara and Suzumura (1993), Anderson et al. (1995) and Fudenberg and Tirole (2000) for other works on excessive entry in the presence of scale economies. Klemperer (1988), Lahiri and Ono (1988) and Ghosh and Saha (2007) suggest that excessive entry can occur without scale economies but in the presence of marginal cost difference. Spence (1976), Dixit and Stiglitz (1977) and Salop (1979) show that entry can be either excessive or insufficient if there is monopolistic competition.

<sup>3</sup> Two exceptions are those of Lim (2010) and Mukherjee (2012). In an independent work, Lim (2010) examines the excess-entry theorem in the presence of foreign competition and domestic tariff and VER. In contrast, we focus on the transportation cost, and ignore the effect of the tariff revenue. Further, unlike Lim (2010), we consider the effects of labour market distortion. Unlike Mukherjee (2012), which considers the situation with a market leader and competitive input market, this paper considers the problem under competitive and imperfectly competitive input markets with no leadership advantage in the product market.

<sup>4</sup> In order to compare our results with the previous works on “excessive entry”, we ignore the integer constraint while looking at the social efficiency of domestic entry. It follows from Mankiw and Whinston (1986) that entry can be socially insufficient in a closed economy under integer constraint.

oligopolistic markets in the presence of foreign competition even if we ignore the factors, such as vertical relationship (Ghosh and Morita, 2007a,b),<sup>5</sup> technology licensing (Mukherjee and Mukherjee, 2008), spatial competition (Matsumura and Okamura, 2006), external economies of scale (Mukherjee, 2010) and market leadership (Mukherjee, 2012), which are responsible for insufficient entry in other recent works.

If the domestic labour market is competitive, the domestic wage and the domestic firms' marginal costs of production are not affected by the market characteristics such as the number of the firms and the transportation cost. However, that may not be the case in the presence of a domestic labour union, which creates a vertical structure in the domestic country and adjusts the wage depending on the market characteristics. Inspired by the closed economy models of Ghosh and Morita (2007a,b), which show that vertical structures have significant implications on the social efficiency of entry, and due to the wide prevalence of labour unions across countries, we extend our analysis in Section 3 to show the effects of a domestic labour union. In the presence of a domestic labour union, entry is always socially insufficient for the domestic country, thus suggesting that the possibility of insufficient entry under foreign competition increases with the vertical relationship in the domestic country. This result extends the basic conclusions of Ghosh and Morita (2007a,b) to an open economy. Thus, we suggest that the anti-competitive entry-regulation policy may not be justified in an industry facing foreign competition, and it may depend on the transportation cost, the marginal cost difference between the firms and the domestic labour market structure.

In a recent paper, Stähler and Upmann (2008) consider entry regulation policies of two competing countries. They assume that the governments' welfare-maximising best-reply functions do not need to take into account the participation constraints of the firms given by the zero-profit conditions (see, Stähler and Upmann, 2008, pg. 617). Hence, they determine the equilibrium entry policies under the assumption that excess-entry prevails. However, our "insufficient entry" result shows concern to their assumption, and suggests that we need to see whether entry is excessive or insufficient before determining the equilibrium policies of the countries.

The remainder of the paper is organised as follows. Section 2 describes the basic model and shows the results under competitive labour markets. Section 3 shows the implications of a domestic labour union. Section 4 discusses the implications of some of our assumptions. Section 5 concludes.

## 2. Perfectly competitive labour markets

Assume that there is a foreign firm, firm 1, and large number of potential domestic firms.<sup>6</sup> These firms can compete in the domestic country with homogeneous products. In case of competition in the domestic country, we assume that the product market is characterised by Cournot competition. We consider free entry in the domestic country, where entry of a domestic firm requires a fixed entry cost  $K^2$ . The entry cost can be viewed as a fixed investment or the opportunity cost of entering the industry. If the domestic firms acquire the knowledge of the production technology either through innovation or through imitation of the foreign technology, the cost of entry can be interpreted as the cost of innovation or the cost of imitation respectively. The number of domestic firms entering the industry is determined endogenously and entry in the domestic country occurs as long as the net profit of a domestic entrant is non-negative.

<sup>5</sup> Extending Ghosh and Morita (2007a), which mainly consider bilateral bargaining between the upstream and downstream agents, Mukherjee (2009) shows that entry is more likely to be excessive if there is a centralized upstream agent.

<sup>6</sup> The consideration of a single foreign firm allows us to bring foreign competition in the simplest way. Our qualitative results hold with multiple foreign firms.

We assume that firm 1's marginal cost of production is constant, and it is normalized to 0 for simplicity. However, firm 1 incurs a per-unit transportation cost,  $t$ , for exporting to the domestic country. Hence, the total marginal cost of firm 1 is  $t$ , which includes its marginal cost of production and the transportation cost. The constant marginal cost of production of each potential domestic firm is  $c$ . The constant marginal costs of production of the foreign and the domestic firms imply that the foreign and the domestic labour markets are perfectly competitive. Assuming that production requires only labour, we can normalize the labour coefficient of the foreign firm to zero to normalize its marginal cost of production to zero. However, assuming that the labour coefficient of each domestic firm as one, we can then view  $c$  as the competitive wage in the domestic country.

Assume that the inverse market demand function is

$$P = a - q, \quad (1)$$

where  $P$  is price and  $q$  is the total output.

We consider the following game. At stage 1, the domestic firms decide whether to enter the industry. At stage 2, the firms compete like Cournot duopolists in the domestic country and the profits are realised. If no domestic firm enters the industry, the foreign firm sells in the domestic country as a monopolist and the profit is realised. We solve the game through backward induction.

We do our analysis under the following two assumptions:

- A1: The equilibrium output of firm 1 is positive for a given  $n$ , i.e.,  $t < \frac{a+nc}{n+1} \equiv \bar{t}$ .  
 A2: The equilibrium outputs of all active domestic firms are positive, i.e.,  $c < \frac{a}{2}$ .

If  $n$  domestic firms enter the industry, the equilibrium output and profit of firm 1 can be found respectively as

$$q_1 = \frac{a - (n+1)t + nc}{n+2} \quad \text{and} \quad \pi_1 = \frac{(a - (n+1)t + nc)^2}{(n+2)^2}. \quad (2a)$$

The equilibrium output and profit of the  $i$ th domestic firm are respectively

$$q_i = \frac{a - 2c + t}{n+2} \quad \text{and} \quad \pi_i = \frac{(a - 2c + t)^2}{(n+2)^2} - K^2, \quad i = 2, \dots, n+1. \quad (2b)$$

The equilibrium number of domestic firm is given by the zero profit condition  $\pi_i = \frac{(a - 2c + t)^2}{(n+2)^2} - K^2 = 0$ , which gives the equilibrium number of domestic firms as

$$n^*(t) = \frac{a - 2c - 2K + t}{K}. \quad (3)$$

Now determine the domestic welfare-maximising number of domestic firms. Domestic welfare is given by the "sum of net total domestic profit and consumer surplus", i.e.,  $W^d = n\pi_i + \frac{(q_1 + nq_i)^2}{2}$ , where consumer surplus is  $\frac{(q_1 + nq_i)^2}{2}$  and  $i = 2, \dots, n+1$ . Given the equilibrium outputs and profits, domestic welfare maximising number of domestic firms is found by maximising the following expression:

$$\text{Max}_n W^d = \text{Max}_n \frac{2n(a - 2c + t)^2 + (a(n+1) - t - nc)^2}{2(n+2)^2} - nK^2. \quad (4)$$

The domestic welfare maximising number of  $n$  is the solution of the following first order condition:

$$-(n-2)(a - 2c + t)^2 + (a(n+1) - t - nc)(a - 2c + t) - (n+2)^3 K^2 = 0. \quad (5)$$

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