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Trade and FDI liberalization in a general oligopolistic equilibrium☆

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ABSTRACT

Incorporating recent evidence that FDI firms are more efficient than exporters into a general oligopolistic equilibrium model, this paper examines the welfare effects of trade and FDI liberalization. We find that trade liberalization alone is beneficial if the difference in marginal cost between the exporting and FDI industries is small enough while FDI liberalization unambiguously improves welfare. Combining these results, we further show that simultaneous liberalization of trade and FDI necessarily turns out welfare-improving.

1. Introduction

The volume of foreign direct investment (FDI) has increased over the last two decades. According to the latest World Investment Report of UNCTAD (2015), global FDI inflows are $1.23 in 2013, which are nearly three times as large as those in 1995 ($0.4). This report also forecasts that global FDI inflows will grow further due to several factors including 'continued investment liberalization and promotion measures.' (p. 2). Given this trend of global FDI, it is more and more inevitable to take into account the effects of trade policies on FDI. While there are many topics on FDI, 'export versus FDI' has received much attention in literature. A related question is how liberalization of trade and/or FDI affects the choice between these entry modes and welfare.

This paper examines the welfare effects of liberalization of trade and FDI.[1] For this purpose, we develop a two-country general oligopolistic equilibrium (GOLE) model pioneered by Neary (2016).[2] And, we incorporate recent evidence that FDI firms are more efficient than exporting firms into this model.[3] Assuming a continuum of industries engaging in either exporting or FDI depending on the cost parameters, we show that trade liberalization modeled by a tariff reduction improves welfare if either the initial tariff is high enough or the difference in marginal cost between exporting and FDI is sufficiently small. In contrast, FDI liberalization proves necessarily welfare-improving. Combining these results, we finally establish that welfare necessarily improves if trade and FDI are simultaneously liberalized. A straightforward implication of these results is that trade liberalization alone may be welfare-reducing, but that it becomes welfare-improving if FDI liberalization is accompanied. This finding has both theoretical and practical relevance in the sense that the same result is demonstrated in a different setting, e.g. Ishikawa et al. (2010) and Eggar and Etzel (2014).

There is a large literature on the choice between exporting and FDI. By applying Brander and Krugman's (1983) reciprocal market model, Dei (1990), Horstmann and Markusen (1992) and Brainard (1997) propose a so-called 'proximity-concentration trade-off' between these two entry modes. That is, FDI is preferred if trade costs, e.g. a transport cost and/or an import tariff, are high

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[1] This paper focuses only on greenfield FDI as an FDI instrument.

[2] The first version of Neary (2016) was released in 2002.

[3] Helpman et al. (2004) find this evidence for the United States while the same is found by Girma et al. (2004) for Ireland, Girma et al. (2005) for the United Kingdom, and Head and Ries (2003), Tomiura (2007) and Wakasugi et al. (2014) for Japan.

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relative to the fixed cost of FDI.[4] Helpman et al. (2004) theoretically and empirically revisit this hypothesis by allowing FDI in a Melitz (2003) model of firm heterogeneity. Their notable result is that FDI is chosen rather than exporting if firms are sufficiently efficient. Chor (2009) and Ahn (2014) examine FDI policies and FDI liberalization in an extended model of Helpman et al. (2004), respectively.

While the literature published after Helpman et al. (2004) mainly uses a monopolistic competition model, this paper employs an oligopoly model developed by Neary (2016).[5] Neary (2003a,b) combines his model with a Dornbusch–Fischer–Samuelson (1977) model, and examines how the comparative advantage (cost difference) and competitive advantage (difference in the number of oligopolistic firms) interact to determine trade patterns. Neary (2007) discusses the determinant and consequence of cross-border merger, showing that trade liberalization leads to more mergers. Dividing the whole economy into a set of trading industries and a set of non-traded industries, Kreickemeier and Meland (2013) show that a tariff reduction is beneficial whereas Bastos and Straume (2012) find that the welfare effect of trade liberalization is ambiguous in the presence of product differentiation. Our paper is different from the previous studies above in that we allow for FDI.

This paper is organized as follows. Section 2 presents a model. Section 3 investigates the welfare effects of trade and FDI liberalization. Section 4 concludes.

2. Model

Our model is a combination of Brander and Krugman (1983) and Neary (2016). Suppose two identical countries (Home and Foreign) that comprise a continuum of duopolistic industries in a unit interval $[0, 1]$.[6] The utility maximization problem of the Home representative consumer is

$$\max_{c_i} \int_0^1 \left(ac_i - \frac{c_i^2}{2} \right) di \text{ subjectto } \int_0^1 p_i c_i di = I, \tag{1}$$

which yields the first-order condition $a - c_i = \lambda p_i$, where λ is the Lagrangean multiplier and represents marginal utility of income. In this paper, we assume that all firms are 'large' in their product market, but 'small' in the whole economy. Thus, firms take λ parametrically, and we set $\lambda = 1$ following Neary (2016) and the subsequent literature. Then, the demand function of good i becomes $c_i = a - p_i$, and welfare (indirect utility) is fully measured by

$$W = \frac{a - \sigma_p^2}{2}, \quad \sigma_p^2 \equiv \int_0^1 p_i^2 di, \tag{2}$$

by substituting $c_i = a - p_i$ into the utility function in (1). This expression of welfare helps to facilitate analysis since welfare depends only on the second moment of prices σ_p^2.

The whole economy consists of a set of exporting industries $i \in \left[0, \tilde{i}\right]$ and a set of FDI industries $j \in \left[\tilde{i}, 1\right]$.[7] Given the assumption of market segmentation, the inverse demand function of good i of Home and Foreign is $p_i = a - x_i - y_i$ and $p_i^* = a - x_i^* - y_i^*$, where x_i and y_i are respectively the output of the Home firm and that of the Foreign firm in the Home market, and x_i^* and y_i^* are counterparts in the Foreign market.

As to the production technology, marginal labor input of exporting industries is α_1 for all $i \in \left[0, \tilde{i}\right]$ and that of FDI industries is α_2 for all $j \in \left[\tilde{i}, 1\right]$. And, exporting is subject to a specific trade cost t while a fixed amount of labor f has to be employed for FDI. Furthermore, we assume that Foreign labor is employed in order to produce the good for the Foreign market. Summarizing these assumptions, the profit of a representative exporting firm and an FDI firm is defined by

$$\pi_i \equiv p_i x_i + p_i^* x_i^* - w\alpha_1 \left(x_i + x_i^* \right) - t x_i^*$$
$$\pi_j \equiv p_j x_j + p_j^* x_j^* - w\alpha_2 x_j - w^* \alpha_2 x_j^* - wf,$$

where π is a profit, and w is the wage. The Foreign firms' profit is analogously defined. Firms choose outputs in a Cournot fashion to maximize their profit. At this stage, we make:

Assumption. FDI industries are more efficient than exporting industries, i.e. $\alpha_1 > \alpha_2$.

The recent empirical studies have commonly confirmed that firms engaging in FDI are more efficient than exporting firms.[8] The above assumption reflects such evidence, and claims that marginal cost of exporting firms is higher than that of FDI firms.

For the exporting industries, the first-order conditions for profit maximization are obtained as

$$a - w\alpha_1 - 2x_i - x_i^* = 0, \quad a - w\alpha_1 - t - x_i - 2x_i^* = 0,$$

where use is made of the assumption of identical countries; $x_i = y_i^*$ and $x_i^* = y_i$. Solving these equations for x_i and x_i^* yields the Cournot equilibrium outputs:

$$x_i = \frac{a - w\alpha_1 + t}{3}, \quad x_i^* = \frac{a - w\alpha_1 - 2t}{3}. \tag{3}$$

In the same vein, the first-order conditions for profit maximization in the FDI industries are

$$a - w\alpha_2 - 2x_j - x_j^* = 0, \quad a - w\alpha_2 - x_j - 2x_j^* = 0,$$

from which the equilibrium outputs are

$$x_j = x_j^* = \frac{a - w\alpha_2}{3}. \tag{4}$$

In the GOLE model, the wage is endogenously determined so that the labor market in each country clears. By using the equilibrium outputs in Eqs. (3) and (4), the labor market-clearing condition is given by

$$\begin{aligned} l &= \int_0^{\tilde{i}} \alpha_1 \left(x_i + x_i^* \right) di + \int_{\tilde{i}}^1 \left[\alpha_2 \left(x_j + x_j^* \right) + f \right] dj \\ &= \int_0^{\tilde{i}} \alpha_1 \frac{2a - t - 2w\alpha_1}{3} di + \int_{\tilde{i}}^1 \left(\alpha_2 \frac{2a - 2w\alpha_2}{3} + f \right) dj \\ &= \frac{-2\left[\tilde{i}\alpha_1^2 + \left(1 - \tilde{i}\right)\alpha_2^2 \right] w + \tilde{i}(2a - t)\alpha_1 + \left(1 - \tilde{i}\right)(2a\alpha_2 + 3f)}{3}, \end{aligned}$$

where l is the labor endowment. By solving this equation, the equilibrium wage is explicitly computed as follows.

$$w = \frac{2\left[\tilde{i}\alpha_1 + \left(1 - \tilde{i}\right)\alpha_2 \right] a - \tilde{i}\alpha_1 t - 3\left[l - \left(1 - \tilde{i}\right) f \right]}{2\left[\tilde{i}\alpha_1^2 + \left(1 - \tilde{i}\right)\alpha_2^2 \right]}. \tag{5}$$

[4] Markusen (1995, 2002) provides a detailed review of the literature on multinational firms in the last century. Antras and Yeaple (2014) offer an updated review, mainly focusing on the literature of firm heterogeneity.

[5] Colacicco (2015) reviews the basic model of Neary (2016), and some applications to international trade.

[6] Duopoly is assumed just for simplicity. All the results in this paper hold for an arbitrary number of firms as long as all industries have the same number of firms.

[7] If the non-traded industry is added like Helpman et al. (2004), the analysis becomes so complicated that nothing clear is obtained. We recognize that this assumption is restrictive, but make it, following the existing literature, e.g. Dei (1990), Horstmann and Markusen (1992), Brainard (1997) and Mrazova and Neary (2013).

[8] See the papers cited in Section 1.