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## A model for liberalizing nursing and trade

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### ABSTRACT

This paper proposes a model for liberalizing nursing and trade and analyses the welfare effects of nurse and trade liberalizations. We show that the welfare effects of nurse liberalization depend on the income enhancing (I-E) and tariff revenue (TR) effects and that contrary to the conventional (Heckscher-Ohlin) model of capital imports the former is not always zero and the latter is not always negative and then provide sufficient conditions for nurse liberalization welfare enhancing. We also provide a necessary and sufficient condition for trade liberalization welfare enhancing.

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### 1. Introduction

As a result of the Economic Partnership Agreements (EPAs), Japan started to accept foreign nurses. It started in 2008 accepting 104 nurses from Indonesia. At the end of 2014, the total number of nurses from Indonesia was 481 and that from the Philippines was 337. Further, we accepted 21 nurses from Vietnam in 2014.<sup>1</sup>

As the acceptance of foreign nurses began recently, the number of foreign nurses in Japan is still small. However, other OECD countries have already accepted many foreign nurses and the

importance of nurse immigration has been recognized.<sup>2</sup> Yet the economic analysis is scarce. The only work is Rutten (2009) and it deals with the output effects of medical immigration by the use of the Rybczynski theorem. No literature exists on the welfare effects of nurse liberalization.<sup>3</sup>

Today, international agreements on factor mobility including nurses are nested within the EPAs and the liberalization of nurse and trade is proceeding along with the EPAs. Is nurse liberalization welfare enhancing? If enhancing, by what factors and under what conditions? The purpose of this paper is to address these issues and provide an answer to these questions.

Proposing a model for liberalizing nursing and trade, we show that the welfare effects of nurse liberalization depend on the income enhancing (I-E) and tariff revenue (TR) effects and that contrary to the conventional (Heckscher-Ohlin) model of capital imports the former is not always zero and the latter is not always

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<sup>1</sup> Based on the programs of EPAs, these nurses are working at the medical facilities and preparing for the qualifying examination. They must pass it within three years and if not they must return to their countries. Some problems in the examination and the terms of stay have been solved. But one defect of the programs was that it does not require the understanding of Japanese beforehand. Accordingly, all candidates from Vietnam are required to pass the examination of Japanese, N3, before coming to Japan.

<sup>2</sup> See a report of OECD, The Looming Crisis in the Health Workforce: How can OECD countries respond? (2008).

<sup>3</sup> In contrast, many papers have been written on capital imports and welfare including seminal works such as Bhagwati (1973), Brecher and Diaz Alejandro (1977), Hamada (1971), and Uzawa (1969), among others. By the use of the conventional model they produced a wisdom: "Capital import under a tariff is always immiserizing". But this wisdom is too pessimistic and far from the realities. A model that justifies the acceptance of foreign capital in a multi-dimensional framework was provided by Oda and Shimomura (2012).

negative and then provide sufficient conditions for nurse liberalization welfare enhancing. We also provide a necessary and sufficient condition for trade liberalization welfare enhancing. It will be shown that our model produces more general and optimistic results than the conventional one.

Our study is related to the theory of distortions in growth and welfare literature. This theory says that when a distortion such as a tariff exists in an economy an increase in factors of production is not always welfare enhancing. A pioneering work within the realm of trade theory would be Bhagwati (1971). Based on this theory, the conventional model says that trade must be liberalized (a distortion must be removed) before the acceptance of foreign capital. In contrast, in our model, an increase in foreign nurse could be welfare enhancing under a tariff, so that trade need not always be liberalized before the acceptance of foreign nurse.

The rest of the paper is as follows. In Section 2, we point out some stylized facts about nurse inflow in Japan and then set up a model for liberalizing nursing and trade. In Section 3, we consider the factors and conditions for welfare enhancement of nurse and trade liberalizations. Section 4 concludes. The Appendix confirms the stability condition of the model.

## 2. The model

### 2.1. Stylized facts

We start by pointing out some stylized facts about nurse, nurse inflow, and nurse markets in Japan.

First, nurse is an indispensable skilled labor specifically used in the medical care sector and the medical care service is a non-traded good. Therefore, it is necessary to provide a specific factor model with a non-traded good. The specific factor model was developed by Jones (1971) and has been used in many aspects of trade theory including factor mobility.

Second, Japan has been negative to labor inflow, accepting only skilled labor in exceptional cases.<sup>4</sup> This is the same in nurse inflow and we care about the benefits of Japanese nurses. As Giordani and Ruta (2011), we do not choose complete open or complete ban in nurse liberalization.

Third, we have two types of nurses and two nurse markets; the Japanese nurses and foreign ones, and the markets for the Japanese nurses and for foreign ones. Two nurses are considered different in skills and two markets are separated. The market for the Japanese nurses is organized only by the Japanese and protected by the Japanese Nursing Association.

Fourth, at the negotiations of EPAs, Indonesia and the Philippines required the emigration of nurses. In order to start EPAs, Japan decided to accept their nurses. A feature of this nurse inflow is that the Japanese government is paying a training (or education) subsidy.

Fifth, there are labor abundant developing countries that supply nurses to Japan with low rate of returns. We regard them as a foreign country. Thus we totally have three kinds of nurses, three

kinds of markets, and three rates of returns, where two nurses and markets are in Japan and one nurse and market are in the foreign country.<sup>5</sup>

### 2.2. Model setup

We set up a model of nurse inflow and trade that reflects above facts. Assume two countries, host (domestic) and home (foreign). Let the country in question be the host country and assume that as a result of an EPA it liberalizes nurse and trade. It is a small open economy with three sectors; export ( $X$ ), import ( $Y$ ), and non-traded medical care ( $Z$ ). We assume four factors; capital ( $K$ ), unskilled labor ( $L$ ), host nurse ( $N_h$ ), and foreign nurse ( $N_f$ ), where capital, unskilled labor, and host nurse are supplied domestically. Capital is a general factor used in all three sectors and unskilled labor is also a general factor used in both traded sectors. Domestic nurse is a skilled labor educated in the domestic country and used in the medical care sector.<sup>6</sup> Foreign nurse is a semi-skilled labor used in the medical care sector. Thus the medical care is produced by capital and two types of nurses. The production functions are;  $X = X(K_x, L_x)$ ,  $Y = Y(K_y, L_y)$ , and  $Z = Z(K_z, N_h, \delta N_f)$ , where  $\delta$  is a multiplicative parameter that captures the effects of training subsidy. Two nurses are assumed different in skills and two nurse markets are separated. Perfect competition and full employment are assumed.

Choosing export good as the numeraire, denote the domestic relative price of imports by  $p$ . Also let  $q$  be the relative price of medical care determined in the domestic market. Under perfect competition, we have

$$1 = c^x(r, w), \tag{1}$$

$$p = c^y(r, w), \tag{2}$$

$$q = c^z(r, n_h, n_f), \tag{3}$$

where  $r$  is the rental rate of capital,  $w$  the wage rate of unskilled labor,  $n_h$  the rate of returns to domestic nurse, and  $n_f$  the rate of returns to foreign nurse. The right side of (1), (2), and (3) stands for the unit cost function of each good. Assume the domestic country imports  $Y$  under a tariff. Then, we have

$$p = p^* + t, \tag{4}$$

where  $p^*$  is the fixed foreign relative price of imports and  $t$  the specific tariff rate. Given the supply of capital, unskilled labor, domestic nurse, and foreign nurse, the assumption of full employment produces

$$c_r^x(r, w)X + c_r^y(r, w)Y + c_r^z(r, n_h, n_f)Z = K, \tag{5}$$

<sup>5</sup> EPAs require that the rate of returns to foreign nurses in Japan must be equal to that of the Japanese nurses. But the reports of the Japanese Nursing Association and the Ministry of Health, Labor, and Welfare indicate that, at 2014, the average rate of returns to a Japanese nurse per month was about 330,000 yen, whereas that of Indonesian nurse in Japan was about 150,000 yen and that of Indonesian nurse in Indonesia was about 30,000 yen. The difference between former two is about two times while the difference between latter two is just five times. We have another difference; the difference in the passing rate of the qualifying examination. From 2010 to 2014, the average rate of passing of Japanese nurse was 90.1% while that of foreign nurse was just 7.3%.

<sup>6</sup> We assume that the decision of an unskilled labor to be skilled or unskilled has been made in the previous stage. Skill formation has been taken up by Behrens and Sato (2010), Kar and Beladi (2004), and Stark and Zakharenko (2012). Recently, Sato and Yamamoto (2012) provided a model to explain how trade induces skill formation.

<sup>4</sup> In order to level up the competitiveness of the economy, the Japanese government decided, in 2011, to relax the conditions for the permanent stay of foreign skilled labors in science and technology sectors.

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