Economic Modelling 33 (2013) 326–332

Contents lists available at SciVerse ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/ecmod

International factor mobility, monopolistic competition, and wage inequality

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ARTICLE INFO

Article history:
Accepted 5 April 2013

JEL classification:
F21
J31
L13

Keywords:
FDI
Skilled immigration
Unskilled immigration
Wage inequality
Monopolistic competition

ABSTRACT

This paper introduces monopolistic competition into two-sector general equilibrium models to investigate the impacts of international factor mobility on the skilled–unskilled wage inequality. The basic model shows that the change of skilled–unskilled wage inequality is determined by the comparison of the capital–labor distributive shares between the two sectors. The extended model finds that when the output of the monopolistically competitive sector is non-tradable, the mechanism in the basic model fails to work. Thus, we should pay special attention to the role that the non-tradable feature of final-good production plays. In addition, the welfare effects of an FDI inflow are also examined by the basic and extended models.

1. Introduction

Along with the process of globalization, both developed and developing countries have been suffering from growing skilled–unskilled wage gaps. Some empirical studies, such as Lawrence (1994) and Feenstra and Hanson (2003), observe the occurrence of this phenomenon in developed countries like the United States and some European countries. The empirical studies on the skilled–unskilled wage inequality in developing countries can be exemplified by Feenstra and Hanson (1996, 2003), Wood (1997), Anwar and Sun (2012), Mehta and Hasan (2012), and Kamal et al. (2012), which demonstrate that this problem has prevailed in some Asian and Latin American countries.

The growing skilled–unskilled wage inequality worldwide has provoked great interest of many theoretical economists. International factor mobility resulting from economic liberalization has become one of the most important viewpoints in addressing this issue. Related works can be attributed to Wu (2001), Das (2002), Marjit and Kar (2005), Kar and Guha-Khasnobis (2006), Anwar (2006, 2008), Chaudhuri and Yabuuchi (2007), Beladi et al. (2008), Chaudhuri (2008), Jones (2008), Chaudhuri and Banerjee (2010), and Marjit and Kar (2011). They contend that the international migration of skilled and unskilled workers, as well as foreign direct investment, will unambiguously or conditionally widen the skilled–unskilled wage gap.

However, the production sectors are commonly assumed to be perfectly competitive in most of the above-mentioned studies, whereas the monopolistically competitive feature of some sectors, especially of the sector for final good production, is mostly ignored.[1] Since the publication of Dixit and Stiglitz's (1977) original pioneering work, a number of papers have employed the Dixit–Stiglitz monopolistic competition framework to analyze various economic issues. The representative works include Helpman and Krugman (1985), and Fujita et al. (1999). Monopolistic competition, which is featured with a firm's internal increasing return to scale, is an important analytical framework which can also be used to deal with the problem of the skilled–unskilled wage inequality.

In addition, the related aforementioned studies also neglect to test the robustness of their results by considering the non-traded feature of the product, especially when the final non-traded good is produced by the monopolistically competitive sector. The role of the non-traded good production in determining skilled–unskilled wage inequality is stressed by Marjit and Acharyya (2003), Gupta and Dutta (2010), and Oladi et al. (2011). They argue that the introduction of non-traded good production may dramatically change the commonly obtained conditions under which the skilled–unskilled wage inequality is widened.

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[1] A few studies like Anwar (2006, 2008) feature the intermediate production sector with monopolistic competition when analyzing the relation between international factor mobility and skilled-unskilled wage gap, but Anwar (2006, 2008) also neglects to take the monopolistically competitive final-good production into consideration.

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http://dx.doi.org/10.1016/j.econmod.2013.04.013

In order to fill the current research gap, this paper introduces the Dixit–Stiglitz monopolistic competition into two-sector general equilibrium models to investigate how international factor mobility influences the skilled–unskilled wage inequality. The basic model shows that the change in the wage gap is determined by the comparison of the capital–labor distributive shares between each sector. Then we extend the basic model by considering the monopolistically competitive sector that produces a non-traded final good. When the product of the monopolistically competitive sector is non-tradable, the mechanism in the basic model fails to work. Skilled and unskilled immigrants exert definable impacts on the wage inequality. If the return of FDI is sent back to home countries, an inflow of FDI also generates definable impacts on the wage inequality. However, if the return of FDI is not sent back to home countries, the change of the skilled–unskilled wage inequality is determined by the factor substitution elasticity. Our extended model highlights the role that the production of the non-tradable final good plays in the framework of monopolistic competition. The absolute changes in the wage rates of skilled and unskilled workers due to international factor mobility are also investigated.

Furthermore, the effects of an FDI inflow on welfare are also examined by the basic and extended models. In the basic and extended models, we conclude that the Brecher and Alejandro (1977) proposition is conditionally violated. Compared with the situation that the final good produced by the monopolistically competitive sector is tradable, conditions under which social welfare changes in response to an FDI inflow will be strengthened or weakened when the final good produced by that sector is non-traded.

To sum up, the contributions of this paper are mainly embodied in the following aspects. First, we discuss the impacts of international factor mobility on the skilled–unskilled wage gap when the final good sector is monopolistically competitive, which is largely ignored by the existing studies. Second, we consider the case that the final good produced by the monopolistically competitive sector is the non-traded good, which has been generally overlooked, although some literature has highlighted the role of non-traded final good in the framework of perfect competition. Finally, a reexamination of the Brecher and Alejandro (1977) proposition constitutes another contribution to the existing studies.

It is worth mentioning that Anwar (2006, 2008, 2010) also analyzes the impacts generated by international factor mobility and trade liberalization with the consideration of monopolistic competition. However, our paper is greatly different from Anwar's in several respects. First, the monopolistically competitive sector in our paper produces the final good, while the monopolistically competitive sector in Anwar (2006, 2008, 2010) only produces the non-traded intermediate good serving for the production of the perfectly competitive final good. Second, our paper extends the basic model to investigate whether the non-tradable feature of the product in the monopolistically competitive sector affects the change of the skilled–unskilled wage gap due to international factor mobility, which is neglected by Anwar. Third, our paper only considers a two-sector general equilibrium model, while Anwar's works usually adopt a three-sector general equilibrium model. The factor employment in the production sector in our paper is also greatly different from that in Anwar's.

The rest parts of this paper are organized as follows. In Section 2, we build a basic theoretical model to investigate the impacts of international factor mobility on the skilled–unskilled wage inequality. In Section 3, a potential extension of the established theoretical model is provided to test the robustness of the results obtained in Section 2. In Section 4, we make some concluding remarks.

2. Basic theoretical model

Consider a small open economy consisting of two sectors, sector 1 and sector 2. Sector 1 employs skilled labor and capital as factors of production. Sector 2 uses unskilled labor and capital as factors of production. Capital can flow freely between the two sectors. The products of sector 1 and sector 2 are tradable, and their prices are internationally given. Sector 1 is a monopolistically competitive sector, which is composed of a finite number of firms. Each firm in sector 1 produces only one variety of horizontally differentiated products with the same production cost. In sector 1, therefore, the number of the varieties of the products is equal to the number of the firms and the symmetric assumption applies to all the firms (see, Fujita et al., 1999). Sector 2 is a perfectly competitive sector, which produces a homogenous product. Here the price of the good produced by sector 2 is normalized to be unity.

For a representative firm in sector 1, the cost function of this firm is given by:

$$C = (f + ux)w_S^{\theta} r^{1-\theta}, \tag{1}$$

where C is the total production cost, w_S is the wage rate of skilled labor, r is the unit return to capital, θ is a parameter which lies in (0,1), x is the output of the representative firm, f is the fixed cost, and u is the marginal cost.

From Eq. (1) we know that both the unit fixed cost and marginal cost are composed of skilled labor and capital. Such kind of production cost is also used by Anwar (2006, 2009) with regard to the denotation of the monopolistically competitive sector. In addition, Eq. (1) can be also treated as a specific form of the production cost in Chao and Takayama (1990), Chao and Yu (1994), and Markusen and Venables (2000).

The profit maximization of sector 1 yields:

$$p\left(1-\frac{1}{\sigma}\right) = uw_S^{\theta} r^{1-\theta}, \tag{2}$$

where p is the price of the product in sector 1, and σ is the price elasticity of demand and treated as a constant. It is reasonable to denote the price elasticity of demand as a constant because if the consumer's preference is the Dixit–Stiglitz type, the price elasticity of demand is derived from the constant substitution elasticity among different varieties of products (see Fujita et al., 1999; Helpman and Krugman, 1985; Markusen and Venables, 2000).

In the long run, all the firms in sector 1 have no economic profit, and the zero profit condition of a representative firm in sector 1 is described by:

$$px = (f + ux)w_S^{\theta} r^{1-\theta}. \tag{3}$$

The cost minimization condition of sector 2 is shown as:

$$1 = a_{LA}w_U + a_{KA}r, \tag{4}$$

where w_U is the wage rate of unskilled labor, and a_{LA} and a_{KA} are the unskilled labor and capital used to produce one unit of the product in sector 2, respectively.

The full employment conditions of the factor markets are given by:

$$\theta(f + ux)w_S^{\theta-1} r^{1-\theta} n = \overline{L}_S, \tag{5}$$

$$(1-\theta)(f + ux)w_S^{\theta} r^{-\theta} n + a_{KA}A = \overline{K}, \tag{6}$$

$$a_{LA}A = \overline{L}_U, \tag{7}$$

where A is the output of sector 2, n is the number of firms in sector 1, and $\overline{L}_S, \overline{K}$, and $\overline{L}_U$ are the economic endowments of skilled labor, capital and unskilled labor, respectively.

This paper treats the skilled–unskilled wage gap as the ratio of the wage rate of skilled labor and that of unskilled labor, namely $\frac{w_S}{w_U}$. The change of the skilled–unskilled wage inequality is simply depicted by the disparity between the relative change rate of skilled labor's wage rate and that of unskilled labor's wage rate. Similar