

International Migration and Real Wages

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Abstract

We provide an analysis of the impact of migration on the skilled- unskilled wage gap. In particular, we show the possibility of a rise in the wage gap following the migration of skilled (unskilled) labor.

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1. Introduction

International migration of labor has always been an area of great concern for policy makers and researchers. There is considerable academic research that relate international migration to skilled – unskilled wage gap in an economy. A notable sample can be drawn from Davis (1998), Feenstra (2000), Feenstra and Hanson (2003), Jones and Marjit (2003), Kar and Beladi (2004) and Marjit and Kar (2005) and Marjit, Beladi, and Chakrabarty (2003).

It is worth noting that most of the research to date looking for consequences of international migration on wage gap has been done using models that focus on traded goods and neglect the role of non-traded goods. In many developed countries the majority of low-wage unskilled labor are predominately employed in non-traded goods sector. In the U.S., 73.4 percent of low-wage workers are employed in the non-traded service sector while only 26.6 percent are employed in the traded goods industries. The statistics are similar for the European Union where 73.6 percent of low-wage employment is concentrated in the non-traded industries whereas only 26.4 percent is found in the traded-goods sector.¹

Our purpose in this paper is to highlight the role of non-traded goods, as in Beladi and Batra (2004), and explore the consequences of international migration on the wage gap as both skilled and unskilled labor immigrate. We show, among other things that migration of unskilled labor lowers both skilled and unskilled wages in the host country and the wage gap widens between the wages of skilled and unskilled workers under a fair condition.

2. The Model

We assume a small open economy with three production sectors: exportable, importable, and non-traded. The production technology of the exportable sector is represented by the production function $X_e = F_e(K_e, L_e)$, where X_e is the quantity of production in the exportable sector, and K_e and L_e are the capital and skilled labor usage in this sector, respectively. Similarly, the production function for the importable sector is given by $X_i = F_i(K_i, L_i)$, where X_i is the quantity of importable good, K_i is the capital used in the production of importable good, and L_i denotes the skilled labor used by the importable sector. Finally, capital and unskilled labor are used as inputs in the production of the non-traded good with the production technology $X_n = F_n(K_n, L_u)$, where X_n , K_n , and L_u denote

¹For more details, see Beladi and Batra (2004) and OECD (2001).

the quantity of production in the non-traded good sector, capital employed by non-traded sector, and unskilled labor used in this sector, respectively. Following Beladi and Batra (2004) and consistent with their observation, we assume that the unskilled labor is used only in the non-traded sector. All the neoclassical assumptions are imposed on the above production functions.

We assume that all markets are perfect competitive, according to which we have the following zero profit conditions:

$$a_{Le}w + a_{Ke}r = p_e \quad (2.1)$$

$$a_{Li}w + a_{Ki}r = p_i \quad (2.2)$$

$$a_{Ln}w_u + a_{Kn}r = p_n \quad (2.3)$$

where a_{Lj} , a_{Kj} , and p_j are the labor-output ratio, capital-output ratio, and the price in sector $j = e, i, n$, respectively. Moreover, w , w_u , and r are the skilled wage, unskilled wage, and the return to capital, respectively. Full employment of all factors requires the following additional conditions:

$$a_{Le}X_e + a_{Li}X_i = \bar{L} \quad (2.4)$$

$$a_{Ke}X_e + a_{Ki}X_i + a_{Kn}X_n = \bar{K} \quad (2.5)$$

$$a_{Ln}X_n = \bar{L}_u \quad (2.6)$$

where $\bar{L}, \bar{K}, \bar{L}_u$ are the fixed endowments of skilled labor, capital, and unskilled labor, respectively. Equations (2.4)-(2.6) imply that skilled labor is mobile between the exportable and the importable sectors, while capital is mobile across all three sectors and that unskilled labor is specific to the non-traded good sector. Due to our assumption of a small open economy, p_e and p_i are given by international markets. As for the price of the non-traded good, it is determined by the domestic market clearing condition, i.e.:

$$X_n = D(p_n, p_e, p_i, I) \quad (2.7)$$

where D is the demand for the non-traded good and the left-hand side of equation (2.7) is the supply of the non-traded good. I denotes national income, defined as:

$$I = \sum_{j=e,i,n} p_j X_j \quad (2.8)$$

The system of equations (2.1)-(2.8) is a complete general equilibrium system with eight endogenous variables. We normalize all (input) prices to have initial value of unity.

Now, using the linear homogeneity of the unit cost function, we can rewrite equations (2.1)-(2.3) using real factor prices. Then, by differentiating these equations, and denoting proportional changes by a circumflex we get:

$$(a_{Le}\hat{\omega} + a_{Ke}\hat{\rho})/\hat{X}_n = -1/\eta_n \quad (2.9)$$

$$(a_{Li}\hat{\omega} + a_{Ki}\hat{\rho})/\hat{X}_n = -1/\eta_n \quad (2.10)$$

$$a_{Ln}\hat{\omega}_u + a_{Kn}\hat{\rho} = 0 \quad (2.11)$$

where ω , ω_u and ρ denote the real skilled wage, real unskilled wage, and real return to capital, respectively, all in terms of non-traded good and $\eta_n < 0$ is the price elasticity of demand for the non-traded good.

Now we turn to the questions we have raised in the next two sections.

3. The impact on the host country

In this section we explore the impact of unskilled and skilled labor migration on real skilled and unskilled wages as well the gap between them for the host country. First, assume that the endowment of unskilled labor increases as a result of migration, resulting in an increase in marginal product of capital in the non-traded sector. This brings about movements of capital from both importable and exportable sectors to non-traded sector. Thus, the output of non-traded sector rises, i.e., $\hat{X}_n > 0$. On the other hand, the marginal product of labor falls in both of the trading sectors, lowering the real skilled wage, that is, $\hat{\omega} < 0$. This, along with equation (2.9) and $\hat{X}_n > 0$, imply that the real return to capital increases across the economy, i.e., $\hat{\rho} > 0$. Consequently, all this along with equation (2.11), indicate that the real unskilled wage must fall, $\hat{\omega}_u < 0$.

The most interesting issue is however the impact of this type of migration on the gap between skilled and unskilled wages. To investigate this, we substitute equation (2.11) in equation (2.10) to obtain $\hat{\omega} > ((k_i)/(k_n))\hat{\omega}_u$. This implies that $\hat{\omega} > \hat{\omega}_u$ if $k_i < k_n$. Note that, as the changes in both real wages are negative, this indicates that the absolute value of the change in unskilled real wage is greater than the absolute value of the change in skilled wage. Therefore, we have the following proposition.

Proposition 3.1. *Migration of unskilled labor decreases both skilled and unskilled real wages in the host country. Moreover, such migration widens the gap between skilled and unskilled wages if the importable sector is less capital intensive than the non-traded sector.*

Now let the endowment of skilled labor increase as a result of migration. This increases the marginal product of capital in both the exportable and importable sectors, causing movements of capital from the non-traded sector to exportable and importable sectors. This, in turn, leads to a decrease in production of the non-traded good, i.e. $\hat{X}_n < 0$, as well as a decrease in marginal product of unskilled labor. The latter implies that unskilled wage falls, i.e. $\hat{\omega}_u < 0$. This and equation (2.11) imply that return to capital increase across the economy, that is, $\hat{\rho} > 0$. Finally, equation (2.10) and $\hat{\rho} > 0$ imply that $\hat{\omega} < 0$ as we already concluded that $\hat{X}_n < 0$.

Next, we investigate the impact of skilled labor migration on skilled-unskilled wage gap. We substitute equation (2.11) in equation (2.10) and use $\hat{X}_n < 0$ to conclude that $(k_n/k_i)\hat{\omega} < \hat{\omega}_u$. With this the following result is in order.

Proposition 3.2. *Migration of skilled labor decreases both skilled and unskilled real wages in the host country. However, the skilled-unskilled wage gap reduces as a result of such migration if the non-traded sector is less capital intensive than the importable sector.*

The following proposition formally addresses the fate of capital.

Proposition 3.3. *Migration of unskilled or skilled labor increases the real return to capital.*

4. The impact on the source country

Turning to the source country in this section, let the endowment of unskilled labor decrease due to migration. As a result, the marginal product of capital decreases in the non-traded sector. This in turn leads to movements of capital from the non-traded sector to both the importable and exportable sectors. Thus, the output of non-traded good falls, i.e., $\hat{X}_n < 0$. Moreover, the movements of capital from the non-traded sector to tradable sectors raise the marginal product of skilled labor in the economy, which results in an increase in the skilled real wage, i.e., $\hat{\omega} > 0$. As $\hat{X}_n < 0$ and $\hat{\omega} > 0$, it can be concluded from equation (2.10) that the return to capital must fall across the economy, that is, $\hat{\rho} < 0$. Finally, equation (2.11) and $\hat{\rho} < 0$ imply that $\hat{\omega}_u > 0$, i.e., the unskilled wage must go up.

As in the preceding section, now we explore the gap between skilled and unskilled wages. Again, we conclude from $\hat{X}_n < 0$ as well as equations (2.10) and (2.11) that $\hat{\omega} < \hat{\omega}_u$ if $k_i < k_n$. Therefore we have the following proposition:

Proposition 4.1. *Migration of unskilled labor increases both skilled and unskilled real wages in the source country. Moreover, such migration reduces the gap between skilled and unskilled wages if $k_i < k_n$.*

Next assume that skilled labor migrates from the source country, resulting in a decline in the marginal product of capital in the importable and exportable sectors. This leads to movements of capital from these two tradable sectors to the non-traded sector, raising the marginal product of unskilled labor and hence the real unskilled wage, that is, $\hat{\omega}_u > 0$. This and equation (2.11), in turn, imply that $\hat{\rho} < 0$. Moreover, it is clear that $\hat{X}_n > 0$. We then conclude from $\hat{\rho} < 0$, $\hat{X}_n > 0$, and equation (2.10) that $\hat{\omega} > 0$. Once again, using $\hat{X}_n > 0$, and equations (2.10) and (2.11), we obtain that $\hat{\omega} > \hat{\omega}_u$ if $k_i > k_n$. Thus, we have the following result.

Proposition 4.2. *Migration of skilled labor increases both skilled and unskilled real wages in the source country. Moreover, such migration increases the gap between skilled and unskilled wages if $k_i > k_n$.*

As for the impact of migration, skilled or unskilled, on return to capital, we have the following formal statement.

Proposition 4.3. *Migration of unskilled or skilled labor decreases the real return to capital in the source country.*

5. Conclusion

The purpose of this paper was to analyze the impact of international migration of skilled and unskilled labor on the wage gap. We show that factor intensities and the output of the non-traded sector continue to play a dominant role in explaining the behavior of skilled and unskilled wages.

In particular, we point out that migration of both skilled and unskilled labor would decrease skilled (unskilled) wages in the host country irrespective of capital intensity ranking. However, migration of skilled (unskilled) labor would decrease (increase) the skilled–unskilled wage gap if importables are the most (least) capital-intensive.

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