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Foreign Direct Investment, Non-traded Goods and Real Wages

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Abstract

Using a three-sector general equilibrium model with non-traded goods, we investigate the impact of foreign direct investment on the real wages of skilled and unskilled workers. We show that foreign direct investment increases the real wages of skilled and unskilled workers, but widens the gap between the two under plausible conditions.

JEL: F10, F11, F21
Keywords: Real wages, foreign direct investment, non-traded goods

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Abstract

Using a three-sector general equilibrium model with non-traded goods, we investigate the impact of foreign direct investment on the real wages of skilled and unskilled workers. We show that foreign direct investment increases the real wages of skilled and unskilled workers alike, but widens the gap between the two under plausible conditions.

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1 Introduction

The rapid pace of globalization over the past decade has raised, among other issues, questions over the impacts on wage trends in general and on the disparity of between the wages of skilled and unskilled workers in particular. Many observers view globalization and its major economic elements, international trade and foreign investment, as the driving forces behind wage disparity. With respect to the former, Wood (1994), Bergstrand et al. (1994), Leamer (1996), and Beladi and Batra (2004), among others, have addressed the impact of trade on the skilled-unskilled wage gap. Others, including Bhagwati and Dehejia (1994), Krugman and Lawrence (1993), and Katz and Murphy (1992), put the focus on technical progress. In yet another approach, Das (2002) considered the impact of foreign direct investment on the relative wage for a developing economy.

As noted in Beladi and Batra (2004), in the United States, as in other economies, almost all unskilled labor is used by non-traded sectors such as services produced in restaurants, hair salons, retailing, etc. In most empirical studies, unskilled labor is identified as low-wage workers who often lack college education. Table 1 compares employment of low-wage production workers in traded and non-traded industries in the United States. Production workers usually earn less than the non-production workers in an industry. As shown, about 19.65 million low-wage workers were employed by non-traded good industries, compared to 0.51 million in traded-goods industries. That is, about 97 percent of

low-wage workers were employed in the non-traded sectors in the United States.[1] Given this important observation, it is imperative to consider non-traded sectors of an economy in order to study the behavior of wages for skilled and unskilled workers.

In recent work the presence of non-traded goods has not been considered, despite the fact that the non-traded good sectors of an economy employ most of the unskilled labor in an economy. Hence, while the impact of globalization on the skilled-unskilled wage differential has been studied extensively, an important aspect of this issue has been largely overlooked. This paper investigates, within the context of a small, open economy, the impact of foreign direct investment (FDI) on skilled and unskilled wages. In doing so, we depart from the existing literature by explicitly including non-traded goods in our analysis as in Batra (1973) and Beladi and Batra (2004), and FDI as in Das (2002).

The remainder of the paper is structured as follows. We present our model and derive our results in section 2, while section 3 presents concluding comments.

2 The Model and Analysis

Consider a small, open economy consisting of three sectors: an exportable good, an importable good and a non-traded good. Production of the exportable good uses foreign capital and skilled labor as inputs, and is represented by the production function $X_e = F_e(K_f, L_e)$, where X_e denotes the quantity of production in the exportable sector, and K_f and L_e are the capital and skilled labor used in this sector, respectively. We assume that foreign capital K_f is only used in the exportable sector. This is, to a large extent, consistent with the behavior of multinational corporations, which often invest in the export sector and sell their products across the globe. In the import competing sector, the production process uses both domestic capital and skilled labor, that is, $X_i = F_i(K_i, L_i)$, where X_i is the quantity of production of the importable good, K_i is the domestic capital used in the production of importable good, and L_i denotes the skilled labor usage by the import competing sector. Finally, domestic capital and unskilled labor are used as inputs in the production of the non-traded good, using production technology $X_n = F_n(K_n, L_u)$, where X_n, K_n, and L_u denote the quantity of production in the non-traded good sector, domestic capital employed by non-traded sector, and unskilled labor used in this sector, respectively. The inclusion of unskilled labor as an input only in the non-traded sector is compatible with our earlier observation. We maintain all the neoclassical assumptions

[1] We follow Beladi and Batra (2004) and choose the wage rate of \$10 as our cut-off level for skilled and unskilled labor.

regarding the above production functions, which exhibit constant returns to scale and diminishing marginal productivity.

We assume that all markets are perfect competitive. Then the following equations are the zero profit conditions for the three industries:

$$a_{Le}w + a_{Ke}r_f = p_e \tag{1}$$

$$a_{Li}w + a_{Ki}r = p_i \tag{2}$$

$$a_{Ln}w_u + a_{Kn}r = p_n \tag{3}$$

where a_{Lj}, a_{Kj}, and p_j, $j = \{e, i, n\}$, are the optimal unit labor and unit capital demands, and the price in sector j, respectively, w and w_u are the returns to skilled and unskilled labor, respectively, and r and r_f are the returns to domestic and foreign capital. The production side of the model is completed by the resource constraints:

$$a_{Le}X_e + a_{Li}X_i = \bar{L} \tag{4}$$

$$a_{Ke}X_e = \bar{K}_f \tag{5}$$

$$a_{Ki}X_i + a_{Kn}X_n = \bar{K} \tag{6}$$

$$a_{Ln}X_n = \bar{L}_u \tag{7}$$

where $\bar{L}, \bar{L}_u, \bar{K}$ and $\bar{K}_f$ are the fixed endowments of skilled labor, unskilled labor, domestic capital, and foreign capital, respectively.

Note that equation (4) implies that skilled labor is mobile between the exportable and the import competing sectors, while equation (7) indicates that unskilled labor is specific to the non-traded good sector. Similarly, equation (6) assumes that domestic capital is mobile across the importable good and non-traded good sectors and equation (5) states that foreign capital is sector specific. Sector specificity of foreign capital stems from the observation that multinational corporations tend to invest heavily in export sectors, especially in developing economies. Moreover, such corporations account for most FDI. Given our assumption of a small open economy, p_e and p_i are given by international markets for exportable and importable goods. For the non-traded good, the domestic market clearing condition determines the price, i.e:

$$X_n = D(p_n, p_e, p_i, I) \tag{8}$$

where the left-hand side of equation (8) is the supply of the non-traded good and D is the demand function for the non-traded good. I denotes national income, defined as:

$$I = p_eX_e + p_iX_i + p_nX_n - r_fK_f \tag{9}$$

The first three terms in equation (9) are gross domestic product, while the last term is the repatriated income earned by foreign capital. The system of equations (1)-(9) constitute our complete general equilibrium system with nine endogenous variables. We normalize output units such that all prices have an initial value of unity.

We now turn to the first question we have raised: the impact of FDI on real skilled and unskilled wages. The following proposition addresses this issue:

Proposition 1. *An increase in foreign direct investment increases both the unskilled and skilled wage in real terms.*

Proof. First, we show that the real unskilled wage in terms of the non-traded good increases. As foreign capital flows in, the marginal product of skilled labor in the exportable sector rises, and hence so does the real skilled wage in terms of the exportable and the nominal skilled wage. This results in migration of skilled labor from the importable sector to the exportable sector. However, this in turn decreases the marginal product of domestic capital in the importable sector, and hence the real return to domestic capital in terms of the importable and the nominal return to domestic capital. This leads to migration of domestic capital to the non-traded sector. As a consequence the marginal product of unskilled labor, and hence the real return to unskilled labor in terms of the non-traded good, rises.

Now, using the linear homogeneity of the unit cost function, we can rewrite equations (1)-(3) using real factor prices in terms of the non-traded good. Then, by differentiating equations (1)-(3), and denoting proportional changes by a circumflex we obtain:

$$(a_{Li}w\hat{\omega} + a_{Ki}r\hat{\rho})/\hat{X}_n = -1/\eta_n \tag{10}$$

$$a_{Ln}w_u\hat{\omega}_u + a_{Kn}r\hat{\rho} = 0 \tag{11}$$

where ω, ω_u, and ρ denote the real skilled wage, real unskilled wage, and real return to domestic capital, respectively, all in terms of the non-traded good, and $\eta_n < 0$ is the price elasticity of demand for the non-traded good. Now, since we have already established that $\hat{\omega}_u > 0$, equation (11) implies that $\hat{\rho} < 0$. This and equation (10) in turn imply that $\hat{\omega} > 0$. Note also that $\hat{X}_n > 0$ due to positive marginal productivity and since domestic capital moves into the non-traded good sector. □

Moreover, we conclude, from the proof of the above proposition, the following corollary that addresses the fate of domestic/foreign capital:

Corollary 1. *An increase in foreign direct investment decreases the return to domestic capital in nominal terms and in real terms relative to all goods.*

This result follows from the fact that the nominal return to capital must fall by the logic developed above, and by the fact that the prices of the importable and exportable are fixed. Hence we have established that foreign capital inflow unambiguously hurts owners of domestic capital and unambiguously benefits both skilled and unskilled labor.

Finally, we turn to the most important question that this paper has raised: the impact of foreign direct investment on gap between skilled and unskilled wages. Even though both wages increase, it is imperative to investigate the gap between these wages. Hence the following proposition:

Proposition 2. *An increase in foreign direct investment widens the gap between real skilled and unskilled wages if the import competing sector is capital intensive relative to the non-traded good sector.*

Proof. Again we conclude from equation (10) that:

$$a_{Li} w \hat{\omega} + a_{Ki} r \hat{\rho} > 0 \tag{12}$$

Then, using equation (11), we rewrite equation (12) as $\hat{\omega} > (k_i/k_n)\hat{\omega}_u$, where $k_i = K_i/L_i$ and $k_n = K_n/\bar{L}_u$. This implies that $\hat{\omega} > \hat{\omega}_u$ if $k_i > k_n$. □

3 Conclusion

We presented a three-sector general equilibrium model with the complexity of having four factors of production, skilled and unskilled labor and foreign and domestic capital. The foreign capital and unskilled labor are specific to the exportable and non-traded good sectors, respectively, while skilled labor is used in both the exportable and the importable sectors and domestic capital is used in the importable and non-traded sectors. We showed that an increase in foreign direct investment increases both skilled and unskilled real wages relative to all goods, while it decreases the real return to domestic capital. More importantly, we indicated that foreign direct investment increases the real skilled-unskilled wage disparity under a plausible factor intensity condition.

We have demonstrated another avenue through which globalization could increase the divide between skilled and unskilled workers. Hence, our results provide a foundation for further empirical investigation of skilled and unskilled wage behavior.

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Table 1: Low-wage Employment of Production Workers in the Non-farm Economy, 2001 (thousands)

Industry	
Traded goods	
Lumber and Wood Products	48
Textiles and Apparel	436
Leather Products	27
Total	**511**
Non-traded goods	
Retail	17,642
Personal Services	390
Hotel Services	1,623
Total	**19,655**

Source: Statistical Abstract of the United States (2002)