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**Native Welfare Losses from High Skilled
Immigration**

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Native Welfare Losses from High Skilled Immigration

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Abstract:

This paper explores the effects of high skilled immigration to a host country with unionized low skilled labor and an unemployment insurance scheme. We show that such immigration can create a negative immigration surplus due to adverse effects on low skilled employment, provided that the elasticity between high and low skilled labor is high as empirical evidence suggests.

JEL-Classification: F22, J5, H53, J61, J65

Keywords: Immigration, Trade Union, Unemployment, Elasticity of Substitution

I. Introduction

While the impact of the international mobility of the highly skilled on sending countries has received continuous interest (Bhagwati & Hamada, 1974; Mountford, 1997; Fan & Stark, 2007), the beneficial effects for receiving countries have been taken more or less for granted. In particular, the interaction between high skilled immigration and distortions in other labor market segments of the host country which may render immigration into these segments undesirable has received little attention. This is somewhat surprising as these distortions figure prominently in the debate on immigration policy, stressing not only the fiscal, but also the employment virtues of attracting high skilled workers (OECD, 2002, Chiswick, 2005).

This paper builds a simple model addressing the question how high skilled immigration affects a host economy with a distorted low skilled labor market. Featuring some important characteristics of European labor markets, unemployment results from the existence of trade unions and an unemployment insurance scheme.

We show that high skilled immigration can indeed impose a burden on the aggregate income of the native population. This loss is based on the empirically corroborated fact that high and low skilled labor are close, albeit imperfect substitutes in the production process (Johnson, 1997; Card & Lemieux, 2001). With this property, we find that a higher number of high skilled workers reduces total low skilled employment as low skilled labor demand, determining unions' wage markup, becomes less elastic. This effect is reinforced by intensified fiscal redistribution from the high to the low skilled.

The paper is organized as follows. Section II derives the labor market equilibrium of the host economy. Section III addresses the effects of high skilled immigration on the labor market and the overall position of natives. Section IV offers some concluding remarks.

II. The Host Economy

Consider an economy where competitive firms produce the output with the inputs high and low skilled labor H and L according to a CES production function:

$$Y = [\alpha H^\rho + (1 - \alpha)L^\rho]^{1/\rho}, \quad (1)$$

where $\rho > 0$, which is the empirically more relevant case of close substitutability of skills (Johnson, 1997; Card & Lemieux, 2001).

The native population comprises high and low skilled workers in amounts N_H and N_L , respectively. The number of high skilled immigrants is M_H .

The high skilled labor market is perfectly competitive, ensuring full employment of this skill type by full flexibility of the wage w_H . In contrast, the low skilled wage w_L is determined by a standard monopoly union model (Layard et al., 1991), where unions act at the firm level in order to maximize a weighted surplus of members' per capita net income and employment L relative to the reference situation. As both unions and firms are small relative to the economy, this reference situation is characterized by full lay-off with all members receiving an unemployment benefit b . Letting τ denote the contribution rate to unemployment insurance, the union objective reads:

$$\Omega = \log[(1 - \tau)w_L - b] + \log L. \quad (2)$$

When setting w_L , unions anticipate that firms hire labor according to the respective marginal productivity conditions:

$$\frac{\partial Y}{\partial H} = [\alpha(N_H + M_H)^\rho + (1 - \alpha)L^\rho]^{\frac{1}{\rho}-1} \alpha(N_H + M_H)^{\rho-1} = w_H, \quad (3)$$

$$\frac{\partial Y}{\partial L} = [\alpha(N_H + M_H)^\rho + (1 - \alpha)L^\rho]^{\frac{1}{\rho}-1} (1 - \alpha)L^{\rho-1} = w_L, \quad (4)$$

where both L and w_H adjust for equilibrium, the high skilled wage warranting $H = N_H + M_H$. It is straightforward to show that both L and w_H decrease in the low skilled wage.

Taking into account (4), the maximization of (2) yields the first-order condition for w_L :

$$\frac{(1 - \tau)}{(1 - \tau)w_L - b} + \frac{\partial L}{\partial w_L} \frac{1}{L} = 0, \quad (5)$$

The second-order condition is easily shown to be fulfilled.

Considering the fact that aggregate low skilled labor demand cannot exceed aggregate supply, (5) can be written as:

$$WS = (1 - \tau)w_L(\gamma + (1 - \gamma)\varepsilon) - (1 - \gamma)\varepsilon b \geq 0, \text{ with } = 0 \text{ if } w_L \geq w_L^*, \quad (6)$$

where w_L^* denotes the full employment wage and

$$\varepsilon = \frac{\partial L}{\partial w_L} \frac{w_L}{L} = \frac{\alpha H^\rho + (1 - \alpha)L^\rho}{(\rho - 1)\alpha H^\rho}, \quad (7)$$

is the (own) wage elasticity of low skilled labor demand, which decreases in the amount of high skilled labor:

$$\frac{\partial \varepsilon}{\partial H} = \frac{(1 - \alpha)\rho L^\rho}{\alpha(1 - \rho)H^{\rho-1}} > 0. \quad (8)$$

Equation (6) has the usual interpretation that the low skilled net wage is a markup $(1 - \gamma)\varepsilon / ((1 - \tau)(\gamma + (1 - \gamma)\varepsilon))$ on the benefit, which is inversely related to the labor demand elasticity.

Accordingly, both an increase of the unemployment benefit and the tax rate reduce the preferred employment level, as either the reference point or the markup itself increases:

$$\left. \frac{\partial L}{\partial b} \right|_{WS} = - \underbrace{\frac{\partial WS / \partial b}{\partial WS / \partial L}}_{(>0)} < 0, \quad \left. \frac{\partial L}{\partial \tau} \right|_{WS} = - \underbrace{\frac{\partial WS / \partial \tau}{\partial WS / \partial L}}_{(>0)} < 0. \quad (9)$$

Unemployment benefits are financed by taxing low and high skilled earnings at rates τ and $\delta\tau$, respectively. Thus, the welfare state is actuarial unfair if $\delta > 0$ as the high skilled contribute but do not receive any benefits.

Utilizing (3), the unemployment insurance budget constraint $b(N_L - L) = \tau w_L L + \delta\tau w_H H$ can be written as:

$$BB = b - \frac{\tau w_L L}{(N_L + M_L - L)} \left[1 + \frac{\delta\alpha}{1 - \alpha} \left(\frac{H}{L} \right)^\rho \right] = 0. \quad (10)$$

A labor market equilibrium requires (6) and (10) to be mutually compatible.

Proposition 1. *For every $\tau \in [0, 1]$, there exists at least one stable labor market equilibrium.*

Proof. follows from the fact that WS is a continuous function in (b, L) -space, with $L = N_L$ for $b < \max[b^*, 0]$ where b^* denotes the benefit level for which $w_L = w_L^*$ according to WS. For $b \geq \max[b^*, 0]$, L decreases continuously in b . For $\tau = 0$, BB coincides with the L -axis, hence equilibrium employment amounts to $\min[\underline{L}, N_L]$. For $\tau > 0$, BB is continuous in (b, L) -space, with $b = 0$ for $L = 0$ whereas $\lim_{L \rightarrow N_L} b = \infty$. Hence, BB must cut WS at least once from below, which means that the equilibrium complies with the stability property:

$$\begin{aligned}
 |D| &= \frac{\partial WS}{\partial b} \frac{\partial BB}{\partial L} - \frac{\partial BB}{\partial b} \frac{\partial WS}{\partial L} \\
 &= -\frac{(1-\gamma)\varepsilon\tau w_L}{N_L + M_L - L} \frac{\delta\alpha\rho}{1-\alpha} \left(\frac{H}{L}\right)^\rho + \frac{\gamma(1-\tau)w_L}{\varepsilon} \frac{\partial \varepsilon}{\partial L} \\
 &\quad + \frac{(1-\tau)w_L(N_L + M_L)}{L^2(N_L + M_L - L)} \frac{\gamma + (1-\gamma)\varepsilon}{1-\gamma} < 0 \quad \square.
 \end{aligned} \tag{11}$$

Although additional equilibria with $|D| > 0$ may exist, the following analysis concentrates on a stable equilibrium. We do so because a tax increase, increasing the wage markup and the unemployment benefit, impinges on low skilled employment only when (11) holds:

$$\frac{\partial L}{\partial \tau} = \frac{1}{|D|} \left[\underbrace{\frac{\partial WS}{\partial \tau}}_{(>0)} \underbrace{\frac{\partial BB}{\partial b}}_{(>0)} - \underbrace{\frac{\partial WS}{\partial b}}_{(>0)} \underbrace{\frac{\partial BB}{\partial \tau}}_{(<0)} \right] \stackrel{\leq}{\geq} 0 \quad \Longleftrightarrow \quad |D| \stackrel{\leq}{\geq} 0.$$

III. The Effects of Immigration

This section addresses the consequences of high skilled immigration for employment and the total income of natives.

Proposition 2. *High skilled immigration reduces low skilled employment.*

Proof. Low skilled employment reacts according to:

$$\begin{aligned} \frac{dL}{dM_H} &= \frac{\partial WS/\partial H \cdot \partial BB/\partial b - \partial WS/\partial b \cdot \partial BB/\partial M_H}{|D|} \\ &= \underbrace{\frac{1}{|D|}}_{<0} \left[\underbrace{-\frac{\gamma(1-\tau)w_L}{(1-\gamma)\varepsilon} \frac{\partial \varepsilon}{\partial H}}_{(>0)} - \delta \underbrace{\frac{\rho\varepsilon\alpha(1-\gamma)\tau w_L}{(1-\alpha)(N_L + M_L - L)} H^{\rho-1} L^{-\rho-1}}_{(<0)} \right]. \square \end{aligned}$$

The economic mechanisms behind this result are simple. First, the stronger presence of the high skilled makes low skilled labor demand less elastic. This increases the markup for a given benefit. Second, the income share of the high skilled increases ($\frac{\partial(w_H H)/Y}{\partial H} > 0$). When $\delta > 0$, the resulting intensified redistribution from the high to the low skilled creates a disproportionate benefit increase which reinforces the low skilled employment reduction.

This employment contraction is contentious for the immigration surplus (Borjas, 1999), measured by the change in aggregate income of natives. The total income of natives for given M_H amounts to:

$$\begin{aligned} TNI &= (1 - \delta\tau)w_H N_H + (1 - \tau)w_L N_L + (N_L - L)b \\ &= w_H N_H + w_L L + \delta\tau w_H M_H, \end{aligned} \tag{12}$$

the sum of native gross earnings plus immigrants' net fiscal contribution.

Proposition 3. *Whenever the welfare state is not too actuarially unfair, marginal immigration decreases total native income.*

Proof. The effect of an additional immigrant is:

$$\frac{\partial TNI}{\partial M_H} = \frac{\partial w_H}{\partial H} N_H + \frac{\partial w_L}{\partial H} L + w_L \frac{dL}{dM_H} + \delta\tau \frac{\partial w_H}{\partial H} M_H + \delta\tau w_H. \tag{13}$$

For marginal immigration ($M_H = 0$), using $H = N_H$ and $\frac{\partial w_H}{\partial H} H + \frac{\partial w_L}{\partial L} L = 0$, (13) becomes:

$$w_L \frac{\partial L}{\partial H} + \delta\tau w_H,$$

which is unambiguously negative for $\delta = 0$. \square

There are two effects of marginal immigration on aggregate native income. First, there is a negative output effect, as the immigrant receives w_H , which is more than

he adds to total production ($\partial Y/\partial H - w_L dL/dM_H = w_H - w_L dL/dM_H$). Second, he is a net fiscal contributor to an actuarially unfair welfare state. However, this effect vanishes when $\delta = 0$; so the overall impact is negative whenever fiscal redistribution is not too intense, that is δ is low.

We have thus identified a situation where high skilled immigration decreases total native income although wages are flexible and the welfare state is outright redistributive. This result differs substantially from a full employment setting where marginal immigration would be beneficial, as $\frac{dL}{dM_H}$ would necessarily equal zero.

IV. Conclusion

This contribution puts some caution on the conventional wisdom that high skilled immigration is unambiguously beneficial for the receiving country. We find that distortions in the low skilled labor market can render high skilled immigration a burden for the employment of less qualified individuals. This negative effect can translate into a negative immigration surplus. But even if the aggregate effect was positive, it would not be because but rather despite the labor market effects. In particular, one should be sceptical about the popular belief of positive spillovers on low skilled employment.

Changing the perspective to sending countries, our result provides another source for positive effects of a brain drain, complementary to studies emphasizing positive effects on skill formation (Mountford, 1997). In our model, high skilled emigration would have a positive aggregate effect on the source country provided its welfare state has little redistribution. However, acknowledging that migration is driven by redistribution differentials, the consequences of high skilled mobility become much less clear-cut. It is easy to devise of a situation where the migration of high skilled from a high to a low tax country hurts both the home country because of the loss in fiscal contributions, and the receiving country because of higher low skilled unemployment.

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