

# The Economic Impact of Immigration on Domestic Employment in a Dual Economy: A New Sustainable Challenge

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## Abstract

This paper examines the impact of immigration within an economy based on two sectors, facing administered wages. It is characterized by skilled and unskilled workers. It will be shown that immigration has no effects on skilled employment and negative consequences on employment of unskilled labor.

**Keywords:** migration, unions, heterogeneous labor, migration policy

## 1. Introduction

In the standard economic theory, immigration is expected to produce both earnings and employment displacement effects on native labor force. Many studies investigating these displacement effects find small significant effects concentrated among natives or past immigrants that are close substitutes (Kerr and Kerr, 2011). At the same time, this general finding implies that specific sector or population groups can be adversely affected by migration flows. In the International Migration Outlook 2018 the estimated relative impact of immigration on labor force is considered to be higher among young low educated men. An asymmetric impact of immigration, therefore, may exacerbate inequalities among population groups.

Another feature relevant for displacement effects of immigration concerns labor market flexibility. According to Angrist and Kugler (2003), reduced flexibility increases negative immigration effects. Because labor market institutional arrangements can play a role, the interaction between labor market rigidity and skill intensity may generate different outcomes for domestic labor force subject to migration flows. To investigate this issue, we present a modified version of Rivera-Batiz model (1986). As shown, that model examines a two sector economy, where: 1) immigration is endogenous; 2) administered wages generate unemployment in the modern sector, the sector characterized by the production of a good to be exported, and in which there is a traditional import sector with full employment and flexible wages. It takes into account the existence of two types of workers (skilled and unskilled), two different administered wages and unemployment for domestic and foreign workers.

We consider a simple economy, divided in two sectors as in Rivera-Batiz model (1986), but characterized by skilled workers employed in the modern sector and unskilled domestic and foreign workers in the traditional one. We suppose administered wages, above the market-clearing values, in both sectors. This assumption produces unemployment for all kinds of workers.

The analysis shows that immigration has no effects on the modern sector, whereas in the traditional sector immigration increases unemployment of domestic residents. Consequently, immigration has no effects on skilled employment and negative consequences on employment of unskilled labor.

The paper is organized as follows: in Section 2, a literature review about the immigration policies is discussed. In Section 3, we present the two-sector model; in Section 4, we derive the solution of the model and analyse the effects of exogenous parameters on the amount of foreign workers employed in the traditional sector; in Section 4, we investigate how the endogenous variables modify in case of foreign unskilled workers not allowed in the country; Section 5 concludes.

## 2. Literature Review and Research Hypothesis

The impacts of immigration on domestic labor market is traditionally approached in terms of different complementarity or substitutability between native and immigrant labor force, where different effects on wages

summarize the impact of immigrants on native employment opportunities (Borjas, 1994).

Many analyses of immigration flows are focused on their effect on wages, showing that immigration reduces the wage of competing workers by 3 to 4 percent for a 10 percent increase in supply (Borjas, 2003). By considering fixed wages above the market clearing values, we focus only on employment and unemployment effects of migration flows, but mediated by wages. Bauer and Zimmermann (1999) perform a similar exercise, simulating an economic model of the labor market effects of immigration, with rigid wages and the immigration of exclusively unskilled workers. This configuration creates the worst scenario, where immigration of 1% of the EU-population in one year would imply income losses for the EU member countries of about 0.7% of the EU GDP. More generally, they predict that immigration has modest effects on native employment. A theoretical model on the interactions between immigration effects and labor market flexibility is also in Schmidt et al. (1994), who distinguish labor markets by skills, where in the unskilled labor markets the imperfectly competitive mechanism of wage determination prevails. The authors demonstrate that additional immigration might be beneficial precisely because of potential replacement effects, leading to higher employment, if the wages of skilled workers are positively affected by additional unskilled labor.

In a model with wages determined by bargaining, where skilled and unskilled labor are substitutes, and immigrants are complementary to the former, Dolado et al. (1996) find little evidence that the inflows of immigrants are associated with negative effects on both wages and employment of less-skilled natives. Pischke and Velling (1997) find no detrimental effect of immigration on native employment for Germany, while Card (2001) shows that immigrant inflows reduced wages and employment rates of low-skilled natives by 1-3 percentage points. Hunt (1992) estimates an increase of unemployment of natives of 0.3 percentage points after the 1968 repatriates of French. Venturini and Villosio (2006) find that migrant workers do not reduce the probability of finding a job for the highly educated workers or for those with a low level of education. The group most at risk is the medium-level education group. According to Kerr and Kerr (2011), who review literature on impacts of immigration, effects tend to be relatively small and concentrated among natives or past immigrants that are close substitutes. The authors also underline that it is still possible that specific sectors or population groups experience more significant impacts from immigration.

Two specific strands of literature on immigration can be further relevant for the present study. The first concerns the impact of institutional arrangements on the relationship between immigration and domestic labor market. As suggested by Angrist and Kugler (2003), reduced labor market flexibility may protect some native workers from immigrant competition but can increase negative effects on equilibrium employment. Allowing interactions between immigration and measures of labor and product market rigidity, they find that reduced flexibility increases negative immigration effects, with strongest effects in rigid product markets.

The second strand of literature concerns the effects of low skilled immigration on women labor supply. If immigrants substitute natives in the production of household services, women can more easily participate to the labor market both on the extensive and the intensive margin. A positive effect on female labor force may counterbalance other negative effects (displacement effects), with the result of a stable employment. This effect can be more evident for skilled workers if, as shown in Forlani et al. (2015), the share of immigrants working in services is positively associated with an increase of native - born women's labor supply at the intensive margin, if skilled, and at the extensive margin, if unskilled. Cortes and Tessada (2011) find that low-skilled immigration increases average hours of market work and the probability of working long hours of women at the top quartile of the wage distribution. Barone and Mocetti (2011) show an increase in the intensive margin of female labor supply and no effect on the extensive margin, but only for highly skilled women.

Following suggestions from previous literature, in the next sections we analyze a two sectors economy with skilled workers in the modern sector and unskilled domestic and foreign workers in the traditional one, explaining mechanisms underlying the following two research hypotheses.

*H1: Immigration has a negative impact on employment of unskilled domestic employment;*

*H2: Immigration has no effects on skilled employment.*

### **3. The Model**

This economy is composed of two sectors: a traditional and a modern one. The modern sector consists of price-taking firms who supply a traded good to foreign and domestic consumers at exogenous world price, while the traditional one produces an importable good.

The output of the modern sector  $X_I$  in short-run can be defined in the following way:

$$a = X_1 = S_1 \tag{1}$$

where  $S_1$  are skilled workers employed in the sector. The total consumption of modern sector goods  $C_1$  is:

$$C_1 = X_1 - E \tag{2}$$

in which  $E$  measures exogenous net exports, while the consumption depends on the real income  $Y$  and price ratio

$p = \frac{p_2}{p_1}$ .  $P_1$  identifies the export good price, while  $P_2$  represents the price of imports so that we have:

$$C_1 = C_1(P, Y), C_{1p} > 0 \text{ and } C_{1Y} > 0$$

where the international price-ratio  $P$  is assumed as given because of the assumption that the country is small. We assume that the consumption function can be written as follows:

$$C_1 = [C_1^0 + bY]P \text{ with } C_1^0 > 0 \text{ and } 0 < b < 1 \tag{3}$$

The income  $Y$  derives from:

$$Y = C_1 + PC_2 \tag{4}$$

where  $P_1$  (the price of modern sector good) is introduced as a numeraire.  $C_2$  is relative to resident consumption of good 2.

The output of the traditional sector  $X_2$  in short-time may be defined as:

$$X_2 = (L_2)^\beta \text{ with } 0 < \beta < 1 \tag{5}$$

where:

$$L_2 = N_2 + N_m \tag{6}$$

$N_2$  measures employment of unskilled domestic workers in the sector and  $N_m$  is employment of foreign labor. Employers hire foreign and domestic labor in the traditional sector. Foreign labor is to be imported. We will assume that for any given real wage and any resulting level of employment the level of domestic unskilled employment will be:

$$N_2 = \theta L_2 \tag{7}$$

where the fraction  $\theta$  of employment held by native workers is equal to their share in the total unskilled labor force:

$$\theta = \frac{L}{L+L_m} \text{ with: } 0 < \theta < 1 \tag{8}$$

where  $L$  and  $L_m$  measure total unskilled labor supply of native and foreign workers respectively.

The domestic consumption of the traditional sector commodity  $C_2$  depends on the real income and the international price-ratio  $P$ :

$$C_2 = C_2(Y, P) \text{ with } C_{2Y} > 0 \text{ and } C_{2P} < 0$$

and we assume a simple version of this function:

$$C_2 = \frac{[C_2^0 + \sigma Y]}{P} \text{ with } C_2^0 > 0 \text{ and } 0 < \sigma < 1 \tag{9}$$

The total consumption will be:

$$C_2 = X_2 + M \tag{10}$$

where the net imports of traditional sector goods are identified as  $M$ .

The equilibrium condition for the balance of payments is:

$$E = \alpha W_2 N_m + PM \text{ with } 0 < \alpha < 1 \tag{11}$$

which means that migrants employed ( $N_m$ ) are considered to be foreign residents. In this way, a fixed share of their income is sent to workers' families in the less developed countries, which they come from.

We assume that in the traditional sector the wage  $W_2$  for unskilled workers is set unilaterally above the market clearing value by a trade union whose aim is to maximize total wage bill.

As a consequence the employers will choose the level of employment  $L_2$  in this market as a solution to:

$$W_2 = \frac{\beta X_2}{L_2} \tag{12}$$

In the modern sector the union of skilled workers will set wages  $W_1$  according to the equation:

$$W_1 = hW_2 \quad \text{with } h > 1 \tag{13}$$

where  $h$  reflects the productivity differential between skilled and unskilled workers.

Since wages are set over market clearing values there will be unemployed workers in both the sectors:

$$U^n = L - N_2 \tag{14}$$

$$U^s = S - S_1 \tag{15}$$

Finally, the amount of foreign unemployed is:

$$U^m = L_m - N_m \tag{16}$$

#### 4. The Determinants of Immigration

In the previous section, we obtain 13 equations: (1), (2), (3), (4), (6), (7), (9), (10), (11), (12), (14), (15) and (16) in 13 variables:  $C_1, C_2, X_1, X_2, Y, M, S_1, N_2, L_2, N_m, U_n, U_s$  and  $U_m$  with  $W_2, C_1^0, C_2^0, E, P, L$  and  $L_m$  as given parameters.

The solutions of this system are the following:

$$Y = \frac{C_1^0 P + C_2^0}{1 - bP - \sigma} \quad \text{with } 1 > (1 - bP - \sigma) \tag{17}$$

$$C_1 = \frac{P[C_1(1-\sigma) + bC_2^0]}{1 - bP - \sigma} \tag{18}$$

$$X_1 = \frac{P(1-\sigma)C_1^0 + bPC_2^0 + E(1-bP-\sigma)}{1 - bP - \sigma} \tag{19}$$

$$X_2 = \frac{C_2^0(1-bP) + \sigma C_1^0 P - E(1-bP-\sigma)}{(1-bP-\sigma)[P - \alpha(1-\theta)\beta]} \tag{20}$$

$$C_2 = \frac{1}{P} \left[ \frac{C_2^0(1-bP) + \sigma C_1^0 P}{(1-bP-\sigma)} \right] \tag{21}$$

$$M = \frac{E}{P} - \frac{\alpha(1-\theta)\beta}{P} \left[ \frac{C_2^0(1-bP) + \sigma C_1^0 P - E(1-bP-\sigma)}{(1-bP-\sigma)[P - \alpha(1-\theta)\beta]} \right] \tag{22}$$

$$S_1 = \frac{aP(1-\sigma)C_1^0 + bPaC_2^0 - Ea(1-bP-\sigma)}{(1-bP-\sigma)} \tag{23}$$

$$L_2 = \frac{\beta[C_2^0(1-bP) + \sigma C_1^0 P - E(1-bP-\sigma)]}{W_2(1-bP-\sigma)(P - \alpha(1-\theta)\beta)} \tag{24}$$

$$N_2 = \frac{\theta\beta[C_2^0(1-bP) + \sigma C_1^0 P - E(1-bP-\sigma)]}{W_2(1-bP-\sigma)(P - \alpha(1-\theta)\beta)} \tag{25}$$

$$N_m = \frac{(1-\theta)\beta[C_2^0(1-bP) + \sigma C_1^0 P - E(1-bP-\sigma)]}{W_2(1-bP-\sigma)(P - \alpha(1-\theta)\beta)} \tag{26}$$

$$U^s = S - \frac{aP(1-\sigma)C_1^0 + bPaC_2^0 + Ea(1-bP-\sigma)}{(1-bP-\sigma)} \tag{27}$$

$$U^n = L - \frac{\theta\beta[C_2^0(1-bP) + \sigma C_1^0 P - E(1-bP-\sigma)]}{W_2(1-bP-\sigma)(P - \alpha(1-\theta)\beta)} \tag{28}$$

$$U^m = L_m - \frac{(1-\theta)\beta[C_2^0(1-bP) + \sigma C_1^0 P - E(1-bP-\sigma)]}{W_2(1-bP-\sigma)(P - \alpha(1-\theta)\beta)} \tag{29}$$

If we suppose that  $L_m$  is a function of the average income of workers in their less developed countries  $Y'$  and of a parameter  $A$  reflecting socio-political conditions:

$$L_m = f(Y', A) \quad \text{with } f_{Y'} < 0, f_A < 0 \tag{30}$$

We have from equation (26):

$$\begin{aligned} \frac{dN_m}{dC_1^0} > 0, \frac{dN_m}{dC_2^0} > 0, \frac{dN_m}{dW_2} < 0, \frac{dN_m}{dP} < 0, \\ \frac{dN_m}{dL} < 0, \frac{dN_m}{dL_m} > 0, \frac{dN_m}{dY} < 0, \frac{dN_m}{dA} < 0 \end{aligned} \tag{31}$$

From eq. (26), we can observe that the amount of foreign workers employed in the traditional sector decreases if the non-immigrant labor force of unskilled workers ( $L$ ) increases, while an increase in the immigrant labor supply due to a decline of income  $Y'$  or to a deterioration of socio-political conditions in counties of origin, leads to a growth of  $N_m$ . A second variable influencing  $N_m$  is  $E$ . A rise in  $E$  will produce an increase of net import of traditional sector commodity and a decline of production  $X_2$ , which leads to a decline of immigrant workers employed. A third factor affecting  $N_m$  is the domestic demand of traditional sector good. An increase in  $C_2$  due to a rise in  $C_1^0$  or  $C_2^0$  or to a decline of  $P$ .

Finally, a reduction in the wage  $W_2$  fixed by unions leads to an increase of  $N_m$ .

### 5. The Effects of Immigration

Let's now explore how the endogenous variables modify if we assume that the foreign people cannot work in the country. We want to compare, as in Rivera-Batiz analysis (1986), the no immigration and the immigration situation. We have to distinguish between the situation in the modern sector and that of the traditional one. In the first case, the immigration of unskilled workers from less developed countries has no effects on the production and on the employment of skilled workers because there are no changes in the domestic consumption and in net export of the commodity produced.

Let's consider firstly the impact of immigration in the traditional sector. If there are no foreign workers in this sector the equations (6), (7), (8) and (16) of the system disappear, while the equation (11) will be modified as follows:

$$E = PM \tag{32}$$

The solutions (20), (22), (24) and (28) will change in the following way:

$$X_2 = \frac{C_2^0(1-bP) + \sigma C_1^0 P - E(1-bP - \sigma)}{P(1-bP - \sigma)} \tag{33}$$

$$M' = \frac{E}{P} \tag{34}$$

$$L'_2 = \frac{\beta\{[C_2^0(1-bP)] + \sigma C_1^0 P - E(1-bP - \sigma)\}}{W_2 P(1-bP - \sigma)} \tag{35}$$

$$U'_m = L - \frac{\beta[C_2^0(1-bP) + \sigma C_1^0 P - E(1-bP - \sigma)]}{W_2 P(1-bP - \sigma)} \tag{36}$$

If we compare eq. s (33) and (34) with eq. s (20) and (22), we can see that immigration increases the production function of commodity two ( $X_2$ ) because net imports ( $M$ ) are reduced. This effect arises because migrant workers send a fixed share of their incomes to their families abroad.

Let's examine now the labor market effects of immigration in this sector. If we compare eq. (35) with eq. s (24) and (25), and eq. (36) with eq. (28), we can see that immigration increases total unskilled employment but decreases the employment of domestic labor; in fact, we have that:

$$N_2 < L'_2 \quad \text{because of} \quad \theta < \frac{P - \alpha\beta}{P - \beta} \tag{37}$$

As a consequence of the eq. (37), we have a greater amount of unemployment of unskilled workers ( $U'_n < U_n$ ) in presence of immigration.

Finally, we put in evidence that immigration has no effect on the total income of the non-immigrants people.

Thus, our results confirm the theoretical predictions of the model.

The discussion about the impact of immigration on native workers' welfare is increasing in all countries. As far

as the empirical evidence of our results are concerning, we can conclude that in case of immigration, less educated native workers should engage in less manual occupations to face in a more opportune way the increasing specialization pressure from migrants. This finding is in line with the main empirical studies in the literature (Foged & Peri, 2016). For this reason, immigration could produce a reduction of less educated workers.

## 6. Conclusions

In this paper we have considered an economy characterized by two sectors, with two different types of workers, which face unemployment because wages are fixed above the market-clearing values in both the sectors, and in which there are many foreign unskilled workers. We ground on two basic observations arising from previous literature about the displacement effects of immigration. First, the displacement effects are often concentrated on specific segments of labor force, which enclose more substitutable workers. Second, institutional settings increasing labor markets rigidities can have negative effects on equilibrium employment. Our main conclusions are that immigration has no effects on the modern sector. In the modern sector only skilled workers are employed and immigration has no effect on domestic consumption and net exports of the commodity produced. In the traditional sector, we have that immigration increases unemployment of domestic residents even if the total employment of the sector increases.

Our analysis depends on a substantial number of assumptions relative to the functioning of this dual-economy. It is evident that our conclusions would modify if we relax these assumptions. For example if we modify the functioning of labor market and suppose flexible wages instead of administered ones, the additional supply of labor due to immigrants, will lead to a decrease in wage rate both in sector 2 and in sector 1.

Finally, we would like to elaborate new extensions to our investigation and comments for further research, considering that the two crucial building blocks of the model are the assumptions that there are two types of workers and that immigration realizes only in the traditional sector of the economy. This model could be expanded into a three-sector model with a third sector for unskilled foreign workers and with flexible wages.

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