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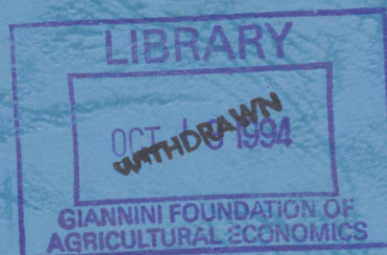
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**RESISTING MIGRATION: THE PROBLEMS OF WAGE  
RIGIDITY  
AND THE BURDEN ON THE WELFARE STATE\***

by

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# RESISTING MIGRATION: THE PROBLEMS OF WAGE RIGIDITY AND THE BURDEN ON THE WELFARE STATE

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## ABSTRACT

Just like any trade activity in well-functioning markets, migration tends to generate gains to all parties involved: the migrants as well as the native population. But these gains tend to be typically rather low. However, when the labor market is mal-functioning, migration exacerbates imperfections in the market. Consequently, it may lead to losses to the veteran population which can be quite sizable.

Another problem raised by migration is the toll it imposes on the welfare state. Being unable to perfectly exclude migrants from various entitlement programs and public services, the modern welfare state finds it more and more costly to run its various programs.

These two economic considerations may help explain why there is strong resistance to migration. Consequently, to be able to benefit more from migration, one may want to improve the functioning of the markets (with a possible compensation to wage earners that compete with unskilled migrants) and to be more selective in the scope of and the eligibility for the state entitlement programs.

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# 1 Introduction

The conventional wisdom of welfare economics is that a free flow of goods and factors of production (including labor) enhances the efficiency of the allocation of resources. Migration which typically shifts workers from economies with low productivity of labor to economies with high productivity of labor can accordingly raise global output. It is also well known that generally a country stands to gain from in-migration, which tends to increase its consumption (output, minus wage payments to migrants). Even though certain sectors in the receiving country (e.g. native workers that are a substitute for migrants) may lose, there are conceivably some non-distortionary lump-sum redistribution mechanisms that enlarge the share of every sector in the national pie.

Nevertheless, in practice, one may often find a widespread resistance to guest workers or migrants in the receiving (destination) country. In this paper we highlight two economic considerations that may explain the reasons behind such resistance.

First, when wages are rigid (due to unionism, search costs, efficiency wage elements, etc.), migration may well lower the total share of the native population (skilled labor, unskilled labor, capital, etc.) in the domestic output.<sup>1</sup> Furthermore, while with flexible wages the gain from migration is miniscule, with wage rigidity, migration may inflict a substantial loss to the native population. Also, with wage rigidity migration induces a misallocation of investment between human and physical capital.

Second, low-income migrants increase the economic costs of non lump-sum income

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<sup>1</sup>It is true that the majority of unemployed people in Europe, for example, are second-generation migrants. But the unemployment rate emanating from wage rigidity for the native population also rises as a result of migration. For instance, the unemployment rate for ethnic Germans rose by about one third between 1989 and 1993 as a result of the East-West migration.

redistribution policies (which are inevitably more common in practice), thereby imposing a burden on the modern welfare state. For instance, a typical welfare state may find it impossible to redistribute income in a way that makes all sectors better off. Indeed, the opposite may be true; all may lose from migration (e.g. Wildasin (1991)). Thus, one may conjecture that resistance to migration should be stronger and more widespread in economies with less wage flexibility and more comprehensive welfare programs (such as many of the countries in Western Europe) than in economies with more wage flexibility and less comprehensive welfare programs (such as the United States).

The paper is organized as follows. Section 2 analyzes the effects of wage rigidity and investment in physical and human capital on the potential gains from migration. Section 3 describes the implications of the modern welfare state for the welfare gains (losses) from migration. We conclude the paper in Section 4.

## 2 Wage Flexibility and Migration

Following Saint-Paul (1994), we assume a stylized economy in which there are only two types of labor productivity: "low" and "high". While a high productivity worker provides one efficiency unit of labor, the low productivity worker provides only  $\rho < 1$  efficiency units of labor. A person can acquire education which makes her a high-productivity worker (denoted "skilled" worker). If she does not acquire education she remains a low-productivity worker (denoted "unskilled" worker). There is a continuum of individuals varying in their cost of acquiring education (due to innate ability). We assume that the distribution of these costs in the population is uniform over the interval  $[0, \bar{c}]$ .

Each individual can either invest in human capital (through education) or in physical capital (which yields a return  $r$ ). There exists a cut-off cost level,  $c^*$ , such that all those

with education-cost below  $c^*$  invest in human capital and become skilled workers while all the rest remain unskilled. Denoting the wage per efficiency unit by  $w$ , the cut-off cost level is determined by an equality between the marginal return and marginal opportunity cost (via investment in physical capital) to education:

$$(1 + r)c^* = [(1 - u_1) - \rho(1 - u_2)] w, \quad (1)$$

where  $u_i$  is the unemployment rate among workers of type  $i$  (where  $i = 1$  denotes "skilled" and  $i = 2$  denotes "unskilled".) Notice that in calculating the return to education, one must take into account the differential wage and the probability of attaining employment for skill level  $i$  (namely,  $1 - u_i$ ).

Thus, the proportion ( $x$ ) of skilled workers in the total population is given by:

$$x = c^*/\bar{c}. \quad (2)$$

Therefore, a total of

$$\int_0^{c^*} (c/\bar{c})dc = (c^*)^2/2\bar{c} \equiv H \quad (3)$$

is invested in human capital.

Denoting by  $I$  the initial endowment, the endogenously determined stock of physical capital ( $K$ ) is given by:

$$K = I - H. \quad (4)$$

Finally, we specify a Cobb-Douglas production function for the GDP of this economy with constant returns to scale:

$$Y = AK^\alpha L^{1-\alpha}, \quad (5)$$

where

$$L = x(1 - u_1) + \rho(1 - x)(1 - u_2) + \rho m \quad (6)$$

is the input of labor in efficiency units.<sup>2</sup> (Notice that the two types of labor are assumed, for simplicity, to be perfect substitutes in production.) The proportion of unskilled migrants in the native labor force is denoted by  $m$ . Assuming that capital does not depreciate,  $Y + K$  is available for consumption at the end of the production process. The wage rate ( $w$ ) and the return to capital,  $r$ , are given by the standard marginal productivity conditions:

$$w = (1 - \alpha)A(K/L)^\alpha \quad (7)$$

and

$$r = \alpha A(L/K)^{1-\alpha}. \quad (8)$$

We now explore two market regimes. In the first, the wages are flexible and completely clear the labor market. In the second regime wages are rigid, which gives rise to unemployment. We now turn to these two cases.

## 2.1 Flexible Wage

To set a benchmark case we start with perfect wage flexibility (the market-clearing case), and no unemployment, that is,  $u_1 = u_2 = 0$ . Given the proportion of migrants ( $m$ ), equations

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<sup>2</sup>Note that the native labor force is normalized to one.

(1)-(8) determine the equilibrium levels of  $w_F, r_F, c_F^*, x_F, H_F, K_F, Y_F$ , and  $L_F$  as functions of  $m$ . (The subscript  $F$  stands for the "Flexible" wage model.)

The aggregate consumption of native workers and native capital owners<sup>3</sup> is taken as a welfare indicator ( $W$ ). This measure is equal to GNP (that is, GDP, minus wage payments to foreign labor), plus the underpreciated stock of physical capital. Thus, the change of welfare due to migration is given by:

$$\Delta W_F = \Delta Y_F + \Delta K_F - w_F(m)\rho m \quad (9)$$

where  $\Delta Z = Z_F(m) - Z_F(0)$  and  $Z_F = W_F, Y_F, K_F$ .

Graphically,  $\Delta W$  can be illustrated with the help of the marginal product of labor schedule in Figure 1. Accordingly, let the schedule denoted by  $MP_L$  describe the marginal product of labor at the pre-migration stock of capital (that is,  $K_F(0)$ ). If migration would not change the stocks of physical capital ( $K_F$ ) and human capital ( $x_F$ ), we obtain the standard measure of the gains from migration, which is represented by the area of the triangle  $ABC$ . However, since the wage per efficiency unit falls, the return to human capital falls as well and therefore investment is shifted from human capital to physical capital. As a result, the  $MP_L$  curve rises and the supply of effective labor falls. The additional adjustment must raise the total gain from migration (over the standard measure of gain), accruing to both natives and migrants because the underlying competitive allocation is Pareto-efficient (for every exogenously given level of migration).

However, the gain to veterans which is the focus of our attention here (as measured by equation (9)) may actually fall by this adjustment in the stocks of physical and human capital, because of the familiar terms-of-trade effect. The initial (pre-adjustment) decline

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<sup>3</sup>For simplicity, it is assumed that capital-owners are all residents of the country in question.

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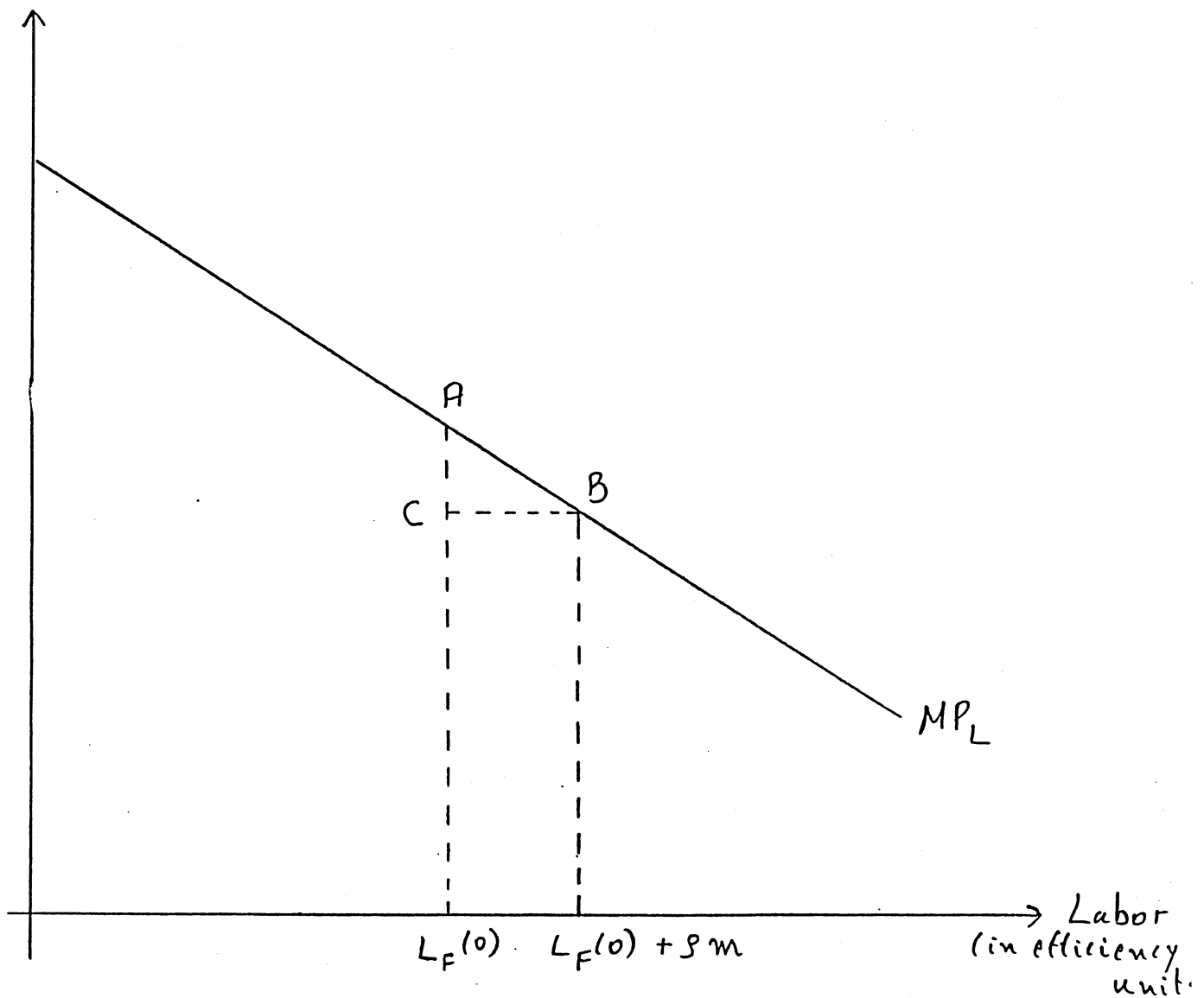


Figure 1: Migration-Induced Welfare Change for Fixed Stocks of Human and Physical Capital

in  $w$  lowers the return to human capital and increases the return to physical capital. As a result, the induced adjustment in the allocation of investment raises the stock of physical capital and lowers the stock of human capital. Consequently, the ratio of physical capital to labor (in efficiency units) rises and  $w$  rises as well. Thus, the capital stock adjustments lead to a deterioration in the terms of the trade of the receiving country; that is, the wage paid on imports of labor services (of the migrants) increases. This wage increase may actually more than offset the efficiency gain resulting from the adjustments in the capital stock. Nevertheless, altogether the destination country must gain from migration because the classical gains from trade argument is still valid.

Table 1 illustrates the magnitude of the gains from migration. It turns out that the standard gain which accrues to the veterans for fixed  $K, H$  and  $x$  (the familiar triangle  $ABC$  in Figure 1) is quite small: A migration of the size of 10% of the existing population generates a gain to the veterans amounting to 0.045% of their consumption. The induced shift of investment from human to physical capital actually reduces this gain in our setup, but not by much, to 0.044%.

**Table 1: Gains from Migration:  
Flexible Wages**

Percentage of Migrants in the Native Population	Standard Gain	Gain from the Reallocation of Investment between Human and Physical Capital	Total Gain
2	0.0019	-0.0001	0.0018
4	0.0075	-0.0001	0.0074
6	0.0166	-0.0003	0.0163
8	0.0290	-0.0004	0.0286
10	0.0446	-0.0006	0.0440

**Note:**

<sup>a</sup> The gain is measured as a percentage of the aggregate consumption of the native population which is equal to  $GNP + K$ .

<sup>b</sup> The parameter values are:  $\alpha = 0.33$ ,  $\rho = 0.75$ ,  $\bar{c} = 2$ ,  $I = 1$ ,  $A = 1$ .

## 2.2 Rigid Wages

Consider now some imperfections in the labor market which prevent wages from fully adjusting downward so as to fully clear the market in the wake of migration. Consequently, migration must create unemployment among the native workers. There are quite a few attempts in the literature to model imperfections in the labor market and the reason for persistent unemployment (e.g. Layard and Nickell (1990), Pissarides (1990)). To sharpen the analysis we make the extreme assumption that wages are frozen at their pre-migration market-clearing levels.

Strictly speaking, it does not matter in this model whether migrants are skilled or unskilled since the various labor types are assumed to be perfect substitutes. All that matters is how much labor in efficiency units has been brought in with migration. Nevertheless, as a matter of interpretation, we assume that the migrants are all unskilled and that they replace only unskilled native workers, since skilled workers have typically some advantage in the job market over unskilled workers.

In this case, we have  $u_1 = 0$  and  $w_R$  is fixed at the pre-migration wage level, that is  $w_R = w_F(0)$ . (The subscript  $R$  stands for the "Rigid" wage model.) Thus, for any given level of  $m$ , equations (1)-(8) determine  $u_{2R}$ ,  $r_R$ ,  $c_R^*$ ,  $x_R$ ,  $H_R$ ,  $K_R$ ,  $Y_R$  and  $L_R$  as functions of  $m$ . In essence  $w$  and  $u_2$  change roles between the flexible and rigid wage models. In the flexible wage model,  $u_2 = 0$  and  $w$  is determined by the market-clearing condition in the labor market. In the rigid wage model,  $w$  is fixed (at the pre-migration, flexible wage equilibrium level) and  $u_2$  is equal to the excess supply of labor.

Schedule MC in Figure 2 describes the marginal product of labor for the pre-migration

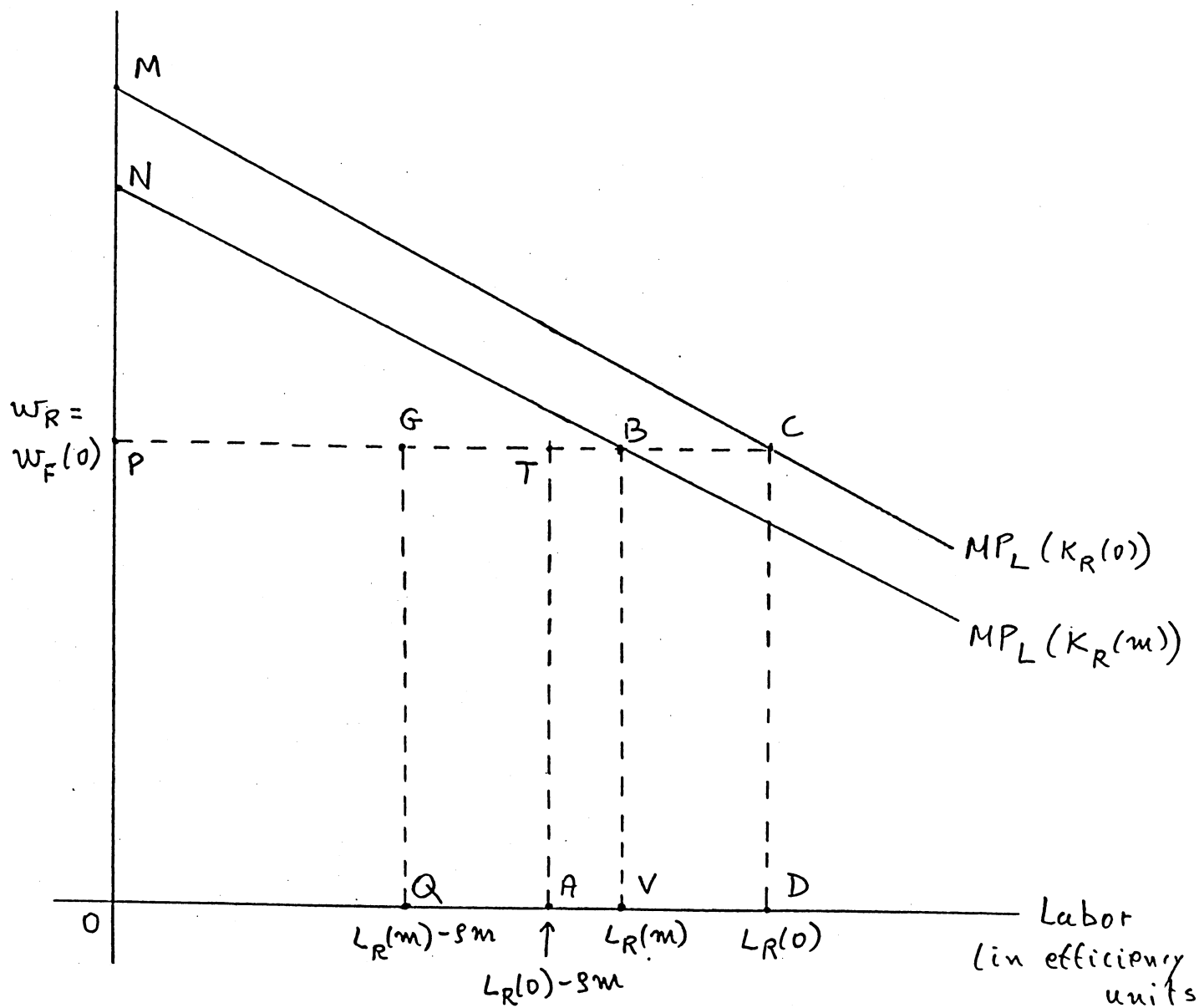


Figure 2: Migration-Induced Welfare Loss with Rigid Wages

stock of capital ( $K_R(0)$ ). Pre-migration GNP is thus measured by the area OMCD. If  $K$  and  $x$  were fixed migration will reduce GNP to an amount represented by the area OMCTA, a loss which is measured by the area of the rectangle ATCD. However, since unemployment among the unskilled workers rises, the expected return to education must rise as well (see equation (1)). Hence, a chunk of investment switches from physical to human capital. Thus,  $K$  must fall and  $x$  must rise, which leads to an even further increase in unskilled labor unemployment. The marginal product of labor schedule shifts downward to  $NB$  and the post-adjustment GNP is measured by the area  $ONBGQ$ . Thus, the fall in  $K$  and the increase in  $x$  induce an additional loss in GNP by an amount which is measured by the sum of the areas  $NMCB$  and  $QGTA$ . In addition, aggregate consumption of the native population falls also by the amount in which  $K$  falls. (Recall that aggregate consumption of the native population is equal to GNP, plus the undepreciated capital stock owned by the native population.)

It is useful to compare the two cases: the flexible and the rigid wage cases. In the former case, the migration per se (even before adjustment in the allocation of investment between human and physical capital) raises the welfare of the native population. In the absence of market-distortions, the induced adjustment in the two forms of capital (i.e. a shift from human to physical capital resulting from the wage decline) further enhances global efficiency and thereby raises the welfare of the native population as well. This efficiency gain may be more than offset by the deterioration in the terms of trade (that is, the rise of the wage paid to migrants). In the case of wage rigidity, however, the migration per se lowered the welfare of the native population, since foreign labor merely drove out domestic labor. The induced reallocation of investment from physical to human capital further reduces the welfare of the existing population. Indeed, the additional investment in human capital is a total loss, in the sense that even a penny of the investment is not recovered. Nevertheless, the private net yield to the individual making the investment is positive, thereby producing

the (socially wrong) market incentive for such an investment.

It turns out that the extra loss in GNP, due to the reallocation of investment between human and physical capital, relative to the loss that results from the mere substitution of native workers by migrants is quite substantial. Table 2 illustrates the relative magnitudes of these two measures of loss. When migrants make up 10 percent of the native population, the loss due to the reallocation of investment is about as much as 1/7th of the total loss. Our sensitivity analysis suggests that when the share of capital in GDP (namely,  $\alpha$ ) is lowered from 1/3 to 1/4, the standard loss rises from 2.98% of consumption to 3.3% and the total loss rises from 3.43% to 3.97%. Thus, the relative importance of the loss due to the reallocation of investment rises from 1/6th to 1/7th of the total loss. An increase in the productivity gap between skilled and unskilled labor (i.e. a decline in  $\rho$ ) also raises the relative importance of the loss due to the reallocation of investment from physical to human capital: from 14% to 18% of the total loss.

**Table 2: Losses from Migration  
Rigid Wages**

Percentage of Migrants in the Native Population	Loss from Substitution of Domestic Labor by Foreign Labor	Loss from Reallocation of Investment between Human and Physical Capital	Total Loss
2	0.60	0.07	0.67
4	1.19	0.16	1.35
6	1.79	0.25	2.04
8	2.40	0.33	2.73
10	2.98	0.45	3.43

**Note:**

<sup>a</sup> The loss is measured as a percentage of the aggregate consumption of the native population which is equal to  $GNP + K$ .

<sup>b</sup> The parameter values are:  $\alpha = 0.33$ ,  $\rho = 0.75$ ,  $\bar{c} = 2$ ,  $I = 1$ ,  $A = 1$ .

### 3 The Welfare State and Migration

Income distribution makes a developed welfare state more attractive to poor migrants from less developed countries, even when these migrants do not qualify for all the ingredients of the entitlement programme. Therefore, migration has strong implication for the welfare of the veteran residents in the destination country. These considerations were presented by Wildasin (1991) in a stylized model with one immobile factor whose distribution is the underlying source of inequality and internationally mobile homogenous workers (natives and migrants).

The curves " $MP_L^{DC}$ " and " $MP_L^{SC}$ " in Figure 3 portray the marginal products of labor in the Destination Country ( $DC$ ) and the Source Country ( $SC$ ), respectively. Suppose that the immobile factor is capital and that it is owned by immobile residents. Also consider the income distribution in the  $DC$  between the capital-owners and the original native workers. Assume that initially the allocation of (native) workers between the  $DC$  and the  $SC$  is at point  $A$  in Figure 3 and no migration is allowed. The income of workers is represented by the area  $O_{DC}QHA$  and the income of capital-owners by the area  $QRH$ . This initial distribution of income is represented by point  $A$  in Figure 4. Suppose redistribution takes the form of a subsidy (possibly negative) to workers, financed by a lump-sum tax on capital-owners. We assume that the supply of labor of each worker is perfectly inelastic. Hence this redistribution scheme creates no distortions, i.e., the size of the national pie remains unchanged. Thus, the income redistribution frontier is a straight line with a slope of unity (in absolute terms) - the line  $FAH$  in Figure 4.

Now, suppose that free migration is allowed. When no redistribution takes place in

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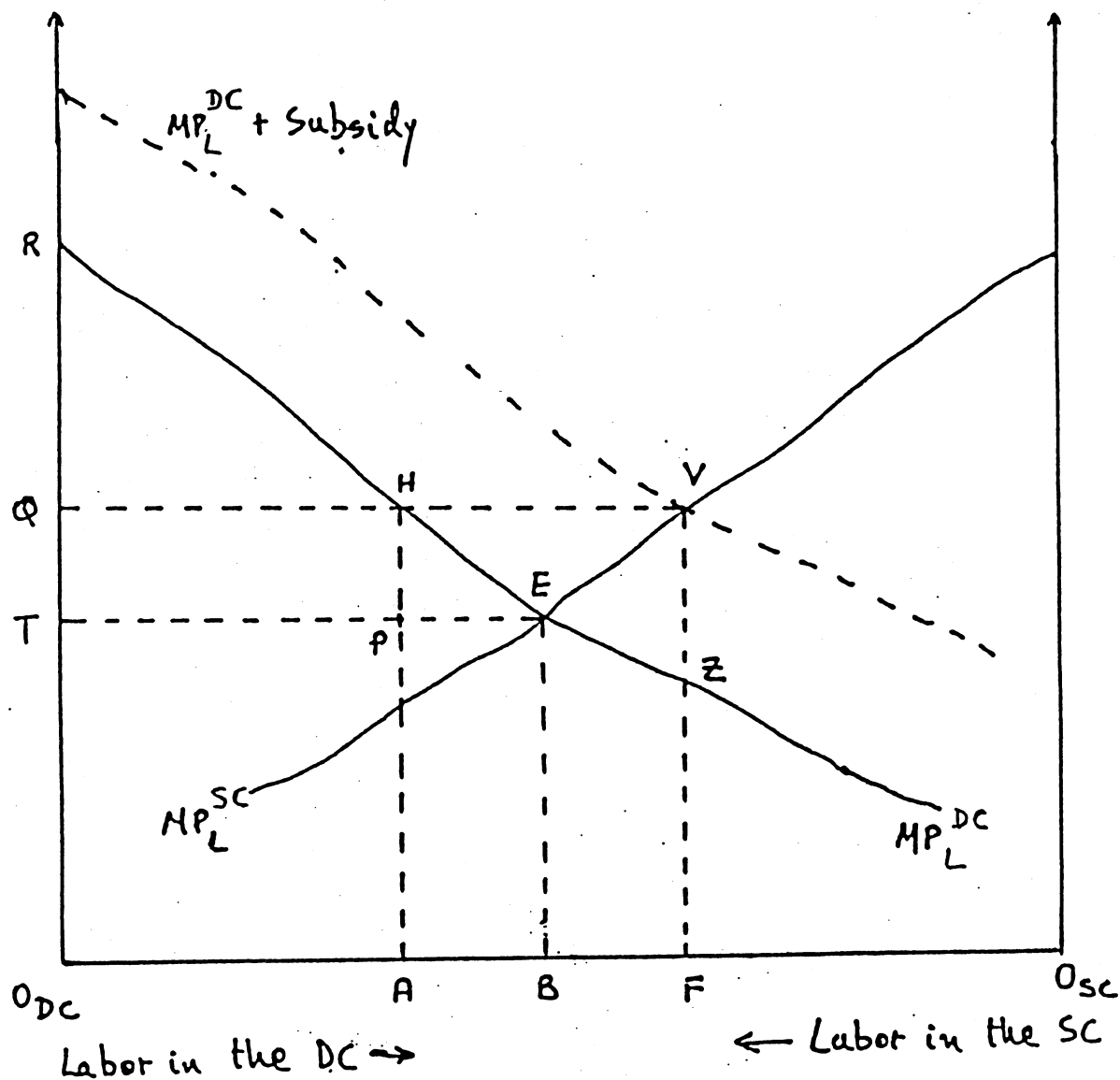
Marginal  
Product  
of LaborMarginal  
Product  
of Labor

Figure 3 : The Allocation of Workers  
Between The DC and The SC

Disposable Income  
of Native Capital-Owners

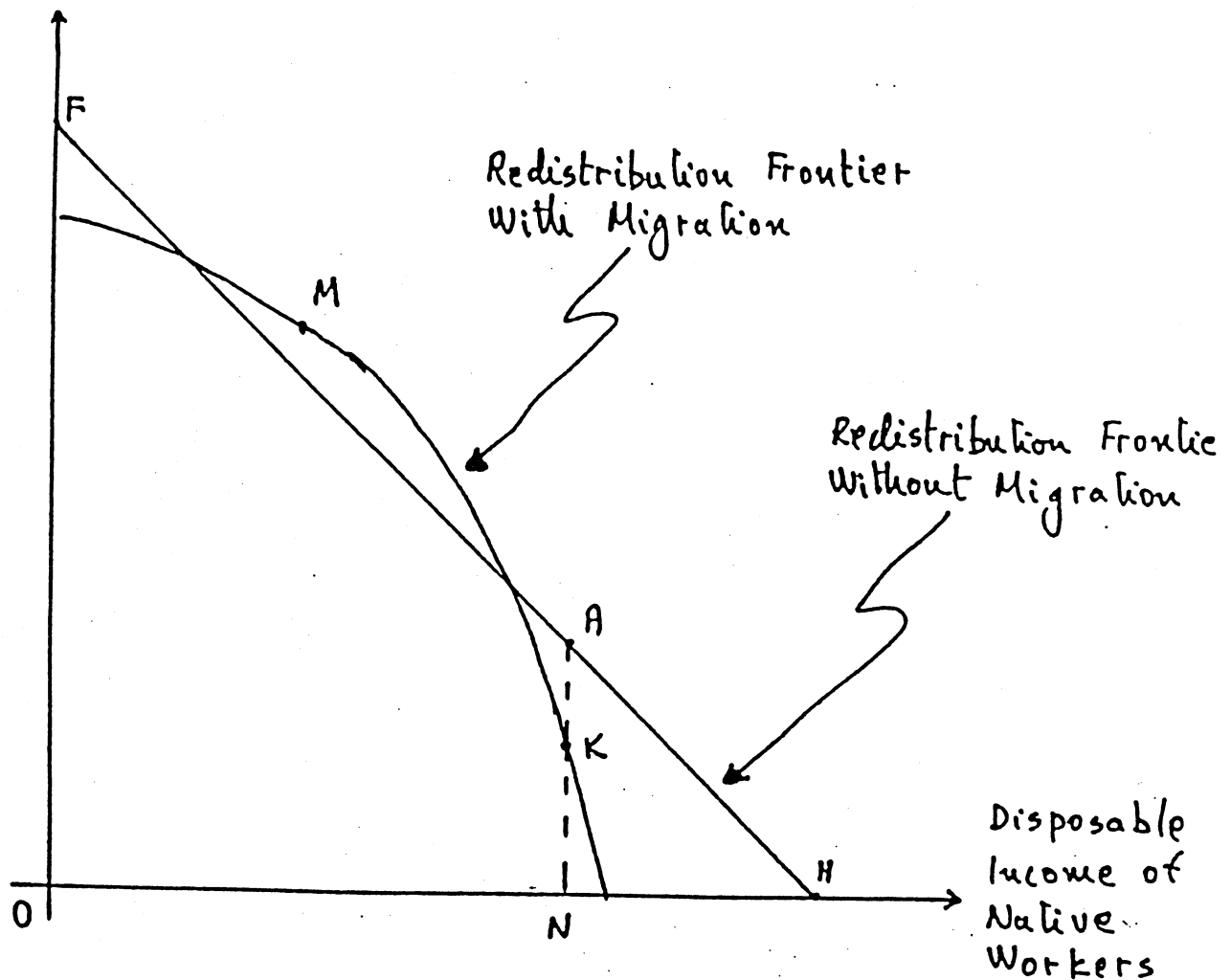


Figure 4: The Income Redistribution Frontiers  
With and Without Migration

the *DC* (i.e., the subsidy to workers in the *DC* is zero), then *AB* workers will migrate from the *SC* to the *DC*. The wages in the *DC* fall from  $O_{DC}Q$  to  $O_{DC}T$  and the total income of the native workers in the *DC* falls from  $O_{DC}QHA$  to  $O_{DC}TPA$ . At the same time, income of capital-owners rises from  $QRH$  to  $TRE$ . The total income of native workers and capital-owners rises from  $O_{DC}RHA$  to  $O_{DC}REPA$ . Thus, the income distribution point in this case, denoted by *M* in Figure 4, lies to the northwest of point *A* and outside the no-migration income redistribution frontier *FAH*.

Now, suppose that redistribution takes place in the *DC*, and let us trace out in Figure 4 the income redistribution frontier in this case. A subsidy to workers in the *DC* raises the demand curve for workers in the *DC* from " $MP_L^{PC}$ " to " $MP_L^{PC} + Subsidy$ ." The subsidy brings more migrants to the *DC*, raises the wage received by workers (natives, migrants and "those left behind"), raises the total income of native workers in the *DC*, but lowers the net income of *DC*'s capital-owners. (Note that the subsidy to labor is financed by a lump-sum tax on capital). The subsidy is no longer distortion-free, and the income redistribution frontier is no longer a straight line with a unitary slope. Recall that the total wage of native workers in the no-migration, no-subsidy case was  $O_{DC}Q$  in Figure 3 and their total income was *ON* in Figure 4. Now, suppose that with migration we still want to preserve the income level *ON* of native workers. The amount of the subsidy that is required for this purpose is *VZ* in Figure 3. An amount of *AF* workers migrates to the *DC* in this case. Total income of capital-owners is equal to total output ( $O_{DC}RZF$  in Figure 3), less total wage income, including the wage subsidy (which is equal to the tax levied on capital), received by workers ( $O_{DC}QVF$  in Figure 3). That is, total income of capital owners in the *DC* is equal to  $QRH$ , minus *HVZ*. This income is obviously smaller than  $QRH$ . Thus, the income redistribution frontier with migration passes below point *A* (say, *K*) in Figure 4.

Migration therefore changes the income redistribution frontier in an interesting way. In a certain range, migration shifts the frontier outward while in some other ranges the frontier moves inwardly. With no redistribution, migration lowers the income of native workers and raises the income of native capital-owners. If a redistribution scheme attempts to preserve for native workers at least the income that they had before migration (at the point of no redistribution), it must make capitalists worse off than they were in the pre-migration state, and vice versa. In the neighborhood of  $K$  and to the left of it, both native groups (workers and capitalists) are worse off than in the absence of migration. Therefore, both of them will opt for imposing immigration quotas or some other restrictions on immigration. The modern welfare state is therefore more receptive (on economic grounds) to the idea of restricting immigration, a hypothesis that is yet to be tested empirically.

## 4 Conclusion

Just like any trade activity in well-functioning markets, migration tends to generate gains to all parties involved: the migrants as well as the native population. But these gains tend to be typically rather low. However, when the labor market is mal-functioning, migration exacerbates imperfections in the market. Consequently, it may lead to losses to the veteran population which can be quite sizable.

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