

Ethnic discrimination and the migration of skilled labor*

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Abstract

We consider a small open developing economy, whose population is bifurcated into a majority and a minority group, the latter lacking political influence. Agents are heterogeneous in skills, and decide whether to invest in education when young and whether to migrate in their adulthood. Assuming a rent-extraction basis for discrimination, we first endogenize ethnic discrimination in the benchmark case of an economy closed to migration, and then explore how migration prospects affect ethnic inequality. Under the free migration assumption, we find the intuitive result that migration prospects have a protective effect on the minority. Moreover, the optimal discrimination rate (from the majority's perspective) is shown to be such that there is no migration at equilibrium, unless the distribution of individuals' skills exhibits marked asymmetries. Last, we find that immigration restrictions set by receiving countries have the paradoxical effect of creating migration flows which would otherwise have remained latent.

Keywords: Ethnic minorities, discrimination, migration, human capital formation.

JEL classifications: F22, J15, J24, J71, 015

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1 Introduction

The connection between migration, ethnic discrimination, and education, is a relatively neglected issue in development economics.¹ This is quite surprising, since minority groups often represent a substantial proportion of a developing country's emigrants and are relatively highly educated. The phenomenon is difficult to quantify because receiving countries generally ignore the ethnic affiliation of their immigrants. An exception is the recent Australian data on immigrants from Malaysia, Sri Lanka, and Fiji, three ethnically-divided countries which have minorities subject to discrimination. The data show that among the immigrants sampled, minority members are significantly over-represented and better educated than members of their respective relevant majority group.² This is also confirmed by many country studies on intergroup differences in education and migration profiles. For example, the studies of Gani and Ward (1995) on Fiji, or the evidence on labor migration in Asia presented in Martin (1991), show that members of minorities tend to be more mobile and educated than the rest of the population, due to cultural as well as economic factors. In their research on the sources of ethnic inequality in Vietnam, van de Walle and Gunewardena (2000) also found substantial returns to migration for the educated members of the minority. These behavioral patterns are not new to labor economists; indeed, standard human capital theory (e.g., Levhari and Weiss, 1974, Brenner and Kiefer, 1981) suggests that members of discriminated-against minorities would massively invest in education if this provides them with a means of avoiding discrimination. This would seem to be particularly relevant in the context of migration, since education has been shown to provide its owners with exit options (Carrington and Detragiache, 1999, Katz and Rapoport, 2000).

From a more macroeconomic perspective, there is a growing interest in the effects of ethnic fractionalization on growth. The first argument put forward was that ethnic diversity might translate into political polarization, and, therefore, impede the adoption of efficient policies.³ It was then suggested that ethnic diversity may contribute to political instability, thereby discouraging domestic as well as foreign investments (Barro and Lee, 1993, Alesina *et al.*, 1996). In addition, ethnic diversity may also cause market segmentation, thereby limiting the scope for potential economies of scale. At the empirical level, Easterly and Levine (1997) asserted that ethnic diversity is central to explaining cross-country differences in economic performance in sub-Saharan Africa. They interpreted this as showing that ethnic fractionalization leads to social conflicts, political instability, and the adoption of inefficient economic policies, including discrimination against minorities. These findings have been chal-

¹As in Bardhan (1997), for convenience, we use the word "ethnic" as a general label for relevant racial, tribal, linguistic, regional or religious divisions.

²For more details on the Australian data, see Tremblay (2000).

³See Alesina and Drazen (1991), for a discussion on stabilization policies, and Schiff (1998), for a general view on ethnic diversity and economic reform in Africa.

lenged notably by Collier and Gunning (1999), who point out that fractionalization *per se* is of little interest since the negative growth effect of ethnic diversity only applies in societies lacking political rights.⁴

Until recently, however, ethnic discrimination has mostly been treated as an exogenous trait, inherited from a country's specific culture and history. In an attempt to endogenize such discriminations and conflicts, the recent literature on the political economy of growth suggested two possible economic rationales for ethnic discrimination (Bardhan, 1997, Bates, 1999, Horowitz, 1998): the hostility externality, and the redistribution motive. To use a distinction proposed by Horowitz (1998), the hostility theory proposes a hard view of ethnic conflicts, while the redistribution theory endorses a soft view. In the first approach (e.g., Wintrobe, 1996, Azam, 2000), the group in power - the majority - has a distaste for the well-being of minorities, and aims to harm them, using the government as a (costly) means of inflicting hostility up to a given point. In the second approach, as advocated, for example, by Benhabib and Rustichini (1996), Congleton (1996), and Benabou (1996), the group in power builds on the lack of political rights and influence of the minority to promote an ethnically biased redistribution, whether through direct or indirect means. Obviously, the hostility theory would seem to apply to phenomena that range from market discrimination to secular conflicts culminating in ethnic violence and civil war. By contrast, the redistribution theory would apply mainly to governmental discrimination (access to public jobs and loans, budget allocation on an ethnic basis, ethnically biased tax systems, etc.). The two theories, however, are not mutually exclusive, and their differences should not be overstated. On the contrary, it seems obvious that these two types of motives can coexist and feed off one another (Carlton, 1995).⁵

Along the lines suggested by the second approach, we assume a rent-maximizing government, whose objective is to maximize the welfare of a privileged group (henceforth, the majority). In our model, people make two decisions: whether to invest in education during their youth; and whether to emigrate as adults. Both of these are affected by the anticipated domestic discrimination, which, in our setting, takes the form of proportional taxation of the educated fraction of the minority, with lump-sum redistribution within the majority. These assumptions are discussed below. Instead of focusing on the growth effects of such policies, as in the above cited literature, we focus on how migration prospects may affect ethnic inequality when discrimination is endogenous. Our approach has some similarities to that of Epstein *et al.* (1999), Docquier and Rapoport (1999), and Tremblay (2000). In contrast to Docquier and Rapoport (1999), where migrants are picked up randomly by immigration authorities, we assume proportional taxation, as indicated above, rather than a poll tax. This results in a self-selection process, whereby, consistently with existing data, migration is more likely for the most highly skilled (see, e.g., Carrington and Detragiache,

⁴See also Bluedorn (2001) for a reassessment of this empirical controversy.

⁵Cognitive dissonance being one of the many channels that could account for such a cumulative process.

1999). In contrast to Epstein *et al.* (1999) and Tremblay (2000), where individual productivity is given, individual productivity depends on education decisions. As a result, from the majority's perspective, there is a tradeoff between the amount of the tax rate and the number of taxpayers, so that ethnic discrimination is endogenously limited even in the case of a closed economy.

The remainder of the paper is organized as follows. Section 2 presents the formal framework of the model and discusses its main assumptions. Section 3 details the results for three different possible distributions of individuals' inherited skills, and examines the sensitivity of the results with respect to the choice of a particular distribution. Section 4 introduces uncertainty into the model in the form of immigration restrictions set by the receiving countries, and studies how these affect equilibrium outcomes. Section 5 offers the conclusions and suggests extensions for further research.

2 A rent-maximizing model

We consider a small open developing economy, whose population is divided between a majority group (denoted by M) and a minority group (denoted by m), the latter lacking political influence. Individuals are born with a given minimal endowment of human capital (normalized to 1), and with heterogeneous learning abilities: each individual is characterized by his personal ability to learn, i.e., to transform a given educational investment into productive skills. The learning ability of an individual, denoted by a , is distributed according to a density function $f(a)$ of mass 1 on the space $[\underline{a}, \bar{a}]$:

$$\int_{\underline{a}}^{\bar{a}} f(a) da = 1$$

The distribution is the same for the majority and the minority.

Two generations coexist. During the first period, people have the possibility of investing in education, so as to improve their productivity in the second period. The education decision is a "take it or leave it" choice. There is a unique educational program which requires a fixed time cost e , expressed as a proportion of the first period duration. An educated agent is endowed with $1 + a$ efficiency units of labor to supply when old. Non-educated agents, on the other hand, keep the same unitary level of human capital over their whole lifetime. The no-investment income is assumed to reflect the subsistence minimum required in that economy.

We formalize ethnic discrimination through a proportional tax, extracted on the educated fraction of the minority, and equally redistributed among the majority. This tax is assumed to reflect the various distortions in the taxation system penalizing the minority. For example, the tax structure may be designed to penalize activities in which ethnic minorities are over-represented, or fiscal privileges may be offered to the government's ethnic constituency. Alternatively, minority members may be victims of financial extortion, or forced to use bribes or majority name-lenders to

circumvent ethnic restrictions. It is assumed that non educated agents remain at the subsistence level, thereby escaping taxation. Being educated, therefore, signals ability to pay the ethnic tax, which is levied on the educated only. Last, since we are not interested in the fate of the majority elite, or in the growth effects of discrimination, we assume for analytical convenience a lump-sum redistribution within the majority, i.e., redistribution equally benefits every member of the majority, whether educated or not.⁶

The constant tax rate is denoted by t . Education is assumed to provide its owners with a passport to a discrimination-free country, whose factor prices are equal⁷ and unaffected by migration. There is a fixed migration cost C .

The education decision is taken during the first period, while the migration decision is taken at the beginning of the second period. A minority member of type a thus compares his life-cycle income W_a^m in three possible situations:

- Not investing in education and staying in the home country:

$$W_a^m = 1 + \frac{1}{R} = \frac{1}{R} [(1 - e)R + 1 + eR] \quad (1)$$

- Investing in education and staying in the home country:

$$W_a^m = 1 - e + \frac{1 + a(1 - t)}{R} = \frac{1}{R} [(1 - e)R + 1 + a(1 - t)] \quad (2)$$

- Investing in education and emigrating:

$$W_a^m = 1 - e + \frac{1 + a - C}{R} = \frac{1}{R} [(1 - e)R + 1 + a - C] \quad (3)$$

where R denotes the private discount rate on future earnings (1 plus the interest rate).

The comparison of these three alternatives determines two critical ability thresholds. The first threshold characterizes the minority member who is indifferent about whether to invest in education: $a^m = a_{c1}^m \equiv \frac{eR}{1-t}$. The second ability threshold characterizes the educated member of the minority who is indifferent about whether to emigrate: $a^m = a_{c2}^m \equiv \frac{C}{t}$. Agents falling in the range between the minimal ability \underline{a} and the critical ability a_{c1}^m opt for alternative 1, agents in the range between a_{c1}^m and a_{c2}^m choose alternative 2, and agents in the range between a_{c2}^m and the maximal ability \bar{a} opt for alternative 3. To avoid trivial solutions, we make the assumption that the agent with the highest ability would choose to invest in education in the absence of discrimination:

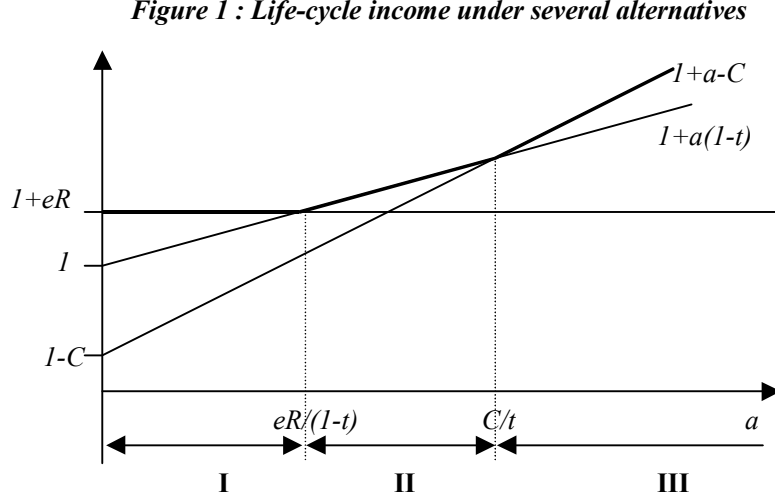
Assumption 1: $\bar{a} - eR > 0$.

⁶Obviously, redistribution only within the educated fraction of the majority would create further incentives for education for the majority, thus giving rise to rent-seeking activities.

⁷This is to neutralize the incentives for emigration based on inter-country wage differentials. Such incentives have already been extensively discussed in previous literature.

Note that Assumption 1 does not preclude that, if $a_{c2}^m = \frac{C}{t}$ is higher than \bar{a} (that is, for sufficiently low discrimination tax rates), no one chooses to emigrate.

Given the terms at the right hand side of equations (1)-(2)-(3), the possible alternatives are graphically represented in Fig. 1 for a given discrimination rate:



All the agents who opt for alternative 1 (no investment in education) are in zone I, all the agents who opt for alternative 2 (education without emigration) are in zone II, while the most capable agents, those who choose to invest in education and emigrate, are in zone III. As the tax rate increases, zone I and III are increased while zone II is decreased. Indeed, more discrimination, on the one hand, deters investment in education, and, on the other hand, pushes more educated members of the minority towards emigration. It may easily be shown that if $t \geq \frac{C}{eR+C}$, zone II becomes empty. In this case, no educated minority members remain in the country, so that the discrimination revenue falls to zero.

Under the rational discrimination assumption, there are two mechanisms whereby minority members are protected against "excessive" discrimination. First, the tax rate must be such that a sufficient number of agents opt for education; second, the tax rate must be such that a sufficient number of educated agents choose to stay in their origin country. Formally, zone II delimits the fraction of the minority on which the discrimination rent is extracted. The lower bound of this interval is unambiguously given by $\frac{eR}{1-t}$, while the upper bound may either be $\frac{C}{t}$ or \bar{a} , depending on whether some of the educated minority members actually emigrate. Typically, if $\frac{C}{t} > \bar{a}$, the migration cost is too high (or, alternatively, the discrimination tax rate is too low) to induce migration. Therefore, the relevant fraction of the minority that is subject to taxation is given by the interval $\left[\frac{eR}{1-t}, \min\left(\frac{C}{t}, \bar{a}\right) \right]$. Note that the critical values for the majority (which correspond to those for the minority for $t = 0$) are respectively given by $a_{c1}^M = eR < a_{c1}^m$ and $a_{c2}^M = \infty > a_{c2}^m$. This implies: (i) that the proportion of

the educated is always higher within the majority than in the minority; and (ii) that none of the majority members are willing to emigrate.

Let α denote the share of the minority in the total population and $1 - \alpha$ the share of the majority. The optimal discrimination rate from the majority's perspective is given by:

$$t^* = \arg \max \left\{ \frac{\alpha}{1 - \alpha} \times t \times \int_{\frac{eR}{1-t}}^{\min(\frac{C}{t}, \bar{a})} af(a)da \right\} \quad (4)$$

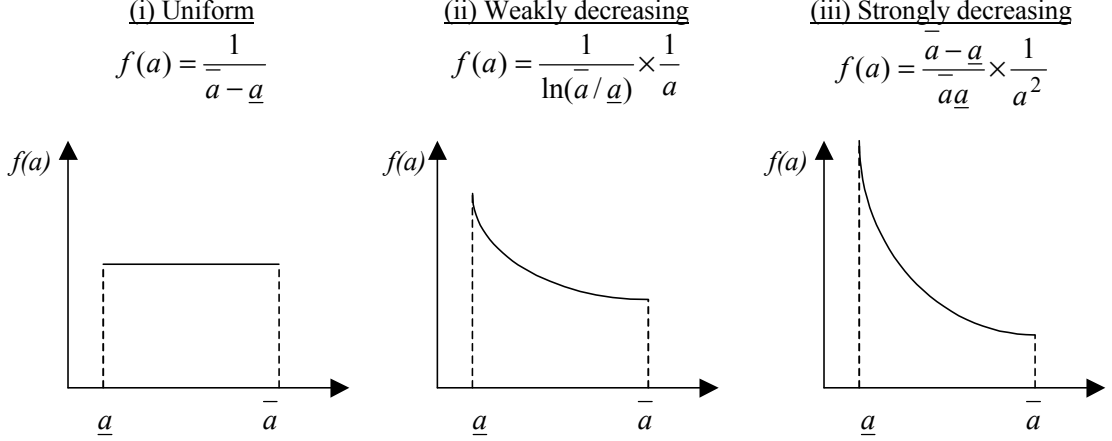
where the per-capita rent between brackets is defined for $0 < t < \frac{C}{eR+C}$, and the integral measures the taxpayers' average ability.

3 Endogenous discrimination under several ability distributions

As shown in equation (4), the equilibrium discrimination tax rate strongly depends on the minority's ability distribution. The intuition for this is the following. Consider a given initial level for the discrimination tax rate, t_0 . How does a marginal increase in that rate affect the aggregated rent extracted from the minority? On the one hand, the gain is obvious: the educated who stay in the home country pay more. But, on the other hand, the number of taxpayers decreases as a result of increased emigration and a fall in the human capital formation within the minority. The first effect is highly detrimental for rent maximization since it affects the individuals with the highest abilities (those who pay the highest taxes). Its magnitude, and, therefore, the total effect of a marginal tax increase, is clearly depending on the ability density at the right of C/t_0 . Examining this problem at \bar{a} (i.e. for $t_0 = C/\bar{a}$), it is obvious that the choice to discriminate above t_0 strongly depends on the relative thickness of the tail of the ability density function at the right hand side.

Various rent-maximization solutions may be obtained, in which the density shape becomes more or less decreasing. To illustrate this, we consider three possible ability distributions: (1) uniform ($f(a) = U(a) = cst$), perfectly symmetric around the mean; (2) weakly decreasing, with density decreasing hyperbolically with the ability level ($f(a) = cst/a$); and (3) strongly decreasing, with density decreasing with the square of the ability level ($f(a) = cst/a^2$). Fig. 2 gives a schematic representation of these distributions.

Figure 2 : The ability distribution



3.1 The case of uniform density (*un*)

In the case of uniform density, the optimal discrimination tax from the majority's perspective may be written as:

$$t_{un}^* = \arg \max \left\{ t \times \int_{\frac{eR}{1-t}}^{\min(\frac{C}{t}, \bar{a})} \frac{a}{\bar{a} - \underline{a}} da \right\} \quad (5)$$

Given the condition on the upper bound of the integral, two regimes may be distinguished, depending on whether $t_{un}^* < C/\bar{a}$ or $t_{un}^* > C/\bar{a}$. We treat this problem in two preliminary steps, and then derive the corresponding Laffer curves, depending on whether the upper bound of the integral is C/t or \bar{a} . As apparent from Fig. 3, the Laffer curve associated to the upper bound \bar{a} (called L1) applies for $t_{un}^* < C/\bar{a}$, and the Laffer curve associated to the upper bound C/t (called L2) applies for $t_{un}^* > C/\bar{a}$. In the final step, we compute the general Laffer curve, which combines L1 and L2 and exhibits a discontinuity point at $t_{un}^* = C/\bar{a}$.

STEP 1 : DERIVATION OF THE LAFFER CURVE L1

For $t < C/\bar{a}$, $\min(\bar{a}, C/t) = \bar{a}$, so that the aggregated rent extracted is given by $t \times [\bar{a}^2 - (\frac{eR}{1-t})^2]$. The solution is obtained by setting the derivative with respect to t at zero. This gives the implicit first-order condition: $h_1(t) = (\frac{\bar{a}}{eR})^2$, with $h_1(t) \equiv \frac{1+t}{(1-t)^3}$. The RHS term of this equality is clearly constant and above unity. The LHS term is an increasing and convex function of the tax rate. This gives the following result:

Lemma 1 *The Laffer curve L1 (corresponding to the Laffer curve in the closed economy) has a unique interior solution: $t_{1,un}^* \in [0, 1]$. The discrimination tax $t_{1,un}^*$ increases with the ability range and decreases with education cost: $t_{1,un}^* = f(\frac{\bar{a}}{eR})$, $f' > 0$.*

Proof. $h_1(t)$ increases in $t \in [0, 1]$, with $h_1(0) = 1$ and $h_1(1) = \infty$. Given assumption 1, since $h_1(t) = \left(\frac{\bar{a}}{eR}\right)^2$ for $0 < t < 1$, this ensures an internal solution. ■

This closed economy Laffer curve is represented by the L1-curve of Fig. 3. Note that the tax rate $t_{1,un}^*$ corresponds to the equilibrium solution in the closed economy since it is not constrained by migration prospects.

STEP 2 : DERIVATION OF THE LAFFER CURVE L2

For $t > C/\bar{a}$, $\min(\bar{a}, C/t) = C/t$, so that the aggregated rent is given by $t \times \left[\left(\frac{C}{t}\right)^2 - \left(\frac{eR}{1-t}\right)^2\right]$. The derivative of the aggregated rent with respect to t is always negative $\left(-\left(\frac{C}{t}\right)^2 - (eR)^2 \frac{1+t}{(1-t)^2} < 0\right)$ so that this function is monotonically decreasing in t . If migration occurs, the tax rate must be as low as possible. The maximal rent is thus obtained if the tax is set to the lower bound $t_{2,un}^* = C/\bar{a}$, as apparent from Fig. 3 (L2 curve).

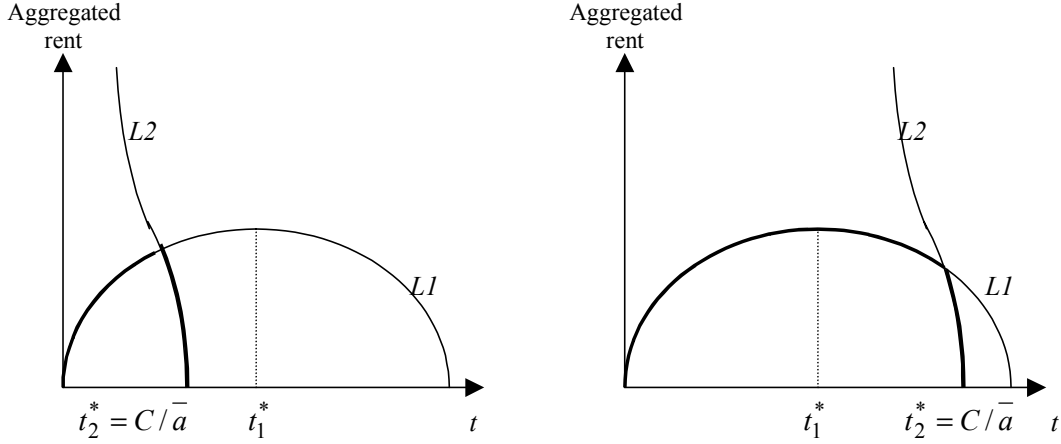
STEP 3 : DERIVATION OF THE GLOBAL LAFFER CURVE

The global Laffer curve combines L1 and L2. It is represented in bold lines on Fig. 3.

Figure 3 : The global Laffer curve and migration costs

Fig. 3.a : Low migration costs

Fig. 3.b : High migration costs



The equilibrium discrimination tax rate is given by the maximum of this global Laffer curve, which corresponds to the minimum of the two rates derived in steps 1 and 2. Thus:

$$t_{un}^* = \min(t_{1,un}^*, t_{2,un}^*) \quad (6)$$

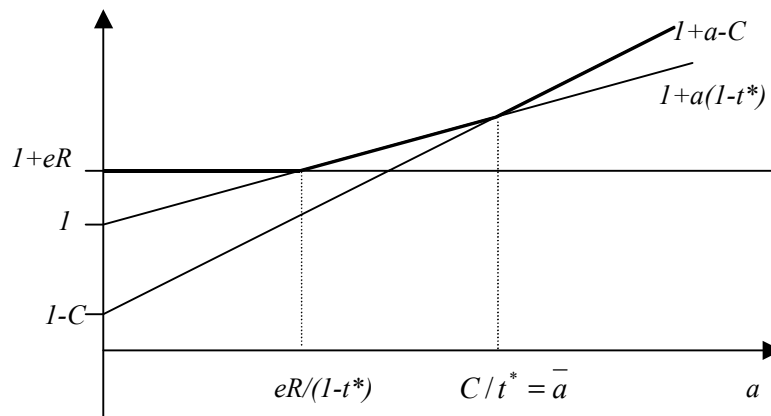
giving the following general result:

Proposition 1 *In the case of a uniform ability distribution: (i) migration prospects do not influence the equilibrium discrimination tax rate if migration costs are sufficiently high; formally, $t_{un}^* = t_{1,un}^* = f(\frac{\bar{a}}{eR})$ if and only if $t_{1,un}^* < C/\bar{a}$; (ii) if migration costs are sufficiently low, the equilibrium tax rate is such that the minority member with the highest ability is indifferent about whether to emigrate; formally, $t_{un}^* = t_{2,un}^* = C/\bar{a}$ if and only if $t_{1,un}^* > C/\bar{a}$.*

Proof. This clearly follows from the definitions of t_{un}^* , $t_{1,un}^*$ and $t_{2,un}^*$. ■

From equation (6), $t_{un}^* = t_{1,un}^* < t_{2,un}^*$ if migration costs are high. This case is shown in Fig. 3b, where the maximum of the closed economy Laffer curve $L1$ corresponds to that of the global Laffer curve. In such cases, migration prospects do not affect the level of discrimination, which is only limited by internal incentives to invest in human capital. Since migration opportunities are not relevant, it is also clear that there is no migration at equilibrium. On the contrary, if migration costs are low, from equation (6), $t_{un}^* = t_{2,un}^* < t_{1,un}^*$. This case is shown in Fig. 3a where the maximum of the global Laffer curve corresponds to the intersection point of the curves $L1$ and $L2$. This case is obtained when the $L2$ curve intersects the $L1$ curve to the left of its maximum. In such cases, migration prospects reduce the rent-extracting power of the majority, and the equilibrium tax rate is such that even the minority members with the highest abilities choose to stay in their origin country. This is obviously due to the fact that the relative density at the right of the distribution is high: a higher tax rate would generate a large income loss. This also results in the absence of any migration at equilibrium, as shown in Fig. 4.

Figure 4 : Equilibrium with a uniform distribution and low migration costs



The following corollary emerges from Proposition 2:

Corollary 1 (i) *The equilibrium discrimination rate is a non-increasing function of migration costs. It is strictly decreasing if migration costs are sufficiently low; (ii) The educational investment of minority members is a non-decreasing function of the migration cost. It is strictly increasing if migration costs are sufficiently low.*

Minority members choosing to acquire education are those whose ability is higher than the threshold $\frac{eR}{1-t}$. Given the previous proposition, migration prospects lower the tax rate and decrease the critical value.

3.2 The case of a weakly decreasing density (wd)

If the density of the distribution decreases hyperbolically with individuals' abilities, the optimal discrimination tax from the majority's perspective is given by:

$$t_{wd}^* = \arg \max \left\{ t \times \int_{\frac{eR}{1-t}}^{\min(\frac{C}{t}, \bar{a})} \frac{1}{\ln \bar{a} - \ln \underline{a}} da \right\} \quad (7)$$

This is obtained by maximizing $[ta]_{\frac{eR}{1-t}}^{\min(C/t, \bar{a})}$ with respect to t . We adopt the same three-step-methodology as in the previous section.

STEP 1 : DERIVATION OF L1

For $t < C/\bar{a}$, one has to maximize $\bar{a}t - \frac{teR}{1-t}$ (representing the L1 curve). The first-order condition gives the tax rate $t_{1,wd}^* = 1 - \sqrt{\frac{eR}{\bar{a}}}$, which clearly belongs to the interval $[0, 1]$, i.e., the closed economy solution is an interior solution. It is clear that the equilibrium tax rate increases with the ability range and decreases with the educational cost. This result is very similar to that in the case of a uniform distribution, except that it gives an explicit analytical solution.

STEP 2 : DERIVATION OF L2

For $t > C/\bar{a}$, the L2 curve is given by $C - \frac{teR}{1-t}$. Again, the derivative of the L2 curve with respect to the tax rate is negative ($-\frac{eR}{(1-t)^2} < 0$). The maximal rent is thus obtained when the tax rate is set to the lower bound $t_{2,wd}^* = C/\bar{a}$.

STEP 3 : DERIVATION OF THE GLOBAL LAFFER CURVE

The global Laffer curve combines L1 and L2 and the equilibrium discrimination tax rate is given by the minimum of the rates derived in steps 1 and 2: $t_{wd}^* = \min(t_{1,wd}^*, t_{2,wd}^*)$, giving the following result (which is also very similar to that in the previous section):

Proposition 2 *In the case of a hyperbolic distribution: (i) migration prospects do not influence the equilibrium discrimination tax rate if migration costs are sufficiently*

high ($t_{wd}^* = t_{1,wd}^* = 1 - \sqrt{\frac{eR}{\bar{a}}}$ if and only if $t_{1,wd}^* < C/\bar{a}$); (ii) the equilibrium tax rate is such that the minority member with the highest ability is indifferent as to whether to emigrate if migration costs are sufficiently low ($t_{wd}^* = t_{2,wd}^* = C/\bar{a}$ if and only if $t_{1,wd}^* > C/\bar{a}$).

Proof. This clearly follows from the definitions of t_{wd}^* , $t_{1,wd}^*$ and $t_{2,wd}^*$ ■

Fig. 3 and 4 and corollary 1 in the previous section are still valid in characterizing the consequences of migration prospects on ethnic inequalities in the case of a weakly decreasing ability distribution..

3.3 The case of a strongly decreasing density (*sd*)

If the density of the distribution is decreasing with the square of the ability level, the optimal discrimination tax from the majority's perspective is given by:

$$t_{sd}^* = \arg \max \left\{ t \times \int_{\frac{eR}{1-t}}^{\min(\frac{C}{t}, \bar{a})} \frac{\bar{a}a}{a(\bar{a} - a)} da \right\} \quad (8)$$

This is obtained by maximizing $[t \times \ln a]_{\frac{eR}{1-t}}^{\min(C/t, \bar{a})}$ with respect to t .

STEP 1 : DERIVATION OF L1

For $t < C/\bar{a}$, the equation of the *L1* curve is proportional to $t \ln \frac{\bar{a}}{eR} + t \ln(1 - t)$. Using the first-order condition, we derive the following implicit equilibrium condition,

$$g_1(t_{1,sd}^*) \equiv \frac{t_{1,sd}^*}{1 - t_{1,sd}^*} - \ln(1 - t_{1,sd}^*) = \ln \frac{\bar{a}}{eR}$$

This induces the following lemma:

Lemma 2 *The L1 Laffer curve (the Laffer curve in the closed economy) has a unique interior solution: $t_{1,sd}^* \in [0, 1]$. The discrimination tax rate $t_{1,sd}^*$ increases with the ability range and decreases with the cost of education: $t_{1,sd}^* = k_1(\frac{\bar{a}}{eR})$ with $k_1' > 0$.*

Proof. The function $g_1(t)$ is monotonically increasing and convex. It starts from 0 ($g_1(0) = 0$) and tends to infinity ($g_1(1) = \infty$). Given assumption 1, $\ln \frac{\bar{a}}{eR}$ is positive. It follows that $g_1(t)$ intersects $\ln \frac{\bar{a}}{eR}$ between 0 and 1. The higher $\ln \frac{\bar{a}}{eR}$, the higher the tax rate at the intersection point. ■

STEP 2 : DERIVATION OF L2

For $t > C/\bar{a}$, the equation of $L2$ is proportional to $t \ln \frac{C}{eR} - t \ln t + t \ln(1-t)$. Using the first-order condition, we derive the following implicit equilibrium condition,

$$g_2(t_{2,sd}^*) \equiv \frac{t_{2,sd}^*}{1 - t_{2,sd}^*} - \ln \frac{t_{2,sd}^*}{1 - t_{2,sd}^*} = \ln \frac{C}{eR} - 1$$

This induces the following lemma:

Lemma 3 *The L2 Laffer curve has a unique interior solution: $t_{2,sd}^* \in [0, 1]$. The discrimination tax $t_{2,sd}^*$ increases with the ability range and decreases with the education cost $t_{2,sd}^* = k_2(\frac{C}{eR})$, with $k_2' > 0$*

Proof. The function $g_2(t)$ is monotonically increasing. It starts from minus infinity ($g_2(0) = -\infty$) and tends to infinity ($g_2(1) = \infty$). The RHS term $\ln \frac{C}{eR} - 1$ is either positive or negative. It follows that $g_2(t)$ intersects $\ln \frac{C}{eR} - 1$ at a discrimination rate between 0 and 1. The higher $\ln \frac{C}{eR}$, the higher the tax rate at the intersection point.

■

In the case of a strongly decreasing distribution of ability, the L2 curve becomes concave. It is increasing for low tax rates and decreasing for higher values of the tax rate.

STEP 3 : DERIVATION OF THE GLOBAL LAFFER CURVE.

The global Laffer curve combines two concave curves: $L1$, with a maximum at $t_{1,sd}^*$, and $L2$, with a maximum at $t_{2,sd}^*$. As shown in Fig. 5, there are three possible solutions for the equilibrium discrimination tax rate: it can either be the maximum of $L1$, the maximum of $L2$, or the discontinuity point at which $L1$ and $L2$ intersect: $t_{sd}^* \in \{t_{1,sd}^*, t_{2,sd}^*, \frac{C}{\bar{a}}\}$. Several cases must therefore be distinguished:

- If $t_{2,sd}^* < t_{sd}^* = t_{1,sd}^* < \frac{C}{\bar{a}}$ (Case 1), there is no migration at equilibrium, and the equilibrium discrimination rate is identical to that observed in the closed economy.
- If $t_{2,sd}^* < t_{sd}^* = \frac{C}{\bar{a}} < t_{1,sd}^*$ (Case 2), the equilibrium discrimination rate is lower than that obtained in the closed economy. However, as in the cases of a uniform or weakly decreasing distribution, it is optimal for the majority to set the tax rate so that the minority member with the highest ability is indifferent as to whether to emigrate; as a result, there is no migration at equilibrium in Case 2.
- If $\frac{C}{\bar{a}} < t_{sd}^* = t_{2,sd}^* < t_{1,sd}^*$ (Case 3), as distinct from the other cases, there is migration at equilibrium. Indeed, migration prospects reduce the rate of discrimination (since $t_{sd}^* < t_{1,sd}^*$), but the equilibrium tax rate induces emigration

for the fraction of the minority with the highest abilities (since $\frac{C}{a} < t_{sd}^*$). Graphically, Case 3 emerges if the $L2$ curve intersects the $L1$ curve and both curves have a positive slope (see Fig. 5).⁸

- If $t_{1,sd}^* < \frac{C}{a} < t_{sd}^* = t_{2,sd}^*$ (Case 4). Graphically, Case 4 also emerges if $L2$ is positively sloped at the intersection with, but has its maximum to the right of $t_{1,sd}^*$. However, such a case is theoretically irrelevant. Indeed, since $L2$ integrates two (internal and external) detrimental effects of taxation on human capital accumulation while $L1$ integrates only one (internal) effect, the $L2$ curve should be either more decreasing or less increasing than $L1$ at their intersection point.

The main insights of the above discussion can be summarized as follows:

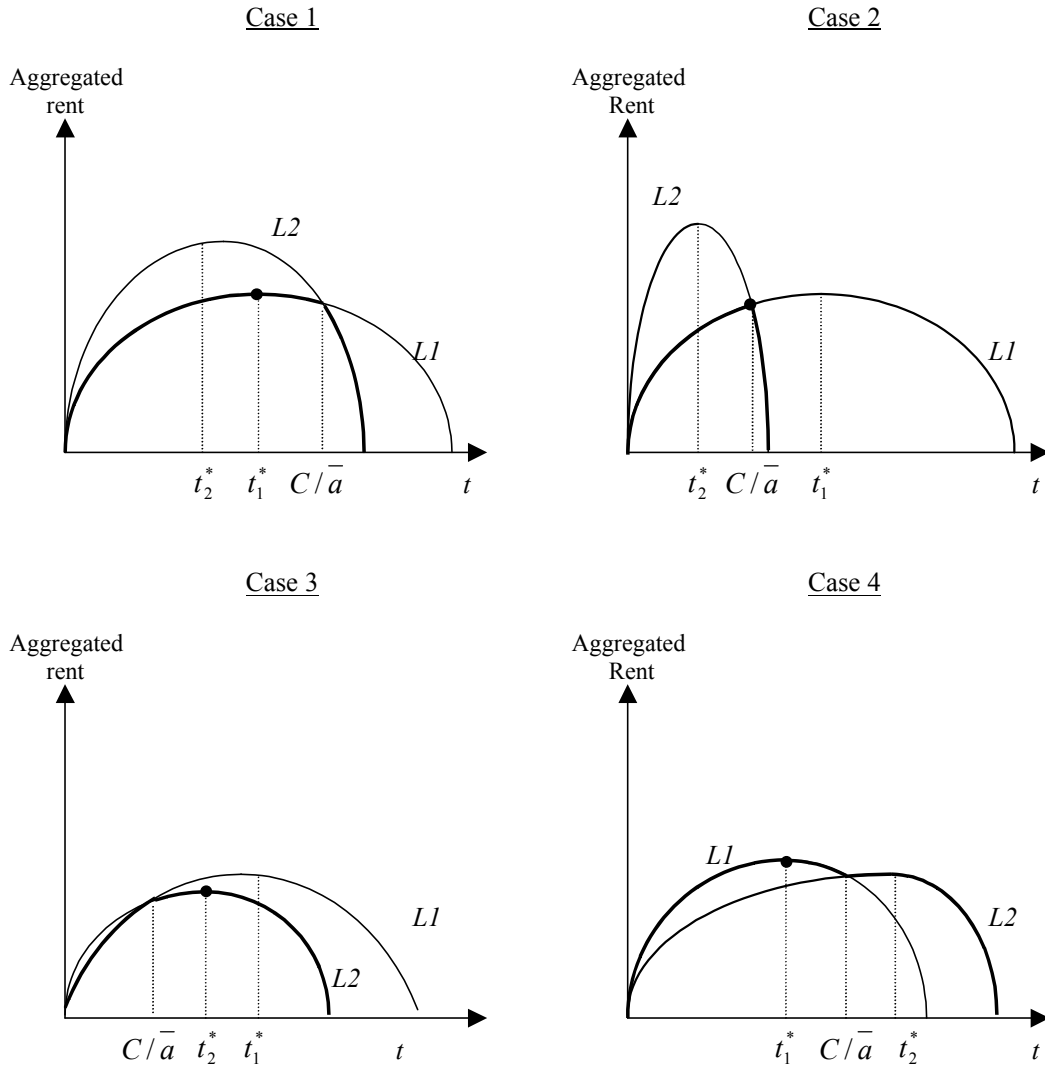
Proposition 3 *In the case of a strongly decreasing distribution, migration prospects reduce the equilibrium tax rate and are likely to generate effective emigration if $\ln \frac{\bar{a}-C}{eR} > \frac{\bar{a}}{\bar{a}-C}$.*

Proof. Effective emigration is observed in case 3. A necessary and sufficient condition to obtain Case 3 is that the slope of $L2$ must be positive at $\frac{C}{a}$. Formally, this slope at $\frac{C}{a}$ is given by $-\frac{C}{\bar{a}-C} - \ln \frac{C}{\bar{a}-C} + \ln \frac{C}{eR} - 1$. It is positive if and only if $\ln \frac{\bar{a}-C}{eR} > \frac{\bar{a}}{\bar{a}-C}$. ■

The condition required for observing effective migrations is likely to be satisfied when both the migration and the education costs are relatively low. Under such conditions, the open economy equilibrium tax rate is lower than that obtained in the closed economy (since the maximum of $L2$ must lie at the left of the maximum of $L1$). In Case 3, despite the effective emigration of its most skilled members, the minority is still protected by migration prospects since the discrimination rate decreases.

⁸As a matter of fact, since only the most highly-skilled individuals emigrate, this situation corresponds to a brain drain phenomenon. On the possible growth effects of such a brain drain, see e.g. Mountford (1997), and Beine *et al* (2001).

Figure 5 : Configurations with a strongly decreasing distribution



4 The consequences of migration restrictions (mr)

Until now, we have assumed a context of free labor mobility. In the real world, of course, prospective migrants are often constrained by immigration restrictions set by receiving countries. Such restrictive immigration policies, which are increasingly selective and biased towards the most educated, explain at least partially the overall tendency for migration rates to be much higher for the educated (Carington and Detragiache, 1999). However, individual skills are not perfectly observable (while educational attainments are), and migrants' selection, even for the educated, generally

proceeds through a kind of random selection among the candidates with appropriate educational record. As a result, uncertainty is introduced in the migration process. To account for such uncertainty, we assume that only a fraction $q < 1$ of the candidates for immigration is effectively allowed to immigrate, while the complementary fraction $1 - q$ is forced to remain in the home country. For analytical convenience, we limit our analysis to the case in which the ability distribution is weakly decreasing.⁹

The rent-maximizing government now faces the following problem:

$$t_{mr}^* = \arg \max \left\{ \int_{\frac{eR}{1-t}}^{\min(\frac{C}{t}, \bar{a})} \frac{t}{\ln \bar{a} - \ln \underline{a}} da + (1 - q) \int_{\min(\frac{C}{t}, \bar{a})}^{\bar{a}} \frac{t}{\ln \bar{a} - \ln \underline{a}} da \right\} \quad (9)$$

We use the same three steps procedure as before:

STEP 1 : DERIVATION OF L1

For $t < C/\bar{a}$, we obtain the same $L1$ curve as in the case of free migration. The equilibrium tax rate is thus given by $t_{1,mr}^* = t_{1,wd}^* = 1 - \sqrt{\frac{eR}{\bar{a}}} \in [0, 1]$.

STEP 2 : DERIVATION OF L2

For $t > C/\bar{a}$, the expected $L2$ curve now depends on the relative immigration quota: $(1 - q)t\bar{a} + qC - \frac{teR}{1-t}$. The $L2$ curve has a concave shape and its derivative $((1 - q)\bar{a} - \frac{eR}{(1-t)^2})$ is positive for low tax rates and negative for high tax rates. Formally, it is clear that $L2$ differs from zero if the tax rate is zero. Nevertheless, recall that this $L2$ curve is only defined for tax rates higher than C/\bar{a} . At the left of C/\bar{a} , the actual Laffer curve is given by $L1$.

Lemma 4 *In the case of a weakly decreasing (hyperbolic) distribution with a migration restriction at rate $0 < q < 1$, the $L2$ Laffer curve has an interior maximum $t_{2,mr}^* = 1 - \sqrt{\frac{eR}{\bar{a}(1-q)}} \in [0, 1]$ and this maximum is lower than that obtained in the closed economy ($t_{2,mr}^* < t_{1,mr}^*$).*

Proof. This clearly follows from the derivative of the $L2$ curve. ■

It is worth noting that this maximum is relevant only if $t_{2,mr}^* < \frac{C}{\bar{a}}$.

STEP 3 : DERIVATION OF THE GLOBAL LAFFER CURVE

This interior solution now differs from that obtained in the free mobility case. The majority must now compare the rent generated in the three following alternatives: $t_{mr}^* \in \left\{ t_{1,mr}^*, t_{2,mr}^*, \frac{C}{\bar{a}} \right\}$. Consequently, the results in terms of discrimination and in terms of emigration flows are likely to be different than in the case of free migration. More precisely,

⁹This is the simplest analytical case. The essence of the results would not be affected by the use of another ability distribution.

Proposition 4 *In the case of a weakly decreasing (hyperbolic) distribution with a migration restriction at rate $0 < q < 1$: (i) the equilibrium discrimination rate is lower or equal to that obtained in the closed economy ($t_{mr}^* \leq t_{1,mr}^*$); (ii) in contrast to the free migration case, migration restrictions increase the equilibrium rate of discrimination if the quota rate is low ($1 - q > \frac{eR\bar{a}}{(\bar{a}-C)^2}$), but has no effect on discrimination if the relative quota is sufficiently high ($1 - q < \frac{eR\bar{a}}{(\bar{a}-C)^2}$).*

Proof. This is apparent on Fig. 6. ■

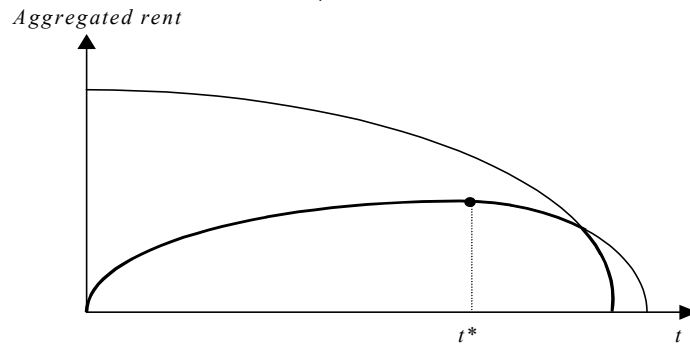
Graphically, the global Laffer curve still combines $L1$ and $L2$. Three possible configurations now have to be distinguished (see Figure 6):

- If $1 - \sqrt{\frac{eR}{\bar{a}(1-q)}} < 1 - \sqrt{\frac{eR}{\bar{a}}} < \frac{C}{\bar{a}}$, migration costs are so high that the closed-economy solution applies despite migration prospects.
- If $1 - \sqrt{\frac{eR}{\bar{a}(1-q)}} < \frac{C}{\bar{a}} < 1 - \sqrt{\frac{eR}{\bar{a}}}$, the $L2$ curve intersects the $L1$ curve with a negative slope. It is then optimal for the majority to set the tax rate at $\frac{C}{\bar{a}}$, in order to avoid the emigration of the most educated fringe of the minority. In this case, immigration restrictions do not modify the solution as compared to the case of free mobility.
- Finally, if $\frac{C}{\bar{a}} < 1 - \sqrt{\frac{eR}{\bar{a}(1-q)}} < 1 - \sqrt{\frac{eR}{\bar{a}}}$ (i.e., if $1 - q > \frac{eR\bar{a}}{(\bar{a}-C)^2}$), the $L2$ curve intersects the $L1$ curve with a positive slope. In contrast to the case of free mobility, the level of discrimination is increased and migration outflows are observed. In such a case, therefore, we find, paradoxically, that immigration restrictions spark emigration within the ranks of the minority and have the unexpected effect of increasing the level of discrimination experienced by remaining minority members.¹⁰

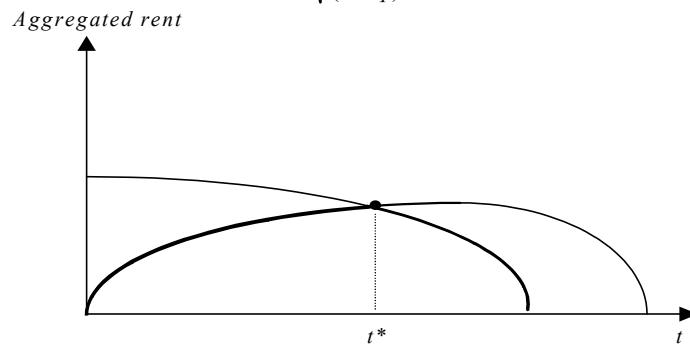
¹⁰Note, however, that as distinct from Docquier and Rapoport (1999), the equilibrium discrimination rate in the partial mobility case is never higher than the one obtained in the closed-economy.

Figure 6 : Optimal discrimination with migration restrictions

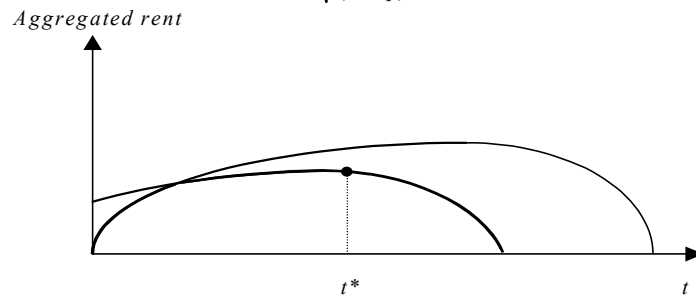
$$\text{Case a : } 1 - \sqrt{\frac{eR}{(1-q)a}} < 1 - \sqrt{\frac{eR}{a}} < \frac{C}{a}$$



$$\text{Case b : } 1 - \sqrt{\frac{eR}{(1-q)a}} < \frac{C}{a} < 1 - \sqrt{\frac{eR}{a}}$$



$$\text{Case b : } 1 - \sqrt{\frac{eR}{(1-q)a}} < \frac{C}{a} < 1 - \sqrt{\frac{eR}{a}}$$



5 Conclusion

In this paper, we adopted a political economy approach to ethnic discrimination in developing countries. Assuming a rent-extraction basis for discrimination, we modeled discrimination as a financial penalty levied on each educated minority member and equally redistributed among the majority. There are, therefore, two sources of ethnic inequality in our model: on the one hand, discrimination lowers the return to human capital for the minority group; on the other hand, this, in turn, decreases the number of minority members who invest in education. Focussing on the impact of migration prospects on the optimal tax rate from the majority's perspective, we found the following results.

First, taking the closed-economy (no mobility) as a benchmark case, we found the intuitive result that if there are unlimited exit options to a discrimination-free country (full mobility case), such migration prospects are likely to protect the minority *via* a decrease in the equilibrium domestic level of discrimination (providing that migration costs are sufficiently low). Under such circumstances, investment in education is fostered among the minority, and ethnic inequality decreases. Second, the equilibrium discrimination rate under full mobility has been shown to be strongly affected by the thickness of the ability distribution tail on the right hand side. If it is sufficiently thick (as in the cases of uniform or weakly decreasing ability distribution), the equilibrium tax rate is such that the minority member with the highest ability is indifferent as to whether to emigrate. If it is sufficiently thin (as is the case for strongly decreasing ability distributions), on the contrary, migration outflows are effectively observed at equilibrium. Third, compared to the free migration case, we found that highly restrictive quotas are likely to increase the level of discrimination imposed on the minority group, thus inducing emigration from among its ranks. In such cases, immigration quotas have the paradoxical effect of increasing ethnic discrimination in the source country and creating migration flows which would otherwise have remained latent.

The issue of ethnic discrimination and conflict in developing countries is a very sensitive question, and one should be extremely cautious before deriving policy implications from a purely theoretical analysis. One immediate legitimate interrogation concerns the motivation at work behind ethnic discrimination. From this perspective, the main testable implication of our model is that, everything else being equal, ethnically divided developing countries for which migration costs are substantial, or immigration quotas to the US and the EU are binding, should have their ethnic minorities subject to higher levels of domestic discrimination.¹¹ Regarding policy issues, it is clear that there is a growing concern for the fate of minority groups at the inter-

¹¹Migration costs are known to increase with the distance to the receiving country and to decrease with the size of the community network at destination (Carrington *et al.*, 1996). Regarding the measurement of immigration restrictions, the sending country's total population has been shown to provide a good proxy to evaluate whether immigration quotas are binding (Beine *et al.*, 2001).

national level. In an attempt to monitor the behavior of oppressive governments and provide protection to such groups, the international community has recently made use of its right of ingerence, threatening to implement or actually imposing economic sanctions, aid conditionality, and, occasionally, military intervention. To the extent that ethnic discrimination is rationally and socially organized for redistributive purposes, our analysis suggests that, alongside such traditional incentive/sanction mechanisms, targeted immigration policy might provide a cost-effective means of protecting ethnic minorities.¹²

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¹²This could be achieved, for example, by making the criteria required to obtain a refugee status more flexible, so as to include economic as well as political discrimination.

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