1. INTRODUCTION

The unification process of Western Europe, on the one hand, and the collapse of the Eastern European block, on the other, is expected to increase migration flows within Europe and from the outside. The expected influx of immigrants already stirred reactions on several levels. Some extreme groups, motivated by xenophobia, turned to violent actions against the immigrants. Though the majority denounced, at least publicly, these reactions, the legislative bodies which represent the moderate majority adopted measures designed to contain the influx of immigrants.

In explaining the immigration and the reactions to it in the host countries, the economic literature focused on the variation in productivity, on the one hand, and social benefits disparities, which result in fiscal externalities, on the other hand (see Myers (1991), Hercowitz and Pines (1991 and Forthcoming), Wildasin (1991 and Forthcoming), and Sadka and Razin (1992)). Extending the social benefits to immigrants is explained in Wildasin (Forthcoming) by altruism of the host countries. [1]

The present paper is focused on another aspect of this potential conflict: the heterogeneity of preference regarding public decision-making, in general, or the level of a public good provision, in particular. Suggestively, the reluctance to grant political rights to immigrants who are already entitled to social benefits, indicates that this aspect of the potential conflict may be even more important than the one emphasized in the literature.

From the analytical point of view, most of the literature concentrates on issues associated with the **distribution of population** between rich and poor countries, rather than on issues associated with the **migration process** per-se which is a dynamic phenomenon. In particular, the literature

[1] This very altruism is not inconsistent with the reluctance to allow free migration. On the contrary, it may be one of the sources of this reluctance.

abstracts from the dynamic aspects of immigrants' absorption into the societies which host them. An important dimension of this absorption involves the granting of political rights which makes the immigrants an integral part of the decision making process, thus affecting the attraction of the host country to further immigration. In the present paper we focus on these issues. In particular, we elaborate on a basic political conflict between the immigrants and the rest of the population, where the source of this conflict is determined within the model rather than being imposed on it exogenously.

We describe a migration equilibrium, where, in deciding whether to migrate, the individual compares the attainable utility in his/her present country of residence with that in the potential country of destination. In this comparison, the individual takes into consideration pecuniary opportunities, as well as the supply of a public good, which is the outcome of a majoritarian political decision in each country. (Actually, the analysis is more general. It applies to any public issue about which different individuals have different opinions.) In order to completely distinguish our analysis from the fiscal externality issue discussed in the above literature, the public good in this paper is a publicly-provided private good.

Our analysis implies that the preferences regarding the public good are correlated with the ”immigration vintage”. This finding provides an insight regarding the potential political conflict between new immigrants and older-time residents or, in general, among resident groups of different seniority. This analysis may provide a rationalization of why political rights are deprived from new immigrants while economic and social rights are more promptly granted. In particular, we show that older-time residents, who initially own the voting franchise, find it advantageous to use the political system in order to, temporarily, deny political rights from more recent immigrants. This incentive structure on the part of older-time residents is due to the existence of systematic differences about the public policy issue across residents according to the time of arrival to the country (everyone has been an immigrant at some time). The US, for example, seems to fit into this model, immigrants are granted voting right only several years after immigration.

The paper is organized as follows. Section II presents the setup of the model and Section III analyzes the individual decision. The migration equilibrium is characterized in Section IV and the political equilibrium, which closes the model, is analyzed in Section V. Section VI analyses political equilibria in which established residents deny political rights from immigrants and informally discusses additional related factors. This is followed by concluding remarks and an agenda for further work in Section VII.

II. THE SETUP OF THE MODEL

We consider here a distribution of the "world" population of size P = 1 between two countries, the North and the South. Each individual is endowed with one unit of homogeneous labor which can produce, at time t, $w^n + z_t$ in the North and w^s in the South. The terms w^n and w^s are the deterministic components, satisfying $w^n > w^s$ while z_t is the stochastic component of productivity which is identically and independently distributed, both across individuals and over time. The distribution of z_t is uniform over the interval $[-\sigma, \sigma]$.

The world population is heterogeneous with respect to the preferences regarding some public policy issue, which may be, but not necessarily, the level of public good. The supply of this public good in the North is g^n and in the South is g^s. This idiosyncratic preference is indexed by *i* which is uniformly distributed over the interval $[0, \gamma]$. At the beginning of each period *t*, each individual observes the value of z_t affecting his/her potential income in the North and decides whether to stay where he/she lives or to emigrate to the other country. Migration from the North to the South costs m^s and from the South to the North-m^n. Given g^n, g^s, and z_t, the attainable per-period utilities at time *t* of a type-*i* individual in the North and in the South are given, respectively, by

$$U_t^{ni} + z_t \equiv w^n + f(g^n, i) + z_t \tag{1}$$

and

$$U_t^{si} \equiv w^s + f(g^s, i)\,. \tag{2}$$

The basic political conflict in the two countries takes the form of different preferences with respect to We assume that the component of preferences regarding this policy issue, $f(g^j, i)$, is single peaked in g^j $(j = n, s)$. The index i characterizes the position of the ideal point of an individual of type i in the (single) policy space. By convention, a higher value of i refers to a higher ideal point of g^j. Those assumptions can be formalized by

Assumption A1:

(a) $f(\cdot)$ as a function of $g^j(j = n, s)$ has an inverted U shape (not necessarily symmetric),

(b) $\partial^2 f(\cdot)/\partial g^j \partial i > 0$ and bounded for $j = n, s$,

(**c**) $\partial^2 f(\cdot)/\partial(g^j)^2 < 0$ and bounded for $j = n, s$.

As an example, consider the specific formulation: $f(g^j, i) = u(g^j, i) - g^j$, with $\partial u/\partial g^j > 0$, $\partial^2 u/\partial(g^j)^2 < 0$, $\partial u/\partial g^j \to 0$ as $g^j \to \infty$, and, according to **A1**, $\partial^2 u/\partial g^j \partial i > 0$. Here, $u(\cdot)$ is the direct utility from the public good and the term g is the cost of providing it. Since the direct marginal utility converges to zero and the per unit cost is constant, $f(\cdot)$ has a maximum.

The inter-temporal preferences of an individual of type-i is given by

$$E_o \sum_{o}^{\infty} \beta^t Y_t^i \tag{3}$$

where $0 < \beta < 1$ is a subjective discount factor, and

$Y_t^i =$

$U_t^{ni} + z_t$, if the individual is in the North and stays there one more period,

$U_t^{si} - m^s$, if the individual is in the North and emigrates to the South at time t,

U_t^{si}, if the individual is in the South and stays there one more period, and

$U_t^{ni} + z_t - m^n$, if the individual is in the South and emigrates to the North at time t,

Finally, the levels of g^n and g^s are determined in each country by majority vote.

III. *THE INDIVIDUAL PROBLEM*

As in Hercowitz and Pines (1991 and forthcoming), the individual solves a sequential decision making over two alternatives as in a job search model (see Mortensen (1986)). In each period the alternatives are either to remain where the individual currently lives, or to migrate to he other country (see also McCall and McCall (1987)).

From the individual's point of view, the levels of g^n and g^s are both given. Thus, the problem of an individual who lives in the North at the beginning of period t, and whose current utility is $U_t^{ni} + z_t$, can be represented by the choice of country of residence, satisfying

$$V^{ni}(z_t) = Max\,\{U_t^{ni} + z_t + \beta E_t V^{ni}(z_{t+1}), U_t^{si} - m^s + \beta E_t V^{si}(z_{t+1})\} \tag{4}$$

where $E_t V^{ni}(z_{t+1})$ is the expected value of staying in the North next period. The individual emigrates to the South if the current utility in the South plus the expected value of being there, net of emigration costs, is higher than the current utility in the North, plus the expected value next period of staying in the North.

Likewise, the problem of an individual who resides in the South at the beginning of period t, and who can realize z_t if emigrating to the North is:

$$V^{si}(z_t) = Max\left\{U_t^{ni} + z_t + \beta E_t V^{ni}(z_{t+1}) - m^n, U_t^{si} + \beta E_t V^{si}(z_{t+1})\right\}. \tag{5}$$

Observe that when migration is costless, $V^{ni}(z_t)$ and $V^{si}(z_t)$ coincide. In this case the location at the beginning of the period is inconsequential: individuals decide where to locate themselves in the current period only by comparing $U_t^{ni} + z_t$ to U_t^{si}.

The solution of (4) and (5) is characterized by a pair of reservation levels $\underline{z}_i$ and $\bar{z}_i$. $\underline{z}_i$ is the value of the stochastic income below which a type-i individual, currently living in the North, decides to emigrate to the South and $\bar{z}_i$ is the level of the stochastic income in the North above which a type-i individual, currently living in the South, decides to emigrate to the North. It follows from (4) and (5) that for an interior solution these reservation levels satisfy:

$$w^n + \underline{z}_i + f(g^n, i) + \beta EV^{ni} = w^s + f(g^s, i) + \beta EV^{si} - m^s, \tag{6}$$

$$w^n + \bar{z}_i + f(g^n, i) + \beta EV^{ni} - m^n = w^s + f(g^s, i) + \beta EV^{si}. \tag{7}$$

where, because the random shock, z_t, is i.i.d., the index t and the arguments z_t and z_{t+1} were suppressed in the expectation expressions.

These conditions say that $\underline{z}_i$ is the level of the stochastic component of income which makes a i-type individual living in the North indifferent between remaining there or migrating. Likewise, $\bar{z}_i$ is the level of z_t which leaves indifferent an i-type individual living in the South.

It follows from (6) and (7) that

$$\bar{z}_i - \underline{z}_i = m^n + m^s. \tag{8}$$

Observe that, for some type $i \in [0, 1]$, (6) and (7) may not be satisfied for feasible levels of z_t. For example, for some types, it may be the case that the l.h.s. of (6) exceeds the r.h.s. even for

$z_t = -\sigma$. These individuals always remain in the North. We assume, however:

Assumption A2: $\underline{z}_i \geq -\sigma$ and $\bar{z}_i \leq \sigma$ for all $i \in [0, \gamma]$.

Assumption A2 states that there is a positive probability that all types will migrate.

For a mobile type-*i*, (8) says that when two individuals, one in the North and one in the South are indifferent regarding whether to stay where they are or to migrate, the increase in utility of both from switching places is equal to the migration costs in both directions.

To solve for the reservation levels, it is necessary to calculate the expected values of being in the North, EV^{ni},and in the South, EV^{si}. Applying the expected operator to V^{ni} and V^{si}, equations (4) and (5) yield

$$\begin{aligned} EV^{ni} = (w^s + f(g^s, i) - m^s + \beta EV^{si})(\underline{z}_i + \sigma)/2\sigma + \\ (U^{ni} + \beta EV^{ni})\,(\sigma - \underline{z}_i)/2\sigma + \textstyle\int_{\underline{z}_i}^{\sigma} (z/2\sigma) dz \end{aligned} \quad (9)$$

and

$$\begin{aligned} EV^{si} = (w^s + f(g^s, i) + \beta EV^{si})\,(\sigma + \bar{z}_i)/2\sigma + \\ (U^{ni} - m^n + \beta EV^{ni})\,(\sigma - \bar{z}_i)/2\sigma + \textstyle\int_{\bar{z}_i}^{\sigma} (z/2\sigma) dz \end{aligned} \quad (10)$$

The system of four equations (6), (7), (9) and (10) can now be solved to determine the four unknowns, $\underline{z}_i$, $\bar{z}_i$, EV^{ni}, and EV^{si}. The solution is

$$EV^{ni} = \left[U^{ni} + (\sigma + \underline{z}_i)^2/4\sigma\right]/(1 - \beta) \quad (11)$$

$$EV^{si} = \left[U^{si} + (\sigma - \bar{z}_i)^2/4\sigma\right]/(1 - \beta) \quad (12)$$

$$\underline{z}_i = \left[U^{si} - U^{ni} + (1-\beta)(m^n - m^s)/2\right]/A - (m^n + m^s)/2. \tag{13}$$

$$\bar{z}_i = \left[U^{si} - U^{ni} + (1-\beta)(m^n - m^s)/2\right]/A + (m^n + m^s)/2 = \underline{z}_i + (m^n + m^s), \tag{14}$$

where $A \equiv 1 - \beta(m^n + m^s)/2\sigma$.

Since assumption **A2** and (8) imply

$$m^n + m^s \leq 2\sigma \tag{15}$$

and $\beta < 1$, it follows that A is positive.

Differentiating (11)-(14), it can be shown that EV^{ni} and EV^{si} are both decreasing functions of m^n and m^s. These results are, of course, hardly surprising, since higher migration costs reduces the value of the migration option.

IV. *MIGRATION EQUILIBRIUM*

In this section we derive the stationary distribution of the world population across the two countries with P^n in the North and P^s in the South. We begin with the distribution of the type-*i* world population, P^i, between the two countries. Let P^{ni} and P^{si} be the populations of type-*i* individuals in the North and the South, respectively. Given g^n in the North and g^s in the South, the probability that a type-*i* individual migrates to the South in a given period is $(\sigma + \underline{z}_i)/2\sigma$. Since z_t is distributed independently across individuals, $(\sigma + \underline{z}_i)/2\sigma$ is also the proportion of type-*i* individuals in the North who emigrate in a given period to the South. Similarly, $(\sigma - \bar{z}_i)/2\sigma$ is the proportion of type-*i* individuals in the South who emigrate in a given period to the North.

A stationary equilibrium exists when the migration flow (within every group) to the North and to the South are equal, i.e.:

$$(P^i - P^{ni})(\sigma - \overline{z}_i)/2\sigma = P^{ni}\left(\sigma + \underline{z}_i\right)/2\sigma. \tag{16}$$

It follows from (14) and (16) that the stationary population of type-i individuals in the North, P^{ni}, is given by

$$P^{ni} = P^i\left(\sigma - \overline{z}_i\right)/B, \tag{17}$$

where

$B = 2\sigma - m^n - m^s > 0.$

Since the world population is 1, and the distribution of types is uniform on the $[0, \gamma]$ interval, the type-i population is given by

$$P^i = 1/\gamma \tag{18}$$

Substituting (1), (2), (14), and (18), into (17) yields

$$P^{ni} = K_0 + K_1(g^n, g^s, i) \tag{19}$$

where

$K_0 = \sigma/B\gamma - \left\{\left[(w^s - w^n) + (1 - \beta)\left(m^n - m^s\right)/2\right]/A + \left(m^n + m^s\right)/2\right\}/B\gamma$

and

$K_1\left(g^n, g^s, i\right) = \left[f\left(g^n, i\right) - f\left(g^s, i\right)\right]/AB\gamma.$

Since, $P^{si} = 1/\gamma - P^{ni}$,

$$P^{si} = 1/\gamma - K_0 - K_1(g^n, g^s, i). \tag{20}$$

We have thus solved for the distribution of world type-i population between the North and the South for given values of g^n and g^s. In order to calculate the population in the North and the South, we have to integrate P^{ni} and P^{si}, respectively, over $i \in [0, \gamma]$.

In the next section we turn to the political determination of g^n in the North, and of g^s in the South.

V. *POLITICAL EQUILIBRIUM*

1. General Characterization

We assume that the level of g^j ($j = n, s$) in each country is determined by majority rule. Since preferences are single peaked, the choice of g in each country is determined only by the choice of the median voter (see Black (1958) and Westhoff (1977)). We denote the median voter's type in country j by i^j. Accordingly, given the median voter's type in country j, the level of g^i is obtained as the solution of

$$\partial f(g^n, i^n)/\partial g^n = 0 \tag{21}$$

and

$$\partial f(g^s, i^s)/\partial g^s = 0. \tag{22}$$

In this section we restrict the discussion to the case of universal vote and postpone the discussion of discrimination against new immigrants to the next section. In this case, the median voter of the North, i^n, is implicitly defined by

$$\int_0^{i^n} (P^{ni}/P^n)\, di = 1/2,$$

or, alternatively,

$$\int_0^{i^n} P^{ni} di = \int_{i^n}^{\gamma} P^{ni} di. \tag{23}$$

Similarly, for the South:

$$\int_0^{i^s} (1/\gamma - P^{ni})\, di = \int_{i^s}^{\gamma} (1/\gamma - P^{ni})\, di. \tag{24}$$

The system (1), (2), (11)- (14), and (18)-(24) can be used to solve for U^{ni}, U^{si}, EV^{ni}, EV^{si}, $\underline{z}_i$, $\overline{z}_i$, g^n, g^s, P^{ni}, P^{si}, P^i, i^n, and i^s. One solution is obtained when $g^n = g^s$, such that, in (19), $K_1 = 0$, and $i^n = i^s = \gamma/2$, which is referred to hereafter as the ”uniform solution”. It is proved in appendix A and illustrated below with an example that this is the unique solution whenever the heterogeneity among the *i*-types is small enough, reflected in a small interval γ, and or a small variation of the ideal g^j with type – a small value of $[\partial^2 f/\partial g \partial i]/[\partial^2 f/\partial g^2]$– relative to the variation of the stochastic income component reflected in σ. We, thus state

Proposition 1:

If taste variation according to type and the interval of taste variation are sufficiently small, the uniform solution is the unique solution.

In general, however, other solutions may exist. Furthermore, if the variation in tastes is sufficiently large, a corner solution may result, with $P^{ni} = 1$ for extreme values of *i*. The meaning of this situation is that, in a stationary equilibrium, those with extreme values of *i* do not migrate, even when the stochastic component of income reaches σ. They constitute the permanent population of their respective countries.

A non-uniform solution satisfies:

Proposition 2:

If a given solution is non-uniform, then: $(i^n - \gamma/2)(i^s - \gamma/2) < 0$.

Proof: By definition, a solution is non-uniform if $i^n \neq i^s$, and, therefore, $g^n \neq g^s$. To prove the proposition we have only to show that i^n and i^s cannot be simultaneously either larger or smaller than $\gamma/2$. We do it by contradiction. Assume, for example, that $i^n, i^s \geq \gamma/2$. Then, since P^{ni} and P^{si} are both non-negative, it follows then from (23) that

$$\int_0^{\gamma/2} P^{ni} di < \int_0^{i^n} P^{ni} di = \int_{i^n}^{\gamma} P^{ni} di < \int_{\gamma/2}^{\gamma} P^{ni} di \tag{25}$$

and from (24)

$$\int_0^{\gamma/2} (1/\gamma - P^{ni}) di < \int_0^{i^s} (1/\gamma - P^{ni}) di = \int_{i^s}^{\gamma} (1/\gamma - P^{ni}) di < \int_{\gamma/2}^{\gamma} (1/\gamma - P^{ni}) di. \tag{26}$$

Summing up the extreme expressions across (25) and (26) implies:

$$\frac{1}{2} = \int_0^{\gamma/2} \frac{1}{\gamma} di < \int_{\gamma/2}^{\gamma} \frac{1}{\gamma} di = \frac{1}{2}$$

Contradiction. □

It follows from proposition 2 that $(g^n - G)(g^s - G) < 0$, where G is the ideal level of g^j for type-$\gamma/2$ individual, that is, the median voter of the world population.

In the absence of an income effect on preference for the public good, our model does not determine whether $g^n > g^s$ or vice versa. However, we can observe that the model implies some specific relationship between income and the population heterogeneity. This relationship is addressed in

Proposition 3:

(a)$\partial\left|i^n-\gamma/2\right|/\partial w^n=-\partial\left|i^n-\gamma/2\right|/\partial w^s=-\partial\left|i^s-\gamma/2\right|/\partial w^n=$
$\partial\left|i^s-\gamma/2\right|/\partial w^s<0.$

(b) Let $f(g^j,i)$ be a symmetric decreasing function of the gap between the ideal g^j of a type-i individual and the actual g^j, i.e.,

$$f(g^j,i)=F\left(\left|g^j-g(i)\right|\right)$$

where $g(i)$ is the solution for g of $\partial f(g,i)/\partial g=0$, $F'(\cdot)<0$, $<F''(\cdot)<0$, and, $g'(i)>0$. Then, if $m^n=m^s$,

$$\left|i^n-\gamma/2\right|<\left|i^s-\gamma/2\right|.$$

Proof:

(a) Substitute (19) into (23) and differentiate the result to obtain

$$\partial i^n/\partial w^n=\left(\int_{i^n}^{\gamma}di-\int_0^{i^n}di\right)/(B\gamma P^{ni})=2(\gamma/2-i^n)/(B\gamma P^{ni})$$

Now, suppose that $i^n>i^s$, so that, by proposition 2, $i^n>\gamma/2>i^s$ and, similarly, $g^n>G>g^s$. Then it follows that $\partial i^n/\partial w^n<0$. If $i^n<i^s$, the opposite must be true and $\partial i/\partial w^n>0$. It then follows that $\partial\left|i^n-\gamma/2\right|/\partial w^n<0$. The rest of (a) is proved likewise.

(b) With (a) proved, we only have to show that, under the above specification, if $w^n=w^s$, and $m^n=m^s$,

$$\left|g^n-G\right|=\left|g^s-G\right|.$$

This is proved in appendix B. □

The implication of proposition 3 is that the more affluent country tends to be more heterogeneous than the less affluent country. The level of g^j chosen by the less affluent country deviates from the ideal value of the entire population by more than that of the more affluent country.

We now turn to a characterization of the relative propensity of different types of individuals to migrate from the North to the South or in the opposite direction. To this end, we first establish:

Lemma 1:

$g^n > g^s \Rightarrow \partial \underline{z}_i/\partial i = \partial \bar{z}_i/\partial i < 0$ and $g^n < g^s \Rightarrow \partial \underline{z}_i/\partial i = \partial \bar{z}_i/\partial i > 0$.

Proof: It follows from (1), (2) and (14) that

$$A\partial\, \bar{z}_i\, /\partial i = -\left[\partial f(g^n, i)/\partial i - \partial f(g^s, i)/\partial i\right] = -\left\{\int_{g^s}^{g^n} \left[\partial^2 f(.)/\partial g \partial i\right] dg\right\} < 0.$$

Using **A1**, it follows that if $g^n > g^s$, the expression inside the tilted parenthesis is positive. This proves the Lemma for $g^n > g^s$. If $g^s < g^s$, the expression inside the tilted parenthesis becomes negative, which proves the Lemma for $g^n < g^s$. □

The intuition underlying lemma 1 can be illustrated by considering, for example, the case $g^n > g^s$. In this case there is a higher concentration of individuals with high ideal points in the North than in the South. The probability that a type-*i* individual will migrate from the South to the North is $(\sigma - \underline{z}_i)/2\sigma$ and the probability that a type-i will migrate from the North to the South is $(\sigma + \underline{z}_i)/2\sigma$. The Lemma implies that the first probability is higher and the second probability lower for individuals with a higher index *i*. Individuals with higher $i-$s tend to migrate from the

South to the North for a wider set of realization of z_t since the North offers them a higher level of g^j. As a consequence, such individuals are more likely to migrate from the South to the North than individuals with lower i. Similarly, individuals with higher i are less likely to migrate from the North to the South since the South offers them a lower g^j. These considerations lead to the following proposition

Proposition 4:

(a) When $g^n > g^s$, an individual with a higher i (a higher ideal point $g(i)$) is more likely to migrate from the South to the North and less likely to migrate from the North to the South.

(b) The opposite holds when $g^n < g^s$.

The political implication of proposition 4 is that the more permanent residents can improve their welfare by imposing restrictions on the right to vote of the new immigrants. Since, as shown in proposition 2, new immigrants are characterized by a lower preference for the public good, this policy shifts the median voter in the North towards a higher value of i and a higher value of g^n, which the majority of the more permanent residents prefers. We deal with this issue more precisely in section VI below.

Due to the stochastic nature of relative individual incomes the populations of **both** countries include positive numbers of **every** type. But the fraction of individuals with higher $i - s$ is larger in the high g country. Figure 1 (which is based on equations (19) and (20)) displays the distribution of population by types in each country for the case $g^n > g^s$. It is apparent that the fraction of type i individuals in the North (South) rises (decreases) monotonically with the type index i. This contrasts with Westhoff (1977) in which there is a complete separation of types by countries. The distribution of types across countries in his case is represented by the line ABDγ for one country, and by the line ODBC for the other. This difference is due to the fact that in his case there are no shocks to relative individual incomes and, therefore, no reason for migration.

Figure 1 about here

2. A Specific Example[2]

Assume that

$$f(g^j, i) = -\alpha[2i - \gamma - (g^j - G)]^2; \quad j = n, s, \tag{27}$$

where $G > 0$.

Obviously, the r.h.s. in (27) satisfies the conditions in **A1**. Applying (21) and (22) to this specification, the ideal value of g^j for the respective median voters are

$$g^n = G + 2i^n - \gamma \tag{28}$$

and

$$g^s = G + 2i^s - \gamma. \tag{29}$$

Substituting (1), (19), and (28) into (23) and integrating the result yields

$$K_0 AB\gamma(g^n - G)/\alpha + [(g^n - G)(g^s - G) + \gamma^2](g^s - g^n) = 0. \tag{30}$$

Similarly, substituting (2), (19), (20), and (29) into (24) yields

$$(1/\gamma - K_0)AB\gamma(g^s - G)/\alpha - [(g^n - G)(g^s - G) + \gamma^2](g^s - g^n) = 0. \tag{31}$$

[2] A quick reader can go directly to section VI.

Subtracting (31) from (30), we obtain

$$\frac{g^n - G}{g^s - G} = -\frac{1 - \gamma K_0}{\gamma K_0}. \tag{32}$$

K_0 is the proportion of the type i population in the North when $g^n = g^s$ and it is always positive and less than 1. . Since, in this case, $0 < P^{ni} = K_0$ it follows that

$$0 < \gamma K_0 = \gamma P^{ni} = \frac{\sigma - \bar{z}_i}{2\sigma - (m^n + m^s)} = \frac{\sigma - \bar{z}_i}{\sigma - \bar{z}_i + \sigma + \underline{z}_i} < 1.$$

Hence (32) implies that $(g^n - G)(g^s - G) < 0$, i.e., $g^n - G$ and $g^s - G$ have different signs. Now, suppose that $g^n - G$ is positive (and $g^s - G$, of course, is negative). Then, by (28),

$$i^n = \gamma/2 + (g^n - G)/2 > \gamma/2 \tag{33}$$

and, by (29),

$$i^s = \gamma/2 + (g^s - G)/2G < \gamma/2. \tag{34}$$

The opposite is true if $g^n - G$ is negative. Equations (33) and (34) constitute, therefore, an illustration of proposition 2.

Substituting (32) into (30) and (31), and rearranging terms, we derive the equilibrium solutions for g^n and g^s:

$$g^n = \pm\sqrt{\gamma^2 - \gamma K_0(1 - \gamma K_0)AB/\alpha}\sqrt{(1 - \gamma K_0)/\gamma K_0} + G \tag{35}$$

$$g^s = \pm\sqrt{\gamma^2 - \gamma K_0(1 - \gamma K_0)AB/\alpha}\sqrt{(\gamma K_0/(1 - \gamma K_0)} + G \tag{36}$$

A non-uniform real solution for g^n and g^s requires a positive value inside the first root.[3] This, in turn, requires that either γ or α are sufficiently large. For example, given γ, if α is sufficiently small, the expression under the first root in (35) and (36) becomes negative and the only real solution is the uniform one where $g^n = g^s = G$. It can be observed that both γ and α represent the degree of taste variation regarding g^j. The parameter γ represents the size of the interval within which the taste varies over types and α reflects the degree of variation of the taste with g^j for a given type. Thus, the uniform solution is the unique solution for the trivial case where the population is homogeneous and for cases where the preference regarding g^j varies mildly both across as well as within types. This illustrates proposition 1.

When taste variation is sufficiently large, we have two real non-uniform solutions, in addition to the uniform one. When this level of variation is reached, any further increase in taste variation, as reflected in $\alpha\gamma^2$, is associated with a divergence of the median voters (and their respective ideal values of g^j) in the two countries. When α or γ are too large, however, some types do not migrate at all and (19) and (20), upon which (35) and (36) are based, are no longer valid.[4]

Assuming that migration costs are independent of destination, it follows from the definition of K_0 in equation (19) that, since the productivity in the North exceeds that of the South, $\gamma K_0 > 1/2$. It then follows from (32) that the absolute value of $g^n - G$ is smaller than that of $g^s - G$, which is an illustration of proposition 3.

VI. THE LAG IN EXTENDING VOTING RIGHTS TO IMMIGRANTS

[3] The second root is always positive

[4] In our example, a sufficient condition for the existence of interior non-uniform solutions is:

$5/16 > \alpha\gamma^2/AB > 4/16$.

In many democratic countries immigrants are granted voting rights only some time after their arrival to the new country. The model presented in this paper provides a political explanation to this phenomenon. Underlying this explanation is the fact that the policy preferences of new immigrants differ from those of the more established residents. In fact, we show that the ideal policy varies systematically with the ”vintage” or ”immigration cohort”. In what follows, we first lay down the precise proof of this property. Then, we use it to show that the more established residents (older vintage or cohort) are better off when they withhold the voting right from the less established residents (newer vintage or cohort).

We focus on a political equilibrium in which $g^n > g^s$. Let P^{ni}_{τ} be the number of type-i individuals who have resided in the North exactly τ periods ($\tau = 1, 2, 3, ...$).The number of individuals in vintage τ is given by $\int_0^{\gamma} P^{ni}_{\tau} di$. The relationship between P^{ni}_{τ} and $P^{ni}_{\tau+1}$ is given by

$$P^{ni}_{\tau+1} = P^{ni}_{\tau}\rho_{ni} = P^{ni}_{1}\left(\rho_{ni}\right)^{\tau}, \tag{37}$$

where ρ_{ni} is the probability that a type-i individual residing in the North remains there one more period. This probability is given by

$$\rho_{ni} = 1 - \frac{\sigma + \underline{z}_i}{2\sigma} = \frac{\sigma - \underline{z}_i}{2\sigma}. \tag{38}$$

Due to the stochastic nature of the relative opportunities in the two countries, some of the type-i individuals within both vintage τ and $\tau + 1$ in the North migrate to the South. However, proposition 4 (or lemma 1) and (38) imply that the probability ρ_{ni} is an increasing function of i. Consequently, the number of any type-i individuals within vintage $\tau + 1$ is always smaller than their number in vintage τ. Although, in the case under consideration (in which there is a positive probability that all types will migrate) this is true for all types, the rate of emigration, $1 - \rho_{ni}$, is lower for types with higher $i-$s. One consequence of the systematic differences in the attrition rates is that individuals with higher i-s are more likely to have been in the North for a longer period of time. The reason, obviously, is that their personal taste makes it less likely that they will migrate to the South. In reality, a positive correlation between the type index, i, and duration of residence may also be an outcome of adaptation of taste to the one prevailing in the new country of residence (in terms of our notation, the tastes of low i immigrants in the North move up towards i^n). Thus, we provide an alternative explanation to a positive correlation between immigration vintage and tastes.

Consider now the median voter within two successive vintages, τ and $\tau + 1$, where $\tau \geq 1$. These median voters, denoted by i^τ and $i^{\tau+1}$, are determined, respectively by:

$$\int_0^{i^\tau} P_\tau^{ni} di = \int_{i^\tau}^{\gamma} P_\tau^{ni} di \tag{39}$$

and

$$\int_0^{i^{\tau+1}} P_{\tau+1}^{ni} di = \int_{i^{\tau+1}}^{\gamma} P_{\tau+1}^{ni} di. \tag{40}$$

In view of (37), these conditions can be rewritten as:

$$\int_0^{i^\tau} P_1^{ni} (\rho_{ni})^{\tau-1} \, di = \int_{i^\tau}^{\gamma} P_1^{ni} (\rho_{ni})^{\tau-1} \, di \tag{41}$$

and

$$\int_0^{i^{\tau+1}} P_1^{ni} (\rho_{ni})^{\tau} \, di = \int_{i^{\tau+1}}^{\gamma} P_1^{ni} (\rho_{ni})^{\tau} \, di. \tag{42}$$

Let ρ_{ni^τ} be the survival rate in the North of individuals who are at the median, i^τ, of vintage τ. Since ρ_{ni} is an increasing function of i, it follows that

$$\int_0^{i^\tau} P_1^{ni} (\rho_{ni})^{\tau-1} \rho_{ni} \, di < \int_0^{i^\tau} P_1^{ni} (\rho_{ni})^{\tau-1} \rho_{ni^t} \, di \tag{43}$$

and

$$\int_{i^\tau}^{\gamma} P_1^{ni} (\rho_{ni})^{\tau-1} \rho_{ni} \, di > \int_{i^\tau}^{\gamma} P_1^{ni} (\rho_{ni})^{\tau-1} \rho_{ni^\tau} \, di. \tag{44}$$

Equation (41) implies that the r.h.s. of (43) and (44) are equal. Therefore:

$$\int_0^{i^\tau} P_1^{ni} (\rho_{ni})^{\tau} \, di < \int_{i^\tau}^{\gamma} P_1^{ni} (\rho_{ni})^{\tau} \, di \tag{45}$$

or

$$\int_0^{i^\tau} P_{\tau+1}^{ni} \, di > \int_{i^\tau}^{\gamma} P_{\tau+1}^{ni} \, di. \tag{46}$$

Hence, the median voter of vintage $\tau + 1$ is characterized by a higher i than that of vintage τ. Formally,

$$i^{\tau+1} > i^{\tau}. \tag{47}$$

This basic result is summarized in the following proposition

Proposition 5:

(a) When $g^n > g^s$, the median voters of different migration vintages in the North satisfy the following condition

$$i^1 < i^2 < i^3 < \ldots i^\tau < i^{\tau+1} < \ldots, \tag{48}$$

(b) when $g^n < g^s$, the inequalities in (48) are reversed. □

We turn now to the political implications of proposition 5. Suppose that the North is characterized by a constitution which stipulates that immigrants are granted voting rights only after

τ periods. For brevity sake, we shall refer to immigrants of vintage less than or equal to τ as ”immigrants” and those with vintages which exceed τ as ”residents”.

Proposition 5 implies that the preferred policy of the median voter among residents is characterized by a higher value of i than that of the median voter among immigrants. It follows that, if-given the option to change the critical vintage for voting rights- the decisive median voter among residents will always prefer to leave the critical vintage unchanged. The reason is simple. Any shift in g^n, brought about by changing the type composition of voters, will move g^n away from the ideal value from the view point of the decisive resident median voter. Hence, any delay of τ years in the granting of voting rights is a (majoritarian) political equilibrium in the sense that once established, there is no incentive for those with voting rights to alter the length of the delay. Since this is true for any $\tau \geq 1$, the model implies that **any** lag in the granting of voting rights can persist in a political equilibrium.

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V*II*. *CONCLUDING COMMENTS*

In many Western countries the population is composed of multiple layers of immigrants or descendants of immigrants. The model presented in this paper addresses this phenomenon by emphasizing the dynamic nature of migration and its eventual absorption in the host countries. The model refers to two countries, North and South, and an heterogeneous world population, where each individual is characterized by his/her preference regarding some policy issue which may be, but does not have to be, the level of a public good.

The stationary politico-economic equilibrium presented in section V implies that one of the countries supplies a larger quantity of the public good than that preferred by the world median individual, while the other country provides less. The more affluent country tends to be more heterogeneous in terms of population types and it supplies a quantity of the public good that is closer to the quantity preferred by the world median individual. The less affluent country is more homogeneous in the sense that the quantity of the public good deviates more (than that of the affluent one), from the level most preferred by the world median individual.

To gain further insight, we use a specific formulation of the preferences and then solve the model in closed form. In this specification, the level of the public good is unrelated to the income level of each country. The rich country may have either a higher or a lower level of the publicly-provided public good. This result would be altered, of course, if the utility function would incorporate an income effect on the demand for the public good. The two possible solutions bring to mind the Germany-Turkey and the U.S.-Canada cases. As predicted above, the poorer country turns to be the more homogeneous one, either with a low or a high level of the public good, while the rich country is the more heterogeneous one. In either case, individuals with relatively low preference for the public good tend to be more numerous in the low g^j country and individuals with relatively high preference tend to be more numerous in the high g^j country. However, due to stochstic shocks to relative incomes, **there are** some individuals with low preference in the high g^j country as well as some individuals with high preference in the low g^j country.

An important implication of our analysis follows from its dynamic structure. The median voter of recent immigrants has lower preference for the public good than the median voter among established residents of the high g^j country (and higher preference than that of the median voter in the low-g^j country). As a consequence, it pays established residents to delay the granting of political rights to immigrants. This may turn out to be the case even though established residents who initially own the voting franchise support the norm of universal suffrage. The US and Canada are examples.

Meltzer and Richard (1981) have analyzed the effect of extending the franchise to poorer individuals on the size of redistribution via the budget. They have shown that an extension of the franchise tends to increase redistribution. Since the typical immigrant into the US during the twentieth century was poorer than the average established resident, their model, in conjuction with ours, implies that the (temporary) denial of voting rights to immigrants may have been a way to reduce the extent of redistribution by the relatively affluent established residents.

Taken at face value our model implies that any historically given lag in the granting of voting rights to immigrants is a majoritarian equilibrium in the sense that the decisive median voter has no incentive to alter the lag. This appears to be a reasonable approximation of reality only for moderate values of the lag τ. However, when τ is large, implying that a large fraction of total population is excluded from political participation, additional elements that are not treated in the model, come into play. In particular, the exclusion of large population segments from political participation may increase political instability. There is evidence that higher political instability reduces economic growth (Alesina et al. (1991)). Hence, there may be an economic incentive for those with voting rights to extend the franchise once the fraction of individuals who are deprived of it becomes sufficiently large. This additional element, which pushes owners of the voting franchise to extend it to immigrants, may help select one out of the many equilibrium delays in the granting of voting rights produced by the model.[5]

Another element that may help in narrowing the range of equilibria is a norm of universal suffrage. Such a norm may be modeled by assuming that the welfare of each individual is lower, ceteris paribus, the larger is the fraction of individuals with no political rights. In either case, the decisive voter among those with political rights will choose the length of delay between immigration and granting of political rights by weighting the cost (to him) of changes in g^n due to the change in the composition of the voting population against the utility costs of political exclusion due to a reduction in productivity or to a deviation from the universal suffrage norm. The presence of either

[5] A similar element has been analyzed in the context of land reform by Grossman (forthcoming).

one, or both, of these element may produce a unique equilibrium delay in granting voting rights. This equilibrium is more likely to involve delay ($\tau > 1$) the larger is $\partial f^2(\cdot)/\partial(g^j)^2$ in absolute value, the smaller the effect of absence of political rights on productivity, and the weaker is the norm of universal suffrage in society.

The framework of this paper can also be used to answer the following intriguing question: Suppose that the founding fathers of a country pick the delay in granting voting rights to immigrants once and for all so as to maximize a weighted average of the welfare of all individuals (including those with no voting rights) that are consequently attracted to that country; what is the resulting lag and under what circumstances is it positive? The answer to this question has both positive and normative implications. It will obviously depend on whether only one or both countries follow such a policy. But the precise investigation of those issues is beyond the scope of this paper.

A*ppendix A*

Proposition 1:

(a) $g^n = g^s = G$ is always an equilibrium solution;

(b) If $\partial f^2/\partial g\partial i$ and γ are sufficiently small globally, then $g^n = g^s = G$ is the only equilibrium solution.

Proof:

(a) When $g^n = g^s = G$, $K_1(g^n, g^s, i) = 0$ for all $i - s$ and by (19) $P^{ni} = K_0$ for all $i - s$. Hence the number of individuals within a given country does not vary by types. As a consequence the type composition of population in the two countries is identical and is equal to the type composition of the world. It follows that the median voters in the two countries are identical to the world median voter whose most preferred position is G. Hence $g^n = g^s = G$ is a political equilibrium in both countries.

(b) Given (1), (14), (19), and (23), i^n can be solved in terms of g^n and g^s. Let this solution be

$$i^n = \varphi^n(g^n, g^s). \tag{49}$$

Similarly, given (2), (14), (19), and (24), the solution of i^s in terms of g^n and g^s is represented by

$$i^s = \varphi^s(g^n, g^s). \tag{50}$$

Next, let (21) and (22) be used to solve g^n and g^s in terms of i^n and i^s, respectively:

$$g^n = g(i^n) \tag{51}$$

and

$$g^s = g(i^s). \tag{52}$$

Then, substitute (49) into (51) and (50) into (52) to obtain for the North

$$g^n = g(\varphi^n(g^n, g^s)) \tag{53}$$

and for the South

$$g^s = g(\varphi^s(g^n, g^s)). \tag{54}$$

Thus, (53) and (54) define for the North

$$g^n = \phi_n(g^s) \tag{55}$$

and for the South

$$g^n = \phi_s(g^s). \tag{56}$$

The solution for g^n and g^s can, therefore, be derived by solving (55) and (56).

In completing the proof, we proceed in two steps:

(i) In this step we prove that if $\partial f^2/\partial g \partial i \to 0$ globally, and $g^n = g^s = G$, then:

$$\phi_n'(g^s) \to -0 \text{ and } \phi_s'(g^s) \to -\infty$$

To prove this, we differentiate (53)-(56) to obtain

$$\phi_n' = \frac{\partial \varphi^n/\partial g^s}{1/g'(i^n) - \partial \varphi^n/\partial g^n} \tag{57}$$

and

$$\phi_s' = \frac{1/g'(i^s) - \partial\varphi^s/\partial g^s}{\partial\varphi^s/\partial g^n}, \tag{58}$$

where, from (21) and (22), we have

$$\frac{1}{g'(i^n)} = -\frac{\partial f^2/\partial(g^n)^2}{\partial f^2/\partial g^n\partial\ i^n} \tag{59}$$

and

$$\frac{1}{g'(i^s)} = -\frac{\partial f^2/\partial(g^s)^2}{\partial f^2/\partial g^s\partial i^s}. \tag{60}$$

For evaluating $\partial\varphi^j/\partial g^k$ where $j = n, s$; $k = n, s$, we differentiate (23) and (24) with respect to g^n and g^s and obtain

$$\frac{\partial\varphi^n(g^n, g^s)}{\partial g^n} = \left(-\int_0^{\varphi^n(g^n,g^s)} \frac{\partial f(g^n, i)}{\partial g^n}di + \int_{\varphi^n(g^n,g^s)}^{\gamma} \frac{\partial f(g^n, i)}{\partial g^n}di\right)/D, \tag{61}$$

$$\frac{\partial\varphi^n(g^n, g^s)}{\partial g^s} = -\left(-\int_0^{\varphi^n(g^n,g^s)} \frac{\partial f(g^s, i)}{\partial g^s}di + \int_{\varphi^n(g^n,g^s)}^{\gamma} \frac{\partial f(g^s, i)}{\partial g^s}di\right)/D, \tag{62}$$

$$\frac{\partial\varphi^s(g^n, g^s)}{\partial g^n} = -\left(-\int_0^{\varphi^s(g^n,g^s)} \frac{\partial f(g^n, i)}{\partial g^n}di + \int_{\varphi^s(g^n,g^s)}^{\gamma} \frac{\partial f(g^n, i)}{\partial g^n}di\right)/D, \tag{63}$$

and

$$\frac{\partial\varphi^s(g^n, g^s)}{\partial g^s} = \left(-\int_0^{\varphi^s(g^n,g^s)} \frac{\partial f(g^s, i)}{\partial g^s}di + \int_{\varphi^s(g^n,g^s)}^{\gamma} \frac{\partial f(g^s, i)}{\partial g^s}di\right)/D, \tag{64}$$

where

$$D \equiv \left[\gamma ABK_0 + f\,(g^n, \varphi^n(g^n, g^s)) - f\,(g^s, \varphi^n(g^n, g^s))\right] = P^{ni^n} > 0.$$

First, we evaluate $\partial\varphi^j/\partial g^k$ for $j = n, s; k = n, s$ when $g^s = g^n = G$. Using figure 1, we observe that $\partial\varphi^n/\partial g^n$ is equivalent to the shaded areas and, therefore is positive. By inspecting (61)-(64), we realize, in addition, that, for $g^s = g^n = G$,:

$$\partial\varphi^n/\partial g^s = \partial\varphi^s/\partial g^n = -\partial\varphi^n/\partial g^n = -\partial\varphi^s/\partial g^s < 0.$$

Second, we infer from figure 2 that when γ is finite and $\partial^2 f/\partial g^n\partial i$ tends to zero, the shaded areas vanish implying that $\partial\varphi^j/\partial g^k$ for $j = n, s; k = n, s$ tends to zero. Then, by (57) and (59), the slope of the locus ϕ_n is negative tending to zero, and, by (58) and (60), the slope of the locus ϕ_s is negative tending to infinity, as portrayed in figure 3. This completes the proof of step (i) that , as $\partial f^2/\partial g^j\partial i \to 0$ globally, then, for $g^n = g^s = G$, $\phi_n'(g^s) \to -0$ and $\phi_s'(g^s) \to -\infty$.

(ii) In this step we characterize ϕ_n and ϕ_s for any combination of g^n and g^s when $\partial f^2/\partial g^j\partial i \to 0$ globally . The evaluation of the signs of $\partial\varphi^j/\partial g^k$ for $j = n, s; k = n, s$ along the lines suggested in figure 1 becomes more complex. In particular, the loci $\partial f(g^n, i)/\partial g^n$ in figure 1 does not necessarily cut the horizontal axis at $\gamma/2$ since g^n may differ from G. But the general form of the curve remains the same. Hence the absolute value of each area calculation still tends to zero as taste variability tends to zero. Then, it follows that the slopes of the loci ϕ_n and ϕ_s in (57) and (58) are determined by $1/g_n'$ and $1/g_n'$, respectively. Hence, we conclude from (57) and (58) that as $\partial^2 f/\partial g\partial i$ tends to zero, ϕ_n' tend to zero and ϕ_s' tends to infinity. This, however, implies that with sufficiently small bound on $\partial^2 f/\partial g\partial i$, we can make the locus ϕ_n as close to the locus $g^n = G$ and the locus ϕ_s as close to the locus $g^s = G$ as we wish. But this implies that if there exists a non-uniform solution at all, it must be close to $g^n = g^s = G$. However, according to step (i), at $g^n = g^s = G$, the loci ϕ_n and ϕ_s are perpendicular and, therefore, cannot intersect in an interval which is sufficiently close to G. □

Appendix B

Proposition 3b: If:

(a) $f(g^j, i) = F\left(\left|g^j - g(i)\right|\right)$ where g(i) is the solution for g of $\partial f(g,i)/\partial g = 0$,
$F'(\cdot) < 0$, $F''(\cdot) < 0$, and, $g'(\cdot) > 0$, and

(b) $w^n = w^s$; $m^n = m^s$, then

$$\left|i^n - \gamma/2\right| = \left|\gamma/2 - i^s\right|.$$

Proof: Substituting the above assumptions into (19) yields

$$P^{ni} = 1/2\gamma + K_1^i; \;\; P^{si} = 1/2\gamma - K_1^i.$$

where $K_1^i \equiv K_1(g^n, g^s, i)$. Therefore, (23) and (24) become, respectively:

$$\int_0^{i^s} (1/2\gamma + K_1^i)di = -\int_{i^s}^{i^n} (1/2\gamma + K_1^i)di + \int_{i^n}^{\gamma} (1/2\gamma + K_1^i)di$$

$$\int_0^{i^s} (1/2\gamma - K_1^i)di = \int_{i^s}^{i^n} (1/2\gamma - K_1^i)di + \int_{i^n}^{\gamma} (1/2\gamma - K_1^i)di$$

Summing up these two conditions, we obtain

$$2\int_{i^s}^{i^n} K_1^i di = 1 - i^n/\gamma - i^s/\gamma = [(\gamma/2 - i^s) - (i^n - \gamma/2)]/\gamma.$$

Hence, we only have to show that, under our specification, $\int_{i^s}^{i^n} K_1^i di = 0.$ But

$$\gamma AB\int_{i^s}^{i^n} K_1^i di \equiv \int_{i^s}^{i^n} [f(g^n, i) - f(g^s, i)]di = \int_{i^s}^{i^n} F\left(\left|g^n - g(i)\right|\right) di - \int_{i^s}^{i^n} F\left(\left|g^s - g(i)\right|\right) di.$$

Due to the symmetry of F(.)

$$\int_{i^s}^{i^n} F(|g^n - g(i)|)di = \int_{i^s}^{i^n} F(|g^s - g(i)|)di.$$

This is illustrated in Figure 4. Hence, $\int_{i^s}^{i^n} K_1^i di = 0$, which completes the proof. □

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