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Giuseppe Russo

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Economics and Econometrics Research Institute
Avenue de Beaulieu
1160 Brussels
Belgium

Tel: +322 299 3523
Fax: +322 299 3523
www.eeri.eu

Voting over Selective Immigration Policies with Immigration Aversion*

Giuseppe Russo[†]
Department of Economics and Statistics, University of Salerno

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Abstract

The claim that "skilled immigration is welcome" is often associated to the increasing adoption of selective immigration policies. I study the voting over differentiated immigration policies in a two-country, three-factor one-period model where there exist skilled and unskilled workers, migration decisions are endogenous, enforcing immigration restriction is costly, and natives dislike unskilled immigration. According to my findings, decisions over border closure are made to protect the median voter when her capital endowment is sufficiently small. Therefore I argue that the professed favour for skilled immigration veils the protection for the insiders. This result is confirmed by the observation that entry is rationed for both skilled and unskilled workers. Moreover, immigration aversion helps to explain the existence of entry barriers for unskilled workers in countries where the majority of voters is skilled.

Keywords: selective immigration policies, multidimensional voting, Condorcet winner.

Jel classification: D72, F22, J18.

1 Introduction

Decisions over immigration policy are a major problem for developed countries. Aggregate shocks -such as regional conflicts and long-term climate changes- and persistent wage differentials foster both constrained and voluntary migration.

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[†]Università degli Studi di Salerno, Dipartimento di Scienze Economiche e Statistiche, via Ponte don Melillo, 84084 Fisciano (SA) Italy. e-mail: grusso@unisa.it

Representative democracies are moving towards a stricter border enforcement, as reported by Boeri and Brucker (2005). In several European countries the importance of immigration aversion is increasing[1].

A well developed literature is concerned with voting over immigration restriction. Nonetheless, the study of *selective* policies as a result of a voting process has received comparatively little attention. In order to shed light on this issue, we have to drop the assumption that workers are homogeneous, and we need to introduce skilled and unskilled labour. This fairly complicates the analysis, because the effects of immigration can be less intuitive when two factors are entering (leaving) a country and, moreover, it implies a majority decision along two dimensions when voting over the entry policy.

Some important attempts is in this direction are in Grether et al. (2001) and Bilal et al. (2003). They analyse attitudes towards immigration in an economy open to international trade. These authors use a factor-specific technology to study how immigration affects the individual income for both skilled and unskilled workers in presence of capital mobility. However, their attention is focused on the outcome of a referendum rather than on the selection of a Condorcet winner.

Remarkably, in the literaure the costs associated to a restrictive immigration policy are rarely considered[2]. Such costs include -for example- funding an Immigration Department and frontier stations, the creation of the necessary databases, the detection and repatriation of illegal immigrants, and so on[3]. The unlikely result is that voters choose corner solutions where they prefer either open immigration or no immigration at all (see Benhabib 1996)[4]. In this paper voters have to finance the border enforcement, and this generates interior solutions. Bosi et al. (2008) show a similar result in a model with two production factors (labor and capital) where skilled workers enter the production function with different weights and the enforcement costs are additively separable for skilled and unskilled workers.

Finally, however, decisions over immigration depend crucially on a variety of socio-cultural factors as well. There are many non-economic reasons why natives may dislike immigration, including concerns for preserving the national culture, the traditional religion, or feelings of increased insecurity[5]. While the

[1] In recent elections, anti-immigration parties increased their votes in Denmark, Swiss, Belgium, Norway.

[2] Ethier (1986) argues that "since border enforcement requires real resources, it must be financed". Bucci and Tenorio (1996) try to estimate the welfare effects of different methods to finance the enforcement budget. See also Hanson and Spilimbergo (2001). These papers, however, do not consider the voting process behind the decision.

[3] In Italy, the costs associated to the management of immigration flows were approximately 145 millions euro in 2004 and 206 millions euro in 2003 (Chiarotti and Martelli, 2005).

[4] Ortega (2005) needs intergenerational altruism without bequests to leave out corner solutions for immigration policies. If bequests were allowed, intergenerational transfers would be maximized with unlimited entry of unskilled workers.

[5] For example, according to a poll, in April 2007 34.6% Italians considered immigration as a danger for the national identity. In 2005, the figure was 26.6. Similarly, the share claiming that immigration is a danger for security and public order increased from 39.2% (2005) to 43.2 (april 2007). *La Repubblica*, 05/06/2007.

literature is focused on the redistributional problem, less effort has been devoted to introduce immigration aversion in formal models, in spite of the overwhelming empirical evidence of its importance. Dustmann and Preston (2004) find that racial discrimination is by far the most important factor to explain opposition to immigration in the U.K.; O' Rourke and Sinnott (2006), using survey evidence for 24 countries, show that attitudes towards immigration are affected by nationalist sentiments. See also Scheve and Slaughter (2001), Mayda (2006). Schiff (2002) develops a model where immigration affects individual utility via its effect on the social capital: people are assumed to derive utility from living in a culturally homeogeneous society, with a well-defined sense of national identity. In Hillman (2002) older people place a higher value on traditional norms than the young. In this paper I'm also introducing immigration aversion into the voters' preferences. There is, indeed, an important reason why a skilled majority should oppose open immigration for unskilled workers: since a skilled individual can declare to be unskilled, an unconditional opening to unskilled workers implies free entry for *all* workers.

The model presented in what follows obtains a selective immigration policy from a bidimensional voting process that assigns different probability of entry to skilled and unskilled workers. Moreover, as explained above, the paper also takes into account both the cost of enforcing the borders and the immigration aversion.

The results show that selective policies, instead of "welcoming" skilled immigration, can be interpreted as a form of protectionism, where a skilled median voter decides the extent of the entry rationing. In other words, entry requirements are set high enough to protect the median voter from competition.

On the other hand, the role of immigration aversion is useful to explain why a skilled majority restricts the entry of a complementary factor (unskilled work).

The paper is organized as follows: after this Introduction, Sections 2 and 3 describe, respectively, the characteristics of the destination and of the origin country. Section 4 introduces the borders enforcement cost, and in Section 5 I present the immigration policy and the formalization of the emigration decision. Section 6 studies the voting over selective immigration policies, and section 7 reports some examples of selective policies and some statistics on the educational attainment in the OECD countries. Conclusions are summarized in Section 8, and the proofs are gathered in the Appendix.

2 Destination Country

The Destination country (henceforth D) includes a given population of skilled workers (S_D) and unskilled workers (U_D). Each worker, skilled or unskilled, is endowed with a unit of labor supplied inelastically in a competitive labor market. The production technology is

$$Y_D = F(U, S, K) \tag{1}$$

where Y_D is a homogeneous consumption good. K, S and U stand, respectively, for aggregate capital, skilled and unskilled labor. $F(U, S, K)$ exhibits the usual neoclassical features: it is CRS, smooth and strictly concave; moreover, given K, when $U = S$ the marginal product of skilled workers is higher than that of unskilled workers. Partial derivatives are denoted by subscripts: F_S, F_U, F_K are the marginal productivities.

For simplicity, only skilled workers are endowed with capital[6], denoted by k_j $(j = 1, 2, ...S_D)$. k_j is distributed according to the continuous and differentiable function $n(k)$ defined over $[\underline{k}, \bar{k}]$, with $\underline{k}, \bar{k} > 0$; $\bar{k}$ can be arbitrarily high and $\underline{k}$ can be arbitrarily small. The aggregate capital (K) is given by

$$K = \int_{\underline{k}}^{\bar{k}} n(k)\, k dk \tag{2}$$

and the total natives of D (L_D) are

$$L_D = U_D + S_D = U_D + \int_{\underline{k}}^{\bar{k}} n(k)\, dk \tag{3}$$

3 Origin Country

The Origin Country (heceforth *O)* is also populated by skilled workers (S_O) and unskilled workers (U_O). For simplicity, we suppose that O is a poor country, and that it has no capital. Agents living in O also supply inelastically one unit of labor in a competitive labor market. A homogeneous consumption good Y_O is produced out of a CRS technology $G(U, S)$ using only unskilled and skilled labor (U and S):

$$Y_O = G(U, S) \tag{4}$$

$G(U, S)$ has the same standard properties of $F(U, S, K)$[7]. Again, partial derivatives are denoted by subscripts: G_S, G_U are the marginal productivities. Since there is no capital, for a given vector of (U, S) the marginal productivity is lower than in D.

An important characteristic of the literature on migrations is the assumption that consuming at home yields a higher utility. This assumption is essential to explain why current emigration flows are indeed *low*, given the existing wage differentials. For example, Ramos (1992) shows that only 25% of Puerto Ricans migrate to the US even though they are entitled to free mobility to the U.S. According to Borjas (1999) this is a proof that "important non-economic factors help to restrain migration flows". These restraining factors include, for example, differences in language and culture and the psychic costs of entering

[6] As far as the cost of enforcing the border is borne mainly by skilled workers, this assumption does not cause any loss in generality.

[7] It is useful to recall that standard production functions like (1) and (4) are analytic, i.e. they can be developed in a convergent Taylor series in any point of their domain. This property will be used to prove Lemma 1.

an alien environment. In the present model, the preference for domestic consumption is denoted by the parameters θ_S, θ_U for skilled and unskilled workers respectively. Workers are heterogeneous with respect to their preference for home consumption, and the distributions of (θ_S, θ_U) are given by the continuous and differentiable functions $i(\theta_S)$, $i(\theta_U)$ defined, respectively, over the real intervals $[\underline{\theta}_S, \bar{\theta}_S]$ and $[\underline{\theta}_U, \bar{\theta}_U]$ [8]. For any θ_S, θ_U, $i(\theta_S)$ and $i(\theta_U)$ give, respectively, the number of skilled and unskilled workers endowed with that value of the parameter. The cumulative distributions are indicated by $I(\theta_S)$ and $I(\theta_U)$, where

$$I(\theta_S) = \int_{\underline{\theta}_S}^{\theta_S} i(\theta_S)\, d\theta_S; \tag{5}$$

$$I(\theta_U) = \int_{\underline{\theta}_U}^{\theta_U} i(\theta_U)\, d\theta_U \tag{6}$$

obviously, we have $\frac{dI(\theta_S)}{d\theta_S} = i(\theta_S)$ and $\frac{dI(\theta_U)}{d\theta_U} = i(\theta_U)$.

The natives of O are, then[9],

$$L_O = S_O + U_O = I\left(\bar{\theta}_S\right) + I\left(\bar{\theta}_U\right). \tag{7}$$

By using a simple linear representation, it is possible to characterize the utilities in O and D as follows:

$$u_S(c, \theta_S) = \begin{cases} \theta_S c_O & \text{(consumption in } O\text{)} \\ c_D & \text{(consumption in } D\text{)} \end{cases} \qquad \text{(skilled workers)} \tag{8}$$
$$u_U(c, \theta_U) = \begin{cases} \theta_U c_O & \text{(consumption in } O\text{)} \\ c_D & \text{(consumption in } D\text{)} \end{cases} \qquad \text{(unskilled workers)}$$

where c_O and c_D are, respectively, consumption in O and D. When deciding whether to migrate or not, the agent compares her domestic utility to her utility abroad. Therefore, pre-migration heterogeneity does not translate into any post-migration heterogeneity.

4 Enforcement Cost

The immigration policy in D is summarized by the pair

$$\begin{aligned} \pi_S &\in [0, 1] \\ \pi_U &\in [0, 1] \end{aligned} \tag{9}$$

[8] It is assumed that $\underline{\theta}_S > 1$ and $\underline{\theta}_U > 1$ because any agent is supposed to have a higher utility at home. In general, $\underline{\theta}_S$ and $\underline{\theta}_U$ might be smaller than unity, depicting agents who prefer consuming abroad. On the other hand, $\bar{\theta}_S$ and $\bar{\theta}_U$ can be arbitrarily high.

[9] For simplicity I have used the same notation for both distributions $i(\theta)$ but, obviously, this does not mean that the distributions are equal.

where π_S and π_U are, respectively, the shares of skilled and unskilled immigrants let in.

As I have argued in the Introduction, since any barrier to entry has to be effective, it requires some enforcement and, therefore, real resources are needed to finance its cost.

Below, I specify the properties of the enforcement cost $c(\pi_S, \pi_U)$, defined over $\pi_S, \pi_U \in [0, 1]$, and twice continuously differentiable by assumption. Partial derivatives are denoted with subscripts: $c_{\pi_S}(\pi_S, \pi_U)$ and $c_{\pi_U}(\pi_S, \pi_U)$ are, respectively, the marginal costs incurred to enforce π_S and π_U.

$$c_{\pi_S}(\pi_S, \pi_U) < 0 \textit{ and bounded for all } \pi_S \in [0, 1] \tag{10}$$
$$c_{\pi_U}(\pi_S, \pi_U) < 0 \textit{ and bounded for all } \pi_U \in [0, 1] \tag{11}$$
$$c(1, 1) = 0 \tag{12}$$
$$c(0, 0) = c_0 > 0 \tag{13}$$

Conditions (10) and (11) mean that the cost is decreasing in π_S, π_U and that the marginal cost is finite. Condition (12) says that no restriction implies no cost, and condition (13) gives the (finite) cost of a perfect frontier closure. These assumptions are quite general and fit a wide class of functional forms.

For simplicity, the cost is financed via a flat tax on the capital income, therefore, labour income is not taxed[10]. Obviously, since unskilled workers do not own any capital, they pay no taxes. Let w_S^D and w_U^D define, respectively, the skilled and unskilled wage in D. The enforcement cost per unit of capital income is given by

$$\tau_K = \frac{c(\pi_S, \pi_U)}{KF_K}$$

where KF_K is the economy's total capital income.

The individual tax is therefore

$$T_j = c(\pi_S, \pi_U) \left[\frac{k_j}{K} \right] \tag{14}$$

To ensure that the net capital income is not negative for any j, I assume that the cost of perfect enforcement (c_0) satisfies

$$\left[F_K - \frac{c_0}{K} \right] \geq 0. \tag{15}$$

this also ensures that the capital income without immigration is sufficient to finance perfect border closure.

[10] This is equivalent to a progressive tax on the total income with a no-tax threshold corresponding to the skilled wage.

5 Immigration Policy and the Emigration Decision

It is important now to adopt two simplifying assumptions: D and O cannot trade, and capital cannot flow from D to O. As a consequence, only migration can make factor prices to converge. These assumptions are of great help in simplifying the algebra and, though drastic, they mirror well-known stylized facts: wage differentials are persistent, and capital does not flow towards poor countries (Lucas 1990).

From the point of view a potential migrant, π_S or π_U represents the probability of a successful migration. This method depicts intuitively the effect of entry rationing. The decision whether to migrate or not for an agent living in O is made by comparing the utilities within the alternative locations.

The model can be described in three steps: (1) natives choose a pair of immigration policies $\pi_S, \pi_U \in [0, 1]$; (2) potential migrants choose whether or not to migrate; (3) the nature randomly chooses the shares π_S, π_U of successful migrants.

Natives of O compare their utility in the two countries. Let w_{SD} be the skilled wage in D, and w_{UO} the unskilled wage in O. Since we are in a single-period model, consumption coincides with income. By using the linear utility defined in (8), skilled workers try to migrate if $w_{SD} \geq \theta_U w_{SO}$, and unskilled workers do so if $w_{UD} \geq \theta_S w_{UO}$. As a consequence, we have to find a pair $(\hat{\theta}_S, \hat{\theta}_U)$ such that any agent denoted, respectively, by $\theta_S \leq \hat{\theta}_S$, $\theta_U \leq \hat{\theta}_U$ is willing to migrate.

Therefore, we are searching for the solutions to

$$\begin{cases} w_{SD} \geq \theta_S w_{SO} \\ w_{UD} \geq \theta_U w_{UO} \end{cases} \tag{16}$$

Condition (16) can be rewritten in terms of marginal productivities:

$$\begin{cases} F_S\left[(S_D + \pi_S I(\theta_S), (U_D + \pi_U I(\theta_U), K\right] \geq \theta_S G_S\left[(S_O - \pi_S I(\theta_S), (U_O - \pi_U I(\theta_U)\right] \\ \\ F_U\left[(S_D + \pi_S I(\theta_S)), (U_D + \pi_U I(\theta_U)), K\right] \geq \theta_U G_U\left[(S_O - \pi_S I(\theta_S)), (U_O - \pi_U I(\theta_U)\right] \end{cases} \tag{16'}$$

Each inequality means that emigration towards D continues until the utility of consuming in D is larger or equal to the utility of consuming in O. For a given policy (π_S, π_U), let $\tilde{\theta}_S$ $(\tilde{\theta}_U)$ and $\tilde{\theta}_U(\tilde{\theta}_S)$ denote the marginal skilled and unskilled individuals who weakly prefer migrating to staying in O. Obviously, the complementarity of production factors implies that the quantity of unskilled workers affects the wage of a skilled worker and viceversa. This is the reason of the dependence between $\tilde{\theta}_S$ and $\tilde{\theta}_U$.

Now it is necessary to introduce a mild assumption: remark that it $\tilde{\theta}_S$ $(\tilde{\theta}_U)$ and $\tilde{\theta}_U$ $(\tilde{\theta}_S)$ are obtained by inverting the marginal productivities. Since the latter are analytic (see Footnote 7), I assume that analiticity is preserved after the inversion. This hypotesis is quite useful to prove the following Lemma:

Lemma 1 *The system of inequalities (16') always admits at least a solution given by* $\theta_S \leq \hat{\theta}_S(\pi_S, \pi_U), \theta_U \leq \hat{\theta}_U(\pi_S, \pi_U)$. *Any pair* $(\hat{\theta}_S(\pi_S, \pi_U), \hat{\theta}_U(\pi_S, \pi_U))$ *is locally unique.*

Proof. See the Appendix. ■

The Proposition states that it is always possible to partition the population of O into potential migrants and stayers. In order to simplify the notation, in what follows I'm going to omit the arguments of $\hat{\theta}_S(\pi_S, \pi_U), \hat{\theta}_U(\pi_S, \pi_U)$ where this can be done unambiguously.

The equilibrium real wages in the destination country are given by the left hand-side of (16) evaluated at $\hat{\theta}_S, \hat{\theta}_U$. Remark that in equilibrium the skilled wage cannot be lower than the unskilled wage. This happens since skilled wokers can accept unskilled jobs but not viceversa[11].

To characterize the behaviour of $\hat{\theta}_S, \hat{\theta}_U$ with respect to π_S and π_U we need a further assumption. In fact, when two production factors are moving, the *ceteris paribus* condition is violated, and complementarity makes it difficult to predict what happens to the marginal productivities in both countries. Therefore, we need an assumption on the second derivatives of the production functions. The proposed assumption states that, as skilled and unskilled workers enter (leave) a country, the marginal wage effect of the competing factor is higher than the marginal wage effect of the complementary factor. This ensures that immigration decreases wages in D and increases wages in O. Thus, complementarity -though important- is not sufficient to offset the decreasing marginal productivity. On the other hand, complementarity helps to explain why the negative effect of immigration on wages is often lower than expected[12] (for recent evidence on the wage effects and a brief review of the existing results, see Aydemir and Borjas, 2007).

In order to make the formulas less cumbersome, I'm going to omit the arguments of the partial derivatives where this can be done unambiguously.

What has been discussed above is summarized by means of the following assumption:

$$\text{for a given } \left[\hat{\theta}_S, \hat{\theta}_U\right]$$

$$\begin{aligned}
&| F_{SS} | > | F_{SU} |; \\
&| F_{UU} | > | F_{US} |; \\
&| G_{SS} | > | G_{SU} |; \\
&| G_{UU} | > | G_{US} |
\end{aligned} \tag{17}$$

Under assumption (17) it is possible to characterize the behaviour of $\hat{\theta}_S, \hat{\theta}_U$ with respect to π_S, π_U:

[11] If the marginal productivity of unskilled workers is higher, skilled ones will accept positions in the unskilled sector until the two productivities converge.

[12] A great deal of literature is devoted to studying the effect of immigration on wages. While the magnitude of the effect is debated, there is substantial agreement that wages decrease as long as the capital endowment is constant (Aydemir and Borjas, 2007).

Lemma 2 *In equilibrium, we have*

$$\frac{\partial\hat{\theta}_S}{\partial\pi_S} < 0; \quad \frac{\partial\hat{\theta}_S}{\partial\pi_U} > 0; \tag{18}$$

and

$$\frac{\partial\hat{\theta}_U}{\partial\pi_U} < 0; \quad \frac{\partial\hat{\theta}_U}{\partial\pi_S} > 0; \tag{19}$$

Proof. See the Appendix. The lemma can be easily proved by applying the Implicit Function Theorem. ■

As we are going to see in the next Lemma, $\hat{\theta}_S$ and $\hat{\theta}_U$ are decreasing, respectively, in π_S and π_U because more border openness increases the number of successful migrations and thus reduces the wage differential.

Recall now that the number of successful skilled immigrants is the share π_S of $I(\hat{\theta}_S)$ individuals willing to migrate, therefore $\pi_S I(\hat{\theta}_S)$. The successful unskilled immigrants are, of course, $\pi_U I(\hat{\theta}_U)$.

Lemma 3 *The number of successful immigrants is increasing in π_S, π_U, i.e.*

$$\frac{d\left[\pi_S I(\hat{\theta}_S)\right]}{d\pi_S} > 0 \quad ; \quad \frac{d\left[\pi_S I(\hat{\theta}_S)\right]}{d\pi_U} > 0 \tag{20}$$

$$\frac{d\left[\pi_U I(\hat{\theta}_U)\right]}{d\pi_U} > 0 \quad ; \quad \frac{d\left[\pi_U I(\hat{\theta}_U)\right]}{d\pi_S} > 0 \tag{21}$$

Proof. See the Appendix. ■

The previous Lemma and the complementarity of production factors allow us to write the following Corollary:

Corollary 4 *since the number of successful immigrants is increasing with π_S and π_U, we have $\frac{\partial F_S}{\partial \pi_U} > 0$, $\frac{\partial F_U}{\partial \pi_S} > 0$, $\frac{\partial F_K}{\partial \pi_S} > 0$, $\frac{\partial F_K}{\partial \pi_U} > 0$. Moreover, since enforcement costs are decreasing in π_S and π_U,the skilled (unskilled) wage is always increasing with respect to π_U (π_S).*

Remark, finally, that the individual share of enforcement cost decreases as π_S or π_U increase.

6 Voting Over Immigration Policy

As I argued in the Introduction, an overwhelming literature proves that non-economic factors matter in decisions over immigration. In spite of its importance, this point is little developed. The present model takes into account this factor in the simplest way: it is assumed that the stock of unskilled immigrants enters negatively the utility. Skilled immigration, on the other hand, has smaller figures and creates less concerns (Hanson et al. 2005). Therefore, it is possible to write the utility of natives -defined, respectively, as Q_S, Q_U- as depending on their net income, minus the stock of immigrants.

$$Q_S = F_S + \left[F_K - \frac{c(\pi_S, \pi_U)}{K} \right] k_j - \pi_U I(\hat{\theta}_U) \tag{22}$$

$$Q_U = F_U - \pi_U I(\hat{\theta}_U) \tag{23}$$

Q_S and Q_U are, respectively, the utility of a skilled and of an unskilled native. F_S is the skilled wage, and $F_K k_j$ is the capital income. $c(\pi_S, \pi_U)\frac{k_j}{K}$ is the tax necessary to enforce the entry barriers, and it is paid only by skilled workers. Obviously, F_U is the unskilled wage. Only natives are granted voting rights, and they choose the values of $[\pi_S, \pi_U]$ that maximize their utility. For the final results it is quite important to remark that utility in (22) describes single-crossing preferences, as it is stated in the following Lemma:

Lemma 5 *The preferences described by (22) are single-crossing.*

Proof. see the Appendix. ■

The single-crossing property will be quite useful in determining the voting behaviour of skilled voters in the next Section.

6.1 Pairwise alternatives: the Shepsle procedure

I want now to investigate the existence of an immigration policy able to defeat any other policy in a pairwise contest under majority voting. I'm going to adopt the Shepsle procedure as the solution concept for this bidimensional voting problem.

The following analysis holds around any solution of (16'). For simplicity, the main result is stated at the outset:

Proposition 6 *In a Shepsle voting procedure over* (π_S, π_U) *, the Condorcet winning immigration policy* (π_S^*, π_U^*) *is chosen by the median voter in the case of a skilled majority; when the majority is unskilled the policy is adopted by unanimity.*

Proof. See the Appendix. ■

This result is quite intuitive, and holds under standard conditions specified in the Appendix. The skilled workers' preferences are single-crossing along each dimension of the problem. Unskilled workers, instead, are unanimous because they are homogeneous. Now it is necessary to characterize the main properties of the pair (π_S^*, π_U^*) when the majority is skilled or unskilled.

6.1.1 Skilled natives: decision over skilled immigration

Even though no closed-form solutions are available, it is possible to have some information on the voters' decision: consider first the choice of π_S. As it is shown in the Appendix, it is possible to see when voters prefer a corner solution or an interior solution. This depends, of course, on the individual capital endowment. By analysing the slope of the utility in a neighborhood of $\pi_S = 0$ and in a neighborhood of $\pi_S = 1$, it is possible to introduce the following Proposition[13]:

Proposition 7 *(Optimal π_S for skilled natives): given the capital endowments*[14] $Z(0)$, $Z(1)$:

$$Z(0) \equiv \frac{D(0)(1-F_{SS})}{F_{KS}D(0)+\pi_U F_{KU} i(\hat{\theta}_U(0,\pi_U))\frac{\partial\hat{\theta}_U}{\partial\pi_S}-\frac{c_{\pi_S}(0,\pi_U)}{K}}$$

$$Z(1) \equiv \frac{D(1)(1-F_{SS})-\pi_U F_{SU} i\left(\hat{\theta}_U(1,\pi_U)\right)\frac{\partial\hat{\theta}_U}{\partial\pi_S}}{F_{KS}D(1)+\pi_U F_{KU} i(\hat{\theta}_U(1,\pi_U))\frac{\partial\hat{\theta}_U}{\partial\pi_S}-\frac{c_{\pi_S}(1,\pi_U)}{K}}$$

then,

$$(a) \quad \text{if} \quad Z(1) \geq Z(0), \text{ votes are dispersed:}$$

$$\begin{array}{llll} \text{for any} & k_j \leq Z(0), & \text{we have} & \pi_S^* = 0 \ ; \\ \text{for any} & k_j \in (Z(0), Z(1)], & \text{we have} & \pi_S^* \in (0,1); \\ \text{for any} & k_j > Z(1), & \text{we have} & \pi_S^* = 1 \end{array}$$

$$(b) \quad \text{if} \quad Z(0) > Z(1), \quad \text{votes are polarized:}$$

$$\begin{array}{llll} \text{for any} & k_j \leq Z(1), & \text{we have} & \pi_S^* = 0 \\ \text{for any} & k_j > Z(0), & \text{we have} & \pi_S^* = 1 \end{array}$$

Proof. *See the Appendix.* ■

[13] In order to make the expression more readable, with a slight abuse of notation, in the definitions of $Z_S(0), Z_S(1), V_S(0), V_S(1)$, the symbol of the limit is omitted. I have written always $\frac{\partial\hat{\theta}_S}{\partial\pi_S}$ instead of $\lim_{\pi_S\to 0}\frac{\partial\hat{\theta}_S}{\partial\pi_S}$, $\lim_{\pi_S\to 1}\frac{\partial\hat{\theta}_S}{\partial\pi_S}$, $\lim_{\pi_U\to 0}\frac{\partial\hat{\theta}_S}{\partial\pi_U}$, $\lim_{\pi_U\to 1}\frac{\partial\hat{\theta}_S}{\partial\pi_U}$. The same is true for $\frac{\partial\hat{\theta}_U}{\partial\pi_U}$, $\frac{\partial\hat{\theta}_U}{\partial\pi_U}$ and for all derivatives, indicated, for example, with F_{SS} instead of $\lim_{\pi_S\to 0} F_{SS}$.

[14] In the definitions of $Z(0), Z(1)$ we have $D(0) \equiv \lim_{\pi_S\to 0}\frac{\partial\pi_U I(\hat{\theta}_U)}{\partial\pi_S} = I(\hat{\theta}_S(0,\pi_U)) > 0$, and $D(1) \equiv \lim_{\pi_S\to 1}\frac{\partial\pi_U I(\hat{\theta}_U)}{\partial\pi_S} = I(\hat{\theta}_S(1,\pi_U)) + i(\hat{\theta}_S(1,\pi_U))\lim_{\pi_S\to 1}\frac{\partial\hat{\theta}_S}{\partial\pi_S} > 0$.

This Proposition specifies when skilled voters choose interior solutions or corner solutions with respect to the entry of the competing factor[15]. As I will argue later, case (a) describes best the policies adopted by developed countries, where skilled immigration is neither forbidden nor open. In case (b) we can see that the population of skilled voters is polarized between those preferring open immigration and those preferring no immigration at all. This situation can be interpreted as a particular case of (a). Notice that if $Z(1) < 0$ we have $\pi_S^* = 1$ by unanimity.

6.1.2 Skilled natives: decision over unskilled immigration

By repeating the reasoning used in the previous Section, we can partition the natives with respect to their choice over unskilled immigration. It is useful recalling that the skilled wage is always increasing as unskilled workers enter D, thus any possible solution $\pi_U^* < 1$ is due to non-economic concerns.

Proposition 8 *(optimal π_U for the skilled natives): given the capital endowments*[16] *$V_S(0)$, $V_S(1)$ as follows:*

$$V(0) \equiv \frac{E(0)(1-F_{SU})}{F_{KU}E(0) + \pi_S F_{KS} i(\hat{\theta}_S(\pi_S,0)\frac{\partial \hat{\theta}_S}{\partial \pi_U} - \frac{c_{\pi_U}(\pi_S,0)}{K}};$$

$$V(1) = \frac{E(1)(1-F_{SU}) - \pi_S F_{SS} i(\hat{\theta}_S(\pi_S,1))\frac{\partial \hat{\theta}_S}{\partial \pi_U}}{F_{KU}E(1) + \pi_S F_{KS} i(\hat{\theta}_S(\pi_S,1))\frac{\partial \hat{\theta}_S}{\partial \pi_U} - \frac{c_{\pi_U}(\pi_S,1)}{K}};$$

then,

(a') *if* $V(1) \geq V(0)$ *votes are dispersed:*

for any	$k_j \leq V(0)$,	*we have*	$\pi_{iU}^* = 0$;
for any	$k_j \in (V(0), V(1)]$,	*we have*	$\pi_{iU}^* \in (0,1)$;
for any	$k_j > V(1)$,	*we have*	$\pi_{iU}^* = 1$

(b') *if* $V(0) > V(1)$ *votes are polarized:*

for any	$k_j \leq V(0)$	*we have*	$\pi_{iU}^* = 0$
for any	$k_j > V(0)$	*we have*	$\pi_{iU}^* = 1$

[15] When $Z(1) \to +\infty$ we never have the corner solution $\pi^* = 1$

[16] In the definitions of $V_S(0), V_S(1)$ we have $E(0) \equiv \lim_{\pi_U \to 0} \frac{\partial \pi_U I(\hat{\theta}_U)}{\partial \pi_U} = I(\hat{\theta}_U(\pi_S,0)) > 0$, and $E(1) \equiv \lim_{\pi_U \to 1} \frac{\partial \pi_U I(\hat{\theta}_U)}{\partial \pi_U} = I(\hat{\theta}_U(\pi_S,1)) + i(\hat{\theta}_U(\pi_S,1)) \lim_{\pi_U \to 1} \frac{\partial \hat{\theta}_U}{\partial \pi_U} > 0$.

The above Proposition, as the previous one, specifies the intervals of capital endowments that produce, respectively, interior solutions and corner solutions[17]. In particular, when at least one of $V(0), V(1)$ is negative, the maxima always lie at a corner. The Condorcet winner depends on where the median voter's capital endowment lies. Depending on the relative magnitudes of $V(0), V(1), Z(0), Z(1)$, it is possible to obtain any combination of interior and corner solutions for skilled and unskilled immigration. To understand the practical implications, the next Section reviews the selective policies' requirements and shows that entry is restricted for both skilled and unskilled immigrants. Therefore, we can conclude that the observed policies correspond to an interior solution along both dimensions, i.e. $(\pi_S^*, \pi_U^* \in (0,1))$. This result is summarized by case *(a)* in Proposition 7 and by case *(a')* in Proposition 8.

6.1.3 Unskilled natives

The solution for the unskilled workers problem is easier than the one for skilled workers, and it is summarized in the following Proposition:

Proposition 9 *(Optimal choice for the unskilled natives): since they are homogeneous, unskilled natives decide by unanimity. The utility maximizing pair is* $\pi_U^* = 0$, $\pi_S^* = 1$.

Proof. See the Appendix. ■

This result is quite intuitive, because unskilled workers can switch the cost of border enforcement towards skilled workers, thus they can enjoy protection at no cost. Once the competing factor is left out, labour income is maximized with open entry for the complementary factor.

However, in destination countries unskilled voters are likely to be a minority, and the final decision to pertain to skilled natives.

7 Current immigration policies

In what follows, the attention is focused on the main requirements to enter the most important destination countries *where selective policies are applied.* It is evident that access to skilled workers is far from being open.

For example, Canada requires an Employment Authorization (i.e. a job offer), which entitles to a temporary residence permit. The EA is not required for certain activities considered "beneficial to Canada", which include some highly-skilled jobs and business operators. More requirements have to be met to get a permanent residence permit: job-searching immigrants are screened according to a point system, and business immigrants are selected upon their abilities "to make a contribution to the Canada's economy". The score to get an immigrant visa is 67 points.

Entry to Australia is heavily regulated: applicants take a point test for many visa classes. The main requirements to get a skilled immigration visa are: being

[17] When $V_S(1) \to +\infty$ we never have the corner solution $\pi_U^* = 1$

under 45, being fluent in English, matching the Australian Skilled Occupation List, having more than a post-secondary education, and having the Australian Assessing Authorithy approve the application.

Another remarkable example is the US "green card" lottery program, which grants a permanent residence permit to 55000 skilled immigrants randomly chosen from the pool of applicants. Regulations for entering the US are quite complicated: different visas are granted on the basis of individual characteristics[18].

A comprehensive survey of the European immigration policies falls outside the scope of this paper. Therefore, I'm going to review only some of the most evident entry restrictions for skilled workers. In the UK, the Highly Skilled Migrant Programme is a point system used to select the most qualified immigrants. The admission threshold has been recently increased from 65 to 75 points[19], indicating and increasing protectionism. Since 2002, a Sectors Based Scheme and a Seasonal Agricultural Workers Scheme are used for unskilled workers: they must be between 18 and 30 and have a job offer from a list of sectors where the local labour supply is scarce. Moreover, immigrants can bring no dependents into the country. The reform of immigration regulation to be adopted in 2008 provides for a new points system that replaces the mentioned programs with a 5-tier system. The UK Home Secretary recently declared that the new points system will provide for "clear criteria set for *who we need to come here and who we don't*"[20].

Since 2000, Germany is implementing special programs ("green cards") for highly-skilled immigrants in the IT sector. Currently, a new immigration law is under discussion at the Bundestag. It should include a point system granting permanent residence even without a job offer and the mandatory attendance to German courses.

Of course, admission thresholds can be changed according to economic and political needs (they have recently been lowered in Canada and increased in the UK).

Such selection acts as rationing mechanism, rather than as a "welcome" for skilled workers. The reluctance in opening the labour market to citizens of Central and Eastern European (CEE) entrants to EU on may 1st, 2004, is another example of skilled immigration rationing. These countries provide for a large supply of well-educated workers, whose access is regulated by some transitional arrangements. Currently, under the second phase of such arrangements, different kinds of restrictions for Eastern European workers still hold in Belgium, France, Denmark, Austria, Germany and the U.K. Effective freedom of movement should start only in 2011. Chart 1 on the next page -taken from OECD (2007)- reports some education indicators for the OECD countries.

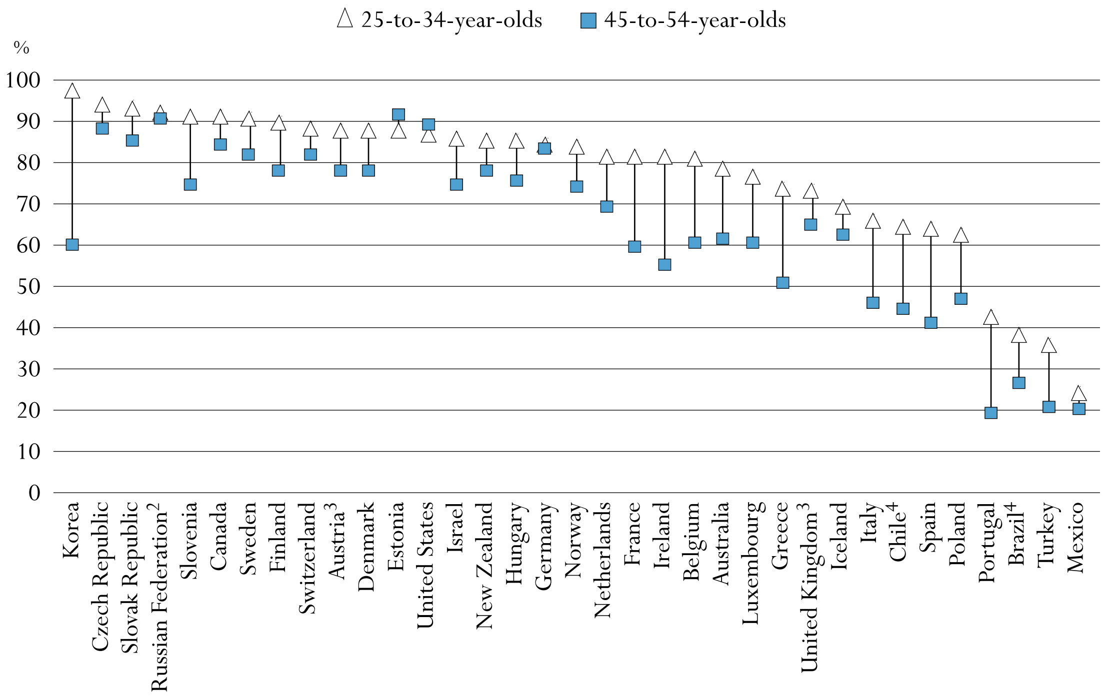
[18] Entry to the U.S. is regulated via a complicated system of visas depending on the skills of the applicants and their sector of activity. They are issued in a pre-determined amount each year.

[19] Points are scored in the following five main areas: educational qualifications, work experience, past earnings, achievements in the applicant's chosen profession, and the skills and achievements of the applicant's partner.

[20] Speech at the LSE Migration Studies Unit, 12-5-2007.

Chart 1. Population that has attained at least upper secondary education[1] (2005)

Percentage, by age group



1. Excluding ISCED 3C short programmes.
2. Year of reference 2003.
3. Including some ISCED 3C short programmes.
4. Year of reference 2004.

Countries are ranked in descending order of the percentage of 25-to-34-year-olds who have attained at least upper secondary education.

Source: OECD. Table A1.2a. See Annex 3 for notes (*www.oecd.org/edu/eag2007*).

StatLink http://dx.doi.org/10.1787/068015451617

From Chart 1 we see that educational attainments[21] for upper secondary education in CEE countries are above average -with the exception of Poland-. Considered that even in Western Europe only a minority of the population accomplished tertiary education, (see OECD 2007, page 29) we can expect that national median voters are educated at the upper secondary level. Therefore Eastern European workers are likely to compete with them[22].

From this point of view, It is not difficult to explain "why European are so tough on Eastern-European migrants" (Boeri and Brucker, 2005). Indeed, the interpretation proposed in this paper complements the explanation of Boeri and Brucker (2005), who argue that the tightening of immigration restriction can be due to a lack of co-ordination among EU members.

8 Conclusions

In this paper I developed a model of voting over selective immigration policies within a three-factor, two-country model. I paid particular attention to include skilled and unskilled voters, and to consider the aversion to immigration, whose importance is neglected in the literature in spite of its overwhelming empirical evidence. This aversion has been useful to explain why entry for unskilled workers is restricted in skilled, well educated societies. From this point of view, entry rationing for unskilled immigrants is more difficult to explain than entry rationing for skilled ones. Moreover, the role played by the cost of financing immigration restrictions is crucial to understand why it is so difficult to observe a perfect border closure, and why a positive inflow of immigrants is always allowed.

Unlike the generalized claim that qualified immigration is "welcome", my model obtains a selective immigration policy as a form of protectionism. Indeed, freedom of entry is usually granted to *highly skilled* individuals in *specific sectors* of the economy where they do not compete with the median voter.

As mentioned above, the German Green Card scheme introduced in August 2000 was aimed at recruiting IT specialists to respond to a predicted national shortage. The UK Highly Skilled Migrant Programme started in 2002 opened the door to highly skilled individuals who had the skills and experience *required by the UK.*

Such limited inflows appear carefully designed in order to protect the national median voters. In the model presented, the case of a skilled majority with interior solutions yields a satisfactory representation of the selective immigration policies.

[21] The OECD data are based on the 1997 Unesco International Standard Classification of Education. ISCED 3C indicates programmes of upper secondary eduction at least one year shorter than the norm.

[22] The upper secondary education attainment rates for the Baltic countries are between 60-70% (OECD 2003).

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Appendix

Proof of Lemma 1
Existence:
I report here the system of inequalities in (16'):

$$\begin{cases} F_S\left[(S_D+\pi_S I(\theta_S)),(U_D+\pi_U I(\theta_U)),K\right] \geq \theta_S G_S\left[(S_O-\pi_S I(\theta_S)),(U_O-\pi_U I(\theta_U))\right] \\ \qquad\qquad\qquad\qquad (\gamma)\text{ -skilled} \\ F_U\left[(S_D+\pi_S I(\theta_S)),(U_D+\pi_U I(\theta_U))\right],K \geq \theta_U G_U\left[(S_O-\pi_S I(\theta_S)),(U_O-\pi_U I(\theta_U))\ \right] \\ \qquad\qquad\qquad\qquad (\sigma)\text{ -unskilled} \end{cases}$$

By assumption, the marginal productivities are continuous and differentiable in all their arguments. The LHS of each inequality is the utility of consuming abroad, while the RHS is the utility of consuming at home. Suppose there is a solution $\tilde{\theta}_U$ to ineq. (σ), and consider ineq. (γ). For having an interior solution, we want that, for any $\tilde{\theta}_U$, there exist $\tilde{\theta}_S(\tilde{\theta}_U)$ such that the LHS of (γ) equals the RHS. If an interior solution does not exist, either $F_S < \theta_S G_S$ for any θ_S or viceversa. In the first case, there is no incentive to migrate for all (skilled) agents. This case has no economic interest, and we can rule it out without loss of generality. On the other hand, when $\theta_S G_S < F_S$ for any θ_S, there exist an incetive to migrate for all (skilled) workers. Hence, the problem is reduced to analyse only the solutions to eq. (σ). Apart this trivial case, since $\frac{\partial F_S}{\partial \theta_S} < 0$ and $\frac{\partial G_S}{\partial \theta_S} > 0$, continuity is sufficient to get a unique solution $\tilde{\theta}_S(\tilde{\theta}_U)$[23].

The same argument can be used to prove that, in eq. (σ), there exist $\tilde{\theta}_U(\tilde{\theta}_S)$ for any $\tilde{\theta}_S$ (apart the trivial case). In the following table, I report the set of possible solutions to (16'):

	Corner Solution $F_U > \theta_U G_U$	Interior Solution $F_U = \theta_U G_U$
Corner Solution $F_S > \theta_S G_S$	$\hat{\theta}_U = \bar{\theta}_U \forall \tilde{\theta}_S$ $\hat{\theta}_S = \bar{\theta}_S \forall \tilde{\theta}_U$	$\hat{\theta}_U \in \left(\underline{\theta}_U, \bar{\theta}_U\right)$ $\hat{\theta}_S = \bar{\theta}_S \forall \tilde{\theta}_U$
Interior Solution $F_S = \theta_S G_S$	$\hat{\theta}_U = \bar{\theta}_U \forall \tilde{\theta}_S$ $\hat{\theta}_S \in \left(\underline{\theta}_S, \bar{\theta}_S\right)$	$\hat{\theta}_U \in \left(\underline{\theta}_U, \bar{\theta}_U\right)$ $\hat{\theta}_S \in \left(\underline{\theta}_S, \bar{\theta}_S\right)$

Now, I have to prove that, given $\tilde{\theta}_S(\tilde{\theta}_U)$ and $\tilde{\theta}_U(\tilde{\theta}_S)$, it is possible to find $\hat{\theta}_U$ and $\hat{\theta}_S$ such that $\tilde{\theta}_U(\hat{\theta}_S) = \hat{\theta}_U$, and $\tilde{\theta}_S(\hat{\theta}_U) = \hat{\theta}_S$.

[23] Remark that $\tilde{\theta}_S(\tilde{\theta}_U)$ is obtained by inverting $(F_S - \theta_S G_S = 0)$ that is a continuous, bijective function. As a consequence, $\tilde{\theta}_S(\tilde{\theta}_U)$ is continuous as well.

This is true when the function $\Phi(\tilde{\theta}_U) = \tilde{\theta}_U(\tilde{\theta}_S(\tilde{\theta}_U))$ has a fixed point. Since the sets $[\underline{\theta}_S, \bar{\theta}_S]$, $[\underline{\theta}_U, \bar{\theta}_U]$ are convex and compact, and since $\Phi(\tilde{\theta}_U)$ maps $[\underline{\theta}_U, \bar{\theta}_U]$ continuously into itself, existence is proved by the Brouwer's fixed point theorem.

Local Uniqueness

In order for the solution $(\hat{\theta}_U,\, \hat{\theta}_S)$ to be locally unique, we need that it does not exist an interval where the functions $\tilde{\theta}_S(\tilde{\theta}_U)$ and $\tilde{\theta}_U(\tilde{\theta}_S)$ are overlapped. Since both $\tilde{\theta}_S(\tilde{\theta}_U)$ and $\tilde{\theta}_U(\tilde{\theta}_S)$ are analytic by assumption, this holds for any $\tilde{\theta}_S(\tilde{\theta}_U) \neq \tilde{\theta}_U(\tilde{\theta}_S)$.

Proof of Lemma 2

Lemma 2 can easily be proved by applying the Implicit Function Theorem and assumption (17) to the equations in (16'). In order to obtain simpler expressions, I'm going to define the following terms:

$$C(U) \equiv \pi_U i(\hat{\theta}_U)(F_{UU} + \hat{\theta}_U G_{UU}) - G_U < 0 \tag{24}$$

$$C(S) \equiv \pi_S i(\hat{\theta}_S)(F_{SS} + \hat{\theta}_S G_{SS}) - G_S < 0 \tag{25}$$

$$A \equiv \pi_U i(\hat{\theta}_U)(F_{UU} + \hat{\theta}_U G_{UU})(F_{SS} + \hat{\theta}_S G_{SS}) -$$

$$-\pi_U i(\hat{\theta}_U)(F_{SU} + \hat{\theta}_U G_{SU})(F_{US} + \hat{\theta}_U G_{US}) - G_U(F_{SS} + \hat{\theta}_S G_{SS}) > 0; \tag{26}$$

$$B \equiv \pi_S i(\hat{\theta}_S)(F_{SS} + \hat{\theta}_S G_{SS})(F_{UU} + \hat{\theta}_U G_{UU}) -$$

$$-\pi_S i(\hat{\theta}_S)(F_{SU} + \hat{\theta}_S G_{SU})(F_{US} + \hat{\theta}_U G_{US}) - G_S(F_{UU} + \hat{\theta}_U G_{UU}) > 0 \tag{27}$$

The derivatives in (18) are, respectively,

$$\frac{d\hat{\theta}_S}{d\pi_S} = \frac{-AI(\hat{\theta}_S)}{\pi_S i(\hat{\theta}_S)A - G_S C(U)} < 0 \tag{28}$$

and

$$\frac{d\hat{\theta}_S}{d\pi_U} = \frac{G_U(F_{SU} + \hat{\theta}_S G_{SU})I(\hat{\theta}_U)}{\pi_U i(\hat{\theta}_U)B - C(S)G_U} > 0; \tag{29}$$

the derivatives in (19) are, respectively,

$$\frac{d\hat{\theta}_U}{d\pi_U} = \frac{-BI(\hat{\theta}_U)}{\pi_U i(\hat{\theta}_U)B - G_U C(S)} < 0 \tag{30}$$

and

$$\frac{d\hat{\theta}_U}{d\pi_S} = \frac{G_S(F_{US} + \hat{\theta}_U G_{US})I(\hat{\theta}_S)}{\pi_S i(\hat{\theta}_S)A - C(U)G_S} > 0. \tag{31}$$

Proof of Lemma 3

The number of successful immigrants is increasing with respect to the border openness: for skilled workers we have

$$\frac{d(\pi_S I(\hat{\theta}_S))}{d\pi_S} = \frac{-G_S C(U) I(\hat{\theta}_S)}{A\pi_S i(\hat{\theta}_S) - G_S C(U)} > 0 \tag{32}$$

$$\frac{d(\pi_S I(\hat{\theta}_S)}{d\pi_U} = \pi_S i(\hat{\theta}_S)\frac{d\hat{\theta}_S}{d\pi_U} > 0 \tag{33}$$

and for the unskilled

$$\frac{d(\pi_U I(\hat{\theta}_U))}{d\pi_S} = \pi_U i(\hat{\theta}_U)\frac{d\hat{\theta}_S}{d\pi_U} > 0 \tag{34}$$

$$\frac{d(\pi_U I(\hat{\theta}_U))}{d\pi_U} = \frac{-G_U C(S) I(\hat{\theta}_U)}{B\pi_U i(\hat{\theta}_U) - G_U C(S)} > 0. \tag{35}$$

Proof of Lemma 5

It is necessary to check if the preferences of skilled workers are single-crossing along both dimensions of the problem (π_S, π_U). That can be done by applying the definition and recalling assumption (17): preferences exhibit the single-crossing property with respect to π_S if we can order the voters from left to right with respect to their capital endowment and, given $\pi'_S > \pi_S$ and $k' > k$, we have:

$$\begin{array}{llll} if \quad u(k', \pi_S) \geq u(k', \pi'_S) & (\alpha) & then \quad u(k_1, \pi_S) \geq u(k_1, \pi'_S) & (\alpha\prime) \\ \quad and & & & \\ if \quad u(k, \pi'_S) \geq u(k, \pi_S) & (\beta) & then \quad u(k', \pi'_S) \geq u(k', \pi_S) & (\beta\prime) \end{array}$$

when (α) is true we can write (omitting for simplicity the arguments of F_S)

$$\begin{aligned} & F_S[\pi_S] - F_S[\pi'_S] + \pi_U I(\hat{\theta}_U(\pi'_S, \pi_U)) - \pi_U I(\hat{\theta}_U(\pi_S, \pi_U)) \geq \\ & \geq k' \left[\frac{c(\pi_S, \pi_U)}{K} - \frac{c(\pi'_S, \pi_U)}{K} + F_K[\pi'_S] - F_K[\pi_S] \right] \end{aligned} \tag{36}$$

when (α) holds, it clearly implies $(\alpha\prime)$ because $k < k'$. Condition (β) can be written as

$$\begin{aligned} & F_S[\pi_S] - F_S[\pi'_S] + \pi_U I(\hat{\theta}_U(\pi'_S, \pi_U)) - \pi_U I(\hat{\theta}_U(\pi_S, \pi_U)) \leq \\ & k' \left[\frac{c(\pi_S, \pi_U)}{K} - \frac{c(\pi'_S, \pi_U)}{K} + F_K[\pi'_S] - F_K[\pi_S] \right] \end{aligned} \tag{37}$$

and it clearly implies (β') since $k < k'$.

Proof of Proposition 6

In order to apply the Shepsle procedure, each voter finds the value of π_S that maximizes her utility for a given π_U and viceversa. This produces two "reaction functions" $\pi_S^*(\pi_U)$ and $\pi_U^*(\pi_S)$. These functions clearly exist because (22) and (23) are continuous functions defined over a compact domain, and we can apply the Weierstrass theorem. $\pi_S^*(\pi_U)$ and $\pi_U^*(\pi_S)$ are implicit functions. Consider now the function $\Omega = \pi_S^*(\pi_U) - \pi_U^*(\pi_S)$. If it displays a fixed point, then an equilibrium exists. Since Ω is continuous, in order to apply the Brouwer's fixed point theorem we only need that the *absolute* maxima $\pi_S^*(\pi_U)$ and $\pi_U^*(\pi_S)$ are unique; otherwise the domain of Ω would not be convex. Thus, as usual in the literature, the existence result is restricted to the case in which $\pi_S^*(\pi_U)$ and $\pi_U^*(\pi_S)$ are unique.

Proof of Proposition 7

Consider the derivative of (22) with respect to π_S:

$$\frac{\partial Q_S}{\partial \pi_S} = F_{SS}\left(I(\hat{\theta}_S) + \pi_S i(\hat{\theta}_S)\frac{\partial \hat{\theta}_S}{\partial \pi_S}\right) + \pi_U F_{SU} i(\hat{\theta}_U)\frac{\partial \hat{\theta}_U}{\partial \pi_S} + \tag{38}$$
$$+ k_j\left[F_{KS}\left(I(\hat{\theta}_S) + \pi_S i(\hat{\theta}_S)\frac{\partial \hat{\theta}_S}{\partial \pi_S}\right) + \pi_U F_{KU} i(\hat{\theta}_U)\frac{\partial \hat{\theta}_U}{\partial \pi_S} - \frac{c_{\pi_S}(\pi_S, \pi_U)}{K}\right] - \pi_U i(\hat{\theta}_U)\frac{\partial \hat{\theta}_U}{\partial \pi_S}$$

To find the intervals $Z(0), Z(1)$ it is necessary to find the capital endowments such that the derivative (38) is increasing when $\pi_S \to 0$ and decreasing when $\pi_S \to 1$. For $Z(0)$ it is sufficient computing $\lim_{\pi_S \to 0} \frac{\partial Q_S}{\partial \pi_S}$, then setting $\lim_{\pi_S \to 0} \frac{\partial Q_S}{\partial \pi_S} > 0$ and solving for k_J. For $Z(1)$, I compute $\lim_{\pi_S \to 1} \frac{\partial Q_S}{\partial \pi_S}$, I set $\lim_{\pi_S \to 0} \frac{\partial Q_S}{\partial \pi_S} < 0$ and I solve again for k_J. It is useful to remark that the limit of expression (38) is finite in both cases.

Interestingly, by examining (38), we immediately see that for $k_j \to \infty$ expression (38) is strictly positive for any π_S. As a consequence, for k_j sufficiently high the optimal choice will be $\pi_S^* = 1$. We know that some individuals choose such a solution since $\bar{k}$ is arbitrarily high.

Proof of Proposition 8:

Consider now the derivative of (22) with respect to π_U:

$$\frac{\partial Q_S}{\partial \pi_U} = \pi_S F_{SS} i(\hat{\theta}_S)\frac{\partial \hat{\theta}_S}{\partial \pi_U} + F_{SU}\left(I(\hat{\theta}_U) + \pi_U i(\hat{\theta}_U)\frac{\partial \hat{\theta}_U}{\partial \pi_U}\right) - \left(I(\hat{\theta}_U) + \pi_U i(\hat{\theta}_U)\frac{\partial \hat{\theta}_U}{\partial \pi_U}\right) +$$
$$+ k_i\left(\pi_S F_{KS} i(\hat{\theta}_S)\frac{\partial \hat{\theta}_S}{\partial \pi_U} + F_{KU}\left(I(\hat{\theta}_U + \pi_U i(\hat{\theta}_U)\frac{\partial \hat{\theta}_U}{\partial \pi_U}\right) - \frac{c_{\pi_S}(\pi_S, \pi_U)}{K}\right) \tag{39}$$

By taking the limit of (39) for $\pi_U \to 0$ and $\pi_U \to 1$ it is possible to find $V(0)$ and $V(1)$ as it has been done for $Z(0), Z(1)$. It is important to remark that $Z(1)$

and $V(1)$ can be negative. In such a case, the utility is never decreasing as π_S and π_U approach unity, and we have polarization on corner solutions.

Proof of Proposition 9

Consider the utility defined by (23). In order to apply the Shepsle procedure, we have to find π_S that maximizes the utility for a given π_U. Again, let this value be $\pi_S^*(\pi_U)$. By the Weierstrass theorem, we know that $\pi_S^*(\pi_U)$ exists. Since there is no heterogeneity, it is chosen by unanimity. Consider now the derivative of (23) with respect to π_U : we have

$$\frac{\partial Q_U}{\partial \pi_U} = \pi_S F_{SS} i(\hat{\theta}_S) \frac{\partial \hat{\theta}_S}{\partial \pi_U} + \left(I(\hat{\theta}_U) + \pi_U i(\hat{\theta}_U) \frac{\partial \hat{\theta}_U}{\pi_U} \right) (F_{UU} - 1) < 0 \tag{40}$$

this derivative is always negative, thus, when voting over unskilled immigration, $\pi_U^*(\pi_S) = 0$ (again by unanimity). Therefore, to get an equilibrium of the Shepsle procedure is easier than for Prop. 6, and it is reduced to the pair $[\pi_S^*(0), 0]$. Since $\pi_S^*(0) = 1$, the result is $[\pi_S^* = 1, \pi_U^* = 0]$.