Immigration Policy and the Welfare State

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Abstract

It has been argued that a substantial increase in skilled immigration can help solve the budget problems of the public sector in the US. This paper studies determinants of immigration policy and income redistribution using a dynamic political economy model. The skill distribution of the native population evolves over time, as a result of skill accumulation and immigration. At each period, the native population chooses immigration and income redistribution by majority vote. The main feature of the model is that voters anticipate that current immigrants will affect future policies, once they gain the right to vote. The main result is that in the long run, redistribution is only compatible with unskilled immigration; the supporters of redistribution admit unskilled immigrants to offset growth in the fraction of skilled voters in order to regenerate the political support for redistribution.I construct an equilibrium that displays income redistribution in every period. This equilibrium illustrates immigration policy can shift substantially in response to changes in the skill composition of the population. In this equilibrium, both an unskilled majority and a skilled majority would impose immigration restrictions in order to retain control over redistribution policy. This result can explain why survey data finds widespread social support for immigration restrictions.

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1 Introduction

In many countries, the welfare state faces serious budget problems. Often, immigration policy is viewed as part of a solution package. For instance, Storesletten (2000) suggests a large increase in skilled immigration for the US. But could such a policy be implemented? And would it indeed save the welfare state?

Virtually every rich country imposes severe restrictions to immigration. Klein and Ventura (2004) have shown that there would be sizeable welfare effects from lifting immigration barriers in the OECD, arising from a large long-run increase in total capital and output per worker. However, survey data reveals a wide social support for immigration restrictions in many countries, across voters' income and education levels.[1] Why are immigration restrictions so prevalent in all countries and why its support is so big within each country? Understanding the nature of the restrictions is necessary because it restricts the set of immigration policies that can be implemented in order to alleviate the fiscal problems of the public sector.

This paper argues that immigration restrictions arise because the native population anticipates that immigrants will affect the size of the government once they gain the right to vote. Substantial evidence suggests that immigrants (and their children) have played an important role in the domestic politics of many countries. For instance, some historians argue that the new waves of immigrants entering the US in the early 20th century tipped the electorate heavily in favor of one party.[2] Analysts predict an increasing influence of the foreign-born in American domestic politics. Analyzing the outcome of the latest presidential election in the US, some commentators suggest that a key to the defeat of the Democratic candidate was poor performance in attracting the Latino vote.

> Yet Mr. Kerry's campaign failed to effectively connect his policy goals to shared family priorities. Latinos want to take care of their children, to keep them healthy and see them succeed in life as they probably could not. An appeal to that moral imperative, perhaps the most common of all denominators, linked to the help Mr. Kerry was offering to achieve it, might have produced a very different result.[3]

[1] In 2000, 86.6% of Americans said that the number of immigrants should either be reduced or left the same. The corresponding figures for 1998, 1996, 1994 and 1992 were 86.7%, 83.9%, 91.1% and 88.5% (Hanson et al, 2002).

[2] Some authors have also argued that the larger government size in California relative to the rest of the country is the result of its history of higher immigration.

[3] Excerpt from "How Hispanics Voted Republican", by Carolyn Curiel, Editorial Observer, New York Times, November 8, 2004.

The main goal of this paper is to investigate the relationship between immigration and the welfare state. I present a model where the skill distribution of the native population evolves over time, as a result of skill accumulation and immigration. At each period, the native population chooses immigration and income redistribution policies by majority vote, taking into account that immigration will affect labor market outcomes and the skill distribution of next period's electorate. In the model, skilled workers are always richer than unskilled ones. In addition, one's wage can be increased by admitting immigrants with complementary skills. I assume that there is a pool of potential immigrants, containing both skilled and unskilled workers. Voters anticipate that immigrants will become citizens after one period and vote according to their own economic interests, just like the other voters. As a result, a tradeoff arises between the effects of immigration on current wages and on future policies.

In the model, in the absence of immigration, the welfare state will be abandoned once the native population becomes skilled enough. In this scenario, I address two main questions. Can the welfare state survive when immigration policy is endogenous? If so, what are the corresponding immigration flows?

There are several interesting results. First, income redistribution is intimately linked to unskilled immigration in steady state. Immigration policy is used by an unskilled majority (the poor) to offset growth in the fraction of skilled voters in the population, in order to maintain redistribution.

Next, I construct a stationary majority-voting equilibrium with redistribution in steady state, provided substantial intergenerational persistence and labor income inequality. Along the equilibrium path, immigration policy endogenously shifts from unrestricted skilled immigration (only limited by the availability) when the country is skilled-scarce to restricted unskilled immigration when the fraction of skilled voters is high enough. Interestingly, both a decisive skilled voter and a decisive unskilled voter support identical restrictions on immigration. The only difference is that a decisive skilled voter would abandon redistribution forever.

Finally, I examine the dynamics of immigration and redistribution when immigrants have little effect on domestic policies, for instance because migration is temporary or because immigrants and their offspring are never granted citizenship. In this case, voters' views about immigration policy are more extreme. Voters of one particular skill level always support unrestricted immigration of workers with complementary skills.

Many other alternative explanations for the prevalent support for immigration restrictions have been proposed, ranging from xenophobia to threats to national identity. However, it is difficult to account for cross-country variation in immigration restrictions, and the corresponding immigration flows, satisfactorily using these theories. In contrast, the present model suggests a set of explanatory variables that have the potential to explain cross-country differences. In particular, the skills and size of immigration flows are a function of skill accumulation, as well as fertility and political participation patterns, in the host country.

The present paper is related to several strands of literature. A rapidly growing body of literature studies the evolution of the size of government using a dynamic political economy approach. Krusell, Quadrini and Rios-Rull (1997) and Krusell and Rios-Rull (1999) study the Markov perfect equilibria of a model with infinitely lived and perfectly foresighted voters to try to account quantitatively for the evolution of the size of the US government. The model I propose shares the previous features of their model, but allows for analytical solutions. In that sense, it is more in the spirit of Hassler et al (2002, 2003) who study the political sustainability of the welfare state in an overlapping-generations model that can be solved analytically and where the dynamics of skill accumulation and the size of the government are closely related. Immigration is absent in these models.

The present work is also related to dynamic models that aim at quantifying the economic effects of immigration. Storesletten (2000) characterizes the immigration policy that would maximize the fiscal gains for the US, taking as given the current tax and expenditure system and demographics. Implicit in his analysis, voters presume policies to be unaffected by the immigration choices. Ben-Gad (2004) analyzes the effects of immigration on the receiving economy in a model with endogenous capital-accumulation and heterogeneously skilled agents. As mentioned earlier, Klein and Ventura (2004) use a two-country model with capital accumulation, capital mobility and differences in total factor productivity to evaluate the welfare effects of eliminating the (exogenously given) immigration restrictions.

The model is also related to a young but growing literature on the political economy of immigration policy. Benhabib (1996) constructs a model where agents with heterogeneous capital holdings choose immigration policy by majority vote. In his model, there is an exogenously given supply of potential migrants with different endowments of capital. His results suggest that immigration policy will display cycles over time, with long periods of relatively low (capital-rich) immigration followed by brief periods of massive (capital-poor) immigration. Roemer and Van der Straeten (2004) the consequences of the rise in xenophobia in some European countries for the size of their welfare states. In their model, voters' preferences over immigration and governmental policies are exogenous. Instead, in the present model voters' preferences are endogenous to the model. Voters' attitudes toward immigration reflect their preferences over streams of consumption. Razin, Sadka and Swagel (2002, JPub) extend the work of Metzler and Richard (1981) by including an exogenous flow of immigrants and study the connection between immigration and income redistribution in a static model.

The present work is also related to a recent empirical literature on the determinants of voters' attitudes toward immigration. Scheve and Slaughter (2001) and Hanson et al (2002) investigate US data. Mayda (2003), and O'Rourke (2003) carry out cross-country analyses. In all these studies, particular attention is given to the role of the respondent's education level on her attitude toward immigration. It is usually found that voters with lower education levels tend to be more in favor of immigration restrictions. However, even highly educated voters support restrictions.

This paper also relates to a new strand of literature that studies franchise extension. Choosing an immigration policy is also a decision on enlarging the set of citizen voters in a country. Some recent contributions to this literature are Acemoglu and Robinson (2000) and Lizzeri and Persico (2003). In these models, some elite decides on whether to allow other (poorer) members of the country to vote from then on, taking into account the consequences on future policies.

2 Model

One consumption good is produced by a competitive firm using two complementary inputs: skilled and unskilled labor. Let $F(L_1, L_2)$ be the production function, a continuous, smooth and constant-returns-to-scale function satisfying the following standard properties: $F_i > 0$, $F_{ii} < 0$ for $i = 1, 2$ and $F_{12} > 0$. Observe that if we define $k = L_2/L_1$, the previous assumptions imply that $F_1(1, k)$ is a strictly increasing function of k and $F_2(1, k)$ is a strictly decreasing function of k. The respective derivatives (with respect to k) are $F_{12} > 0$ and $F_{22} < 0$. To save on notation I will use $F_i(k)$ to denote $F_i(1, k)$, for $i = 1, 2$.

The economy is populated by many agents with two possible skill levels. Unskilled agents will be denoted by $i = 1$ and skilled agents by $i = 2$. These workers can be either natives (born in the country) or foreign-born (immigrants). Let $N_i(t)$ be the number of native agents of skill level i in period t and, similarly, $I_i(t)$ will denote the number of immigrants of type i who entered the country in period t. All agents evaluate consumption streams according to utility function

$$E_t \sum_{j=0}^{\infty} \beta^j u(c_{t+j}),$$

where u is an increasing and concave continuous function. I will interpret these preferences in a dynastic sense. So c_t denotes the consumption of a worker at time t, c_{t+1} her only child's consumption and $\beta \in [0,1)$ is the degree of altruism between parents and children. The expectation refers to uncertainty about the skill levels of the offspring. Each type-i agent is endowed with one unit of labor, assumed to be supplied inelastically, and there are no bequests.[4]

In every period, the government redistributes income from the rich to the poor. This is done by means of a proportional income tax, levied on all workers, and a universal transfer. Let $r_t \in [0, r_b]$ denote the tax rate in period t. Taxes are paid by all workers, regardless of whether they were born in the country or not. The collected tax revenue is redistributed to all workers equally in a lump sum fashion, so the government runs a balanced budget in each period. The net result of the tax and the transfer is that rich agents are net contributors to the welfare state while poor agents are net recipients. For the major part, I shall set $r_b = 1$, a convenient simplification. Since labor supply is inelastic and there are no bequests, taxation is non-distortionary.[5] I shall assume that, given immigration and redistribution policies, prices and allocations follow a competitive equilibrium.

Let $(N_1(t), N_2(t))$ and $(I_1(t), I_2(t))$ be, respectively, the skill distributions of the native-born workers and the just arrived immigrants in period t. Then period t's labor force is given by

$$L_i(t) = N_i(t) + I_i(t),\ i = 1, 2.$$

Note that wages in each period are solely a function of the *ratio* of skilled to unskilled workers in the labor force, that is

$$k_t = \frac{L_2(t)}{L_1(t)}.$$

The following observation will play an important role in the analysis.

Observation. *Individual consumption levels depend solely on r_t and k_t:*

$$\begin{aligned} c_i(k_t, r_t) &= F_i(k_t) + r_t\left(f(k_t) - F_i(k_t)\right) \\ &= (1 - r_t)F_i(k_t) + r_t f(k_t), \text{ for } i = 1, 2, \end{aligned}$$

where

$$f(k_t) = \frac{F_1(k_t) + k_t F_2(k_t)}{1 + k_t}$$

is the output per worker. Moreover, f is an increasing as long as $F_1(k) \leq F_2(k)$.

[4]Incorporating an elastic individual labor supply function is feasible but complicates the expressions for the indirect utility function, which will play an important role in the voting problem.

[5]A simple way to introduce distortionary taxation would be setting $r_b < 1$. I will argue later that the main results would hold in that case too.

Children's skills are determined stochastically and depend on parental skills. More specifically, I assume that intergenerational mobility in skills is governed by a two-state Markov chain with persistence. That is, let p_i be the probability of being *skilled* given parental skill level i and assume that $p_1 < 0.5 < p_2$. The skills of the children of immigrants are determined identically. As a result, when we aggregate over all individuals,

$$\begin{pmatrix} N_1(t+1) \\ N_2(t+1) \end{pmatrix} = \begin{pmatrix} 1-p_1 & 1-p_2 \\ p_1 & p_2 \end{pmatrix} \begin{pmatrix} L_1(t) \\ L_2(t) \end{pmatrix},$$

where $L_i(t) = N_i(t) + I_i(t)$.

It will be useful to define the skilled to unskilled ratio among the natives in each period:

$$n_t = \frac{N_2(t)}{N_1(t)}.$$

Recall that wages are just a function of k_t. It turns out that we can express the law of motion for skills as a function of k_t too:

$$n_{t+1} = M(k_t; p_1, p_2) = \frac{p_1 + p_2 k_t}{1 - p_1 + k_t(1-p_2)},$$

mapping the skills of the labor force in a given period (the parents) to the skills of the native population in the next period (their children). To ease notation, I will denote $M(k_t; p_1, p_2)$ by Mk_t. The following observation summarizes the relevant properties of this mapping.

Observation. *As a function of* k*,* M *is increasing and strictly concave. Moreover,* $M(0) = \frac{p_1}{1-p_1}$*,* $M(\infty) = \frac{p_2}{1-p_2}$*, it has a unique fixed point at* $k^a = \frac{p_1}{1-p_2}$*, and its inverse function is*

$$k_t = M^{-1}(n_{t+1}) = \frac{n_{t+1}(1-p_1) - p_1}{p_2 - n_{t+1}(1-p_2)}.$$

For $k < k^a$*,* $Mk > k$ *while for* $k > k^a$*,* M *is below the 45 degree line.*

I shall assume a tight link between skill distribution and income distribution. The following assumption identifies skilled workers as the rich and unskilled workers as the poor.

Assumption 1: $F_2(k^h) > F_1(k^h)$*, where* $k^h \geq k^a$ *is some sufficiently large skilled ratio.*[6]

This assumption guarantees that there is a positive skill premium at every time, although it can vary over time. As a result, skilled workers are always richer than unskilled workers. Clearly,

[6] More precisely, we need $k^h \geq \max\{k^a, b(1)\}$, where $b(n)$ is a function describing the supply of potential skilled immigrants, to be defined shortly.

a positive skill premium would endogenously arise if agents made investment decisions over costly education.

For now, we shall assume that the children of immigrants are citizens with voting rights. According to our earlier assumptions, the children of immigrants are assumed born in the host country so we are assuming that the citizenship regime is of the "jus soli" type, as is the case in the US and in many other countries. So in most of the paper the words citizen, voter and native-born worker will be synonimous. However, in some other countries citizenship is only transmitted from parents to children ("jus sanguinis"). In those cases, the children of immigrants born in the host country do not gain voting rights. Bertocchi and Strozzi (2004) provides an excellent historical review. As we shall see later, the "jus sanguinis" case can be analyzed as a specific case of the general model.

2.1 Endogenous Policies

This section describes the equilibrium concept employed in the paper. Formally, the equilibrium concept will be an adaptation of Markov perfect equilibrium to allow for majority vote and where, given policies, prices and the consumption allocation follow a competitive equilibrium.

The main feature of the model is that voters anticipate that the current immigration policy will not only affect the labor market, but also future immigration and redistribution policies, given that the children of immigrants will also vote. The recent political experience in the US (especially at the state and local level) and in other high-immigration countries strongly suggests that this may be a highly relevant feature.

Following the convention of the literature on dynamic games, I proceed by defining payoff functions and the set of feasible policies. Recall that consumption levels in each period can be expressed as a function of that period's skilled ratio in the labor force (which includes recent immigrants) and the tax rate:

$$v_i(k, r) = u[(1 - r)F_i(k) + rf(k)],\ \ i = 1, 2.$$

That is, each worker's consumption level is a convex combination between her own wage and output per worker in the economy. The weights are given by the tax rate, r. When the tax rate is zero, and indeed for any tax rate, unskilled consumption increases in k. When the tax rate is one, both types of workers have the same consumption level, which increases in k.

It will be convenient to take as state variable the skilled-to-unskilled ratio in the *native* population, n. States with $n < 1$ are unskilled-majority states while states with $n > 1$ are skilled-majority states. When there is a tie, I will assume that the group that chose policies in the last period can choose them again. A convenient way of capturing this (status-quo) assumption is to define tie states $n = 1^-$ (when the unskilled can choose policies) and $n = 1^+$ (when the skilled can choose policies). I will denote the whole state space by $\Omega = [k^l, 1^-] \cup [1^+, k^h]$.

The special structure of the law of motion and these payoff functions implies that voters will be indifferent between any pair of immigration that gives rise to the same value of k. Thus, I shall restrict the policy space to pairs of (k, r). Note that for a given skill distribution of the native population, n, attaining some desired skilled ratio in the labor force, say $k < n$, requires admitting mostly unskilled immigrants. In particular, if we take as given the skill composition of the (mostly unskilled) immigrant flow, attaining the desired value of k implies choosing the size of the immigration flow, relative to the size of the native population. I shall often refer to the choice of k as the choice of immigration policy.

Let us describe now the set of feasible policies at each state $n \in \Omega$. I will assume that feasible tax rates are independent of the current state, namely, $r \in [0, r_b]$, where unless specificied otherwise, $r_b = 1$.[7] Instead, the set of feasible skilled ratios in the labor force, which includes recent immigrants, depends on the state: $k \in [k^l, b(n)]$, where $0 < k^l \leq n_0$ and b is a continuous and increasing function that satisfies $b(n) \geq n$ and $b(n_0) \geq k^l$. The lower bound is assumed to be state-independent. The interpretation is that there is a very large number of potential unskilled immigrants that are willing to migrate as long as they receive a minimum wage. At k^l, the unskilled wage they would obtain hits the outside option of the potential unskilled immigrants. In contrast, there is a limited amount of potential skilled immigrants and, as a result, the attainable skilled ratios (k_t) are some function of the pre-immigration skilled ratio in the host country (n_t). In particular, if no skilled immigrants are available we have $b(n) = n$. I will define the set of feasible policy pairs in state $n \in \Omega$ by $\Gamma(n) = [k^l, b(n)] \times [0, r_b]$.

For a given pair of skilled ratios before and after immigration, respectively n_t and k_t, I will measure the *skill-content of immigration flows* by $\sigma_t = h(k_t) - h(n_t)$, the difference between the skilled *fraction* in the labor force (wich includes the recently arrived immigrants) and the skilled *fraction* among native population.[8] Note that when immigration is mostly *unskilled* ($k_t < n_t$), σ_t is negative. In this case, lower values of σ_t (i.e. larger in absolute value) will be interpreted as *larger* inflows of unskilled immigrants. Conversely, when immigration is mostly *skilled* ($k_t > n_t$), σ_t is positive, with higher positive values of σ_t associated to larger inflows of skilled immigrants.

[7] Ortega (2004) analyzes a similar model where $r_b = 0$.

[8] Function $h(x) = x/(1+x)$ maps skilled-to-unskilled ratios into skilled fractions and $h(0) = 0$, $h(\infty) = \infty$, $h' > 0$ and $h'' < 0$.

Thus, σ_t also provides a measure of the *size* of immigration flows relative to the size of the native population.

As noted earlier, the process for skill accumulation can be characterized by an increasing function mapping skilled ratios in the labor force in one period into skilled ratios in the native population one period later:

$$n_{t+1} = M(k_t; p_1, p_2) = \frac{p_1 + p_2 k_t}{1 - p_1 + k_t(1 - p_2)},$$

where M is an increasing function. Due to intergenerational persistence, admitting unskilled immigrants in one period translates into reducing the skilled ratio among the natives in the next period. As we shall see, immigration flows will be intimately related to the rate of skill growth across generations. It will be convenient to measure *skill growth* by $\gamma_t = h(n_{t+1}) - h(k_t)$. Observe that when $\gamma_t > 0$, there is skill growth: the average child is more skilled than the average parent. Obviously, there is skill growth in the economy if (and only if) $k < k^a$.

We are now ready to state the equilibrium concept. Essentially, it is an adaptation of Markov perfect equilibrium that takes into account that policies are chosen by majority and that the consumption allocation and prices are a competitive equilibrium for any given policies. That is, an equilibrium is be a policy rule $(k, r) : \Omega \longrightarrow R^2_+$ that assigns a policy pair $(k(n), r(n))$ to each state $n \in \Omega$. Equilibrium requires the policy rule to prescribe, in each state, a policy pair that is optimal for the group in the majority. In addition, voters correctly anticipate the effects of current policy choices on the future state. More formally, we have the following

Definition. *A majority-vote equilibrium is a tuple (k, r, V_1, V_2) such that*
i) Given $(k, r) : \Omega \to R^2_+$, (ex post) continuation values are given by

$$\begin{aligned} V_i(n) &= v_i[k(n), r(n)] + \beta[(1 - p_i)V_1(Mk(n)) + p_i V_2(Mk(n))] \\ &= v_i[k(n), r(n)] + \beta C_i(Mk(n)), \text{ for all } n \in \Omega \text{ and } i = 1, 2. \end{aligned}$$

ii) In all unskilled majority states, $n \leq 1^-$,

$$V_1(n) = \max_{(k,r)\in\Gamma(n)} v_1(k, r) + \beta C_1(Mk), \text{ for } i = 1, 2,$$

iii) and in all skilled majority states, $n \geq 1^+$,

$$V_2(n) = \max_{(k,r)\in\Gamma(n)} v_2(k, r) + \beta C_2(Mk), \text{ for } i = 1, 2,$$

where $\Gamma(n) = [k^l, b(n)] \times [0, r_b]$.[9]

This definition has become relatively standard in the literature on dynamic political economy models in macroeconomics since the work of Krusell, Quadrini and Ríos-Rull (1997). As in their model, here voters' preferences are defined over infinite policy sequences. But, in contrast to their analysis, we can study the equilibrium analytically. In this respect, as well as on the main question of the paper, the current model is more related to Hassler et al (2002).

In the previous definition, note that voters are aware that the current immigration policy has a direct effect on the composition of next period's electorate, that is $n_{t+1} = M(k_t)$. This suggests the existence of an intertemporal trade-off. To illustrate this, let us consider the decision process of a skilled native voter. She realizes that admitting unskilled immigrants will have a beneficial effect on her current wage due to factor complementarity. However, such an immigration flow will increase the political influence of unskilled voters in the next period. Presumably, that will lead to the adoption of immigration and redistribution policies that go against the interests of (the children of) current skilled voters.

Let us state the following very intuitive result.

Lemma 1. I*n equilibrium,* $r(n) = 1$ *if* $n \leq 1^-$ *and* $r(n) = 0$ *if* $n \geq 1^+$.

In words, there is income redistribution only in states where the unskilled are in the majority. This is because current redistribution does not affect next period's state and because there is always a positive skill premium. Moreover, the tax rate takes always corner values because labor supply and saving decisions are totally inelastic, a convenient simplifying assumption.

3 Autarky

Prior to examining the interaction between immigration and redistribution, it will be helpful to examine the dynamics of the model when there is no immigration of either type (autarky) but income redistribution is endogenously determined by majority vote.

In the absence of immigration, the skill distribution of the labor force and of the native population (electorate) coincide. Hence, $n_{t+1} = M(n_t; p_1, p_2)$, which converges monotonically to a unique steady state at $k^a = p_1/(1 - p_2)$.

[9] I shall refer to $C_i(n)$ as the ex ante continuation value of an agent of skill level i, who still does not know her child's skills.

Absent immigration choices, the equilibrium of the model is quite trivial. The skilled ratio monotonically converges to the steady state. Along the process, there is income redistribution as long as the majority is unskilled (assumption 1). As the next result summarizes, whether there is redistribution in steady state depends solely on the transition matrix.

Lemma 2. *Suppose that* $n_0 < k^a$.
i) If $p_1 \leq 1 - p_2$*, redistribution is sustained forever.*
ii) If $p_1 > 1 - p_2$ *redistribution is permanently abandoned after a finite number of periods.*

The intuition is straightforward. Unskilled workers are always poorer than skilled workers and thus impose maximum redistribution whenever they can. If $k^a < 1$, the unskilled are always in the majority but if $k^a > 1$, eventually the majority turns skilled and income redistribution is abandoned forever. Let us turn now to the main question of the paper: the political sustainability of the welfare state. To do so, we make an additional assumption, which implies that, in autarky, redistribution will be eventually abandoned.

Assumption 2: $n_0 < 1 < k^a = \frac{p_1}{1-p_2}$.

The stage is now set to adddress the main question of the paper. When immigration is also an endogenous policy, can redistribution be maintained in the long run?

4 Can Immigration save the welfare state?

Let us now analyze the case where immigration policy and redistribution are chosen at each period. The key feature of the environment is that voters realize that immigration not only affects their labor market outcomes (the skill premium), but also domestic politics. In other words, voters anticipate that current immigration will affect next period's income redistribution and immigration policies. Keep in mind that the model is "biased" toward the elimination of redistribution (assumption 2). Can the welfare state, interpreted as income redistribution from rich to poor, survive in this scenario? What is the relation between the skills of natives and the selected immigrants?

4.1 Immigration and Redistribution in steady state

We shall say that an equilibrium policy rule (k, r) has a *steady state* $n^* \in \Omega$ if it is the case that $n_t = n^*$ implies $n_{t+1} = n^*$, that is, $Mk(n^*) = n^*$ or, equivalently, $k(n^*) = M^{-1}(n^*)$. It is easy to show that in steady state skill growth and the skill-content of immigration flows must offset each other:

$$\gamma^* = -\sigma^* = h(n^*) - h(k(n^*)).$$

It follows that if a steady state dispalys skill growth, it must feature unskilled immigration as well. We can now state the following simple result.

Proposition 1. *Steady state immigration is unskilled if and only if $n^* < k^a$. Thus, any steady state with income redistribution displays unskilled immigration. A steady state without income redistribution involves unskilled immigration too if $n^* < k^a$ and skilled immigration otherwise.*

4.2 An equilibrium with redistribution

It is well known that the set of equilibria in infinite dynamic games can be very large (even under the markovian restriction) and a full characterization is, in most cases, a daunting task. Instead, this section adopts a constructive approach. First, a policy rule that gives rise to an outcome path where redistribution is maintained forever is presented. Next, conditions for the existence of an equilibrium with that policy rule are provided and discussed.

Let us start by defining a particular skilled ratio. Let ϕ be such that $1 = M(\phi; p_1, p_2)$. That is, when the current labor force (after immigration) is $k_t = \phi$, it is the case that there is a tie in next period's election, which allows the incumbent majority to choose policies once again. It is easy to show that $\phi = \frac{1-2p_1}{2p_2-1}$ and, under assumption 2, $\phi < 1 < k^a$, implying skill growth at any $k \leq \phi$.

Now consider the following policy rule:

$$(k(n), r(n)) = \begin{cases} (b(n), 1) \text{ if } n < b^{-1}(\phi) \\ (\phi, 1) \text{ if } b^{-1}(\phi) \leq n \leq 1^- \\ (\phi, 0) \text{ if } n \geq 1^+ \end{cases} . \tag{1}$$

In words, the policies prescribed are as follows. For unskilled majority states when the population is relatively low skilled, the policy rule postulates full redistribution and the maximum feasible skilled immigration, coinciding with skilled voters' favorite static policy mix. When the skills of the native population reach a certain threshold, $n = b^{-1}(\phi)$, the policy mix consists of full redistribution and $k = \phi$, the highest skilled ratio that allows unskilled voters to retain the majority. Policies are constant across skilled majority states: no redistribution and again $k = \phi$, which is the skilled ratio that generates the highest possible skilled wage while maintaining a skilled majority. It is also worth pointing out that there are two steady states: $n^* = 1^-$ and $n^* = 1^+$. In the former, there is full redistribution while in the latter there is no redistribution and both display $k^* = k(n^*) = \phi$.

Observe that, given our initial condition, the economy would start in a situation with income redistribution, which would be maintained indefinitely.

The rest of the section provides conditions under which (1) is an equilibrium policy rule. We shall start by examining the (ex ante) continuation values along the equilibrium path, that is, voters' beliefs about what policies would be adopted in each conceivable state. Recall that ex ante continuation values where defined as

$$C_i(n) = (1-p_i)V_1(n) + p_i V_2(n),\ n \in \Omega,$$

and recall that V_i depends on the postulated policy rule. Using the definition of equilibrium, we can explicitly solve for the continuation values implied by policy rule (1).

Lemma 3. *Ex ante continuation values given policy rule (1) are given by:*

$$C_i(n) = \begin{cases} a_{i1}E_1\left[v(\phi,0)\right] + a_{i2}E_2\left[v(\phi,0)\right] \text{ if } n \geq 1^+ \\ \frac{u[f(\phi)]}{1-\beta} \text{ if } b^{-1}(\phi) \leq n \leq 1^- \\ \Sigma_{t=0}^{T(n)}\beta^t u\left[f\left(b\left[(M\circ b)^t(n)\right]\right)\right] + \beta^{T(n)+1}\frac{u[f(\phi)]}{1-\beta} \text{ if } n < b^{-1}(\phi) \end{cases},$$

where $T(n)$ and $a_{ij}(\beta, p_2, p_1)$ are defined in the proof, and $E_i\left[v(\phi,0)\right] = (1-p_i)v_1(\phi,0)+p_i v_2(\phi,0)$. Note in particular that $C_1(n)$ is non-decreasing over $(0,1^-]$ and $C_2(n)$ is non-decreasing over $[1^+, k^h]$.

Note that in unskilled majority states, $C_1 = C_2$ because there is full redistribution along the outcome path originated from any unskilled majority states. In contrast, ex ante continuation values differ for both types of voters in skilled-majority states due to consumption levels being determined solely by wages. Let us turn now to the determination of voters' political preferences. Given a believed policy rule, a voter with skill level i compares alternative policy pairs according to

$$W_i(k,r) = v_i(k,r) + \beta C_i(Mk),$$

where the continuation value function is given in the previous lemma. It is worth pointing out that voters are aware that immigration influences not only current consumption but also the skill distribution of next period´s electorate. The set of feasible policy rules that voters consider in state n is given by $r \in [0,1]$ and $k \in [k^l, b(n)]$, where $b(n) \geq n$.

Let us examine the political preferences of unskilled voters or, put differently, their best responses to the postulated policy rule. The next lemma provides sufficient conditions for unskilled voters' favorite policy pair to coincide with the prescribed policy rule. We shall make the following assumption.

Assumption 3: $u[f(\phi)] > (1-\beta)u[f(b(1))] + \beta u[F_1(\phi)]$.

In words, the previous assumption requires that $u[F_2(\phi)]$ be high enough relative to $u[F_1(\phi)]$.[10] To see this, consider keeping $F_1(\phi)$ fixed and raising $F_2(\phi)$. Clearly, output per worker, $f(\phi)$, will increase. Intuitively, assumption 3 guarantees a high incentive to redistribute by inducing a high cost to the unskilled (poor) of living in an economy without redistribution, under the assumption of $p_1 = 0$.

Lemma 4. *For low enough p_1, policy rule (1) coincides with unskilled voters' favorite policies in unskilled-majority states.*

The intuition for the result is simple. For very low values of n, the policy rule requires unskilled voters to want to admit as many skilled immigrants as feasible. They are happy to do so given that it increases output per worker (recall their consumption is given by output per worker) and it still assigns to them the majority. As the electorate's skills rise, eventually unskilled voters face a tradeoff. If they choose immigration policy so as to maximize output per worker once again, the majority in the next period will be skilled and redistribution will be abandoned forever. To avoid such grim scenario, the unskilled majority shifts immigration policy toward admitting (restricted) flows of unskilled immigrants.

Assumption 4: $u[F_2(\phi, 0)] > (1-\beta)u[F_2(k^l, 0)] + \beta u[f(\phi)]$.

Intuitively, we are requiring that when $p_2 = 1$, the one-period gain that skilled voters could enjoy from admitting the largest feasible quantity of unskilled immigration be smaller than the accumulated loss due to their income being taxed and redistributed to the unskilled from that period onward. This is the case when $F_2(\phi)$ is large relative to $F_1(\phi)$, that is there is high labor income inequality in the absence of redistribution. Alternatively, we can view the assumption as

[10] Moreover, the inequality holds if β is close enough to one and fails if it is close enough to zero.

requiring a relatively low elasticity for the skilled wage to changes in the skilled ratio.[11]

Lemma 5. *For high enough p_2, policy rule (1) coincides with skilled voters' favorite policies in skilled-majority states.*

The following proposition collects all these results. The proposition requires no proof, as it simply combines the previous lemmas.[12]

Proposition 2. *If intergenerational persistence is high enough for both types of voters, policy rule (1) is an equilibrium. The main features of the equilibrium path are:*

i) Income redistribution is maintained forever.

ii) After several periods of skilled immigration (only limited by its supply), a steady state is reached where a restricted quantity of unskilled immigration is admitted in each period.

iii) If skilled voters were to decide the policies, redistribution would be permanently abandoned and the same restricted flow of unskilled immigration as in ii) would be chosen.

The intuition for the result is quite simple. When the native population is mostly unskilled, there is no cost to imposing the favorite static policy pair for unskilled voters: full redistribution and as large skilled immigration as possible. Over time, immigration policy reinforces the domestic skill accumulation process. Eventually, pursuing such a policy entails a cost, in terms of transferring the decision power over future policies to skilled voters, which would result in the termination of income redistribution. To maintain redistribution, the unskilled majority reverses the use of immigration policy and starts admitting a steady inflow of unskilled immigrants at each period.

Immigration policy is used to offset skill growth. Unskilled voters admit restricted amounts of unskilled immigrants in order to regenerate the political support for redistribution. This behavior is reminiscent of the so-called "voting for your enemy" behavior in Barberà, Maschler and Shalev (1998), a model of dynamic club formation. The group in the majority chooses to admit immigrants (new club members) of their same skill level, incurring a cost in terms of lower current consumption. The reason is purely strategic. When the newcomers gain the right to vote, they are expected to have the same interests on policies as the current majority.

[11] It is worth noting that both assumptions 3 and 4 can hold simultaneously. Fix $F_1(\phi)$ and consider increasing $F_2(\phi)$ until assumption 3 holds. Along this process, both sides of the inequality in assumption 4 increase. However, the left-hand side increases by more. Hence, for a high enough value of $F_2(\phi)$, both inequalitites will simultaneously hold.

[12] The existence of this equilibrium relies on the tax rate being an endogenous policy variable. In a similar environment, Ortega (2004) shows that when the only endogenous policy is immigration policy, one of the two types of voters would not be best-responding to a policy rule that requires both types of voters to retain the majority.

The previous result provides an explanation (not based on exogenous preferences) for why virtually all rich countries impose quantity restrictions on immigration, explicitly or implicitly. Unrestricted entry of skill-complementary immigrants would lead to a switch in the group controlling the degree of income redistribution. Under the assumptions above, no group of voters is willing to tolerate that. To back up this interpretation, it is easy to show that when redistribution is exogenously given, the policy rule proposed above is no longer an equilibrium.[13]

The endogenous appearance of restrictions on (unskilled) immigration provides an explanation, not based in distaste for foreigners, for why virtually all skilled countries impose immigration restrictions. In the model, these restrictions arise because unskilled immigration imposes a cost, in terms of consumption, on unskilled natives. In particular, output per worker falls as the skilled ratio in the economy decreases.[14]

From a dynamic perspective, the reversal in the use of immigration policy is suggestive of dynamic versions of Hecksher-Ohlin models where skill-abundant countries would generally benefit from unskilled immigration, the opposite being true for unskilled-abundant countries. The experience of recent countries of immigration may be interpreted along these lines. Until recently, immigration into Spain would display higher average levels of income and education than the natives. But lately, the average education and income of immigrants is well below that of natives. In addition, some of the educated immigrants end up in low-skill occupations.

As we have seen, the existence of this equilibrium relies on two assumptions: high intergenerational persistence and high labor income inequality (prior to redistribution). How reasonable are these assumptions? A large literature on intergenerational persistence in income and education within families strongly suggests a substantial degree of persistence, although there is still an ongoing discussion about the relative contribution of several competing explanations. The second important assumption is a high value of $F_2(\phi)$ relative to $F_1(\phi)$, that is high labor income (or wealth) inequality in a steady state without redistribution. A large literature in economics has analyzed the extent and the reasons behind the large increase in income inequality in many countries over the last few decades. There is a growing consensus that intense skilled-biased technological change has magnified the degree of labor income inequality in the last few decades in many countries. In a nutshell, both conditions seem quite plausible for a large set of countries.

It is worth noting that the previous equilibrium also relies on voters being altruistic (non-myopic)

[13]Note that if $r_b = 0$, unskilled voters strictly prefer policy pair $(b(\phi), 0)$ over $(\phi, 0)$, which implies that it is not utility-maximizing for unskilled voters to choose $k = \phi$ when $n = \phi$.

[14]Intuitively, the result would hold too if $r_b < 1$. In that case, the effect would be reinforced by the fall in unskilled consumption due to the reduction in the unskilled wage.

to some degree. It is easy to show that when $\beta = 0$, the only equilibrium implies a cyclic behavior of the economy, affecting the degree of redistribution and labor income inequality, as well as the skills and size of immigration flows. Several periods of relatively small (skilled) immigration and redistribution are followed by one period of massive (unskilled) immigration and a sharp reduction in taxes. In this situation, redistribution is only compatible with skilled immigration.[15]

4.3 The size of immigration flows

Countries differ on how restrictive their immigration policies are and, consequently, on the number of immigrants they receive (even in per capita terms). Why is it so? In the context of the equilibrium we have just examined, differences in immigration restrictions reflect differences in skill accumulation. Conditional on the equilibrium, higher skill growth in a country translates into larger inflows of unskilled immigration. This section presents a tiny extension of the model that enriches the set of factors, beyond skill growth, that determines immigration restrictions (and immigration flows). The expanded set of explanatory variables might provide the basis for a better understanding of cross-country variation.[16]

Suppose that each skilled voter has one child, that is one voter in next period's election, just as before. But now one unskilled voter generates α_u voters in the next period. A possible interpretation is that there are *fertility differentials* by skill levels. Incidentally, it is well known that education and fertility are inversely related, which would suggest $\alpha_u > 1$. Suppose the current labor force is given by (L_1, L_2). Then the distribution of children's skills is given by

$$N_2' = p_1 \alpha_u L_1 + p_2 L_2$$
$$N_1' = (1 - p_1) \alpha_u L_1 + (1 - p_2) L_2,$$

which can be summarized by

$$n' = M_{\alpha_u}(k) = \frac{\alpha_u p_1 + p_2 k}{\alpha_u (1 - p_1) + k(1 - p_2)} < M(k),$$

where I used that $\alpha_u > 1$. Recall that in the steady state of the previous equilibrium, the size of immigration flows is given by $\sigma^* = \phi - 1 < 0$, where $M^{-1}(\phi; \alpha_u) = 1$. It follows that higher values of α_u (the fertility rate of unskilled workers relative to the fertility rate of skilled workers) reduce unskilled immigration relative to the size of the native population (lower absolute value of σ^*). The

[15] This result is essentially the same as in Benhabib (1996).

[16] Immigration data that is comparable across countries is hard to compile, so testing these implications is left as future research.

result is quite intuitive. Reaching the steady state now takes fewer current unskilled immigrants, given the fertility differential.

Another interpretation is that *political participation rates* differ by skill levels. There is some evidence supporting that abstention is inversely related to education. Now, assume that all the skilled vote but only a fraction $\alpha_u < 1$ of the unskilled actually vote. It is easy to show that the law of motion for the skilled ratio of actual voters becomes

$$n' = \hat{M}_{\alpha_u}(k) = \frac{1}{\alpha_u} \frac{p_1 + p_2 k}{(1 - p_1) + k(1 - p_2)} > M(k).$$

That is, higher (relative) abstention among the unskilled, that is lower α_u, implies a larger steady state inflow of unskilled immigrants. The intuition is that one unskilled potential voter translates into less than one effective unskilled voter. So more unskilled immigrants than before have to be admitted to maintain the steady state.

5 Only labor market effects

This section considers the case where immigration only affects labor market outcomes, that is, wages in this model. There are at least two instances where this might be the case. Several countries have occasionally implemented immigration policies that require immigrants to go back to their countries after some pre-specified period of time. In such cases, immigrants typically do not have the right to vote in the host country and, hence, cannot directly influence the choice of policies. Another situation where immigrants do not affect domestic politics, in the sense of not having the right to vote, is when citizenship (and franchise, in particular) is only transmitted from parents to children. In the recent past, Germany's immigration policy has been based on this principle. This section analyzes the relationship between immigration and redistribution in these two cases. Throughout, I shall maintain the assumption that immigrants pay taxes and receive transfers. As we shall see, equilibrium dynamics differ substantially from those described in the previous section.

5.1 Temporary migration

Consider modifying the model as follows. Suppose that immigrants (and their children) leave the country at the end of their working lives but before their children become citizens. The key implication is that the evolution of the skills of the native population is independent from the country's immigration history. More specifically, $n_{t+1} = Mn_t = M^t n_0$, which converges monotonically to $k^a > 1$.

Let us examine how voters' political preferences are determined in this case. To fix ideas, consider an unskilled voter in unskilled majority state $n \leq 1^-$. In equilibrium, it has to be the case that

$$V_1(n) = \max_{(k,r)\in\Gamma(n)} v_1(k,r) + \beta C_1(Mn), \text{ for } i = 1,2,$$

where unskilled voters realize that next period's state is given by $n_{t+1} = Mn_t$, independently of the choice of k. The same is true for skilled voters. As a result, voters' political preferences become purely static. Monotonicity of the payoff functions, given optimally chosen tax rates, implies a unique equilibrium policy rule:

$$(k(n), r(n)) = \begin{cases} (b(n), 1) \text{ if } n \leq 1^- \\ (k^l, 0) \text{ if } n \geq 1^+ \end{cases}. \tag{2}$$

The following proposition summarizes the equilibrium path generated by this policy rule.[17]

Proposition 3. *When immigration is temporary, the unique equilibrium path is characterized by:*

i) Several periods of unskilled majority, imposing redistribution and unrestricted skilled immigration.

ii) After that, unrestricted unskilled immigration and redistribution is abandoned forever.

iii) If $k^a \leq 1$*, there is always redistribution and unrestricted skilled immigration.*

5.2 Jus soli

Suppose now that immigrants have children who remain in the country but, in contrast to the main model, they do not gain the right to vote. As a result, immigration only affects the labor market and there is a growing population of disenfranchised workers in the economy, composed of the offspring of the immigrants arrived in all previous periods. This scenario captures an important feature of immigration policy in some countries.

At each point in time, the native population is composed of two groups. Natives with voting rights (citizens) and natives without, that is,

$$N_i(t) = N_i^c(t) + N_i^{nc}(t), \text{ for } i = 1,2.$$

The labor force is the sum of the native population and the newly arrived immigrants:

[17] Recall we are assuming $k^a > 1$.

$$L_i(t) = N_i(t) + I_i(t), \text{ for } i = 1, 2.$$

Let us define the following skilled-to-unskilled ratios:

$$n_t^c = \frac{N_2^c(t)}{N_1^c(t)}, \; n_t = \frac{N_2(t)}{N_1(t)} \text{ and } k_t = \frac{L_2(t)}{L_1(t)}.$$

Thus, n_t^c summarizes the skill distribution among citizens (that is, the electorate), n_t summarizes the whole native population (including the non-citizen natives) and k_t the skill distribution in the labor force (including immigrants and all natives). In this scenario the appropriate state variable that carries the relevant political information is n_t^c, the skilled ratio among citizens (voters).

There is an important difference with the scenario of temporary immigration. In comparison to that case, now the set of attainable skilled ratios by means of immigration depends on the skill composition of the *whole* native population ($n_{t+1} = Mk_t$) rather than on the skill distribution of citizens ($n_{t+1}^c = Mn_t^c$). As a result, two state variables are needed to carry all the relevant information. Ratio n_t^c summarizes the distribution of political power and n_t determines the set of feasible skilled ratios in the labor force:

$$\begin{aligned} k_t &\in [k^l, b(n_t)] \text{ with } n_t = Mk_{t-1} \text{ and} \\ n_{t+1}^c &= Mn_t^c. \end{aligned}$$

In spite of this change, it is clear that there is, again, a unique equilibrium policy rule. As in the case of temporary migration, the electorate is made of the offspring of the initial native population and its evolution is exclusively dictated by the process of skill accumulation, regardless of the immigration policy choices taken in the past. It follows that, once again, voters' decision problems are purely static. The unique equilibrium policy rule is given by

$$(k(n, n^c), r(n, n^c)) = \begin{cases} (b(n), 1) \text{ if } n \leq 1^- \\ (k^l, 0) \text{ if } n \geq 1^+ \end{cases} \tag{3}$$

and $n_{t+1}^c = Mn_t^c$. The dynamics of immigration and redistribution are essentially identical to the case of temporary migration.

In conclusion, when immigration only affects the labor markets, immigration policy always takes corner solutions. Initially, the policy consists of unrestricted skilled immigration, which is eventually replaced by unrestricted unskilled immigration. In stark contrast with the steady state result of the general model, when immigration only affects the labor market, redistribution is never compatible with unskilled immigration.

6 Empirical implication: Attitudes toward immigration and redistribution

A growing body of literature uses survey data to study the determinants of individual attitudes toward particular policy issues. On the specific issue of immigration, Scheve and Slaughter (2001) study the relation between individual attitudes toward immigration and one's education level for the US. Mayda (2003) and O'Rourke (2003) extend the analysis to several other countries. Roemer and Van der Straeten (2003) study simultaenously attitudes toward immigration and the size of the government.

The analysis of the previous sections reveals important differences in attitudes toward immigration, depending on whether voters take into account that immigrants might affect domestic politics. When voters only care about the effects of immigration on the labor market, skilled voters support open doors to unskilled immigration (and lower redistribution). In turn, unskilled voters support open doors to skilled immigration (and larger redistribution).

In contrast, when voters also take into account the effect of immigration on domestic politics, *both skilled and unskilled* voters support restricted (unskilled) immigration, while preferences over redistribution are as in the previous case. Therefore, survey data on attitudes toward immigration and redistribution can be used to construct a test for whether voters take into account the effects of immigration on domestic politics when comparing alternative immigration policies. In addition, the model makes sharply different predictions depending on each country's approach to granting citizenship to second-generation immigrants.

7 Conclusions

In a recent study, Klein and Ventura (2004) show that lifting immigration restrictions in OECD countries would have large welfare effects, due to a sizeable long-run increase in total capital and output per worker. Their results naturally pose the question of what leads countries to adopt immigration restrictions and what determines the evolution of these restrictions over time. The present paper argues that immigration restrictions arise naturally as an equilibrium outcome when voters take into account that immigrants may affect future policies and, in particular, the degree of income redistribution.

I have provided a dynamic, general equilibrium, political-economy model with endogenous immigration and redistribution policies, where immigration affects labor market outcomes and domestic politics. Immigrants may bring complementary skills into the country and become citizens with voting rights. One of the main findings is the emergence of *widespread* support for immigration restrictions within a country, consistent with the robust findings of survey data (Hanson et al, 2002). The reason is that voters use immigration policy as an instrument to gain *control over redistribution policy*, in an environment where the skills of the native population evolve over time. Incidentally, in the absence of political effects of immigration, that is, when immigration only affects the labor market, voters never support quantity restrictions in immigration. In that case, in any equilibrium voters of one skill type support unrestricted immigration of workers with skills complementary to theirs.

Some other interesting results follow. First, I have argued that immigration may play an important role in the (political) sustainability of the welfare state, interpreted as income redistribution from rich to poor. When redistribution survives, immigration policy consists of unrestricted unskilled immigration, instrumental to regenerate the political support for income redistribution. I have also shown that, from a dynamic perspective, immigration policy in skill-scarce countries will target the admission of skilled immigrants. But as skills improve, the country's immigration policy will shift toward the admission of unskilled immigrants, in a specific proportion to the size of the native population.

Finally, the analysis has suggested a set of explanatory variables for immigration restrictions, with the potential to shed light on cross-country variation in policies and immigration flows. In the model, the skills and size of immigration flows are closely connected to the process of skill accumulation in the host economy. In addition, fertility and political participation patterns also determine the size of immigration restrictions.

Appendix: Proofs

Proof lemma 1. Let $n \leq 1^-$ and suppose that (k_1, r_1) is the utility-maximizing policy pair for an unskilled voter, with $r_1 < r_b$. Since the continuation value only depends on k_1, pair (k_1, r_b) is preferred over (k_1, r_1) if and only if $v_1(k_1, r_b) > v_1(k_1, r_1)$, that is

$$(1 - r_b)F_1(k_1) + r_b f(k_1) > (1 - r_1)F_1(k_1) + r_1 f(k_1).$$

But $F_2(k_1) > F_1(k_1)$ implies $f(k_1) > F_1(k_1)$. As a result, the inequality holds. Hence, in any equilibrium, $r(n) = r_b$ if $n \leq 1^-$. A symmetric argument proves that $r(n) = 0$ if $n \geq 1^+$. ■

Proof lemma 2. Observe that $W_i(k, r; n) = v_i(k, r) + \beta C_i(Mk)$ is an increasing function of r for unskilled workers (for any value of k) and it is a decreasing function for skilled workers. Hence, unskilled always choose $r_b = 1$ and skilled choose a zero tax rate. The skilled ratio in the economy evolves according to the law of motion $n_{t+1} = M(n_t; p_1, p_2)$. As long as $n_t \leq 1^-$, we have $r_t = r_b$ whereas if $n_t \geq 1^+$, the adopted tax rate is zero. ■

Proof proposition 1. Let $n^* < k^a$ be a steady state, that is, $n^* = Mk(n^*) < k^a$. Since M is an increasing function, $k(n^*) < M^{-1}(k^a) = k^a$, by definition of k^a. Since $n < M(n)$ for $n < k^a$, it follows that $k(n^*) < Mk(n^*) = n^*$. Rearraging, we obtain $\sigma^* = k(n^*) - n^* < 0$, that is immigration is unskilled. An analogous argument, noting that $n > M(n)$ for $n > k^a$, establishes that immigration is skilled in any steady state $n^* > k^a$. The rest of the proposition follows from the assumption $k^a > 1$. ■

Proof lemma 3. By definition of V_i, and for any policy rule (k, r),

$$V_i(n) = v_i(k(n), r(n)) + \beta C_i(Mk(n)) \text{ for } i = 1, 2.$$

Manipulation of these expressions yields

$$\begin{pmatrix} C_1(n) \\ C_2(n) \end{pmatrix} = \begin{pmatrix} 1 - p_1 & p_1 \\ 1 - p_2 & p_2 \end{pmatrix} \begin{pmatrix} v_1(k(n), r(n)) + \beta C_1(Mk(n)) \\ v_2(k(n), r(n)) + \beta C_2(Mk(n)) \end{pmatrix}.$$

Consider now the policy rule defined in (1) and let $n \geq 1^+$. Then, the previous system of functional equations reduces to

$$\begin{pmatrix} C_1(n) \\ C_2(n) \end{pmatrix} = \begin{pmatrix} 1 - p_1 & p_1 \\ 1 - p_2 & p_2 \end{pmatrix} \begin{pmatrix} v_1(\phi, 0) + \beta C_1(1^+) \\ v_2(\phi, 0) + \beta C_2(1^+) \end{pmatrix},$$

implying that $C_i(n) = C_i(1^+)$ is constant for all $n \geq 1^+$. Furthermore, evaluating at $n = 1^+$, we have a linear system of two equations and two unknowns. The solution to the system is given by

$$\begin{pmatrix} C_1(1^+) \\ C_2(1^+) \end{pmatrix} = \frac{1}{[1-\beta(p_2-p_1)]} \begin{pmatrix} (1-p_1)-\beta(p_2-p_1) & p_1 \\ 1-p_2 & p_2-\beta(p_2-p_1) \end{pmatrix} \begin{pmatrix} \frac{E_1[v(\phi,0)]}{1-\beta} \\ \frac{E_2[v(\phi,0)]}{1-\beta} \end{pmatrix}.$$

In words, the ex ante continuation value for a voter of type i in a skilled-majority state is given by a convex combination. The weights of the combination display less intergenerational persistence than the one-period transition matrix (to the extent that $p_2 > p_1$). The expressions on the right-hand side define the coefficients $a_{ij}(\beta, p_1, p_2)$ appearing in the proposition.

Next, consider an unskilled-majority state in $b^{-1}(\phi) \leq n \leq 1^-$. The policy rule implies full redistribution and $k(n) = \phi$ in these states. Hence,

$$V_i(n) = u[f(\phi)] + \beta C_i(1^-) \text{ for } i = 1, 2,$$

given that $v_1(\phi, 1) = v_2(\phi, 1) = u[f(\phi)]$. Thus, continuation values for the range of states considered are constant functions of n. Next, evaluating the expressions at $n = 1^-$, and using matrix notation, we have the following linear system:

$$\begin{pmatrix} C_1(1^-) \\ C_2(1^-) \end{pmatrix} = \begin{pmatrix} u[f(\phi)] \\ u[f(\phi)] \end{pmatrix} + \beta \begin{pmatrix} 1-p_1 & p_1 \\ 1-p_2 & p_2 \end{pmatrix} \begin{pmatrix} C_1(1^-) \\ C_2(1^-) \end{pmatrix}.$$

It is easy to verify that the unique solution to the system is

$$C_1(1^-) = C_2(1^-) = \frac{u[f(\phi)]}{1-\beta},$$

equal for both types of voters. The intuition is straightforward: with full redistribution, the per-period payoff does not depend on the agent's type so the expected utility given any probability distribution is the same.

Finally, consider an unskilled-majority state with $n < b^{-1}(\phi)$. It follows from the prescribed policy rule and the law of motion for skills that after a finite number of periods the state will fall in region $[b^{-1}(\phi), 1^-]$. Let $T(n)$ be the first period such that $n_t = (M \circ b)^t(n) \in [b^{-1}(\phi), 1^-]$. For such states,

$$\begin{pmatrix} C_1(n) \\ C_2(n) \end{pmatrix} = \begin{pmatrix} 1-p_1 & p_1 \\ 1-p_2 & p_2 \end{pmatrix} \begin{pmatrix} u[f(b(n))] + \beta C_1(Mb(n)) \\ u[f(b(n))] + \beta C_2(Mb(n)) \end{pmatrix}$$

where again $v_1(b(n), 1) = v_2(b(n), 1) = u[f(b(n))]$ and $Mb(n) = (M \circ b)(n)$. It is easy to verify recursively that the solution to the system is given by

$$C_i(n) = \sum_{t=0}^{T(n)-1} \beta^t u[f(b((M \circ b)^t(n)))] + \beta^{T(n)} \frac{u[f(\phi)]}{1-\beta},$$

for both $i = 1, 2$. It is straightforward to check that $C_i(n)$ is a strictly increasing function of n and that $C_1(n) = C_2(n)$ for the states considered. ■

Proof lemma 4. Consider any unskilled majority state, $n \leq 1^-$. Unskilled voters evaluate policy pairs using

$$W_1(k, 1) = v_1(k, 1) + \beta C_1(Mk),$$

where I already used the fact that unskilled voters always impose full redistribution. The set of feasible skilled ratios is given by $k \in [k_l, b(n)]$. Recall that $v_1(k, 1) = u[f(k)]$ is an increasing function and that $C_1(Mk)$ is non-decreasing for $Mk \leq 1^-$ or, equivalently, for $k \leq \phi$. It follows that the optimal choice equals $b(n)$ for all $n \leq b^{-1}(\phi)$.

For $n \in (b^{-1}(\phi), 1^-]$, ϕ clearly dominates any ratio in $[k_l, \phi]$ and $b(n)$ dominates ratios in open interval $(\phi, b(n))$. Note that over this range of states $W_1(b(n), 1|n)$ increases in n. Thus, ϕ will be the optimal unskilled choice in these states if and only if $W_1(\phi, 1) \geq W_1(b(1), 1)$ or, equivalently,

$$u[f(b(1))] - u[f(\phi)] \leq \beta[C_1(1^-) - C_1(1^+)]. \tag{4}$$

From the previous lemma,

$$C_1(1^-) = \frac{u[f(\phi)]}{1-\beta} \text{ and}$$

$$C_1(1^+) = \frac{1}{1-\beta}\left[\left(\frac{1-p_1-\beta(p_2-p_1)}{1-\beta(p_2-p_1)}\right)E_1v(\phi,0) + \left(\frac{p_1}{1-\beta(p_2-p_1)}\right)E_2v(\phi,0)\right],$$

where $E_iv(\phi, 0) = (1 - p_i)v_1(\phi, 0) + p_iv_2(\phi, 0)$. A close look at the previous expression shows that $C_1(1^+|p_1)$ is a continuouts (and increasing) function and

$$C_1(1^+|p_1 = 0) = \frac{v_1(\phi, 0)}{1-\beta}.$$

Thus, the right hand side of (4) is a continuous (and decreasing) function of p_1 too. Note that the left-hand side of that expression does not depend on p_1 (other than through the value of ϕ). Assumption 3 requires inequality (4) to hold when $p_1 = 0$. By continuity, it will still hold for an interval of low enough (positive) values of p_1. ■

Proof lemma 5. Consider any skilled majority state, $n \geq 1^+$. Skilled voters evaluate policy pairs using

$$W_2(k, 0) = v_2(k, 0) + \beta C_2(Mk),$$

where I already used the fact that skilled voters always set a zero tax rate (no redistribution). The set of feasible skilled ratios is given by $k \in [k^l, b(n)]$. Recall that $v_2(k, 0)$ strictly decreases in k.

Clearly, ϕ dominates any other choice of k in interval $[\phi, b(n)]$. The reason is that $C_2(Mk) = C_2(1^+)$ is constant across those values of k. Similarly, among values of k in interval $[M^{-1}\phi, \phi]$, that is $Mk \in [\phi, 1^-]$, ratio $M^{-1}\phi$ is dominant given that $C_2(Mk) = C_2(1^-)$ is constant too.

Let us now turn to choices of k in closed interval $[k^l, M^{-1}\phi]$. For any such choice of k, we have

$$W_2(k, 0) = v_2(k, 0) + \beta C_2(Mk),$$

where $v_2(k, 0)$ is decreasing while $C_2(Mk)$ is *non-decreasing* (lemma 3). An upper bound for the expression can be constructed as follows. For all $k \in [k^l, M^{-1}\phi]$,

$$W_2(k, 0) < v_2(k^l, 0) + \beta \frac{u[f(\phi)]}{1-\beta} = \bar{U}.$$

Next, I shall derive conditions for $W_2(\phi, 0) > \max\{W_2(M^{-1}\phi, 0), \bar{U}\}$. It is easy to show that $W_2(\phi, 0) > W_2(M^{-1}\phi, 0)$ if and only if

$$\begin{aligned} &v_2(M^{-1}\phi, 0) - v_2(\phi, 0) < \\ &\quad < \beta \left(E_2 v(\phi, 0) - u[f(\phi)]\right) + \beta^2 \left((1-p_2)\left(C_1(1^+) - C_1(1^-)\right) + p_2\left(C_2(1^+) - C_2(1^-)\right)\right), \end{aligned}$$

where $C_2(1^-) = C_1(1^-)$, as argued in lemma 3. Evaluating the previous expression at $p_2 = 1$, and rearranging terms, we can see that $W_2(\phi, 0) > W_2(M^{-1}\phi, 0)$ if and only if

$$v_2(M^{-1}\phi, 0) - v_2(\phi, 0) < \frac{\beta}{1-\beta}\left(v_2(\phi, 0) - u[f(\phi)]\right),$$

or equivalently,

$$v_2(\phi, 0) > (1-\beta)v_2(M^{-1}\phi, 0) + \beta u[f(\phi)]. \tag{5}$$

If the previous inequality holds, continuity of the expressions in p_2 implies that it will hold for an interval of p_2 around one.

Similarly, we obtain that $W_2(\phi, 0) > \bar{U}$ if and only if

$$v_2(\phi, 0) - v_2(k_l, 0) + \frac{\beta}{1-\beta}\left(C_2(1^+) - u[f(\phi)]\right) > 0.$$

Evaluating the previous expression at $p_2 = 1$, and using lemma 3, we obtain equivalent expression

$$v_2(k_l, 0) - v_2(\phi, 0) < \frac{\beta}{1-\beta}\left(v_2(\phi, 0) - u[f(\phi)]\right).$$

And rearranging yields

$$v_2(\phi, 0) > (1-\beta)v_2(k_l, 0) + \beta u[f(\phi)], \tag{6}$$

coinciding with assumption 4. A careful comparison of the two sufficient conditions we just derived reveals that condition (6) implies (5). In conclusion, under assumption 4, high enough values of p_2 guarantee the best response for skilled voters in skilled-majority states. ■

Proof proposition 3. Regardless of k_t, the state converges monotonically to k_a. Since $v_1(k,1)$ is an increasing function, in any state $n \leq 1^-$, unskilled voters' favorite policy pair is $(k,r) = (b(n),1)$. In skilled-majority states, skilled voters' favorite policy pair is $(k,r) = (k^l,0)$ since $v_2(k,0)$ is a decreasing function. Given $n_0 < 1$, there exists $T < \infty$ such that $n_T = (M \circ b)^T(Mk^l) > 1$, which implies the equilibrium path described in the proposition. ■

References

[1] Acemoglu, D., Robinson J., 2000. Why Did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective. *Quarterly Journal of Economics.*

[2] Barberà, S., Maschler, M., Shalev, J., 2001. Voting for voters: A Model of Electoral Evolution. *Games and Economic Behavior.*

[3] Benabou, R., Ok E., 2001. Social mobility and the Demand for Redistribution: the POUM Hypothesis. *Quarterly Journal of Economics.*

[4] Benhabib, J., 1996. On the Political Economy of Immigration. *European Economic Review.*

[5] Borjas, G., 1985. Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants. *Journal of Labor Economics.*

[6] Borjas, G., 1987. Self-selection and the Earnings of Immigrants. *American Economic Review.*

[7] Borjas, G., 1999. *Heaven's Door.* Princeton University Press.

[8] Carneiro, P., Heckman, J., 2004. Human Capital Policy. In: *Inequality in America: What Role for Human Capital Policies.* Edited by James Heckman and Alan Krueger.

[9] Cornelius, W., Martin, P., Hollifield, J., 1994. *Controlling Immigration.* Stanford University Press.

[10] DeSipio, L., 1996. *Counting on the Latino Vote: Latinos as a New Electorate.* University of Virginia Press.

[11] Dolmas, J., Huffman, G., 2003. On the Political Economy of Immigration and Income Redistribution. Mimeo.

[12] Fernández, R., Rogerson, R., 2001. Sorting and Long-Run Inequality. *Quarterly Journal of Economics.*

[13] Fernández, R., Fogli, A., Olivetti, C., 2002. Marrying your mum: preference transmission and women's labor and education choices. Mimeo.

[14] Goldin, C., 1994. The political economy if immigration restriction in the U.S., 1890 to 1921. In: Goldin, C., Libecap., G. (Eds), *The Regulated Economy: A Historical approach to political economy.* University of Chicago Press.

[15] Goldin, C., Katz, L., 1999. The Returns to Skill across the Twentieth Century in the United States. NBER Working Paper No. 7126.

[16] Hanson, G., Scheve, K., Slaughter, M., Spilimbergo, A., 2002. *Immigration and the U.S. Economy: Labor-Market Impacts, Illegal Entry, and Policy Choices.* In: Boeri, T., Hanson, G., McCormick, B. (Eds), *Immigration Policy and the Welfare System.* Oxford University Press.

[17] Hassler, J., Rodriguez-Mora, J.V., Storesletten, K., Zilibotti, F., 2002. The Survival of the Welfare State. *American Economic Review.*

[18] Hassler, J., Krusell, P., Storesletten, K., 2003. The Dynamics of Government. Mimeo.

[19] Hendricks, L., 2002. How Important is Human Capital for Development? Evidence from Immigrant Earnings. *American Economic Review.*

[20] Jasso, G., Rosenzweig, M., Smith, J., 2003. The Earnings of U.S. Immigrants: World Skill Prices, Skill Transferability and Selectivity.

[21] Katz, L., Murphy, K., 1992. Changes in Relative Wages: Supply and Demand Factors. *Quarterly Journal of Economics.*

[22] Klein, P., Ventura, G., 2004. Do Migration Restrictions Matter? Mimeo.

[23] Krusell, P., Quadrini, V., Ríos-Rull, J.V., 1997. Politico-Economic Equilibrium and Economic Growth. *Journal of Economic Dynamics and Control*.

[24] Krusell, P., Ríos-Rull, J.V., 1999. On the Size of U.S. Government: Political Economy in the Neoclassical Growth Model. *American Economic Review*.

[25] Krusell, P., Ohanian, L., Ríos-Rull, J.-V., Violante, G., 2000. Capital-Skill Complementarity and Inequality. *Econometrica*.

[26] Lazear, E., 1999. Culture and Language. *Journal of Political Economy*.

[27] Lizzeri, A., Persico, N., 2003. Why Did the Elites Extend the Suffrage? Democracy and the Scope of Government, with an Application to Britain's 'Age of Reform'. Mimeo.

[28] Martin, P., Midgley, E., 2003. Immigration: Shaping and Reshaping America. *Population Bulletin* 58, no. 2, Washington, DC: Population Reference Bureau.

[29] Mayda, A. M., Rodrik, D., 2001. Why are Some People (and Countries) More Protectionist than Others? NBER Working Paper No. 8461.

[30] Mayda, A. M., 2003. Who is Against Immigration? A Cross-Country Investigation of Individual Attitudes Towards Immigrants. Mimeo.

[31] Metzler, A., Richard, S., 1981. A Rational Theory of the Size of Government. *Journal of Political Economy*.

[32] O'Rourke, K., 2003. Heckscher-Ohlin Theory and Individual Attitudes Towards Globalization. NBER Working Paper No. w9872.

[33] Ortega, F., 2003. Immigration Quotas and Skill Upgrading in the Labor Force. Mimeo.

[34] Ortega, F., Tanaka, R., 2003. Changing Parental Roles in the Education of Children. Mimeo.

[35] Persson, T., Tabellini, G., 2000. *Political Economics. Explaining Economic Policy.* MIT Press.

[36] Razin, A., Sadka, E., Swagel, P., 2002. Tax Burden and Migration: A political economy theory and evidence. *Journal of Public Economics*.

[37] Scheve, K., Slaughter, M., 2001. Labor-Market Competition and Individual Preferences Over Immigration Policy. *Review of Economics and Statistics*.

[38] Schmidley, D., 2001. Profile of the Foreign-Born Population in the United States: 2000. *U.S. Census Bureau, Current Population Reports*, U.S. Government Printing Office, Washington, DC.

[39] Storesletten, K., 2000. Sustaining Fiscal Policy Through Immigration. *The Journal of Political Economy*.

[40] Timmer, A., Williamson, J., 1998. Immigration Policy Prior to the Thirties: Labor Markets, Policy Interaction, and Globalization Backlash. *Population and Development Review*.