The Political Economy of Immigrants Naturalization*

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Abstract

This paper provides the first political economy model in which self-interested natives decide when voting rights should be granted to foreign-born workers. This choice is driven by the maximization of the net gains from immigration. We focus on the provision of a public good: immigrants could enlarge the tax base by increasing the total workforce, but at the same time they influence the tax rate by eventually exerting their political rights.

We find that the quantity and the quality (human capital) of perspective immigrants, the political composition of the native population, and the sensitivity of the migration choice to voting rights, are all decisive factors in determining the political choice over the optimal timing of naturalization.

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1 Introduction

According to the OECD's (2001) report on international migrations, developed countries maintain relevant differences in their immigration policies, and mostly in their *naturalization* policies.

By "naturalization policy" we essentially refer to the requirements that foreign-born workers are supposed to meet in order to apply for, and obtain full citizenship. Among these requirements the most important is probably represented by the number of years spent in the host country[1], which goes (see Table 1) from a minimum of 3 (Netherlands, Australia, Canada) to a maximum 12 (Switzerland). Some additional features are often required: for instance, to acquire U.S. citizenship it is also needed to show proficiency in English and some knowledge of American history. This could indeed suggest that behind the concession of citizenship there is a strong concern for *assimilation* and *integration*, and the reluctance in granting political rights to immigrants may be due to the fear of a possible "distortion" of the political process as a consequence of foreigners' different preferences, tastes and political sensitivity.

It's worth noting that the acquisition of citizenship (naturalization *tout-court*) is a sufficient but not necessary condition to obtain voting rights. In fact, several countries allow legal immigrants without citizenship to participate to the political decision process, at least at an administrative (local) level. Once more, we find a minimum number of years of residency to be the main requirement in this respect, and we observe that OECD countries adopt very different policies (see Table 2). In the cases of United Kingdom and Spain we can notice that "cultural affinity" may favor the concession of voting rights.

There is much ongoing debate on this issue of granting voting rights to immigrants without citizenship (let us call it "political naturalization"). At an institutional level we can register a progressively more permissive orien-

[1]However, in most cases, getting married with a native entitles by itself to gain citizenship.

Table 1: Available OECD countries: requirements to apply for full citizenship.

country	*residence*	*notes*
Australia	2 years	
Austria	10 years	(Vienna: 4-5 years)
Belgium	0 years ?	"desire to integrate"
Bulgaria	3 years	
Canada	3 years	
Denmark	7 years	
France	5 years	
Germany	8 years	(before 2000: 15 years)
Italy	10 years	(before 1992: 5 years)
Luxembourg	10 years	
the Netherlands	3 years	
Norway	7 years	
Romania	5 years	
Sweden	8 years	
Switzerland	12 years	+ many additional requirements
U.S.	5 years	+ proficiency in English + American history

tation: in 1998 a resolution of the European Parliament recommended to its member states the concession of voting rights to legal immigrants who are resident from at least 5 years[2], while in 2003 the same institution has suggested to consider a threshold of 3 years[3].

Moreover, we would underline that immigrants are often easily entitled to social benefits, while the reluctance of national governments to give them voting rights is not significantly decreasing over time. Once we take into account that an optimally limited number of immigrants could be an as-

[2]The text adopted by the Parliament is based on the 1996 Annual Report of the Committee on Civil Liberties and Internal Affairs, according to which: "... the principle of equality of treatment (must) be recognized, both as regards economic and social rights and civil and political rights, including the recognition of voting rights in local and European elections for all foreigners without discrimination, whether they are subjects of Member States or third countries, providing they have been residing in the host country for over five years. A Council of Europe Convention has requested this since 1992, but few Member States have applied this provision".

[3]The text of Recommendation 1625 urges the Committee of Ministers "...to call on member states to grant immigrants who have been legally living in the country for at least three years the right to vote and stand in local elections and encourage activities to foster their active political participation".

Table 2: Available OECD countries: conditions to vote without citizenship.

country	*conditions*
Austria	never, by constitution
Denmark	3 years
France	never, by constitution
Germany	never, by constitution
the Netherlands	5 years
Norway	3 years
Portugal	3 years
Spain	0 years (for Latino-Americans)
Sweden	3 years
Switzerland	10 years (Neuchatel)
U.K.	0 years (for people from the Commonwealth and Ireland

set, more than a liability, for the welfare state (see for instance Storesletten, 2000), we could be tempted to resort to two explanations: (i) the concession of voting rights is a more suitable policy tool (than imposing immigration quotas, for instance) in order to regulate immigration inflows, (ii) the heterogeneity of immigrants' preferences regarding public decision-making is a crucial concern of natives when they have to legislate about naturalization policies.

To the best of our knowledge, there is no model in the literature on the endogenous determination of naturalization policies. One possible exception is represented by Cukierman et al. (1993), whose model points out that political preferences of immigrants are correlated with their "immigration vintage", and then a political conflict may arise between new and old immigrants, leading to an ever-lasting delay in the concession of voting rights. However, they don't reach any positive conclusion about the optimal timing of naturalization. As for the rest, even the quite developed literature on the political economy of immigration (see for instance Benhabib, 1996) neglects the problem of naturalization and voting rights concession. Michel et al. (1998) underline the need for filling this gap, and the present paper goes exactly in this direction.

Our model assumes that, before that immigration takes places, the native population of a developed country decides when future immigrants should be granted the right to vote, knowing that immigrants may eventually use this right to intervene in a voting process over the provision of a public good.

The paper is organized as follows. Section 2 presents and solves the basic model. Section 3 analyzes the robustness of our theory to the change of the voting mechanism. A concluding discussion is then supplied in Section 4.

2 The model

The model we propose can be thought of as the description of a two-stage policy game.

In the first stage, which is immediately anterior to immigration, native voters choose the naturalization policy (let's say the number of years that immigrants should reside in the country before being granted the right to vote).

In the second, which could actually involve many repeated voting events, both natives and naturalized immigrants decide each year over the optimal provision of a public good, that we assume not to enter the utility function of foreign born workers.

We assume that the first collective decision is taken through *majority voting*, while for the second stage we adopt a setting with *probabilistic voting*. The reason is essentially that we see voting on political rights as a typical "referendum" issue which undergoes majority voting. On the other side voting on the public good provision is more likely to be regulated through probabilistic voting, with governments being concerned about a utilitarian social welfare function and the individuation of the swing voter (rather than the median voter). In addition, we want to underline that even if we abstract from the issue of realism, dealing with probabilistic voting on both issues would have led to heavy analytical complications, while the case of "double" majority voting (which we describe later in the paper) would produce qualitatively the same results, but with less rich implications and with a consistent loss of smoothness for the model.

2.1 The basic setup

We start by considering our toy economy as being in autarky, i.e. without any migration inflow.

Let's assume that the home economy is composed by two different groups of individuals. The only source of heterogeneity is represented by different preferences regarding a public (or publicly provided good) g.

The first group is assumed to be of size L and to have the following preferences:

$$u_L = c + \gamma \log(1 + g), \tag{1}$$

while the second group (of dimension Z) does not take any utility from the consumption of g, so that:

$$u_Z = c. \tag{2}$$

This characterization of different tastes for the public good is not new in the literature: it is rather close to what we find, for instance, in Bisin and Verdier (2000).

In this stylized economy everybody is endowed with one unit of labor whose retribution is fixed at its constant marginal productivity w.

The production of the public good is financed through a proportional income tax levied at the rate a, so that:

$$c = (1 - a)w \tag{3}$$

and

$$g = aw(L + Z). \tag{4}$$

We should now explain how a is determined as an outcome of the political process. We opt for a probabilistic voting; a is chosen to maximize the following objective function:

$$W = Lu_L + Zu_Z = L\{(1-a)w + \gamma \log[1 + aw(L+Z)]\} + Z(1-a)w. \quad (5)$$

In fact, probabilistic voting is presented here in its simplest form (the two groups have identical political power, so that only their relative size matters), and then boils down to the maximization of a utilitarian social welfare function (see Persson and Tabellini, 2000).

By solving $\partial W/\partial a = 0$, the optimal value for a is found to be

$$a^* = \frac{\gamma L - 1}{w(L+Z)} = \frac{1}{w}\left[\frac{\gamma L}{(L+Z)} - \frac{1}{(L+Z)}\right], \quad (6)$$

every time that this voting process takes place.

This value a^* does correspond to a maximum since

$$\frac{\partial^2 W}{\partial a^2} = -\frac{\gamma L w^2 (L+Z)^2}{[1 + aw(L+Z)]^2}$$

is always negative. Moreover, a^* is positive provided that $\gamma > 1/L$: we will assume this inequality to holds throughout the remainder of the paper.

2.2 Introducing migration

Let's now add migration to our framework.

We start by supposing that M immigrants may, at a given moment, join our economy and that they are characterized by $u_M = u_Z$. This assumption qualifies g as a sort of "national" (or even "patriotic" public good), whose supply native workers are far more concerned about. It seems then natural to assume $L > Z$.

We mean that the taste for the consumption of such a good (or a peculiar quality of some public good) is highly affected by sharing the values and tradition of a community, and developed by living in a given country. Examples can be found thinking to some features of the French educational system (namely its strong and widely shared laicism), to the financial support that the Italian state still gives to the activity of the Catholic Church, or to the high share of public expenditure that the United States devote to defense issues. Immigrants are not likely to express the same kind of preferences[4].

With respect to native workers, they have the same time endowment (entirely devoted to work), but different productivity ($h \neq 1$). How is the voting process altered by the participation of immigrants?

Foreign workers matter in two respects. First, they contribute according to their labor productivity to the production activity, and finance as tax-payers the provision of the public good. Second, they may intervene in the decision process, but of course only once they are allowed to vote.

As long as voting rights are denied to immigrants, we have that (5) becomes:

$$W = Lu_L + Zu_Z = L\{(1-a)w + \gamma \log[1 + aw(L+Z+hM)]\} + Z(1-a)w, \quad (7)$$

and consequently the chosen tax rate a is:

$$a^{\circ} = \frac{\gamma L \frac{(L+Z+hM)}{(L+Z)} - 1}{w(L+Z+hM)} = \frac{1}{w}\left[\frac{\gamma L}{(L+Z)} - \frac{1}{(L+Z+hM)}\right]. \quad (8)$$

If immigrants can vote (with or without having acquired citizenship), the objective function transforms into:

$$W = Lu_L + (Z+M)u_Z = L\{(1-a)w + \gamma \log[1 + aw(L+Z+hM)]\} + (Z+M)(1-a)w, \quad (9)$$

with the tax rate being thus fixed at the following value:

$$a^{\vee} = \frac{\gamma L \frac{(L+Z+hM)}{(L+Z+M)} - 1}{w(L+Z+hM)} = \frac{1}{w}\left[\frac{\gamma L}{(L+Z+M)} - \frac{1}{(L+Z+hM)}\right]. \quad (10)$$

[4]A decent knowledge of American history is one of the requirements that have to be met to be granted U.S. citizenship: it's hard not to recognize behind that an attempt to develop migrant's sensitivity to America's common values and tradition

It is easy to check that $a^{\vee} < a^* < a^{\circ}$.

Let us also underline how immigrant's participation to the production activity depends on their productivity (it is weighted by h), while their participation to the voting process is weighted by 1[5].

With an exogenously fixed number M of immigrants, it is clear that L-type natives would always prevent them from acquiring political rights, while the Z-type group would favor quickest naturalization.

For sake of realism we want now to make M depend on τ, where τ defines the "residence requirement", i.e. the minimum number of years the foreign worker needs to have been resident in the host country before applying for and obtaining voting rights (with or without citizenship). Suppose in fact that at time 0 there are m prospective migrants to our country, i.e. m individuals that, on a pure economic ground (higher wages), would be interested in working and living in that country. We can think that their decision would also be affected by other factors, for instance by the quality of citizenship and by the political status they could earn abroad: *ceteris paribus* a country which offers earlier and wider political participation would be more likely to be elected as one's migration country.

To be more precise, suppose that only permanent migration has to be considered, and let's fix to T years the residual working life of a prospective migrant. Voting rights are granted after τ years of residence in the foreign country. In this framework, actual migration can be thought to obey to the following law:

$$M = (1 - \sigma \frac{\tau}{T})m, \tag{11}$$

with $0 < \sigma < 1$ and $0 < \tau < T$.

[5]This is not unquestionable; Bourguignon and Verdier (2000) supply several explanations according to which political participation could indeed be positively correlated with human capital. However, for our results to hold it is enough to assume that immigrants weigh more as voter than as workers.

The parameter σ determines how much sensitive the migration decision is to the voting rights issue: for $\sigma = 0$ migration will take place regardless of the political status offered abroad; in general a low value of σ could correspond to the case of extremely high foreign wages, so high that the issue of political status becomes of minor importance[6]. For $0 < \sigma < 1$ we can see that the higher is τ (the later voting is allowed), the smaller will be the number of actual migrants.

By fixing the migration law as above we introduce a trade-off linked to τ, from the point of view of L-type voters. In fact an earlier concession of voting rights means more foreign workers in the home economy, and by this a larger collectible tax base to finance the production of the g good. On the other side, a low value for τ implies that the immigrants intervene for a larger number of years in the voting process, thus determining an a which will be for many times different from the ideal value supported by L-type natives, and more different the larger the number of immigrants.

2.3 Voting over the residence time requirement τ

At this point we need to characterize the voting procedure over τ.

First of all we assume that the M immigrants are all of the same age, and that this age corresponds to the minimum age to be eligible for voting. It seems to us that it is not unrealistic to suppose that immigrants are quite young when they reach the host country.

As for the $L + Z$ native workers and voters, we assume that they are distributed in T different cohorts, and that each cohort is composed by $l + z$ individuals, where $l = L/T$ and $z = Z/T$. In other words, we are assuming that the native population does not exhibit any kind of demographic growth, and that the distribution of preferences does not undergo any evolution over

[6]Low values of σ could be also explained by the presence of a large national community in the foreign country (like in the case of Turkish immigrants in Germany), or by a heavy convenience to work in a country that speaks the same language.

generations.

The collective choice over τ will take place once for all exactly before the immigrants' cohort arrives in the home economy[7], and it will be operated through majority voting, so that we search for the median voter in the "autarkic" economy.

Every native (and perfect-foresighted) voter will support the value of τ which maximizes her lifetime utility, i.e.:

$$U_{i,j}(\tau) = \tau u_i(a^{\circ}(\tau)) + (T - j - \tau)u_i(a^{\vee}(\tau)) \tag{12}$$

where i denotes preferences ($i = L, Z$) and j identifies the cohort ($0 \leq j \leq T$). For simplicity and without any change in the results we have preferred not to introduce any time discounting.

Regardless of their age, all the Z-type natives will vote in favor of an immediate concession of voting rights to the immigrants. In fact, new voters with their same preferences will help Z-type workers to obtain a better (from their point of view) tax rate, and this gain will be proportional to M, thus it will be higher the lower τ.

Since we have assumed $L > Z$, we can turn to L-type natives and search inside this category for the median voter.

We can rewrite the lifetime utility of the latter class of voters in the following way:

$$U_{L,j}(\tau) = \begin{cases} \tau u_L(a^{\circ}(\tau)) + (T - j - \tau)u_L(a^{\vee}(\tau)) & \text{if } \tau < T - j \quad \text{(a)} \\ \\ (T - j)u_L(a^{\circ}(\tau)) & \text{if } \tau \geq T - j \quad \text{(b)} \end{cases} \tag{13}$$

where a° and $a^{\vee}$ are as in (8) and (10).

The second part of equation (13) writes this way because if $\tau \geq T - j$ the native worker belonging to the j-th cohort will never be faced with an

[7] To avoid complications in the analysis, we prefer to assume that τ will be never re-voted after immigration.

a chosen with the participation of the immigrants, so that the second half of (13a) disappears; as for the first part, whatever τ, it will always involve $T - j$ years, with τ only affecting a° as in (8).

We can claim what follows.

Proposition 1 *Each cohort j of L-type native voters has single-peaked preferences over τ.*

Proof.

Proving Proposition 1 coincides with proving that (13) has a unique maximum for $0 < \tau < T$. It can be easily done.

In fact it can be shown that (13a) is concave in τ and (13b) is monotonically decreasing in τ, while they get the same value for $\tau = T - j$ (see Appendix A for these results). It follows that the situation may be depicted as in Figure 1: either the two functions cross before the bliss point of (13a) or they cross after. In both cases a maximum of (13) as a whole exists: it is either attained for $\tau = T - j$ (upper part of Figure 1) or corresponds to the maximum of (13a) (lower part). $\sqcap$

Given the single-peakedness of preferences of L-type voters, so that for each cohort j we can identify a unique utility-maximizing value for τ (let's call it τ_j^*, we are ensured that there also exists one value $\tau^\diamond$ of τ which is chosen through majority voting (among the different τ_j^*'s supported by the different cohorts).

Let's now recall an important feature of the voting process, namely that we assumed $L > Z$; this implies that the median voter belongs to one of the T cohorts of L-type natives. But which cohort, exactly?

Assuming that $\tau_j^* > 0$ for each j, we are interested in establishing how τ_j^* depends on j. It can be shown that:

Proposition 2 *For sufficiently high values of h, the function $\tau_j^* = f(j)$ is non-monotone, and more precisely it is $\cap$-shaped. In other words: there exist a $\hat{j}$ such that $\tau_j^* = f(j)$ is increasing for $0 \leq j < \hat{j}$ and decreasing for $\hat{j} < j \leq T$.*

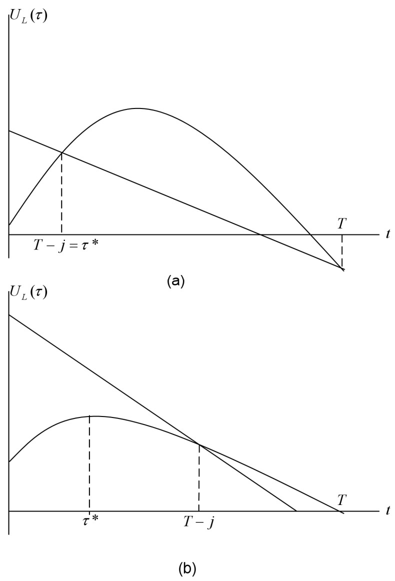

Figure 1: Lifetime utility

Proof.

This proposition comes as a combination of two results. First, we have that, as long as (13b) crosses (13a) after having reached its maximum, $\tau_j^* = f(j)$ is monotonically increasing if h is not too low (by Implicit Function Theorem, see Appendix). On the other hand, going beyond a critical value of j it happens that (13b) crosses (13a) at the left of its bliss point; by consequence $\tau_j^* = T - j$, which is decreasing in j. ⊓

Therefore, the oldest among the L-type citizens will support the lowest (yet positive) values of τ, the young will support higher τ's, while the highest values will be proposed by the middle-aged.

For sake of simplicity (and without loss of realism) we want to rule out the possibility that the median voter will be among the ones for whom $\tau_j^* = T-j$, so that we are able to claim what follows:

Proposition 3 *Let $\tau^\diamond$ be the value for τ obtained through majority voting. Then:* $\frac{\partial \tau^\diamond}{\partial h} < 0$.

Proof.

The proof, obtained by means of the Implicit Function Theorem, is shown in Appendix B.

Moreover, if we abstract from productivity differences between native and foreign workers, assuming $h = 1$, we can state the following:

Proposition 4 *For relatively low values of $\tau^\diamond$:*

- $\frac{\partial \tau^\diamond}{\partial \sigma} < 0$,
- $\frac{\partial \tau^\diamond}{\partial q} > 0$ *if* $(L - Z) \to 0$*; otherwise, if* $(L - Z) \to L$*, then there exists a value* $\hat{q}$ *of* $q = \frac{m}{L}$ *such that: (i) for* $0 < q < \hat{q}$, $\frac{\partial \tau^\diamond}{\partial q} < 0$ *, and (ii) for* $\hat{q} < q < 1$, $\frac{\partial \tau^\diamond}{\partial q} > 0$.

Proof.

As above, see the Appendix.

Proposition 3 tells us that the attitude of L-type natives toward the concession of voting rights to immigrants is more favorable if foreign workers are relatively high-skilled. The explication is that, with h improving, foreign workers contribute more to production, while their impact on the voting process about g does not increase.

Proposition 4 explains that naturalization is also likely to occur earlier when σ is high, i.e. when the decision to migrate is highly sensitive to the quality of the citizenship that is offered by the host country. In such a case τ becomes a more powerful policy tool, so that it will used more "carefully".

Furthermore, the second part of the same Proposition gives us some information about the interaction between the size of potential immigration and the political composition of the native population in the determination of $\tau^\diamond$. In fact we see that, with a very narrow numerical advantage of L-type natives over Z-type ones, any increase in the ratio between potential immigrants and total native population (q) will result *ceteris paribus* in a higher value of $\tau^\diamond$, since the future impact of immigrants in the political process is expected to be decisive, due to the narrow gap which exists between national groups. On the other hand, if the L-type group has a wide pre-immigration majority, we will have that $\frac{\partial \tau^{\diamond}}{\partial q} > 0$ only if q is quite large[8]. This makes sense and depends on the fact that if immigrants are "too many" relatively to the number of L-type natives, they are likely to alter significantly the political outcome in favor of Z-type natives, and the median voter (belonging to the L-group) will react choosing a more "hostile" assimilation policy, i.e. a higher $\tau^{\diamond}$.

3 Majority voting over both a and τ

Here we want to show that our results hold qualitatively unchanged if we assume that both policy decisions (respectively about a and τ) take place by means of a majority voting procedure.

In autarky, if $L > Z$, the chosen value for a corresponds to the value that maximizes L-type individuals' utility and it is:

$$a^A = a^{LA} = \frac{\gamma(L+Z)-1}{w(L+Z)} = \frac{1}{w}\left[\gamma - \frac{1}{(L+Z)}\right]. \tag{14}$$

If the Z-voters were the majority we would have $a^A = a^{ZA} = 0$.

With migration, we will have that:

$$a^M = a^{LM} = \frac{\gamma(L+Z+hM)-1}{w(L+Z+hM)} = \frac{1}{w}\left[\gamma - \frac{1}{(L+Z+hM)}\right], \tag{15}$$

both when the M immigrants don't vote and when they are not numerous enough to form a majority with the Z-type natives (so that $L > Z + M$).

Once immigrants are allowed to vote, and in case they will form a majority with the Z-type natives (so that $Z + M > L$), they will be able to determine $a^M = 0$.

[8] Switzerland in the 70's could be a good example of a high q.

Let's now turn to the voting process over τ and keep unchanged the assumptions we made in the previous section (especially that $L > Z$).

The median voter will be a L-type native.

A voter belonging to this class maximizes the following lifetime utility function:

$$U_{L,j}(\tau) = \begin{cases} \tau u_L(a^{LM}(\tau)) + (T - j - \tau)u_L(0) & \text{if } \tau < \min(T - j, T\frac{(m+Z-L)}{\sigma m}) \quad \text{(a)} \\ \\ (T - j)u_L(a^{LM}(\tau)) & \text{if } \tau \geq \min(T - j, T\frac{(m+Z-L)}{\sigma m}) \quad \text{(b)} \end{cases} \tag{16}$$

In (16a) we have written the expression for lifetime utility in the case of a migration inflow that is large enough to make a minority of the L-type natives. The value of τ which determines $L = Z + M$ is exactly $\hat{\tau} = T\frac{(m+Z-L)}{\sigma m}$.

If $\tau > \hat{\tau}$, the late concession of voting rights will cause a limited immigration to take place, and the L-type voter will see her most preferred a to prevail in each one of her $T - j$ residual years of life, so that her lifetime utility is as in (16b).

In addition we need also to take into account that this switch from (16a) to (16b) may happen for lower values of τ, and it is the case of old voters for whom $\tau > T - j$.

Thus, L-voters' preferences are single-peaked (see Figure 2). The resulting optimal value of τ (τ^*) can be either $T\frac{(m+Z-L)}{\sigma m}$ or $T - j$, the latter being a sort of "corner" solution for older people.

We can see that the situation reproduces what we have described in Section 2.

Moreover, if we forget about the corner solution and focus on $\tau^* = T\frac{(m+Z-L)}{\sigma m}$, we can easily see that, in strong analogy with the case of probabilistic voting over a, we get that: $\frac{\partial \tau^\diamond}{\partial \sigma} < 0$, $\frac{\partial \tau^\diamond}{\partial q} > 0$, $\frac{\partial \tau^\diamond}{\partial L} < 0$, $\frac{\partial \tau^\diamond}{\partial m} > 0$ and $\frac{\partial \tau^\diamond}{\partial Z} > 0$.

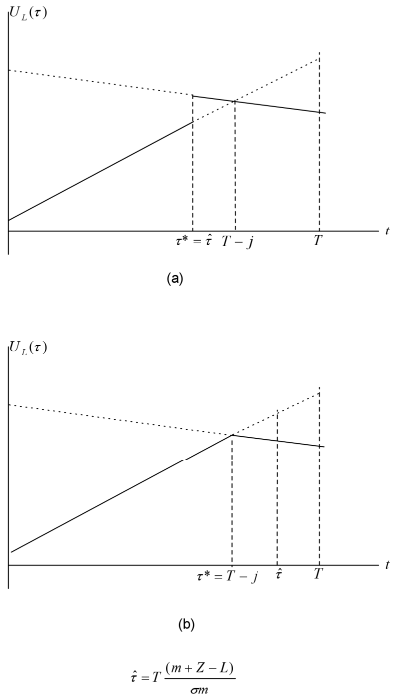

Figure 2: Lifetime utility when a is decided through majority voting

The unpleasant property of this setting with double majority voting is that τ^* turns out to be a sort of "bang-bang" solution: in fact τ^* can be chosen to be either equal to $T - j$ or to $\hat{\tau}$. Thus this specification does not display any smoothness.

We can also observe that natives will set assimilation policies that will encourage immigrants to join the developed economy up to the point when they are numerous enough to overturn the existing political majority (leading to a sort of "razor's edge" situation).

Moreover, given that the actual size of migration inflows are far from being able to revert the political majority on whatever national public good, one would expect natives not to fear anything from granting political rights to foreign born workers.

On the contrary, probabilistic voting has the nice and more realistic property that immigrants could affect the political outcome even being a minority. In addition, it allows us to establish some further results, like the impact of immigrant's productivity (skills) on $\tau^{\diamond}$.

4 Conclusions

Far from being exhaustive, our model has provided a framework of analysis useful to shed some light on the economic motivations that may hide behind the naturalization policies put in place by developed countries.

Focusing in particular on the number of years a legal immigrant should wait before obtaining either political or full naturalization, we have shown that this variable can be determined as an outcome of majority voting, and it depends on the concern, by (the majority of) the native population, about the influence that immigrants could exert on the provision of a 'national' public good, decided by means of probabilistic voting. "Different preferences" is the key concept in explaining the delay in the concession of voting rights to foreign workers. This delay can be relatively short if immigrants are fairly well skilled and if the migration choice is quite sensitive to the issue of political participation, while it is likely to be longer the larger the relative size of prospective immigration.

A natural and interesting extension of our work would consist in taking into account the possibility of an endogenous *assimilation* of immigrants. In other words, by sharing the same social and cultural environment of native citizens, immigrants may change their preferences, developing an increasing taste for the "national" values and traditions of the host country. The working of this assimilation process may be expected to influence the setting of naturalization policies.

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A Derivation of some analytical results used in the Proofs of Propositions 1 and 2

Here we want to supply some analytical derivations that lie at the basis of some of the main results we referred to in Section 2.

Function (13a) is strictly concave in τ.

The second derivative of (13a) w.r.t. τ writes as:

$$\begin{aligned}\frac{\partial^2 U}{\partial \tau^2} \quad = \quad & m\sigma \left\{ \frac{\gamma[m(T-\sigma\tau)+TZ][-2TZ+m(\sigma T-2T-\sigma j+\sigma\tau)+LT(-2TZ+m\sigma j-2mT-\sigma mT+3\sigma m\tau)]}{[T(L+Z+m)-m\sigma\tau]^3} \right\} + \\ & + m\sigma \left\{ \frac{h^2 m(j-T)\sigma[T\gamma(L+Z+hm)-2T-hm\gamma\sigma\tau]}{[T(L+Z+hm)-hm\sigma\tau]^3} \right\}\end{aligned}$$

which is always negative for $\tau < T - j$, provided that $\gamma > 1/L$ and that T, L, m and Z are all larger than one.

Function (13b) is strictly decreasing in τ.

Its first derivative w.r.t. τ is:

$$\frac{hm(j-T)\sigma\,\{T[(L+Z+hm)\gamma-1]-\gamma hm\sigma\tau\}}{[T(L+Z+hm)-hm\sigma\tau]^2},$$

and it is always negative under the same conditions as above.

Provided that h is not too low, the function $\tau^*(j)$ (maximizer of (13a)) is monotonically increasing in j.

Or better:

There exists a $\overline{h}$ such that, for every $h > \overline{h}$ the function $\tau^*(j)$ is monotonically increasing in j.

By the Implicit Function Theorem, we have that:

$$-\frac{U'_\tau(\tau,j)}{U'_j(\tau,j)} = \frac{-U'_\tau(\tau,j)}{\frac{m\gamma\sigma[-TZ-m(T-\sigma\tau)]}{[T(L+Z+m)-m\sigma\tau]^2} - \frac{hm\sigma\{T-\gamma T(L+Z)-hm\gamma(T-\sigma\tau)\}}{[T(L+Z+hm)-hm\sigma\tau]^2}}. \qquad (17)$$

This expression is always positive if we can ensure that the denominator is positive, since the numerator is always negative as proved before.

Given that:

$$\lim_{h\to 0} U'_j(\tau,j) = -\frac{m\gamma\sigma[m(T-\sigma\tau)+ZT]}{[m(T-\sigma\tau)+(L+Z)T]^2}$$

is always negative, while

$$\lim_{h\to 1} U'_j(\tau,j) = -\frac{\sigma mT(\gamma L-1)}{[m(T-\sigma\tau)+(L+Z)T]^2}$$

is always positive, we can conclude that there exists a $\overline{h}$ such that, for $\overline{h} < h < 1$, $U_j'(\tau, j) > 0$, thus establishing what we claimed above (and that is what we meant by saying "provided that h is not too low").

Moreover, the positiveness of the denominator of (17) is granted under the following *sufficient* condition that does not depend on τ:

$$h > \frac{1-(L+Z)\gamma+\sqrt{4m(m+Z)\gamma^2+[\gamma(L+Z)-1]^2}}{2m\gamma}.$$

B Proofs of Propositions 3 and 4

Both Propositions 3 and 4 stated some results about the effects of the parameters on $\tau^\diamond$, under the assumption that the median voter was among the ones with $\tau^* < T - j$.

Thus, to prove that $\frac{\partial \tau^\diamond}{\partial h} < 0$, we simply need to prove that $\frac{\partial \tau^*}{\partial h} < 0$.

By Implicit Function Theorem we get:

$$-\frac{U_\tau'(\tau,h)}{U_h'(\tau,h)} = \frac{-U_\tau'(\tau,h)}{\frac{m(j-T)\sigma T\{(T-\sigma\tau)hm[1+\gamma(L+Z)]+T(L+Z)[-1+\gamma(L+Z)]\}}{[T(L+Z)+(T-\sigma\tau)hm]^3}}.$$

We already know that the numerator is always positive for $\tau < T - j$ (see Appendix A). As for the denominator, it is easy to check that it is always negative. By consequence, the fraction as a whole is negative.

Then, we turn to the sign of $\frac{\partial \tau^\diamond}{\partial \sigma}$.

If we apply, as usual, the Implicit Function Theorem, we find that the sign of $-\frac{U_\tau'(\tau,\sigma)}{U_\sigma'(\tau,\sigma)}$ depends on the configuration of the parameters and cannot be established in advance. However, since we are mostly interested in understanding what happens for high enough values of h (see Proposition 2), without any loss of generality we can fix $h = 1$ and consider the following limit:

$$\lim_{\tau\to 0} U_\sigma'(\tau,\sigma) = -\frac{m(T-j)(\gamma L-1)}{T(L+m+Z)^2};$$

since it is always negative, we can say that $\frac{\partial \tau^\diamond}{\partial \sigma} < 0$, for low values of τ (as claimed in Proposition 3).

We now look at the sign of $\frac{\partial \tau^\diamond}{\partial q}$.

Under the usual assumption about $h = 1$, we now rely on the following limits:

$$\lim_{\tau \to 0, Z \to L} U'_q(\tau, q) = \frac{(1+q)(2+q)\gamma LT - \sigma(2-q)\gamma L(T-j)}{LT(2+q)^3}$$

and

$$\lim_{\tau \to 0, Z \to 0} U'_q(\tau, q) = \frac{q(1+q)\gamma LT - \sigma(1-q)\gamma L(T-j)}{LT(1+q)^3}.$$

The first limit is always positive, and then we can conclude that, provided that the difference in size between L and Z is small enough, $\frac{\partial \tau^\diamond}{\partial q}$ is positive for low values of τ (as stated in Proposition 3: in fact a weak majority is likely to induce restrictive policies).

The sign of the second limit depends on q: in particular, the numerator is a quadratic function of q. Since the whole fraction assumes the values of $-\frac{\sigma(T-j)(\gamma L-1)}{LT} < 0$ and $\frac{\gamma}{4} > 0$ respectively in correspondence of $q = 0$ and $q = 1$, we can conclude that:
$\exists \hat{q}$: (i) for $0 < q < \hat{q}$, $\frac{\partial \tau^\diamond}{\partial q} < 0$, and (ii) for $\hat{q} < q < 1$, $\frac{\partial \tau^\diamond}{\partial q} > 0$.