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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 net gains from immigration. We focus on the provision of a public good: immigrants 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 potential immigrants, the political composition and the age structure of the native population, and the sensitivity of the migration choice to voting rights, all are decisive factors in determining the political choice over the optimal timing of naturalization.

JEL classification: D72; F22; H2; J61.

Keywords: Immigration; Naturalization policies; Voting; Public goods.

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1 Introduction

According to the OECD (2001) report on international migrations, developed countries display 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 the number of years spent in the host country[1], which goes (see Table 1) from a minimum of 2-3 years (Netherlands, Australia, Canada) to a maximum of 12 (Switzerland). Additional features are often required: for instance, proficiency in English and some knowledge of American history are necessary to acquire U.S. citizenship.

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

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

Source: OECD.

This could suggest that behind the concession of citizenship there is a concern for *assimilation* and *integration*[2]: the reluctance in granting political rights to immigrants

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

[2]This is clearly stated in the case of Belgium, where showing a true "desire to integrate" is a

may be due to the fact that natives worry about a possible "distortion" of the political process, as a consequence of foreigners' different preferences, tastes and political sensitivity.

However, the acquisition of citizenship (*tout-court* naturalization) 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. Again, we find a minimum number of years of residence to be the main requirement in this respect, and we observe that OECD countries adopt very different policies (as it is shown in Table 2). In the cases of United Kingdom and Spain, it can be noticed that voting rights are granted quite immediately to people coming from former colonies or bordering countries: "cultural affinity" may favor the concession of voting rights.

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)

Source: OECD.

There is much ongoing debate around the 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 orientation: 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[3], while in 2003

condition to obtain citizenship.

[3]The text adopted by the Parliament is based on the 1996 Annual Report of the Committee on

the same institution has suggested to consider a threshold of 3 years[4].

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 decreasing significantly over time. Once we take into account that an optimally limited number of immigrants could be an asset, more than a liability, for the welfare state (as argued, for instance, by Storesletten, 2000), the following explanation might be put forward: the heterogeneity of immigrants' preferences regarding public decision-making is a crucial concern for natives when they legislate about the concession of voting rights to foreign-born workers. We should also keep in mind that, to some extent, naturalization policies, together with other and more powerful tools (quotas, regulations on the concession of visas), play a role in determining the actual size of migration inflows.

Of course, alternative and complementary explanation are perfectly plausible: rather than being influenced by different preferences, the choice of naturalization policies may depend, for instance, on the skill composition of migration inflows, and its effects in terms of expected wages. It should also be clear that the issue of voting rights and citizenship involves many and important non-economic considerations. Although economic factors play a role, different naturalization policies across countries can be also explained invoking differences in culture, history and political tradition.

To the best of our knowledge, in the economic literature there is no model 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 therefore a political conflict may arise between new and old immigrants, implying that any lag in the

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".

[4]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".

concession of voting rights can persist in a political equilibrium. However, they don't deal with 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 immigration, the native population of a developed country decides when future immigrants should be granted the right to vote, knowing that (i) immigrants may eventually use this right to intervene in a voting process over the provision of a public good, and (ii) expectations on naturalization policies affect the location decision of prospective immigrants. The last point deserves some preliminary discussion. Although wage differentials are in most cases the main force driving migration flows, the quality of citizenship offered abroad matters as well: *ceteris paribus* a country which offers to the potential migrant earlier naturalization and/or political participation would be more attractive as a destination country. Moreover, naturalization implies sizable economic benefits: some contributions to the empirical literature on naturalization and assimilation, like Bratsberg et al. (2002) or DeVoretz and Pivnenko (2004, 2005), show that naturalization entrains, for instance, easier participation to the national labor market and higher wages.

Finally, our model can be also related to a couple of papers by Dolmas and Huffman (2004) and Ortega (2004), which study how natives choose *immigration* policies by majority voting, anticipating how the presence of immigrants will modify future redistributive tax policies, or the relative political power of different skill groups. Our contribution, however, deals with *naturalization* policies, whereas in the mentioned models the acquisition of voting rights is exogenously fixed[5]; moreover we focus on preferences as a source of heterogeneity (instead of skill levels, for instance).

This paper is then organized as follows. Section 2 presents and solves the basic model. Section 3 checks the robustness of our theory to a change in the voting

[5]In Ortega's paper only the children of current immigrants will become citizens with full voting rights; Dolmas and Huffman assume that the immigrants themselves can vote, once admitted in the host country.

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, i.e. the number of years that immigrants should reside in the country before being granted the right to vote. In the *second* one, which could actually involve many repeated voting events, both natives and naturalized immigrants decide about 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 for this modeling choice is essentially a technical one: as it will be shown later in Section 3, an alternative setup with double majority voting would have entrained an important loss of smoothness for our model. However, assuming that the decision on the tax rate takes place 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), allows the minority to play a role in the political process, and this is, from our viewpoint, a desirable and realistic feature of the model[6].

2.1 The basic setup

We start by considering our toy economy as being in isolation, 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 the different preferences they have about a public (or publicly provided) good g.

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

[6]Moreover, we would also see voting on political rights as a typical "referendum" issue which undergoes majority voting.

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

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

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

However, both groups want to consume the private good c. This characterization of "different tastes" is not new in the literature: a very similar formulation can be found, for instance, in Bisin and Verdier (2000).

In our 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 probabilistic voting; a is chosen to maximize the following objective function:

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

Here, probabilistic voting is presented 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).

After solving $\partial W/\partial a = 0$, the optimal value for a is given by:

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

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 hold 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" public good, whose supply native workers are far more concerned about. It seems then natural to assume $L > Z$.

The idea is that the taste for the consumption of such a good (or for a peculiar quality of some public good) is enhanced 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 provides 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[7].

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

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

[7] 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

As long as voting rights are denied to immigrants, we have that expression (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 modifies into:

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

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

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

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

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

It is easy to check that $a^{\vee} < a^{*} < a^{\circ}$. Moreover, if we focus on the quantity of public good that is actually produced on the basis of the voting outcome, we would have that $g^{\vee} = g^{*} < g^{\circ}$; in fact both g^{*} and $g^{\vee}$ are equal to $(\gamma L - 1)$, while:

$$g^{\circ} = \gamma L \frac{(L+hM+Z)}{(L+Z)} - 1.$$

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[8], but still depends on h, through the argument of the utility function (that is $(1-a)hw$). As a consequence, from the viewpoint of the L-type natives there is a trade-off associated with h: a higher h implies from one side a higher contribution of the foreign workers to production, but on the other side it

[8] This is not unquestionable; political participation may indeed be positively correlated with human capital.

causes immigrants to have a higher wage and thus a heavier concern for the voting outcome (see the last term of (9)). As long as immigrants are entitled to vote, the two effects exactly counterbalance each other (in terms of production of the public good), determining $g^{\vee} = g^*$; nevertheless, natives still benefit from migration since $a^{\vee} < a^*$ (the utility gain takes place through a higher c). On the other hand, the presence of foreign workers without voting rights allows the L-type majority of natives to realize a utility gain on g, since g° exceeds g^* (by a quantity that is proportional to hM). However, the total utility of a representative L-type agents is higher when immigrants cannot vote. In fact, $u_L(a^{\circ}) - u_L(a^{\vee})$ is given by:

$$\gamma \left\{ \log \left[\frac{\gamma L(L + hM + Z)}{L + Z} \right] - \log(\gamma L) - \frac{hLM}{(L + Z)(L + hM + Z)} \right\};$$

the expression above is zero for $M = 0$, and it is increasing in M, since $\partial(u_L(a^{\circ}) - u_L(a^{\vee}))/\partial M = h\gamma(hM + Z)/(L + hm + Z)^2$.

Therefore, 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 now want 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 who, on a pure economic ground (higher wages), would be interested in working and living in that country. As we explained in the Introduction, although these economic determinants are likely to be predominant in shaping the location choice of the migrants, we can reasonably 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 that offers earlier and wider political participation would be more likely to be elected as a migration country. In fact, political participation may be by itself an argument of utility (implying social status and participation to the decision process), but citizenship also entrains a number of economic benefits: for instance Bratsberg et

al. (2002) show that "... following naturalization, immigrants gain access to public-sector, white-collar and union jobs, and wage growth accelerates - consistent with removal of employment barriers."

Suppose now 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 determined as:

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

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

The parameter σ determines how much sensitive the migration decision is to the issue of voting rights: 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[9]. Moreover, σ could be interpreted as a measure of the economic benefits induced by citizenship: for instance, if the obtention of citizenship raises significantly expected wages and proves crucial to remove employment barriers, we should expect σ to be high. In any case, for $0 < \sigma < 1$ we can see that the higher is τ (the later voting is allowed), the smaller the number of actual migrants is.

Fixing the migration law as above we have introduced a crucial trade-off linked to τ, from the viewpoint of L-type voters. In fact, an earlier concession of voting rights means more foreign workers in the home economy, and consequently a larger collectible tax base to finance the production of the g good. On the other hand, a low τ implies that the immigrants intervene for a larger number of years in the voting process, thus determining a value for a which will be for a longer period different from the ideal value supported by L-type natives, and which will also be the more different the larger the number of immigrants is.

[9]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.

2.3 Voting over the residence time requirement τ

Let us now 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 that makes people eligible for voting: 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 also are all of the same age; more precisely the representative native agent is supposed to be j years older than the representative immigrant[10], her residual life being thus fixed to $T - j$ years.

The collective choice over τ will take place once for all exactly before the immigrants' cohort arrives in the home economy (to avoid complications in the analysis, we prefer to assume that τ will be never re-voted after immigration), 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.:

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

where i denotes preferences ($i = L, Z$), and a° and $a^{\vee}$ are as in (8) and (10). To keep things simple, and without any substantial change in the results, we have preferred not to introduce any time discounting.

Looking at equation (12), we can see how the utility of native voters will be affected for τ years by a tax rate decided without the participation of the immigrants (a°), while in the remainder of their life ($T - j - \tau$ years), their utility is influenced by the

[10] Alternatively, we may have assumed that natives are distributed in T different cohorts, and that each cohort is composed by $l + z$ individuals, where $l = L/T$ and $z = Z/T$. Adding this kind of cohort structure, which by the way implies no kind of demographic growth, and assuming that the distribution of preferences does not undergo any evolution over generations, would produce a more complete and realistic description. However, it would introduce additional complexity without changing the main results of the model.

fact that foreign workers can exert their right to vote, determining a different tax rate ($a^{\vee}$).

All Z-type natives will vote in favor of an immediate concession of voting rights to 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:

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

The second part of equation (13) writes this way because if $\tau \geq T - j$ the native worker will never be faced with an a chosen with the participation of the immigrants, so that the second half of (13a) disappears; as far as the first part is concerned, whatever τ, it will always involve $T - j$ years, with τ only affecting a° as in (8).

We can claim what follows.

Proposition 1 *L-type native voters have 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 intersect 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). $\sqcap$

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 the L-type class, and

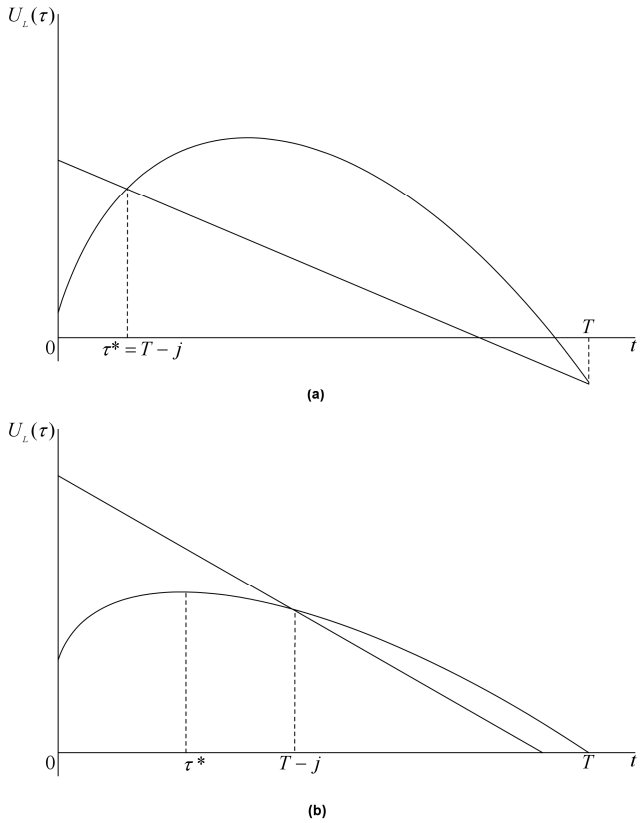


Figure 1: Lifetime utility

the most preferred τ by L-type workers (τ^*) will be also the one selected by majority voting ($\tau^\diamond$).

As a preliminary result we might be interested in establishing how τ^* depends on j. It can be shown that:

Proposition 2 *The most preferred $\tau^*(= \tau^\diamond)$ is a non-monotone function of the age of natives j: more precisely it is $\cap$-shaped. In other words: there exist a $\hat{j}$ such that $\tau^* = f(j)$ is increasing for $0 \leq j < \hat{j}$ and decreasing for $\hat{j} < j \leq T$.*

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, $\tau^* = f(j)$ is monotonically increasing in j (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. $\sqcap$

Therefore, dismissing the possibility that $j > \hat{j}$ as a non-realistic extreme case, we could say that a relatively "old" host country would opt, *ceteris paribus*, for a more restrictive naturalization policy.

We can then go ahead, and claim what follows:

Proposition 3 *Let $\tau^{\diamond}$ be the value for τ obtained through majority voting. Then, for values of h and Z that are not too large, we have that: $\partial\tau^{\diamond}/\partial h < 0$. Otherwise, the more skilled immigrants are, the later voting rights will be granted.*

Proof.

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

Proposition 3 tells us that the attitude of L-type natives toward the concession of voting rights to immigrants becomes more favorable if foreign workers are more skilled, provided that h is not already too high and provided that the size of the Z-type group remains reasonably small. In fact, when at least one between h and Z is "relatively large", the positive marginal impact that an increase in h induces on L-type utility through increased production, could happen to be more than counterbalanced by the negative marginal impact on L-type utility through a smaller a: in this case native voters would react to an increase in h delaying the concession of voting rights, since they could benefit for a higher number of years from the high productivity of immigrants and from their exclusion from the voting process. The effect of τ on the actual size of immigration prevents τ^* from increasing unboundedly.

Moreover, we can state the following:

Proposition 4 *For relatively low values of $\tau^{\diamond}$, the more sensitive the migration choice is to the issue of voting rights, the earlier naturalization occurs, i.e. $\partial\tau^{\diamond}/\partial\sigma < 0$.*

Proof.

See Appendix C.

Proposition 4 says that naturalization is easier 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. As explained before, σ can be high because naturalization implies

notable economic benefits, or because prospective immigrants attach a high value to political participation. Whatever the case, here we have taken σ as an exogenous parameter. However, it would be natural to consider σ as a positive function of h: when deciding about their location, high-skilled migrants may care about the citizenship issue more than low-skilled workers[11]. In that case, the net effect of h on τ^* would be different from what Proposition 3 told us: in particular it would be more positive, in the sense that $\partial\tau^\diamond/\partial h < 0$ should hold for a larger number of cases.

Finally, defining $q = m/L$, we can also claim that:

Proposition 5 *For relatively low values of* $\tau^\diamond$, $\partial\tau^\diamond/\partial q > 0$ *if* $Z \to L$; *otherwise, if* $Z \to 0$, *then there exists a value* $\hat{q}$ *of* $q = m/L$ *such that: (i) for* $0 < q < \hat{q}$, $\partial\tau^\diamond/\partial q < 0$, *and (ii) for* $\hat{q} < q < 1$, $\partial\tau^\diamond/\partial q > 0$.

Proof.

See Appendix D.

Proposition 5 gives us some information about how the interaction between the size of potential immigration and the political composition of the native population may affect the selection 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 on 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 $\partial\tau^\diamond/\partial q > 0$ only if q is quite large[12]. This makes sense: 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 $\tau^\diamond$.

It would also be interesting to identify the Z-group as past immigrants. This would naturally motivate why immigrants and Z-type voters have the same preference

[11] High-skilled people may usually select their location among a larger pool of possible destination countries, when compared to the low-skilled, whose migration choice is normally much more constrained. Moreover, high-skilled people usually hold stronger ambitions about political participation.

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

about the good g, and Proposition 5 could be interpreted in a different way: if a country has experienced huge migration inflows in the past, it would be difficult for new immigrants to obtain voting rights quickly[13].

3 Majority voting over both a and τ

In this Section we want to show that our main results hold qualitatively unchanged if we assume that both policy decisions (respectively over a and τ) take place by means of majority voting.

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 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 $a^M = 0$.

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:

[13] Unless past immigrants make political pressure in favor of future immigrants. This could happen through the threat of political instability or simply because, assuming that voting is not organized on one single issue, political parties may allow easier naturalization in order to gain the consensus of existing immigrants.

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

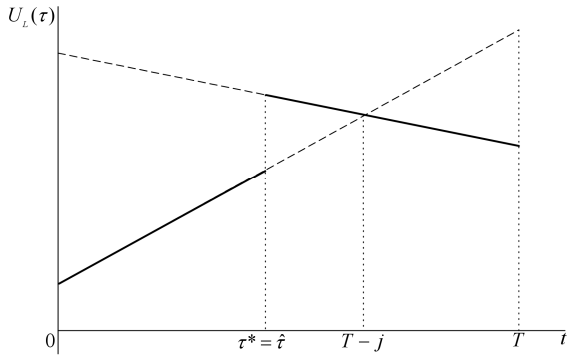
In (16a) we have written the expression for lifetime utility in the case of a migration inflow that is large enough to make a minority of the L-type natives. The value of τ which determines $L = Z + M$ is exactly $\hat{\tau} = T(m + Z - L)/\sigma m$.

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 this is the case if $\tau > T - j$.

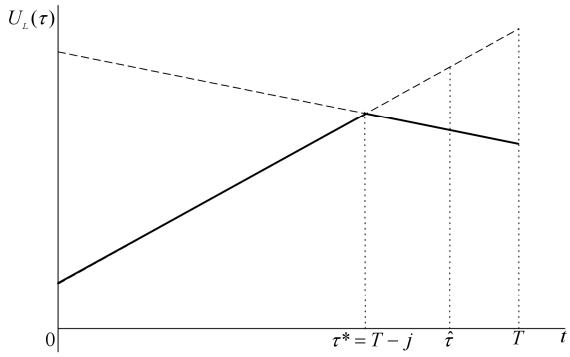
Therefore, L-voters' preferences are single-peaked (see Figure 2). The resulting optimal value of τ (τ^*) can be either $T(m + Z - L)/\sigma m$ or $T - j$, the latter being a sort of "corner" solution if j is particularly high, i.e. when the native population is much older compared to immigrants.

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 $\tau^* = T(m+Z-L)/\sigma m$, we can easily see that, in strong analogy with the case of probabilistic voting over a, we get that: $\partial\tau^\diamond/\partial\sigma < 0$, $\partial\tau^\diamond/\partial q > 0$, $\partial\tau^\diamond/\partial L < 0$, $\partial\tau^\diamond/\partial m > 0$ and $\partial\tau^\diamond/\partial Z > 0$.

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, the change in the political specification of the model induces a consistent loss of 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.



(a)



(b)

$$\hat{\tau} = \frac{T(m + Z - L)}{\sigma m}$$

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

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 whose purpose is to shed some light on the economic motivations that may hide behind the choice of naturalization policies 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 a majority voting process, and that 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 the native population is young enough 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 is. Moreover, we have seen how the fact that immigrants are high-skilled does not necessarily imply that they will earn earlier political participation.

Further research work should try to test empirically the predictions of our theoretical model, using information on naturalization policies and data on immigration (size, skill-composition, origin ...).

As a natural and interesting extension of our work, we would also suggest 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 the traditions of the host country. This kind of assimilation process may be expected to influence the setting of naturalization policies.

Finally, it could be very useful to have either (i) a more comprehensive model, which encompasses other components of immigration policies (like immigration quotas or selection by skill), or (ii) a complementary model proposing a different explanation of the naturalization policy (focusing, for instance, on the skill composition of native and foreign workers).

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

This Appendix supplies some analytical derivations that were used to get some of the main results of Section 2.

• R1: *Function (13a) is strictly concave in τ.*

The second derivative of (13a) w.r.t. τ ($U_{\tau\tau} \equiv \partial^2 U/\partial\tau^2$) writes as:

$$U_{\tau\tau} = -hm\sigma \frac{\gamma(L+hm+Z)T[2T(hm+Z)-3hm\tau\sigma]+hm\sigma[2T(T-j)(\gamma L-1)+\gamma hm\sigma\tau^2]}{[T(L+Z+hm)-hm\sigma\tau]^3}.$$

For $\tau < T-j$, and provided that $\gamma > 1/L$ and that T, L, m and Z are all larger than one, we can give a sufficient condition on Z for the above expression to be negative, i.e.:

$$Z > \frac{hm(3\tau\sigma - 2T)}{2T},$$

which indeed is not a restriction as long as $\sigma < 2T/3\tau$.

• R2: *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.

• R3: *$\tau^*(j)$, maximizer of (13a), is monotonically increasing in j.*

By the Implicit Function Theorem, we have that:

$$-\frac{U_{\tau j}(\tau,j)}{U_{\tau\tau}(\tau,j)} = \frac{\frac{hm\sigma T(\gamma L-1)}{[T(L+hm+Z)-hm\sigma\tau]^2}}{U_{\tau\tau}(\tau,j)}. \tag{17}$$

This expression is always positive: in fact we can ensure that the numerator is positive, while the denominator is always negative as proved before.

B Proof of Proposition 3

As it will be also the case in Appendix C and D, we work under the assumption that $\tau^* < T-j$.

To prove $\partial\tau^\diamond/\partial h < 0$ we simply need to prove $\partial\tau^*/\partial h < 0$. By Implicit Function Theorem, we know that $\partial\tau^*/\partial h < 0$ if $-U_{\tau h}(\tau,h)/U_{\tau\tau}(\tau,h) < 0$.

The sign of the last fraction strongly depends on the configuration of the parameters (let us also recall that the same τ^* can be obtained from different combinations of h and Z, for instance). However, we can look at the limit of the numerator:

$$\lim_{h\to 0, Z\to 0} U_{\tau h}(\tau, h) = -\frac{m(T-j)(\gamma L-1)\sigma}{L^2 T}.$$

It is easy to check that this limit is always negative. Since we already know that $U_{\tau\tau}(\tau, h)$ is always negative if $\tau < T-j$ (see Appendix A), we can conclude that $-U_{\tau h}(\tau, h)/U_{\tau\tau}(\tau, h) < 0$. This allows us to establish that $\partial\tau^{\diamond}/\partial h < 0$ if both h and Z are not too large.

We can also solve $-U_{\tau h}(\tau, h) = 0$ with respect to h. The outcome is a function $h^*(Z)$ representing, for a given τ^* (or $\tau^{\diamond}$) all the solution pairs (h, Z). This line divides the (h, Z) space in two regions: the interior region delimited by this locus and the two axis includes all the possible (h, Z) combinations for which Proposition 3 holds true. If for instance the given τ^* is determined by a pair (h, Z) belonging to the outer region, we would have that $\partial\tau^{\diamond}/\partial h > 0$.

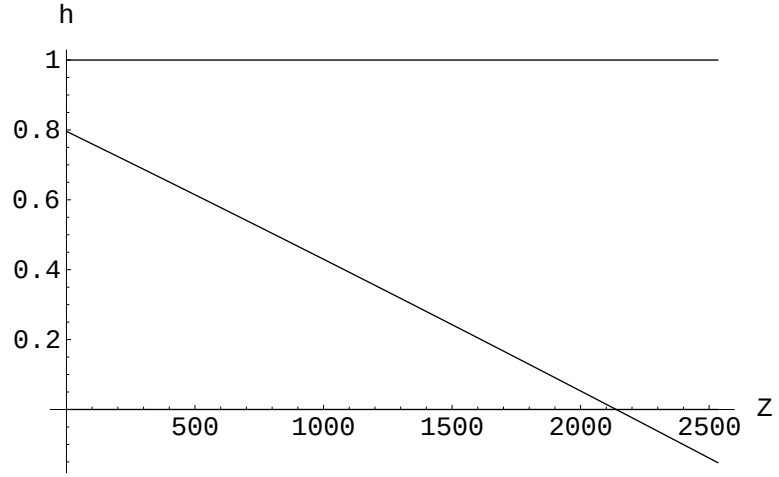

Figure 3: The locus $h^*(Z)$ in the (h, Z) space.

As an example, Figure 3 portraits the situation, as it comes from a numerical simulation based on the following parametrization: $L = 5500$, $m = 1900$, $w = 1$, $\gamma = 0.91$, $\sigma = 0.5$, $T = 55$, $\tau = 10$ and $j = 20$.

C Proof of Proposition 4

Now we turn to the sign of $\partial\tau^{\diamond}/\partial\sigma$. Applying the Implicit Function Theorem, we find that the sign of the fraction $-U_{\tau\sigma}(\tau, \sigma)/U_{\tau\tau}(\tau, \sigma)$ depends on the parameters and no general result can be established in advance. However, we can consider the following limit:

$$\lim_{\tau\to 0} U_{\tau\sigma}(\tau, \sigma) = -\frac{hm(T-j)(\gamma L-1)}{T(L+hm+Z)^2};$$

since it is always negative, we can say that $\partial\tau^{\diamond}/\partial\sigma < 0$, at least for relatively low values of τ^* (as claimed in Proposition 4).

D Proof of Proposition 5

Let us now study the sign of $\partial\tau^{\diamond}/\partial q$. We need to consider the following limits:

$$\lim_{\tau\to 0, Z\to L} U_{\tau q}(\tau, q) = \frac{(1+hq)(2+hq)\gamma hLT - \sigma h(2-hq)(\gamma L-1)(T-j)}{LT(2+hq)^3}$$

and

$$\lim_{\tau\to 0, Z\to 0} U_{\tau q}(\tau, q) = \frac{h[q(1+hq)\gamma hLT - \sigma(1-hq)(\gamma L-1)(T-j)]}{LT(1+hq)^3}.$$

The first limit is always positive, and then we can conclude that, if the difference in size between L and Z is small enough, $\partial\tau^{\diamond}/\partial q$ is positive for low values of τ (as stated in Proposition 5: 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 the parameter q. The whole fraction assumes the value $-\sigma h(T-j)(\gamma L-1)/LT$, which is negative for $q=0$. For $q=1$, it attains $h[h(1+h)\gamma LT - (1-h)(T-j)(\gamma L - 1)\sigma]/(1+h)^3 LT$ that is positive if h is not too low. Then, we can conclude that:
$\exists\hat{q}$: (i) for $0<q<\hat{q}$, $\partial\tau^{\diamond}/\partial q<0$, and (ii) for $\hat{q}<q<1$, $\partial\tau^{\diamond}/\partial q>0$.