Casting the naturalization of asylum seekers as an economic problem

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Reprinted from

ECONOMICS LETTERS

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ABSTRACT

The asylum seekers who choose the level of investment in the host-country-specific human capital, and the government of the host country that chooses the probability of naturalization are modeled as optimizing economic agents in a setting not of their choosing.

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1. Introduction

Political, legal, and moral conditions in many countries within the European Union, and beyond, compel admission of a certain number of asylum seekers.[1] A notable difference between migrants and asylum seekers is that while to a greater or lesser extent migrants plan ahead and prepare for their move to a particular country, asylum seekers do not. One important pre-move preparation is the acquisition of human capital, which will enhance earnings, such as, for instance, knowledge of the language of the country of destination. While asylum seekers cannot be expected to undertake such an investment *prior* to their unplanned departure, there is no reason not to expect them to consider acquiring human capital that will enhance their earnings *after* their arrival in the host country. Mitigating this expectation is the consideration that when this human capital is

highly host-country-specific, it will confer little benefit when the asylum seeker returns to his country of origin assuming, of course, that return will become feasible once the adverse circumstances that prompted the need for asylum are reversed. This prospect should come as welcome news to the government of the asylum seeker's host country, as it will have available to it a policy lever in a setting that it did not choose. If a larger investment in host-country-specific human capital enhances future productivity, earnings, and tax revenue, the government of the host country will want to induce and encourage such investment. One policy tool that is in the hands of the government is the probability of naturalization, assuming that the higher this is, the greater the incentive to the asylum seeker to invest in host-country-specific human capital. But before rushing to set a high level of probability, the government will want to weigh in the associated cost: after all, naturalization confers an entitlement to a package of goods and services associated with permanent residency or citizenship, and the provision of such a social package entails a fiscal burden. Presumably, the government will want to maximize its net revenue, weighing costs and returns, a behavior not very distinct from that of the asylum seeker.

It appears then that we have in place all the components of a Stackelberg-type game: the government chooses the probability of

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[1] The Universal Declaration of Human Rights establishes that "everyone has the right to seek and to enjoy in other countries asylum from persecution" (Article 14; http://www.ohchr.org/EN/UDHR/Documents/UDHR_Translations/eng.pdf).

naturalization from a set of feasible probability measures, well aware of the influence of its choice on an asylum seeker's incentive to form host-country-specific human capital. Each asylum seeker "takes" the government's choice and selects, from a set of feasible allocations, a level of investment in host-country-specific human capital which maximizes the present value of his net income. In turn, the government "takes" the asylum seekers' optimal responses to the probability of naturalization and maximizes the net tax revenue.

Several authors have recently contributed importantly to the scant research on the economics of asylum seeking (Hatton, 2004; Facchini et al., 2006), and to our understanding of the political–economic aspects of the naturalization of migrants (Ortega, 2005; Mariani, 2007). Hatton (2004) studied the reasons for asylum seeking (in particular, conflicts and political oppression), and Facchini et al. (2006) studied policy coordination between countries that host asylum seekers. The purpose, approach, and focus of the current paper differ, however, from those of these two contributions: the reasons for seeking asylum are not looked at in any detail (the phenomenon of asylum seeking, in and by itself, is largely assumed rather than explained), and the inter-country "game" is out of bounds in an analysis that seeks to unravel what occurs within a given country. In the current paper the game of interest is that which is played in the host country between the government and the asylum seekers, not that which is played between countries. Ortega (2005) and Mariani (2007) developed political–economy (voting) theories of the granting of citizenship. These two studies relate to migrants. The current paper draws however on a fundamental distinction between the characteristics and behavior of asylum seekers and those of migrants. The particular features of asylum seekers give rise to a set of policies that differs from the set of policies applied in the case of migrants. Thus, the current paper complements the received literature and, in particular, provides a new microeconomic framework for understanding the manner in which the government of the host country and the asylum seekers interact, and for predicting the outcome of that interaction.

2. Analytical framework

2.1. An asylum seeker's optimal level of investment in host-country-specific human capital

We model the active economic life in the host country of a representative asylum seeker over two periods. Let this asylum seeker be endowed with some general (fully internationally transferable) human capital the amount of which we normalize at one – henceforth the unit endowment of labor – but with no host-country-specific human capital. At the beginning of the asylum seeker's active economic life in the host country, the host country's government announces the probability of naturalization $\alpha \in [0, 1]$. The asylum seeker then bases his human capital acquisition decision (to be described below) on the government's communiqué, anticipating that at the beginning of the second period of his life he will be naturalized with probability $\alpha \in [0, 1]$. Naturalization confers entitlement to stay permanently in the host country and to receive there, just like any other citizen, the country's social package.

Denoting the proportion of the asylum seeker's unit endowment of labor allocated to work by $l \in [0, 1]$, the asylum seeker has a choice between working full-time ($l = 1$) and working part-time ($l < 1$), engaging in the formation of host-country-specific human capital in the remaining time ($1 - l > 0$). Work is rewarded by a competitive wage, $\tilde{w} > 0$, per efficiency unit of labor. Thus, the asylum seeker's first-period earnings are given by $\tilde{w}l$.[2] To allow for some exemption from taxation, it is assumed that wage earnings that are less than or equal to $\tilde{w}$ carry no tax, while wage earnings higher than $\tilde{w}$ are subjected to a fixed income tax rate, $t \in [0, 1)$. Hence, the asylum seeker does not pay any taxes in the first period of his active economic life in the host country since his first-period wage earnings will, at most, be $\tilde{w}$ (and his first-period net income will be equal to $\tilde{w}l$, $0 \leq \tilde{w}l \leq \tilde{w}$).

The amount of host-country-specific human capital (measured in efficiency units), denoted by h, which is available to the asylum seeker in the second period of his active economic life in the host country is yielded by the (twice continuously differentiable) human capital production function

$$h = \phi(1-l), \tag{1}$$

where

$$\phi(0) = 1; \quad \phi'(1-l) > 0, \quad \text{and} \quad \phi''(1-l) < 0 \quad \forall l \in (0,1), \tag{2}$$

and

$$\lim_{l \to 0} \phi'(1-l) = 0, \quad \lim_{l \to 1} \phi'(1-l) = \infty. \tag{3}$$

Clearly then, $\phi(1-l) \geq 1$ for all $l \in [0, 1]$. If no destination-specific human capital is formed in the first period of the asylum seeker's active economic life, the number of efficiency units of labor available to him in the second period remains equal to his unit endowment of labor. Otherwise, the number of efficiency units of labor available in the second period is increasing in the level of investment, but at a decreasing rate (cf. condition (2)).

The level of the asylum seeker's second-period income depends on the decision that he takes at the beginning of his active economic life which, in turn, is based on the announced naturalization policy of the government: when the asylum seeker is naturalized, his second-period net income is $(1-t)\tilde{w}\phi(1-l) + t\tilde{w} + S$, where S is the host country's social package given to all its citizens and permanent residents. However, with probability $1 - \alpha$ the asylum seeker is not naturalized, in which case he returns to his home country where his income is W_H. To rule out the possibility that an asylum seeker who is naturalized chooses to return to his country of origin (for economic reasons), we further assume that $\tilde{w} + S > W_H$.[3]

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[2] The foregone earnings $\tilde{w}(1-l)$ thus constitute the cost of forming host-country-specific human capital.

[3] Clearly, $\tilde{w} + S$ is the lowest level of net income that an asylum seeker who is naturalized will get in the host country.

Let the asylum seeker's intertemporal utility function be defined over periodic income, and be given by

$$U = u(\tilde{w}l) + \beta\{\alpha u[(1-t)\tilde{w}\phi(1-l) + t\tilde{w} + S] + (1-\alpha)u(W_H)\}, \tag{4}$$

where $0<\beta<1$ is the asylum seeker's discount factor, and u exhibits the usual properties of a (twice continuously differentiable) utility function that is strictly concave in the level of income, denoted by y, that is

$$u(0) = 0; \quad u(y) > 0, \quad u'(y) > 0, \quad u''(y)<0 \quad \forall y > 0; \quad \text{and } \lim_{y\to 0} u'(y) = \infty. \tag{5}$$

Taking the government-announced probability of naturalization as given, the asylum seeker chooses the optimal proportion of time allocated to work so as to maximize his expected utility from periodic income, cf. (4). This choice co-determines the optimal proportion of time invested in the formation of host-country-specific human capital. Differentiating Eq. (4) with respect to l yields

$$\frac{\partial U}{\partial l} = \tilde{w}\{u'(\tilde{w}l) - \beta\alpha(1-t)\phi'(1-l)u'[(1-t)\tilde{w}\phi(1-l) + t\tilde{w} + S]\}. \tag{6}$$

Given the properties of the functions $\phi(\cdot)$ and $u(\cdot)$ as represented by the conditions (2), (3), and (5), it can be readily shown that $\frac{\partial U}{\partial l}$ has the properties $\lim_{l\to 0} \frac{\partial U}{\partial l} = \infty$ and $\lim_{l\to 1} \frac{\partial U}{\partial l} = -\infty$. Since U is continuous on $[0, 1]$, twice continuously differentiable on $(0, 1)$, the preceding limits hold, and

$$\frac{\partial^2 U}{\partial l^2} = \tilde{w}[\beta\alpha(1-t)\phi''(1-l)u'((1-t)\tilde{w}\phi(1-l) + t\tilde{w} + S)$$
$$+ \beta\alpha(1-t)^2[\phi'(1-l)]^2 u''((1-t)\tilde{w}\phi(1-l) + t\tilde{w} + S) + \tilde{w}u''(\tilde{w}l)]<0 \quad \forall l \in (0,1), \tag{7}$$

then $\frac{\partial U}{\partial l}$ is strictly decreasing in l and "goes" from $+\infty$ to $-\infty$. Therefore, there is exactly one point where $\frac{\partial U}{\partial l} = 0$, at which, since the second derivative of U is strictly negative (cf. condition (7)), the second order condition for a maximum holds. That is, there exists an optimal interior level of $l^* = l^*(\alpha) \in (0, 1)$, which is uniquely determined by the first order condition

$$\beta\alpha(1-t)\phi'(1-l^*(\alpha))u'[(1-t)\tilde{w}\phi(1-l^*(\alpha)) + t\tilde{w} + S] = u'(\tilde{w}l^*(\alpha)). \tag{8}$$

Eq. (8) states that the optimal amount of time devoted to host-country-specific human capital formation in the first period of an asylum seeker's active economic life just balances the marginal utility derived from first-period income (the right-hand side of Eq. (8)) and the discounted expected marginal utility from second-period income (the left-hand side of Eq. (8)). The optimal time devoted to income generation in the first period of life is such that the marginal utility cost that arises from giving up work time, hence first-period earnings, has to be equal to the discounted expected second-period marginal utility gain that accrues from allocating the first-period forgone work time to the formation of host-country-specific human capital. Moreover, from the asylum seeker's optimization process we derive two implications: first, that choosing a positive level of host-country human capital formation will be the asylum seeker's optimal response to an announced 100% chance of being naturalized $\left(0 < \lim_{\alpha\to 1} l^*(\alpha) \equiv l_1^*\right)$ and second, that the time invested in the formation of host-country-specific human capital will tend to entirely disappear if naturalization were perceived to be highly unlikely $\left(\lim_{\alpha\to 0} l^*(\alpha) \equiv l_0^* = 1\right)$.[4]

Applying next the implicit function theorem to Eq. (8) with respect to l and α yields $\frac{\partial l^*(\alpha)}{\partial\alpha}$, the reaction coefficient of the asylum seeker to the government's announced probability of naturalization

$$\frac{\partial l^*(\alpha)}{\partial\alpha} = \frac{\beta(1-t)\tilde{w}\phi'(1-l^*(\alpha))u'[(1-t)\tilde{w}\phi(1-l^*(\alpha)) + t\tilde{w} + S]}{\left(\frac{\partial^2 U}{\partial l^2}\right)\Big|_{l=l^*(\alpha)}} <0, \tag{9}$$

where the inequality sign in Eq. (9) follows from the condition (7) and the properties of $\phi(\cdot)$ and $u(\cdot)$ as represented by the conditions (2), (3), and (5). Furthermore, we assume that

$$\frac{\partial^2(1-l^*(\alpha))}{\partial\alpha^2} <0 \quad \text{for } \alpha \in (0,1). \quad [5] \tag{10}$$

From the preceding analysis of the behavior of a representative asylum seeker we conclude that it is optimal for him to allocate time to the formation of host-country-specific human capital, that is $1-l^*(\alpha) \in (0, 1-l_1^*)$ as long as his naturalization probability is anticipated to be strictly

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[4] The proof of these two implications is in the Appendix.

[5] Assumption (10) implies that the positive effect that the probability of naturalization exerts on the formation of destination-specific human capital wanes at higher levels of α: the asylum seekers tend to respond more strongly with human capital acquisition to an increase in the probability of naturalization from, say, 10% to 15% than to an increase in the probability of naturalization from, say, 80% to 85%.

positive, $\alpha \in (0, 1)$, and that an increase in α increases the asylum seeker's optimal level of investment in host-country-specific human capital. Is it then optimal for the government to naturalize all the asylum seekers in its midst?

2.2. The government's optimal naturalization policy

The government of the host country is aware of the decision process that guides a representative asylum seeker's choice of the level of investment in host-country-specific human capital in the first period of his active economic life in the host country, and of its dependence on the probability of naturalization. Therefore, the government incorporates the reactions of the asylum seekers to its announced probability of naturalization, α, in its decision. The government knows that increasing α increases an asylum seeker's optimal proportion of time invested in human capital formation (viz. that $\frac{\partial l^*(\alpha)}{\partial \alpha} < 0$), which in turn increases the subsequent optimal level of efficiency units of labor. Consequently, when n is the total number of the asylum seekers in the host-country, the gross tax revenue to be collected from the naturalized asylum seekers is

$$R(\alpha) = \alpha n t \tilde{w} [\phi(1 - l^*(\alpha)) - 1]. \tag{11}$$

Since $\alpha \to 0$ entails $l^*(\alpha) \to 1$, announcing that there is no chance to be naturalized entails no host-country-specific human capital formation and thereby no tax revenue, viz., $\lim_{\alpha \to 0} R(\alpha) = 0$. Due to the properties of the $\phi(\cdot)$ function as given by Eqs. (2) and (3), and the reaction coefficient as given by Eq. (9), it can easily be shown that the tax revenue, $R(\alpha)$, is strictly positive and increases in $\alpha \in (0, 1)$. Since $\alpha \to 1$ entails $l^*(\alpha) \to l_1^*$, the maximum of the tax revenue approaches $\lim_{\alpha \to 1} R(\alpha) = n t \tilde{w} [\phi(1 - l_1^*) - 1]$, where we assume that $R(\alpha)$ increases at a decreasing rate,

$$R''(\alpha) < 0 \text{ for } \alpha \in (0,1). \tag{12}$$

This assumption together with the properties of the $\phi(\cdot)$ and $u(\cdot)$ functions as represented by conditions (2), (3), and (5) translates into a characterization of a (twice continuously differentiable) tax revenue function $R(\cdot)$: it is strictly concave in $\alpha \in (0, 1)$, where we assume that

$$\lim_{\alpha \to 0} R'(\alpha) = \infty. \tag{13}$$

The government's objective function is given then by

$$V = R(\alpha) - C(\alpha n, S), \tag{14}$$

where $C(\alpha n, S)$, which represents the cost of naturalizing αn of the asylum seekers, is assumed to have, for all S, the following usual properties of a (continuously differentiable) cost function

$$C(0,S) = 0, \quad C_\alpha(\alpha n, S) > 0 \quad \forall \alpha \in (0,1), \quad \text{and} \quad n \lim_{\alpha \to 0} C_\alpha(\alpha n, S) \equiv C_0 < \infty. \tag{15}$$

The government of the host country chooses the optimal probability of naturalization so as to maximize Eq. (14). The rationale for formulating Eq. (14) is that the government seeks to maximize its revenue from naturalizing αn asylum seekers net of the cost of the naturalization because it has the welfare of its natural-born citizens in mind. Assuming that what the government collects is transferred to its natural-born citizens, the welfare of the natural-born citizens will be higher the larger the government's net revenue. Thus, in its game with the n asylum seekers, the government will want to reap the highest possible net return to its naturalization investment. Differentiating V with respect to α yields

$$\frac{\partial V}{\partial \alpha} = R'(\alpha) - n C_\alpha(\alpha n, S). \tag{16}$$

From Eqs. (13) and (15), it follows that $\alpha \to 0$ entails $\lim_{\alpha \to 0} \frac{\partial V}{\partial \alpha} = \infty$. Therefore, $\alpha \to 0$ will not maximize the net tax revenue to be collected from the population of naturalized asylum seekers; any optimal choice of the probability of naturalization, given that it exists, must be positive. This is an interesting result, especially because it is derived for a cost function the properties of which are not exceptionally restrictive. What condition (15) calls for is that an asylum seeker who returns to his country of origin does not inflict any further cost upon the host country, and that naturalizing "one more asylum seeker" entails an additional cost. Moreover, Eq. (15) assumes that the cost of naturalizing only one asylum seeker is not prohibitively high, and that it gradually increases for small probabilities (proportions of n) of being allowed to stay in the host country (as is usually the case for linear or convex cost functions).

Let us, furthermore, think of a population of asylum seekers that is not too small relative to the native population of the host country (n is relatively large). When a great majority of these asylum seekers are naturalized (α is large), naturalizing the remainder certainly requires an outlay larger than the per capita cost of the social package, S, since the existing infrastructure of social and related services may not accommodate additional claimants. This would require assuming that the cost of naturalization increases at an increasing (or at least constant) rate. Moreover, thinking about a considerable number of asylum seekers, it is plausible to assume that the marginal cost of naturalization exceeds the marginal tax revenue if all the asylum claims are positively adjudicated ($\alpha \to 1$). These properties suggest complementing condition (15) by

$$C_{\alpha\alpha}(\alpha n, S) \geq 0 \quad \forall \alpha \in (0,1), \quad \text{and} \quad n \lim_{\alpha \to 1} C_\alpha(\alpha n, S) > \lim_{\alpha \to 1} R'(\alpha). \tag{15'}$$

Given Eqs. (12) and (15′), the government faces strictly concave revenue and convex cost. Since, moreover, the slope of the tax revenue function for $\alpha \to 0$ exceeds the slope of the cost function, there exists a unique interior optimum, $\alpha^* \in (0, 1)$, which is given by the first order condition for the maximization problem of the government of the host country

$$nt\tilde{w}\left(\phi(1-l^*(\alpha^*)) + \alpha^*\phi'(1-l^*(\alpha^*))\left(-\frac{\partial l^*(\alpha^*)}{\partial\alpha}\right)-1\right) = nC_\alpha(\alpha^*n,S), \tag{17}$$

where $l^*(\alpha^*)$ and $\frac{\partial l^*(\alpha^*)}{\partial\alpha}$ are yielded by Eqs. (8) and (9), respectively. The left-hand side of Eq. (17) is the (positive) additional revenue that the government collects from a small increase in the probability of naturalizing asylum seekers. The right-hand side of Eq. (17) is the associated marginal cost of naturalization. The optimal interior level of $\alpha^* \in (0, 1)$ just balances incremental revenue and incremental cost.

From the preceding analysis of the behavior of the government of the host country we can conclude that, given the properties of the $R(\cdot)$ and $C(\cdot,\cdot)$ functions (that is, properties (13) and (15)) a restrictive non-naturalization policy is never optimal for a rational government, and that for an arbitrary naturalization probability below its optimal level, it always pays off to render naturalization more likely.

3. Conclusions

This paper is built on three premises. First, even though seeking asylum may not be the outcome of a natural individual choice, the behavior following the application for asylum can fully reflect standard rational optimizing behavior. Second, the public cost of adjudicating asylum status can be countered by tax receipts generated from asylum seekers' (future) wage income. This income depends on the asylum seekers' productivity which, in turn, depends on their host-country-specific human capital. Third, the government of the host country can affect this human capital by signaling to the asylum seekers how likely it is that they will be permitted to remain permanently in the country. Governments have made available to them an array of policy instruments which sums up to such an indication. We have referred to these combined measures as the "probability of naturalization," although the "granting of permanent residence along with the right to receive various social services" serves exactly the same role.

An example of a testable implication of our analytical framework is that a higher naturalization rate will be associated with the asylum seekers exhibiting a superior proficiency of the host country's language, with causality running from the former to the latter rather than the other way around. One policy implication of the analysis is that the procedures and regulations that govern naturalization can be designed to elicit behavior that increases the level of economic assimilation and brings the government's associated net revenue to a maximum.

Appendix A

We provide a proof that $\lim_{\alpha\to 0} l^*(\alpha) \equiv l_0^* = 1$ and that $\lim_{\alpha\to 1} l^*(\alpha) \equiv l_1^* > 0$.

For any $\alpha \in (0,1)$, $0 \leq l^*(\alpha) \leq 1$. Let $\lim_{\alpha\to 0} l^*(\alpha) \equiv l_0^*$ be the asylum seeker's optimal response, $l^* = l^*(\alpha)$, to a probability of naturalization α, as $\alpha \to 0$. Assume that $l_0^* < 1$. Then, taking the limit ($\alpha \to 0$) of both sides of Eq. (6), we have

$$\lim_{\alpha\to 0}\frac{\partial U}{\partial l} = \tilde{w}u'(\tilde{w}l_0^*)-\beta\tilde{w}(1-t)\phi'(1-l_0^*)u'[(1-t)\tilde{w}\phi(1-l_0^*) + t\tilde{w} + S]\lim_{\alpha\to 0}\alpha. \tag{A1}$$

Since the terms $\tilde{w}u'(\tilde{w}l_0^*)$ and $\beta\tilde{w}(1-t)\phi'(1-l_0^*)u'[(1-t)\tilde{w}\phi(1-l_0^*)+t\tilde{w}+S]$ in Eq. (A1) are finite numbers under assumptions (2) and (5), $\lim_{\alpha\to 0}\frac{\partial U}{\partial l} = \tilde{w}u'(\tilde{w}l_0^*) > 0$. This contradicts the assumption that $l_0^* < 1$ is maximizing Eq. (4) given that $\alpha \to 0$. Therefore, we must have that $l_0^* = 1$.

Let $\lim_{\alpha\to 1} l^*(\alpha) \equiv l_1^*$ be the asylum seeker's optimal response, $l^* = l^*(\alpha)$, to a probability of naturalization α, as $\alpha \to 1$. Since from Eq. (9) we have that $\frac{\partial l^*}{\partial\alpha} < 0$, $0 \leq l_1^* < l_0^* = 1$. Assume that $l_1^* = 0$. Then, taking the limit (noting that $l^*(\alpha) \to l_1^*$ as $\alpha \to 1$) of both sides of Eq. (6), we have, assuming that $\phi(\cdot)$ is continuous in 1, that

$$\lim_{\alpha\to 1}\frac{\partial U}{\partial l} = \tilde{w}\lim_{l_1^*\to 0}u'(\tilde{w}l_1^*)-\beta\tilde{w}(1-t)u'[(1-t)\tilde{w}\phi(1) + t\tilde{w} + S]\lim_{l_1^*\to 0}\phi'(1-l_1^*). \tag{A2}$$

Since the term $\beta\tilde{w}(1-t)u'[(1-t)\tilde{w}\phi(1)+t\tilde{w}+S]$ in Eq. (A2) is a finite number under assumptions (2) and (5), from Eqs. (3) and (5) we have that $\lim_{\alpha\to 1}\frac{\partial U}{\partial l} = \infty$. This contradicts the assumption that $l_1^* = 0$ is maximizing Eq. (4) given that $\alpha \to 1$. Therefore, we must have that $l_1^* > 0$.

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