Economic Effects of Illegal Migration and its Alternatives

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Abstract

Current debates on US immigration policy suggest fighting against large scale illegal immigration and instead introducing temporary migration as an alternative. This work aims to study the effect of this and some alternative immigration policies on the economy and welfare of the agents.

1 Introduction

The current immigration debate (Comprahensive Immigration Reform Act of 2007: S.1348) evolves in to direction of substituting the 'hevean's door' for the illegal immigrants with a 'double-sided door' for temporary immigration. Such policy changes potentially affect the bases of fiscal policy, the macroeconomic aggregates and the welfare.

In this work a quantitative study will be conductd based on a model of colsed economy populated with overlapping generations.

[To be completed]

2 Model

The model presents a closed economy populated with overlapping generations of heterogeneous agents.

2.1 Population

The agents in these economy differ in several dimentions:

The cohort and age At each time period a group of agents are born in the economy, and assumingly in some source country of migrants which is not explicitly modelled. The agents born at the same time will be considered from the same cohort t. Further, with the time periods passing the agents age: Some of the first periods while the age $i < \varepsilon$, the agents will be considered as children. Later on they join the workforce and stay there till the age $i = I_r$ after which they are retired. All of the agents are out of economy by the age $i = I_e$. (The lifespan of the agents will be considered uncertain and evolving according to some *survival probability* in later versions.)

Legal status and Years in the economy The agents differ also according to their legal status in the economy, l. The following types are under consern: *native* $(l = L)$, *legal permanent immigrant* $(l = P)$, *legal temporary immigrant* $(l = T)$, *and illegal immigrant* $(l = I)$. (An implicit status of being at source country $(l = H)$ is also considered, however their role is limited to serving as incentive constraint to the immigrants.) Note that natives always stay in the economy. The permanent and illegal immigrants may also remigrate with positive probability. The temporary immigrants are allowed to stay in the economy for one period only, from then on they may choose to become illegal immigrants or go back to the home economy.

The agents will be migrating at different ages, and thus the agents from the same cohort and legal status may still have many of their characteristics different. Also years in the economy, y, (with combination of legal status) is important factor for determination of the social security benefits.

Skill level (education) It is assumed that the agent can be either of the three possible skill groups (education levels), e : low-skilled, $e = 1$; medium-skilled, $e = 2$; and high-skilled, $e = 3$.(Can be understood as school dropouts, high school graduates and collage degree.) The agents are born with some specific skill level, which they draw out of cohort specific probability distribution, $\eta_t(e)$ .Later the skill level will be translated into efficiency units for production: $\varepsilon(e, y)$.

Generation in the economy As Lee and Miller (*AER*, 2000) and Krieger (*JPopulE*, 2004) showed it is useful to count for the immigrant generations in the economy: As opposed to the natives the descendants of the immigrants tend to have skill level closer to their parents' (same is true for fertility rates as the demographic research shows). However, for convenience, the *generations will be omitted* as describing attribute of agents and instead the skill distribution will be modified to accommodate the 'reverse assimilation' of the natives.

2.1.1 Population dynamics

Measure on population There is a measure defined on type (i, s, a, e, y) agent of generation t as $\mu_t(i, s, a, e, y)$, where a is the assets that the agent holds at period t. It is necessary to differentiate the agents based on the assets as they may need to pay fine if they were residing in the economy illegally.

Newborns Newborns in the economy are all locals. At specific ages the agents in the economy 'produce' children. Depending on their type agents have different fertility levels, with less educated immigrants having the highest fertility rates:

$$\mu_t(1,0,\bar{e},L,1) = \eta_{t,e}(\bar{e}) \cdot \sum \mu_t(i,a,e,s,y) \cdot \phi(i,e,s)$$

where $\eta_{t,e}(\bar{e})$ should follow some rule that approximates the *reverse assimilation*, i.e. counts for the second generation migratns skill distribution .

Permanent and temporary immigrants The size of immigrants is pre-defined in each type of the economy studied. It can be some type of function of state variables of the economy. One particular example can be immigrants being fixed portion of current local population:

$$\mu_t(i,\bar{a},\bar{e},P,1) = \psi_P(i,\bar{e}) \cdot \eta_a(\bar{a}) \cdot \sum_{\substack{s\neq \\ temp,illeg}} \sum_{a,e,y} \mu_t(i,a,\bar{e},s,y)$$

where $\psi_t(\tilde{\imath},\tilde{s})$ is the pre-defined fraction of total population for new type $(\tilde{\imath},\tilde{s},2,\tilde{\imath})$ long term immigrants at time t.

The size of temporary immigrants is assumed to be result of a similar policy, thus:

$$\mu_t(i,\bar{a},\bar{e},T,1) = \psi_T(i,\bar{e}) \cdot \eta_a(\bar{a}) \cdot \sum_{\substack{s\neq \\ temp,illeg}} \sum_{a,e,y} \mu_t(i,a,\bar{e},s,y)$$

Thus the government controles distribution of the age and education level of the immigrants, but has no control over the assets that the immigrants bring with them.

Illegal immigratants Illegal immigrants enter to the economy without following any government function. However, governement has an indirect and costly way of controlling illigal immigration. Thus immigration can be presented as a function of legal immigrants and government enforcement level:

$$\begin{aligned}\mu_{t+1}(i+1,\bar{a},\bar{e},illeg,0) &= \underbrace{q(g_t)\cdot\sum_{\substack{a:\bar{a}=f_a(a)\\ illeg=f_s(a,illeg)}}\mu_t(i,a,\bar{e},illeg,0)}_{existing\ illegals}\\ &\quad\underbrace{+q(g_t)\cdot\sum_{\substack{a:\bar{a}=f_a(a)\\ illeg=f_s(a,temp)}}\mu_t(i,a,e,temp,1)}_{temps\ staying}\\ &\quad+\eta_e(\bar{e})\cdot\eta_a(\bar{a})\cdot\mathcal{L}\left(g_t,\sum_{l\neq 1}\sum_{i,s,m}\mu_{t+1}(i,a,e,s,0)\right)\end{aligned}$$

where g_t is the level of enforcement, and $q(g_t)$ is the probability that the illegal immigrant is not repatriated.

Ageing of population For a while a deterministic life span will be assumed, thus for $s=L,P$:

$$\mu_{t+1}(i+1,\bar{a},e,s,y+1)=\sum_{a:\bar{a}=f(a)}\mu_t(i,a,e,s,y)$$

2.2 Preferences and Value functions

Preferences follow Storesletten specification: the agents derive utility form consumption and leisure (children do not optimize, but rather consume government subsidies):

$$\max\sum_{i=\max\{\varepsilon,m\}}^{I_e}\beta^i\frac{\left[c^{\alpha}(1-n)^{1-\alpha}\right]^{1-\gamma}}{1-\gamma}\cdot\prod_{j=m}^{i-1}\pi_j$$

where $m=i-y$, i.e. represents the age at the moment of entering the economy, and π_i is assumed to be unity for all ages below the final I_e.

In each period agents consume and save (borrowing allowed) for the next period and pay taxes, while getting as income their return on labor and savings, and government transfers. Additionally, natives and permanent migrants contribute to social security and at late age collect social security benefits. Illegal immigrants only contribute to the social security but do not collect benefits due to their status. On the other hand, the temporary workers do not participate in social security system. As it was stated above the temporary migrants can choose to stay in the economy illegally facing the risk of repatriation, as do the illegal immigrants. Thus, if $V_s(i,a,e,y)$ denotes the value function for type (i,s,a,e,y) the agents face the following problems:

The locals:

$$V_L(i,a,e,i;N) = \max\{u(c,n) + \beta V_L(i+1,a',e,i+1;N)\}$$

$$\begin{aligned} c_i(1+\tau_t^c) + a'_{i+1} &\leq (1+r)a_i + IN_i \\ IN_i &= \begin{cases} w\varepsilon \cdot n_i(1-\tau^n) - T(n_i) + \chi_i & if\ i < I_R \\ P(h^i) + \chi_i & i \geq I_R \end{cases} \\ h^i &= (0,..0,n_{i-y},n_{i-y+1,\ldots,}n_i) \end{aligned}$$

For the permanent immigrants:

$$V_P(i,a,e,y;N) = \max\{u(c,n) + \beta\max[V_H(i+1,a',e,y);V_P(i+1,a',e,y+1;N)]\}$$

$$\begin{aligned} c_i(1+\tau_t^c) + a'_{i+1} &\leq (1+r)a_i + IN_i \\ IN_i &= \begin{cases} w\varepsilon \cdot n_i(1-\tau^n) - T(n_i) + \chi_i & if\ i < I_R \\ P(h^i) + \chi_i & i \geq I_R \end{cases} \end{aligned}$$

For the temporary immigrants ($i < I_R$):

$$V_T(i,a,e,1;N) = \max\left\{u(c,n) + \beta\max\begin{bmatrix} V_H(i+1,a',e,1;N); \\ q \cdot V_I(i+1,a',e,0;N) + \\ (1-q)\cdot V_H(i+1,a'-f,e,1;N) \end{bmatrix}\right\}$$

$$c_i(1+\tau_t^c) + a'_{i+1} \leq (1+r)a_i + w\varepsilon \cdot n_i(1-\tau^n)$$

For the illegal immigrants:

$$V_I(i,a,e,0;N) = \max\left\{u(c,n) + \beta\max\begin{bmatrix} V_H(i+1,a',e,1;N); \\ q \cdot V_I(i+1,a',e,0;N) \\ +(1-q)\cdot V_H(i+1,a'-f,e,1;N); \end{bmatrix}\right\}$$

$$\begin{aligned} c_i(1+\tau_t^c) + a'_{i+1} &\leq (1+r)a_i + IN_i \\ IN_i &= \begin{cases} w\varepsilon \cdot n_i(1-\tau^n) - T(n_i) & if\ i < I_R \\ 0 & i \geq I_R \end{cases} \end{aligned}$$

For those how will remigrate:

$$V_H(i,a,e,y) = \max\{u(c,n) + \beta V_H(i+1,a',e,y)\}$$

$$c_i\left(1+\tau_t^c\right)+a'_{i+1}\leq\left(1+r\right)a_i+\hat{w}\varepsilon\cdot n_i+\hat{\chi}_i$$

There is an implicit assumption here that the people at home do not think about comming back to the economy!

2.3 The government

The governement is responsible for three different policies: managing the social security system with balanced budget, immigration policy (predefined in each case), and the maintaining the general budget (including the cost of deterring illegal immigrantion).

The social security budget should be balanced? or should be balanced over long time period (as presented below, Breyer called it obscure!, Krueger uses balanced)?

$$\begin{aligned}\sum_{i<I_R}\sum_{s\neq T}\sum_{a,e,y}\mu_t\left(i,a,e,s,y\right)\cdot T\left(n_{i,a,e,s,y}\right) &= \sum_{i\geq I_R}\sum_{s=L,P}\sum_{a,e,y}\mu_t\left(i,a,e,s,y\right)\cdot P\left(h^i_{a,e,s,y}\right)\\ &\quad +Q_t\left(1+r\right)-Q_{t+1}\end{aligned}$$

$$¿\left[\lim_{t\to\infty}\frac{Q_t}{\left(1+r\right)^t}=0\text{ or }Q_t=0\right]?$$

The government budget on the other hand should balance the governmental incomes and expenditures (not connected to social security):

$$\begin{aligned}&\sum_{i<I_R}\sum_{a,e,s,y}\mu_t\left(i,a,e,s,y\right)\cdot\tau^n w\cdot\varepsilon_{i,a,e,s,y}n_{i,a,e,s,y}+\sum_{i,a,e,s,y}\mu_t\left(i,a,e,s,y\right)\cdot\tau^c n_{i,a,e,s,y}\\ &+f\sum_{\substack{i,a,e,y\\ s:illeg=f_s(a,s)}}\mu_t\left(i,a,e,s,y\right)\\ =\;&\left(B_t\left(1+r\right)-B_{t+1}\right)+\left(Q_{t+1}-Q_t\left(1+r\right)\right)+g_t\cdot\sum_{i,a,e,s,y}\mu_t\left(i,a,e,s,y\right)\\ &+\sum_{i,a,e,y}\sum_{s=L,P}\mu_t\left(i,a,e,s,y\right)\cdot\chi_i+\sum_{i\geq I_R}\sum_{a,e,y}\sum_{s=L,P}\mu_t\left(i,a,e,s,y\right)\cdot P\left(h^i_{a,e,s,y}\right)\end{aligned}$$

2.4 The production

Here it is assumed that the firm uses capital and labor inputs for production of the final consumption and investment good using CRS production function:

$$Y_t = z_t K_t^{\alpha} N_t^{1-\alpha}$$

where z_t is is the exogenous productivity level growing at a deterministic rate. This specification follows Storesletten (2000).

Alternatives:
Cortes, P. (JPE'2008):

$$Y = H^{\alpha} \cdot \left[(L^{\rho} + I^{\rho})^{1/\rho} \right]^{1-\alpha}$$

Chojnicki, Docquier and Ragot (2005):

$$\begin{aligned} Y_t &= A_t K_t^{\alpha} Q_t^{1-\alpha} \\ Q_t &= \left[L_t^{1/\rho} + \mu E_t^{1/\rho} + \Theta_t H_t^{1/\rho} \right]^{\rho} \end{aligned}$$