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Intergenerational Mobility and the Political Economy of Immigration

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Abstract

Flows of US immigrants are concentrated at the extremes of the skill distribution. We develop a dynamic political economy model consistent with these observations. Individuals care about wages and the welfare of their children. Skill types are complementary in production. Voter support for immigration requires that the children of median-voter natives and of immigrants have sufficiently dissimilar skills. We estimate intergenerational transition matrices for skills, as measured by education, and find support for immigration at high and low skills, but not in the middle. In a version with guest worker programs, voters prefer high-skilled immigrants but low-skilled guest workers.

Keywords*: immigration, political economy model, overlapping generations, intergenerational mobility, guest workers*

JEL*: F22, E24*

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1 Introduction

Stylized facts of international migration are that immigrants tend to be concentrated at the extremes of the skill distribution (high and low) and that high- and low-skilled immigrants are treated very differently. Many countries allow or even encourage immigration of high-skilled workers but accept low-skilled foreigners only temporarily (e.g. as guest workers) or under severe restrictions (e.g., as unauthorized/illegal immigrants subject to instant deportation).

We examine the political economy of immigration in a dynamic model in which natives care about their children and recognize that immigration influences the labor market for current and future generations. Skill types are complementary and the majority of natives is medium-skilled. Hence from a static perspective, the native majority benefits from foreign workers with skills far from the middle, both high and low.

The challenge is to explain the differential treatment of high and low skilled foreigners. A common argument is that natives worry about low-skilled migrants relying on welfare, whereas the high-skilled pay more taxes. Our model includes a simple tax-transfer system to account for this, but we find the welfare argument incomplete, at least for a country with modest welfare benefits like the US (modest compared to other developed countries). Our main contribution is to provide an alternative explanation: Using U.S. data on generational mobility, we show that children of low-skilled workers tend to compete in the labor market with the children of medium-skilled natives. In contrast, children of high-skilled workers have a skill distribution more complementary to the children of medium-skilled natives.

Children are a relevant concern because legal immigration generally includes children whereas guest worker programs exclude them. Unauthorized immigrants are typically confined to low skilled work and cannot easily settle down as families, being under a constant threat of deportation. De facto tolerance of unauthorized immigrants is therefore analogous to a guest worker program for unskilled workers; the analogy is not perfect, however, because many such immigrants may attempt to stay. In the model, we use "immigrant" and "guest worker" to distinguish foreigners who may, or may not, enter with their children. (For unauthorized immigrants either label may apply empirically, depending on immigration enforcement.)

For our data analysis, we define skills in terms of education levels. Those with a BA degree and above (e.g. Master or Ph.D.) are classified as "high-skilled", those with a high-school diploma or some college are "medium-skilled", and people without a high-school diploma are "low-skilled". Since 1970, about 60% of immigrants were either high- or low-skilled and only 40% medium-skilled. In the U.S. population, more than 50% are medium-skilled. Hence the ratio of immigrants to natives is greater at the high and low skill levels than for the middle group. For the period 1980-2013, we estimate that average annual net immigration into the U.S. was 6.08 low-skilled immigrants per 1000 low-skilled natives, 2.48 medium-skilled immigrants per 1000 medium-skilled natives, and 4.44 high-skilled immigrants per 1000 high-skilled US natives.[1] Thus immigration to the US is more prominently concentrated at the extremes of the skill distribution, as measured by education.

A difficulty in interpreting these flow data is that control over immigration is highly imperfect. Observed immigration is a combination of legal and illegal flows, and of job-related and other flows (e.g., non-working family members of earlier immigrants). To interpret the data, we set up a political-economy model to derive predictions about equilibrium immigration under alternative assumptions, and we examine under what conditions the model provides a positive theory.

The model has three types of labor inputs, low-, medium- and high-skilled; and two types of migrants, permanent immigrants and temporary guest workers. Each worker supplies one unit of their work-type to the production process, earns a wage, pays proportional taxes that are then redistributed via lump-sum. The number of children per worker and their skill/education levels are exogenous and determined by fertility and mobility profiles that depends on the parent's skill and place of birth.[2]

We calibrate the model to match the transition matrices of intergenerational skill transmission and fertility rates for natives and immigrants in the US. The calibrated demographic process is such that with or without immigration, the medium-skilled type are the absolute majority in each generation. Thus the medium-skill always determine policy outcomes. Our paper has therefore a quite different focus than the literature on the political economy of immigration, which examines under what conditions immigration might change voting majorities (such as Ortega (2010)).[3]

Immigration policy is defined by a set of quotas indexed by skill level and type of immigration permit (permanent vs guest-worker). Votes over immigration policy occur before the skill type of children is revealed. Immigrants don't have the right to vote, but the children of immigrants (a.k.a. 2nd generation immigrants) are modeled as identical to natives, i.e., as citizens with voting rights. We use the concept of Markov perfect equilibrium (MPE), as it is common in the literature of dynamic political economy.

Our analysis initially sets aside guest workers and focuses on the more challenging problem of modelling permanent immigration. We show that the medium-skilled majority chooses a positive level of low-skilled immigration, zero medium-skilled migration, and substantial high-skilled immigration. Thereafter, we add the possibility of guest workers, which is straightforward in our setting because guest workers do not raise intertemporal issues.

[1]See appendix for details on these numbers.

[2]Endogenous schooling and fertility choices would complicate the analysis significantly and are left as an area for future research. Both margins have implications for the true mobility opportunities of children, as well as the role of policy in shaping mobility (e.g. education spending). For example, Tamura (2001) has shown that public education can induce convergence in income in the US due to convergence in human capital as measured by education even in the presence of local school districts. Similarly, Tamura, Simon and Murphy (2016) have shown that black and white parent fertility converged over the last 200 years, together with convergence of human capital.

[3]The model predicts that voter preferences over immigration differ by education level. An empirical analysis of voting patters by education is beyond the scope of this paper but may be interesting issue for future research.

Two important objects in the model and of independent interest in this paper are the matrices of intergenerational mobility for natives and for immigrants, which we estimate from the General Social Survey (GSS). This survey collects information on education data on the respondents and their parents, and it also identifies whether the parents are foreign born, among other variables. The data required for our purposes is available since 1977. We find that on average the children of low-skilled and medium-skilled parents do better than their native counterparts, while there is no statistical difference for children of high-skilled parents. This is consistent with Card et al. (2000) who find that 2nd generation immigrants have higher average schooling and wages than children of natives parents with comparable education.

We obtain additional results about the relationship between intergenerational mobility and the political support for immigration by considering hypothetical changes in the mobility matrices. First, support for low-skilled immigration would be much reduced if a greater share of the children of low-skilled immigrants were medium-skilled rather than low-skilled. A shift by five percentage points would reduce low-skilled immigration by more than 50%. Second, support for low-skilled immigration would increase if a greater share of the children of low-skilled immigrants were high-skilled rather than low-skilled. A shift by five percentage points would more than double the low-skilled immigration quota. The intuition for both results is that voters who have mostly medium-skilled children favor immigrants whose children have different (complementary) skills. This suggests that intergenerational mobility matters quantitatively.

Turning to a setting with separate quotas for immigrants and guest workers, we find that the migration policy set by medium-skilled natives specifies that all high-skilled migrants should be immigrants whereas all low-skilled migrants should be guest workers. Moreover, the quota for low-skilled migration is higher than in a setting without separate quotas. Thus our model is consistent both with the observation that flows of immigrants are mostly concentrated at the extremes of the skill distribution and with the observed differential treatment of high and low skilled foreigners.

Real world immigration policy is of course more complex than our model. Notably, we do not incorporate family-based migration nor practical problems in selecting immigrants by skill type. Since the model implies zero medium skilled immigration, we attribute all observed medium skilled immigration to non-economic (primarily family-related) motives and to limited enforcement.[4] We view the practical feasibility of excluding or expelling migrants, or certain types of migrants, as beyond the scope of our model, because decisions about immigration enforcement involve concerns about international relations, migrants' human rights, and other non-economic issues. Changes in immigration policy – reforms – can therefore be interpreted as shifts between policies that are op-

[4] Minimizing medium-skilled immigration requires monitoring of programs meant to allow high-skilled immigration, notably the H1B program. Currently, the number of H1B visas is capped (with exceptions for researchers/professors at universities), and excess demand is allocated via lottery. President Trump has suggested reducing the number of HB1 visas and increasing the salary level required to apply. In addition, firms that use the H1B program are provided monopsony hiring power over the immigrant: workers cannot work for another company other than the sponsoring company. The lottery and monopsony features suggest that current policy is influenced by motives other than optimizing over immigrant skill levels.

timal in the model under different feasible sets as defined by enforcement. From this perspective, recent (pre-2016) US immigration policy is consistent with optimization under relatively restrained enforcement (tolerance for unauthorized immigration) and support for family-based immigration. The pre-2016 reform discussion favored, for instance, creating a guest worker program for unskilled workers and increasing the immigration of the high-skilled.[5] President Trump appears to favor less immigration, harsher enforcement, and less sympathy for family-based immigration; it is premature to judge if and in what form his agenda is implemented. Our model predicts that eventual reforms (passed by Congress as opposed to the policies being implemented by the Executive and which might not be permanent) will emphasize immigration based on skills, together with a low-skill guest worker program, much like previous efforts.

Additional support for the model can be gleaned from the experiences of other developed economies. In particular, the point-based immigration systems of Canada and Australia are designed to select immigrants with particular skills that are thought to contribute to their economies.

The paper is related to Ortega's politico-economic models on immigration with intergenerational mobility (2005, 2010), but our paper differs in that we use three skill types rather than two and show that our political economic theory of immigration implies different trade-offs, produces new conceptual insights, and raises interesting quantitative questions that cannot be addressed in a model with two skill types.

Other related papers include the seminal work of Benhabib (1996) on voting over immigration with heterogenous agents and Dolmas and Huffman (2004) work on immigration and redistribution. The paper uses a MPE concept, where actions depend only on the state of the economy and where current voters foresee the consequences of their choices on the future behavior of voters. The main reference on this is Krusell and Rios-Rull (1999). Papers explaining immigration policy using such equilibrium concept include Sand and Razin (2007) work on immigration and social security and Bohn and Lopez-Velasco (2017) work on fertility and immigration. Related empirical papers on the literature of intergenerational mobility of immigrants include Borjas (1992) and Card et al. (2000).

The paper is organized as follows. Section 2 presents the model and the equilibrium concept. Section 3 presents the empirical evidence on intergenerational mobility and fertility profiles of natives and immigrants, as well as the skill composition of immigration flows to the US. Section 4 presents the calibration of the model as well as some important results from the calibration exercise. In section 5, we use the model to ask applied questions. Section 6 does sensitivity analysis. Section 7 concludes.

[5] Major attempts at overhauling immigration include the *Comprehensive Immigration Reform Act* in 2006, The *Secure Borders, Economic Oportunity and Immigration Reform Act* in 2007 and the *Border Securiy, Economic Opportunity and Immigration Modernization Act* in 2013 which included an increase in high skill visas and/or a point system, and some form of guest worker program for low skilled workers.

2 The Model

2.1 Demographics

Adults live for one period, work full-time, and have children. Individuals are grouped by skill level and immigration status. There are three skill types, which will earn different wages: low-skilled workers (type 1), medium-skilled (type 2) and high-skilled (type 3).

Domestic-born individuals (henceforth: natives) can vote, as can their children. Immigrants cannot vote, but their children are considered natives, and as such have the right to vote. Guest workers also cannot vote and they are assumed to leave their children abroad or return to their countries of origin. They matter only for current-period labor supply and have no impact on population dynamics.

There is intergenerational mobility across skill types: a child's skill level as adult has a distribution that depends on the skill type and immigration status of his/her parents. Children are assumed not to take any economic decisions. Skill is realized at the start of adulthood.

We assume throughout that a majority of natives is medium-skilled. (The assumption will be justified in the calibration of the model.) Thus policy is set by the medium-skilled. The other skill levels are relevant not for voting, but because medium-skilled parents do not know their childrens' skill when voting over immigration. Hence they care about the impact of immigration on future labor supply at all skill levels.

To model population dynamics, let $N_{i,t}$ denote the numbers of natives of skill-type i in period t, let $\theta^I_{it} \geq 0$ denote the quota of immigrants of skill type i as a percentage of the native group of the same skill, and let $\theta^G_{it} \geq 0$ denote the quotas of guest workers of skill type i (for $i = 1, 2, 3$), again as percentage of natives. Let $\theta_{it} = \theta^I_{it} + \theta^G_{it}$ denote total migrants.

Let natives have η_i children, whereas immigrants have η^I_i children. Let q_{ij} denote the probability that the child of a *native* parent of skill type i will have skill type j $(i, j = 1, 2, 3)$. Similarly, let q^I_{ij} be the probability that the children of an *immigrant* parent of skill type i will have skill type j.

With these definitions, the evolution of the native population by skill type is

$$N_{i,t+1} = \sum_{j=1}^{3} \left(\eta_j q_{ji} + \eta^I_j q^I_{ji} \theta^I_{jt}\right) N_{j,t}, \text{ for } i = 1, 2, 3, \tag{1}$$

which includes the children of immigrants. Key state variables in the voting analysis will be the implied ratios of low- and high- relative to medium-skilled population, $x_{1t} = N_{1,t}/N_{2,t}$ and $x_{3t} = N_{3,t}/N_{2,t}$.

For reference below, we define a more compact vector notation. Let intergenerational transition matrices for native and immigrants be

$$\mathbf{Q} = \begin{bmatrix} q_{11} & q_{12} & q_{13} \\ q_{21} & q_{22} & q_{23} \\ q_{31} & q_{32} & q_{33} \end{bmatrix} \text{ and } \mathbf{Q}^I = \begin{bmatrix} q_{11}^I & q_{12}^I & q_{13}^I \\ q_{21}^I & q_{22}^I & q_{23}^I \\ q_{31}^I & q_{32}^I & q_{33}^I \end{bmatrix}. \tag{2}$$

The cells are probabilities. For example, q_{13} is the probability that a child of a low-skilled native parent will be high-skilled. Hence the rows (denoted $Q_{[i]}$ and $Q^I_{[i]}$, respectively) add up to one.

Define the population vector $N_t = (N_{1t}, N_{2t}, N_{3t})'$, where $'$ denotes a transpose. Define the vector of population ratios $X_t = N_t/N_{2t} = (x_{1t}, 1, x_{3t})'$ (with dummy $x_{2t} \equiv 1$). Define policy vectors $\theta_t^I = (\theta_{1t}^I, \theta_{2t}^I, \theta_{3t}^I)$, $\theta_t^G = (\theta_{1t}^G, \theta_{2t}^G, \theta_{3t}^G)$, $\theta_t = \theta_t^I + \theta_t^G$ (dimension 1×3), and $\Theta_t = (\theta_t^I, \theta_t^G)$ (dimension 1×6). Then population and population ratios have the dynamics

$$\begin{aligned} N_{t+1} &= \mathbf{S}_t \cdot N_t, \text{ and} \\ X_{t+1} &= (\mathbf{S}_t \cdot X_t)/(\mathbf{S}_{t[2]} \cdot X_t), \end{aligned} \tag{3}$$

where

$$\mathbf{S}_t = \mathbf{S}(\theta_t^I) = \mathbf{Q}'\eta + \left(\mathbf{Q}^I\right)' \eta^I \cdot diag\left\{\theta_t^I\right\},$$

and $\mathbf{S}_{t[2]}$ is the second row of $\mathbf{S}_t$, $\eta = diag\{\eta_1, \eta_2, \eta_3\}$, and $\eta^I = diag\left\{\eta_1^I, \eta_2^I, \eta_3^I\right\}$.

Policy overall is defined by the vector Θ_t. Constraints on policy are imposed by the available supply of migrants and by the country's ability or inability to prevent guest workers from settling down as immigrants.

Limits on the supply of migrants are modeled as upper bounds $\theta_{it} \leq \theta_i^{\max}$ with $\theta_i^{\max} > 0$ ($i = 1, 2, 3$). The bounds also ensure that policy spaces are compact. For a wealthy country like the U.S., the most relevant economic constraint is the supply of high-skilled migrants, $\theta_3^{\max}$. We assume throughout that the supply of low- and medium-skilled migrants is effectively unlimited; this is implemented by setting $\theta_1^{\max}$ and $\theta_2^{\max}$ high enough to be non-binding.

If a country cannot prevent guest workers from settling down as immigrants, all migrants turn into immigrants and the supply of guest workers effectively equals zero.

Combining these constraints, we consider three main policy settings:

Setting (I) assumes that the supply of high-skilled immigrants is effectively unlimited and that all migrants can and will settle as immigrants. The former is arguably unrealistic and turns out to have implausible implications, but it is instructive as starting point, because it treats high-skill immigration like the others and is therefore least restrictive.

Setting (II) assumes a fixed "small" supply of high-skilled immigrants ($\theta_3^{\max}$), small enough to be a binding constraint; as in (I), all migrants are immigrants. This setting yields the most interesting results about equilibrium immigration and it will highlight the importance of intergenerational mobility.

Setting (III) adds guest workers to the policy choices in (II), so policy can set separate quotas for immigrants and guest workers at each skill level.

2.2 Production

Labor inputs are combined to produce output via a production function F,

$$Y_t = F\left(L_{1t}, L_{2t}, L_{3t}\right), \tag{4}$$

where F has constant returns to scale and L_{it} is the total labor supply of type i at time t. We assume that F has partial derivatives $F_i > 0$ and $F_{ii} < 0$, $F_{ij} > 0$ for $i, j = 1, 2, 3$. Wages $w_{it} = F_{i,t}$ equal the respective marginal products of labor.

We abstract from physical capital in the production function, because capital would complicate and sidetrack the analysis. As benchmark, note that in a small open economy facing a given world return to capital, capital would vary with labor a way that output net of capital costs is a function F with constant returns to labor as in (4). Since the U.S. is neither small nor closed, a careful analysis of capital inputs would require modeling the world capital market, which we see as beyond the scope of this paper. Hence we assume for simplicity that the net supply of capital to the US is sufficiently elastic that wage changes due to limited capital can be disregarded.

Each agent supplies one unit of their labor-type inelastically. Natives, immigrants, and guest workers are assumed to be perfect substitutes within each skill category,[6] which defines the labor supply of type i as

$$L_{it} = N_{it}\left(1 + \theta_{it}^{I} + \theta_{it}^{G}\right) = N_{it}\left(1 + \theta_{it}\right), \quad \text{for } i = 1, 2, 3. \tag{5}$$

Note that immigrants and guest workers of each type have the same impact on labor supply. Hence policy Θ_t enters only through the sums θ_{it}. Constant returns to scale imply that wages depend only on the labor supply ratios

$$\frac{L_{1t}}{L_{2t}} = x_{1t}\frac{1+\theta_{1t}}{1+\theta_{2t}} \quad \text{and} \quad \frac{L_{3t}}{L_{2t}} = x_{3t}\frac{1+\theta_{3t}}{1+\theta_{2t}}.$$

Hence wages depend on the elements of X_t and of θ_t, which we write as

$$w_{it} = w_i\left(X_t, \theta_t\right), \text{ for } i = 1, 2, 3. \tag{6}$$

There is one technical complication. Because the wage premiums $w_{3t} - w_{2t}$ and $w_{2t} - w_{1t}$ depend on relative labor supplies, wage premiums could be negative for some immigration policies (e.g.,

[6] There is evidence by Ottaviano and Peri (2012) that immigrants and natives for a same level of schooling/experience are not perfect substitutes. Borjas (2009) argues that for all practical purpose they can be considered perfect substitutes. For the present purpose out of simplicity we assume that they are perfect substitutes.

if high θ_3 raises L_{3t}/L_{2t} and reduces w_{3t} relative to w_{2t}). We rule out negative wage premiums by assuming agents may work in any job with a lower skill requirement than their own; i.e., the high-skilled can work in medium- or low-skilled jobs, the medium-skilled can work as low-skilled. This assumption ensures that wages satisfy $w_{1t} \leq w_{2t} \leq w_{3t}$ for all states and policies (X_t, θ_t) and is consistent with the identification of skills by schooling level since schooling is acquired sequentially. The job assignment is straightforward but tedious to formalize and therefore is relegated to the appendix.

2.3 Redistributional Taxes

In order to capture the fiscal impact of immigration in a simple way, we assume an exogenous tax rate τ on wages that is redistributed lump-sum. Tax payments are $\tau \cdot w_{it}$. The lump-sum transfer is $b_t = \tau \cdot \bar{w}_t$, where

$$\bar{w}_t = \frac{\Sigma_{i=1}^3 x_{it} (1 + \theta_{it}) w_{it}}{\Sigma_{i=1}^3 x_{it} (1 + \theta_{it})}$$

is the average wage. High-skilled workers are net contributors to the system and low-skilled workers are net beneficiaries, as they have above- and below-average wages, respectively. Medium-skilled workers may have wages above or below the average, depending on relative productivities and labor supplies. Hence their net contribution may be positive or negative.

Since $\bar{w}_t$ depends on the elements of X_t and of θ_t, one may write $\bar{w}_t = \bar{w}(X_t, \theta_t)$.

2.4 Preferences

Utility of a skill-type i agent depends on its own consumption (c_{it}) and on the expected utility of their children (v_{jt+1}). Consumption is derived from after-tax wages plus transfers:

$$c_{it} = (1 - \tau) w_{it} + b_t, \quad \text{for } i = 1, 2, 3. \tag{7}$$

There are no bequests or other financial linkages across cohorts.

Overall utility for each type is obtained recursively from

$$v_{it} = u(c_{it}) + \beta \sum_{j=1}^{3} q_{ij} v_{jt+1}, \quad \text{for } i = 1, 2, 3. \tag{8}$$

where $\beta > 0$ is a scalar that governs the strength of the altruism motive; the sum can be interpreted as expected value $E[v_{t+1}(\cdot)|i] = \sum_{j=1}^{3} q_{ij} v_{jt+1}$ conditional on parental type i.

2.5 Equilibrium

The transition matrices and fertility rates in this paper are such that the medium-skilled remains the majority each period, irrespective of the immigration quotas (justified with the empirical demographic profiles in the calibration stage). Hence they dictate immigration policy every period.

The main equilibrium concept used is Markov perfect equilibrium (MPE), where strategies of agents' are only a function of the state of the system. For our model, this state is described by the composition of the native population (X_t). Thus for the medium skilled workers (who set policy), a strategy maps the state X_t into a policy choice $\Theta_t \in \Omega_\Theta$, where Ω_Θ is a compact policy space (e.g., one of the cases defined in Section 2.1). The medium-skilled have a majority if $x_{1t} + x_{3t} < 1$. To work with compact sets, we use $\Omega_X = \{(x_1, 1, x_3) | x_1 \geq 0, x_3 \geq 0, x_1 + x_3 \leq 1\}$ as domain of X_t.

An equilibrium is then defined as follows:

Definition. A politico-economic equilibrium is a policy rule $P : \Omega_X \longrightarrow \Omega_\Theta$ that defines $\Theta = P(X)$ and a triplet of value functions (v_1^*, v_2^*, v_3^*) such that for all $X \in \Omega_X$:

i) Given the policy rule P and implied rules $\theta = p(X)$ and $\theta^I = p^I(X)$, continuation values are given by

$$v_i^*(X) = u_i(X, p(X)) + \beta \sum\nolimits_{j=1}^{3} q_{ij} v_j^*(\Psi(X, P(X))) \tag{9}$$

for $i = 1, 2, 3$, where $u_i(X, \theta) = u[(1-\tau) w_i(X, \theta) + \tau \cdot \bar{w}(X, \theta)]$ and

$$\Psi\left(X, p^I(X)\right) = (\mathbf{S}(p^I(X))X) / (\mathbf{S}_{[2]}(p^I(X))X) \tag{10}$$

ii) The policy rule P solves:

$$P(X) = \underset{\Theta \in \Omega_\Theta}{\arg\max} \left\{ u_2(X, \theta) + \beta \sum_{j=1}^{3} q_{2j} v_j^* \left(\Psi\left(X, \theta^I\right)\right) \right\}. \tag{11}$$

iii) $\Psi\left(X, p^I(X)\right) \in \{(x_1, 1, x_3) | x_1 \geq 0, x_3 \geq 0, x_1 + x_3 < 1\}$.

The definition requires that the value functions v_i^*, which are the expected lifetime utilities of type-i agents, are consistent with the population process and with the state of the economy induced by P. The policy P maximizes the expected lifetime utility of medium skilled natives (type $i = 2$), which are the voting majority. Since types 1 and 3 do not control policy, their value functions (v_1^* and v_3^*) are computed under the policy set by type-2. The optimization takes into account that type-2 offspring might be type-1 or 3 in the next generation, as well as the response of the next generation to the induced state (which is $\Psi\left(X, p^I(X)\right)$). For completeness, condition (iii) states that type-2 will retain its majority in the next period; this is not a binding constraint in the analysis below. For brevity, we refer to policies that maximize type-2 utility as optimal policies.

Note that there may be multiple policies that solve (11) and yield the same utility. Notably, wages are unchanged if migration is increased marginally at all skill levels in a way that relative labor supplies $\left(\frac{L_{1t}}{L_{2t}}, \frac{L_{3t}}{L_{2t}}\right)$ remain constant. Voters are generally *not* indifferent if this occurs through immigration, because immigration impacts their children. Voters are indifferent, however, if labor supplies were increased proportionally by guest workers. In our three policy settings, policies are nonetheless generically unique: in (I) and (II) because there are no guest workers, and in (III) because of a limited supply of high-skilled migrants.[7]

2.6 Static Analysis: $\beta = 0$ or Guest Workers Only

Dynamic effects would be absent if agents did not care about their offspring (if $\beta = 0$) or if all migrants were guest workers (if $\theta^I_{it} = 0$ exogenously for $i = 1, 2, 3$). Under both assumptions, agents would vote to maximize utility from current consumption. Since the medium-skilled are the majority, policy in equilibrium would maximize c_2.

We discuss these two special cases briefly, mainly to provide intuition; proofs and more details (notably, tedious case distinctions) are relegated to the appendix. For the discussion here, assume positive wage premiums and $w_2 \leq \overline{w}$ (which holds empirically).

Consumption depends on immigration policy through wages and transfers. On the margin,

$$\frac{\partial c_i}{\partial \theta_j} = (1 - \tau)\,\frac{\partial w_i}{\partial \theta_j} + \tau \frac{\partial \overline{w}}{\partial \theta_j}\ ;\ \ i, j = 1, 2, 3. \tag{12}$$

where time subscripts are omitted to reduce clutter. The wage effects $\frac{\partial w_i}{\partial \theta_j}$ are negative for a guest worker of the same type as the native and positive for a guest worker of a different type. Transfers $\tau\overline{w}$ are increased if the guest worker has a skill that earns an above average wage ($\frac{\partial \overline{w}}{\partial \theta_i} > 0$ iff $w_i > \overline{w}$), and decreased otherwise. Applied to the medium-skilled majority (c_2), one finds:

(a) $\frac{\partial c_2}{\partial \theta_3} > 0$, because more high-skilled labor increases both w_2 and $\overline{w}$. Hence high skilled migrants are admitted until $\theta^*_3 = \theta^{\max}_3$.

(b) $\frac{\partial c_2}{\partial \theta_2} < 0$, because more medium-skilled labor reduces w_2 and (under $w_2 \leq \overline{w}$) reduces transfers. Hence medium skilled migrants are not admitted, $\theta^*_2 = 0$.

(c) $\frac{\partial c_2}{\partial \theta_1} \lesseqgtr 0$ is ambiguous because more low-skilled labor increases w_2 but reduces $\overline{w}$. Hence θ_1 may have corner solutions (0 or $\theta^{\max}_1$) or an interior solution (if $\frac{\partial c_2}{\partial \theta_1} = 0$ for some $\theta^*_1 \in (0, \theta^{\max}_1)$). One can show that θ^*_1 is decreasing in τ, as consistent with Razin et al.'s (2011) insight that welfare discourages the demand for low skilled immigration.[8]

These findings determine unique immigration quotas when there are no guest workers (setting (II) with $\beta = 0$). Then $\theta^{I*}_i = \theta^*_i$ ($i = 1, 2, 3$), which means high skilled immigrants are admitted,

[7] To cover non-generic exceptions (e.g., if $\mathbf{Q}^I = \mathbf{Q}$ and $\eta^I = \eta$), we adopt Ortega's (2005) tie-breaker that indifferent voters unanimously choose the policy with the minimal total number of migrants. This can be justified as selecting the unique policy that would be optimal with an infinitesimal cost of processing work permits or with an infinitesimal element of decreasing returns to scale. The multiplicity issue motivates in part (apart from plausibility) why we do not study guest workers combined with unlimited supply of high skilled migrants.

[8] See appendix for more analysis. In principle, it is possible that $\theta^*_3 < \theta^{\max}_3$ (but only if $w_2 = w_3$) and/or that $\theta^*_2 > 0$ (but only if $w_2 > \overline{w}$). Positive wage premiums require (in the static case, not in general) binding $\theta^{\max}_3$, which rules out setting (I).

medium skilled immigrants are not admitted, and low skilled immigrants may or may not be admitted, depending on parameters.

Similarly, if all migrants were guest workers ($\theta_i^I = 0$ exogenously), one would obtain $\theta_i^{G*} = \theta_i^*$; since guest workers leave, this applies for all $\beta \geq 0$. High skilled guest workers would be admitted, possibly low skilled guest workers, but not medium skilled guest workers.

Alternatively, suppose there are separate quotas for immigrants and guest workers (setting (III)) and $\beta = 0$. Since wages depend on migration only through the sums $\theta_j = \theta_j^I + \theta_j^G$, voters are indifferent about immigrants versus guest workers.

Overall, the wage and tax effects documented in this section provide a motive for voters to support high and (at not too high tax rates) low skilled migration. The indifference between immigrants and guest workers for $\beta = 0$ shows that strict preferences for immigrants or for guest workers in the general model must be driven entirely by voter concerns about their children.

3 Empirical Evidence

3.1 Immigration Flows to the US by Education

Figure 1 shows two snapshots (2003 and 2017) of the percentage of foreign born population 25 years and older in the US by education categories as defined in the Current Population Survey (CPS). The percentage of the foreign born is roughly U-shaped, as noted by Peri (2016); that is, immigrants seem to be overrepresented at the extremes of the education distribution.

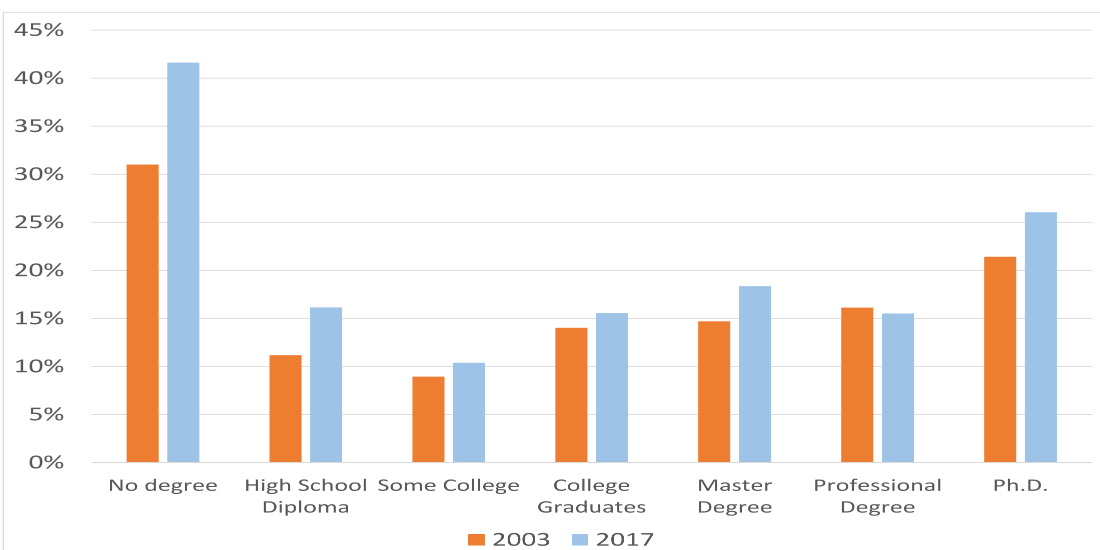

Figure 1. **Percentage of Foreign-Born in US by Skill Group (2003 and 2017)**

Our low-, medium-, and high-skill categories capture this phenomenon parsimoniously. Table 1 presents average data on the annual flows of immigrants by decade for the period 1980-2013 defining low-skilled as "Less than a High-School Diploma", medium-skilled as "High-School Degree" or "Some College", and high-skilled as CPS categories of "Bachelor" or more (details on data construction are presented in the appendix). For the entire 1980-2013 period, the average number of immigrants entering per year for every 1000 natives (of the respective skill type) were 6.08 for the low-skilled, 2.48 for the medium-skilled, and 4.44 for the high-skilled.

Table 1. **Average Annual Number of Immigrants by Type, 1980-2013 (# per 1000 Natives)**

	2010-13	2000-09	1990-99	1980-89	**Average**
Low (*Less than High School Diploma)*	5.30	7.05	8.21	3.29	6.08
Medium (*High School & Some College)*	2.50	1.98	3.36	2.10	2.48
High (*Bachelor or more)*	3.34	4.01	5.62	4.12	4.44

3.2 Intergenerational Mobility Matrices

We use the GSS in order to estimate the matrices of intergenerational mobility across education levels for children of natives and for children of first generation immigrants. The survey captures the education level of respondents and that of their parents since 1977, as well as if they were born in the US.

We consider individuals who were born on or after 1945 and whose age at the time of the interview was between 25 and 55 years old.[9] We classify individuals as 2nd generation immigrants if the respondent was born in the US but any of the parents were born outside the US. Natives in turn are individuals whose parents were born in the US. The education categories that define skill types as low, medium, and high are as defined previously. For individuals with educational information on both parents, we use the maximum degree obtained by any of them. (We also estimate these matrices across various subsamples, e.g. men and women, and with a classification of 2nd generation immigrants requiring that both parents were born outside the US. We find little variation in the results. See appendix for details.)

Using the above filters we estimate matrices of intergenerational mobility for both men and women given by

$$\widehat{\mathbf{Q}} = \begin{bmatrix} .256 & .663 & .081 \\ .062 & .707 & .231 \\ .010 & .397 & .593 \end{bmatrix} \quad , \quad \widehat{\mathbf{Q}}^I = \begin{bmatrix} .211 & .594 & .195 \\ .067 & .633 & .299 \\ .022 & .325 & .653 \end{bmatrix}, \tag{13}$$

[9]We cap age at 55 because of a well know relationship between mortality and education level, and also because using older individuals from the early years of the GSS means using observations who were born early in the 1900's. We use individuals born on or after 1945 as their average schooling years starting with that cohort has remained approximately constant (see the appendix for schooling statistics in the GSS).

with a sample size of 18,999 for children of natives and 1,447 for children of immigrants.

The first two rows of the estimated transition matrices show that the children of low-skilled and medium skilled immigrants to the US appear to be more ”successful” than natives. For low-skilled parents, children of immigrants have a lower probability of staying low-skilled, and a higher probability of upward mobility. Indeed, children of low-skilled natives have an 8% probability of becoming high-skilled, while for the children of low-skilled immigrants it is almost 20%. Given medium-skilled parents, the differences are not as marked as in the low-skilled case but their odds seem to be slightly better.[10]

We test formally if the probability distributions for natives and children of immigrants are statistically the same, conditional on the skill of the parents (details in the appendix). That is, we test if row i in matrix $\mathbf{Q}$ is statistically the same as row i in $\mathbf{Q}^I$. For all i =1, 2, 3, the null hypothesis is rejected at the 1% level. We also test for the equality of both matrices, which is also rejected at the 1% level. Further analysis with more disaggregated data (reported in detail in the appendix) indicates that: (i) children of low-skilled immigrants are significantly more likely to become high-skilled than the children of natives ($q_{13}^I > q_{13}$); (ii) children of natives and immigrant with high-skilled parents have similar skill distributions for most partitions of the data, and (iii) for all subgroups, intergenerational transition matrices of natives and immigrants differ significantly.

3.3 Fertility Rates

In order to calibrate the number of children that agents have, we construct total fertility rates (TFR's) by education level and nativity for 3 different years: 1990, 2000 and 2005. This concept measures the expected number of children that a woman would have in her lifetime if she was subject to the current (cross-section) age-specific fertility profiles.

Table 2. **Total Fertility Rates by Skill Level. Years 1990, 2000 & 2005**

	US-Born			**Foreign-Born**			**All Women**		
	Low	*Med*	*High*	*Low*	*Med*	*High*	*Low*	*Med*	*High*
2005	2.41	1.89	1.82	3.21	2.39	1.99	2.73	1.95	1.85
2000	1.98	1.94	1.82	2.78	2.44	1.99	2.26	2.00	1.84
1990	2.24	2.00	1.59	3.04	2.50	1.76	2.43	2.04	1.61
Average	2.21	1.94	1.75	3.01	2.44	1.91	2.47	2.00	1.77

The TFR's can be accurately calculated by education level for US women with birth data from the National Center for Health Statistics (downloaded from their VitalStats system), and

[10] We make two points about the results. First, for some occupations there can be high-skilled workers who work temporarily or permanently at lower skill levels due to language deficiencies, licensing restrictions (e.g. Medical doctors) or human capital that is not transferrable (e.g. lawyers) and those observations would (at least some of the time) not be counted as high-skilled. Second, some immigrants classified as low-skilled might be medium-or high-skilled according to other metrics and/or perhaps did not received education commensurate with their abilities. For those individuals, opportunities in the US for their children might seem much better than in their countries of origin. Both effects would improve the intergenerational mobility of low and medium-skilled immigrants.

age-education groups from Census data (1990, 2000) and the CPS (2005). However, the available data on births doesn't detail whether the mothers are US-born, or foreign-born. Hence in order to arrive at TFR's by place of births of mothers we also use information from several years of the American Community Survey (ACS). Details on the construction of these estimates are in the appendix. Our estimates are presented in table 2.

The estimated fertility rates show the well-known negative relationship between education and fertility, and also display that foreign-born women have higher fertility rates than US-born women of the *same skill level*.

4 Calibration

4.1 Demographic Profiles and Immigration Quotas

A population process is described in this paper by an intergenerational transition matrix ($\mathbf{Q}$), a vector of fertility rates (η) and a vector of immigration quotas (Θ). As benchmark, denote the steady-state composition of the native population in the absence of any immigration by $(x_1^0, 1, x_3^0) = X^0(\mathbf{Q}, \eta)$ (defined as the unique fixed point of $X^0 = \Psi(X^0, 0)$).

The model uses the matrices of intergenerational mobility $\mathbf{Q}$ and $\mathbf{Q}^I$ shown in equation (13). For the fertility rates of the model, we divide by 2 the TFR's shown in table 2 in order to obtain implied model parameters. This yields $\eta_1 = 1.1$, $\eta_2 = 0.97$, $\eta_3 = 0.87$ and $\eta_1^I = 1.5$, $\eta_2^I = 1.22$ and $\eta_3^I = 0.96$.

One way to assess the quantitative significance of these differences between natives and immigrants is by examining the implied composition of the population. Table 3 displays steady state ratios x_1^0 and x_3^0 implied by alternative assumptions about mobility and fertility.

Table 3. **Steady State Composition of Population.**

	Observed Mobility & Fertility		Mixed Mobility & Fertility	
	$(\mathbf{Q}, \eta)$	$(\mathbf{Q}^I, \eta^I)$	$(\mathbf{Q}, \eta^I)$	$(\mathbf{Q}^I, \eta)$
x_1^0	.0978	.1213	.1041	.1161
x_3^0	.5429	.7987	.5010	.8634

Using the data for natives $(\mathbf{Q}, \eta)$, assuming no immigration, one obtains $x_1^0 = 9.78\%$ (low to medium skilled ratio) and $x_3^0 = 54.29\%$ (high to medium skill ratio). If a population had (hypothetically) the mobility and fertility of first-generation immigrants $(\mathbf{Q}^I, \eta^I)$ forever, one would obtain larger shares of the extremes in the skill distribution, with $x_1^0 = 12.13\%$ and $x_3^0 = 79.87\%$. Considering populations that combine the mobility of natives with the fertility of immigrants, or the fertility of natives with the mobility of immigrants (see columns 3-4), one finds that differences in mobility are far more important than difference in fertility; that is, X^0 for $(\mathbf{Q}, \eta^I)$ is close to X^0 for $(\mathbf{Q}, \eta)$, and X^0 for $(\mathbf{Q}^I, \eta)$ is close to X^0 for $(\mathbf{Q}^I, \eta^I)$.

For the immigration quotas, we interpret a model-period as 30 years, which is roughly the average age of mothers. Given the annual flows of immigrants to the US reported in section 3.1, we obtain 30-year quotas of roughly $\theta_1 = 18\%$, $\theta_2 = 7\%$ and $\theta_3 = 13\%$.

4.2 Production, Preferences and Taxes

We assume that F has a constant-elasticity-of-substitution form (CES),

$$Y_t = \left[\phi_1 \left(L_{1t}\right)^{\rho} + \phi_2 \left(L_{2t}\right)^{\rho} + \phi_3 \left(L_{3t}\right)^{\rho}\right]^{\frac{1}{\rho}}, \tag{14}$$

where production parameters to be calibrated are ϕ_1, ϕ_2, ϕ_3 and ρ.

The elasticity of substitution $\left(\varepsilon = \frac{1}{1-\rho}\right)$ between labor types has been carefully estimated in different studies that control for experience and other observables for what is traditionally defined as "skilled" versus "unskilled" labor inputs, as well as specifications with 4 skill types which correspond to the categories "less than a high school diploma", "high school graduates", "some college" and "college graduates". When using the two-skill specification, the empirical estimates in many studies range between 1.5 and 2.5 (see the references in Ottaviano and Peri (2012) pp. 184), which would imply $0.4 \leq \rho \leq .66$. In specifications with more education types, the estimates range from 1.32 (Borjas (2003)) to the estimates in Borjas and Katz (2007) of 2.42, with Ottaviano and Peri's own estimates lying between those 2 extremes. These other set of estimates imply $0.24 \leq \rho \leq .78$. Even though the definition of the skill groups is different, the intermediate value for ρ in these intervals is very close to $\rho = \frac{1}{2}$, which we use as baseline parameterization. We later perform sensitivity analysis.

The parameters ϕ_1 , ϕ_2 and ϕ_3 are calibrated so that the model in steady state matches U.S. wage premiums for educational attainment. We normalize $\phi_1 + \phi_2 + \phi_3 = 1$ and use the equations

$$\left(\frac{\phi_i}{\phi_j}\right) = \frac{w_{i,t}}{w_{j,t}} \left(\frac{L_{j,t}}{L_{i,t}}\right)^{\rho-1} \qquad \text{for } i \neq j = 1, 2, 3, \tag{15}$$

that relate wage premiums and labor ratios to the production parameters in order to calibrate the latter.

We use census data of the average hourly wage of workers that are between 25 and 65 years old by educational attainment; that work at least 40 hours per week, and that worked at least 40 weeks in the previous year for census years 1990, 2000 and 2005 (IPUMS USA database, see Ruggles et al. (2017)). The skill categories are defined in terms of schooling under the same definition as for the intergenerational mobility matrices. The average wage ratios obtained are $\left(\overline{\left(\frac{w_2}{w_1}\right)}, \overline{\left(\frac{w_3}{w_2}\right)}\right) = (1.315, 1.67)$.[11]

As noted above, the demographic profile of natives $(\mathbf{Q}, \eta)$ yields steady state ratios of $x_1^0 =$

[11] At a generational frequency the returns to skill have increased in the US over time. We do not attempt to formally model these changes and so we calibrate the model by using the average ratios.

0.0978 and $x_3^0 = 0.5429$. Taking into account immigration quotas of 18% for the low-skilled group, 7% for the medium skilled and 13% for the high skilled group yield labor ratios given by $\left(\overline{\left(\frac{L_1}{L_2}\right)}, \overline{\left(\frac{L_3}{L_2}\right)}\right) = (.1078, .5733)$. Using these data in (15), we calibrate $\widehat{\phi}_1 = .0993$, $\widehat{\phi}_2 = .3977$, and $\widehat{\phi}_3 = .5030$.

For the period preferences, we assume log-utility ($u(x) = \ln x$), which is a standard benchmark in the literature. The sensitivity analysis will examine CRRA utility with alternative curvature parameters.

In initial parameterizations that explore the behavior of the model to alternative assumptions on the immigration choice space, we set the discount factor β as Ortega (2005), who uses an annual value of $\widetilde{\beta} = .985$ and that implies a model parameter of $\beta = .985^{30} = .6355$ when the model-period represents about 30 years. In some versions of the model (i.e. setting II) this parameter is calibrated endogenously.

For the tax rate (and implied level of redistribution), we use an average tax rate of 30%, approximately the current average from the series computed in McDaniel (2012) for labor and consumption taxes for the US.[12]

4.3 Closing the Model: The Supply of Immigrants

As outlined in Section 2.1, we limit the policy space by making assumptions about the supply of immigrants and guest workers. We now explain the assumptions in more detail.

For the low-skilled, we model supply as effectively unlimited by setting $\theta_1^{\max}$ high enough so that the maximum does not constrain immigration choices.

For the medium-skilled, arguments about supply turn out to be moot, because in all our calibrations, medium-skilled natives will not allow medium-skilled immigration. This is not a general result that would hold for all possible transition matrices, but a robust finding in the computational experiments.

For high-skilled immigration, we examine three policy settings, as follows:

(I) An "unrealistically large" pool of high-skilled immigrants. Our initial parameterization assumes that high-skilled immigration is essentially unrestricted, just like the other types. Such large supply is arguably unrealistic, but instructive. Specifically, we assume the supply of high skilled immigrants $\theta_3^{\max}$ is large enough that it includes immigration rates that would lead to an equalization of medium and high-skilled wages.

(II) A "small" pool of high-skilled immigrants; no guest workers. Our preferred alternative is that the pool of high-skill immigrants is small enough to be a binding constraint, and small enough to preclude wage equalization.

[12] The particular series used are the average tax rate on labor income, average payroll taxes and the average consumption taxes. Using those series from McDaniel's tax data from 1980 to 2010 results in a 28.7% average tax rate. We use a round number (30%). Sensitivity analysis on this parameter (not shown as the paper is already long) show that small variations in the tax rate produce the same conclusions.

This case is interesting for two reasons. First, U.S. immigration laws have until recently allowed high-skilled workers, especially those with advanced degrees, relatively easy access to coming/staying in the country. Even though H1B visas are typically exhausted, people with advanced degrees working in universities are exempt from the cap on H1B visas. Since this is not a hard limit on skilled migration, this suggests that $\theta_3^{\max}$ can be calibrated from historically observed levels of high-skilled immigration (i.e. that it represents a supply side constraint).

Second, constrained high-skilled immigration is of interest for studying "piece-meal" immigration reforms, if one reinterprets the constraint as resulting from policy inertia. Notably, alternative values of $\theta_3^{\max}$ (alternative reforms of high-skilled immigration) will have implications for subsequent policy choices over low-skilled immigration and guest-workers.

We examine a more general wage-elastic supply of high-skill migrants in section 6.1 as an extension because it involves complications that would distract from the main analysis.

(III) A "small" pool of high-skilled immigrants with policy choice over guest workers. This case assumes the country has the ability to prevent (some) migrants from settling as immigrants. Assumptions about the supply of high-skilled immigrants are as in case (II).

4.4 Results with a Large Pool of Skilled Immigration

This section reports model results for policy setting (I). That is, we investigate which immigration policies would be chosen by the majority in the absence of any meaningful constraint from the supply side of immigration.

We use a value function iteration algorithm in order to solve for the MPE of the model, with discretized state and policy spaces and bilinear interpolation in the evaluation of the value function. Given the demographic profile of natives $(\mathbf{Q}, \eta)$, we first obtain the steady state distribution of the skill types in absence of immigration, given by $(x_1^0, x_3^0) = (0.0978, 0.5429)$. Then given the demographic profile of immigrants $\left(\mathbf{Q}^I, \eta^I\right)$, we consider a grid in the state space (state variables are $x_1 \equiv N_1/N_2$ and $x_3 = N_3/N_2$) that contains both the steady state without immigration and any possible future steady state induced by the space of possible immigration policies Ω_Θ.

We compute results for maximum immigration quotas of $\theta_1^{\max} = 450\%$, $\theta_2^{\max} = 100\%$ and $\theta_3^{\max} = 300\%$. These values are chosen high to ensure that the optimal choices will be in the interior of the policy space $[0, \theta_1^{\max}] \times [0, \theta_2^{\max}] \times [0, \theta_3^{\max}]$ for all possible states.[13]

The optimal policy (as defined in Section 2.5) is a function $\theta = p(X)$ that specifies the immigration quotas preferred by the medium skill majority as function of the composition of the native population. For uniformity across experiments, we always report quotas $\theta^* = p(X^0)$ evaluated at the steady state without immigration. In some cases (when conditioning on X matters

[13]Greater or smaller maximum quotas would not change the results, provided the space considered doesn't lead to a corner solution at a maximum value. At the steady state $\left(x_1^0, x_3^0\right)$, high- and medium-skill wages are equalized at high-skilled immigration of about 200%. The need to allow for wage equalization explains why we use extremely high values for immigration quotas.

substantively), we also report quotas $\theta^{*ss} = p(X^{ss})$ evaluated at the steady state induced by the optimal policy function. (That is, X^{ss} solves $X^{ss} = \Psi\left(X^{ss}, p(X^{ss})\right)$, called induced steady state for brevity). Quotas θ^{*ss} would be observed if every generation follows the optimal policy function until population converges to X^{ss}.

In setting (I), we find that the optimal policy function implies extremely high immigration at high and low skill levels; specifically, $\theta^* = (286\%, 0, 205\%)$ and $\theta^{*ss} = (195\%, 0, 107\%)$. Medium-skilled immigration is always zero.

Table 4. **Initial Parameterization**

	Demographic Profiles	Production and Taxes	Immigration Pool and Preferences
$\mathbf{Q} =$	$\begin{bmatrix} .256 & .663 & .081 \\ .062 & .707 & .231 \\ .010 & .397 & .593 \end{bmatrix}$	$\phi_1 = .0993$ $\phi_2 = .3977$ $\phi_3 = .5030$	$\theta_1^{\max} = 4.5$ $\theta_2^{\max} = 1.0$ $\theta_3^{\max} = 3.0$
$\mathbf{Q}^I =$	$\begin{bmatrix} .211 & .594 & .195 \\ .067 & .633 & .299 \\ .022 & .325 & .653 \end{bmatrix}$	$\rho = \frac{1}{2}$	$\beta = .985^{30}$
η η^I $=$	$\text{diag}\{1.1, 0.97, 0.87\}$ $\text{diag}\{1.5, 1.22, 0.96\}$	$\tau = .30$	

These extremely high immigrations rates in this setting are clearly unrealistic. To put them into perspective, note that a 200% immigration quota would imply that immigrants are about 2/3 of the labor force at the respective skill level.[14] The unrealistic results here mainly serve to motivate the cases below that assume a more limited supply of high-skilled immigrants.

Though the model overpredicts immigration, the optimal policy function has features that are instructive and intuitive. Notably, the high-skilled quota θ_3^* is decreasing in x_3 (the higher the ratio of high to medium-skilled natives, the lower the demand for high-skilled immigration), and is also increasing in x_1, as additional low-skill immigration makes high-skill immigration more valuable by increasing wages of the high-skilled. The converse applies to low-skilled immigration: θ_1^* is increasing in x_3 and decreasing in x_1.

We also studied a version of this model under a small constant marginal cost per immigrant that is paid out of transfers. This could be justified in terms of externalities associated to the absortion of very big immigration flows that are not captured in this parsimonious model (i.e. congestion effects). Transfers in this case are $\widetilde{b} = b - cost * \left[\frac{\Sigma_i^3 x_i \theta_i}{\Sigma_i^3 x_i(1+\theta_i)}\right]$, which reduces to the transfer equation

[14] We explored if alternative values of parameters (β, σ, ρ) might provide more plausible results, but we found no combination of (β, σ, ρ), for which optimization with unlimited supply of high-skilled immigrant would yield immigration rates anywhere close to observed immigration rates.

in the main text when $cost = 0$. For example, when the total cost of immigration is such that it results in a loss of 1% of the initial transfer, the low-skilled quota is reduced significantly, while not reducing the skilled quota much (to $\theta_1^* = 249\%$ and $\theta_3^* = 198\%$, with an induced steady state of $\theta_1^{*ss} = 168\%$, $\theta_3^{*ss} = 98\%$). Increasing this cost leads to lower overall immigration, with θ_1^* decreasing faster than θ_3^*.

Taken literally, this section suggests that flows of high-skilled immigration in the U.S. are far less than optimal. An alternative interpretation is that this section's implicit assumption of an elastic, effectively unlimited supply of high-skilled immigrants is questionable. It leads to the implausible result that in equilibrium, high skilled immigration reduces the wage premium for high-skilled work to zero, yet the supply of high-skilled workers is assumed to be unaffected (given by an unchanged $\theta_3^{\max}$). A more plausible assumption is that the supply of high-skilled immigrants is a limiting factor; this is examined in the next section.

4.5 Results with a Small Pool of Skilled Immigrants

This section reports model results for policy setting (II). That is, we assume a perfectly inelastic supply of high-skill immigration $\theta_3^{\max}$ that is not large enough as to equalize wages between medium skilled and high-skilled workers; for this section, we assume no guest workers.

The particular value that we use is $\theta_3^{\max} = 13\%$, which is the level that has been observed in the US for the analyzed period and that could represent either the supply side, or perhaps some exogenous constraint (in light of the results of the above section). We also study the effect of changing this parameter.

The MPE in this case yields an equilibrium policy that (1) maximizes high skill immigration (set $\theta_3^* = \theta_3^{\max}$), (2) minimizes medium skill immigration (set $\theta_2^* = 0$) and (3) chooses a policy function for the low-skilled that has a similar shape to the one found under setting (I): decreasing in the ratio of low to medium-skilled natives and increasing in the ratio of high to medium-skilled natives.

In this setting, the parameter β (which represents the weight given on the expected utility of children) can be calibrated to yield $\theta_1^* = 18\%$, as it is found that θ_1^* and β are inversely related. We calibrate this parameter as $\widehat{\beta} = .6325$ which just by chance is very close to the value used in the previous section where that parameter was not endogenously calibrated (we used the exogenously calibrated value for β of $.985^{30} = .6355$). We label this case with $\theta_3^{\max} = 13\%$ as the "baseline" since this model reasonably and parsimoniously allows for the analysis of many issues in the subsequent sections, produces immigration of the extremes (which is not an obvious result as it depends on all entries in the intergenerational mobility matrices, among other parameters) while the qualitative predictions are robust to changes that are later discussed.

The equilibrium policies induce a steady state with higher shares of the low-skilled and high-skilled natives relative to the medium-skilled majority, with $x_1^{ss} = .10$ and $x_3^{ss} = .589$ (as opposed to the steady state without immigration with $x_1^0 = .0978$ and $x_3^0 = .5429$). The slightly higher share of low-skilled natives induces less low-skilled immigration, but there's an opposite effect due to the higher share of skilled natives, for a total effect at the induced steady state of $\theta_1^{*ss} = 16.9\%$ and $\theta_3^{*ss} = 13\%$.

We also investigate the effects on equilibrium immigration quotas under an alternative level for $\theta_3^{\max}$ of 30%, which helps to see the effects of a reform under the interpretation that the observed 13% is suboptimal (when the constraint is not the supply side but some other constraint like policy inertia). In this case the (qualitative) predictions remain the same, but the equilibrium level of low-skill immigration is now higher at 21.2% in the steady state without immigration (and 28.4% at the induced one). For the interpretation, note that a "piece-meal" approach to immigration that first increases the amount of high-skill immigration would lead to a higher demand of low-skill immigration. Other alternative values for $\theta_3^{\max}$ yield the same qualitative predictions. [15]

We revisit the assumption of a perfectly inelastic supply of high-skill immigrants in section 6.1.

4.6 Results when Guest-Workers are Available

In this section we enlarge the policy space to allow for the possibility of guest worker quotas, in addition to immigration quotas, following policy setting (III). In the model, the only difference between guest workers and immigrants is that immigrants affect the future composition of the native population because they have children, while guest workers have a zero fertility rate (they return to their home country). We perform this exercise under the exogenous limit on high-skilled immigration, and in the sensitivity section we repeat the analysis with a wage-elastic supply for high skill immigration.

Using the same (baseline) parameterization as in the previous section but allowing for 3 additional choice-variables (guest worker quotas θ_1^G, θ_2^G, θ_2^G), we find that the medium-skill majority chooses full immigration to the available pool of high-skilled immigrants (no guest worker for them), no immigration/guest worker program for the medium-skilled, and for the low-skilled a positive quota of guest workers (without immigration). We discuss the reasons below.

The medium skill majority would offer immigration-only to all available high-skilled agents ($\theta_3^* = \theta_3^{I*} = 13\%$ with $\theta_3^{G*} = 0\%$). As before, high-skilled workers – both immigrants and guest workers – are desirable because their skills are complementary to medium-skilled voters. The voter preference for immigration over guest workers is a notable result that relies on the estimated intergenerational mobility matrices. Children of medium-skilled natives have a high probability of being medium-skilled like their parents ($q_{22} = .707$). High-skilled immigrants have a high probability of having high-skilled children and a low probability of having medium-skilled children

[15] We also analyze a case where we completely shut down high-skill immigration ($\theta_3^{\max} = 0$). In this case the low-skill quota would be slightly lower in the initial steady state ($\theta_1^* = 17.5\%$ as opposed to 18% when $\theta_3^{\max} = 13\%$), and because in the induced steady state there wouldn't be as many high-skilled individuals as in the baseline, the induced policy has even less low-skill immigrants ($\theta_1^{*ss} = 12.2\%$).

($q^I_{33} = .653$ vs $q^I_{32} = .325$). Hence medium-skilled voters can anticipate that the children of high-skilled migrants would raise the expected utility of their own children, and hence they let high-skilled agents enter as immigrants rather than as guest workers.

Technically, the preference for high-skilled immigration over guest workers depends on all elements of the mobility matrices, as voters weight all possible combinations of skill types for their children and for immigrants' children. The result is nonetheless quite robust in the sense that large changes in intergenerational mobility would be needed to overturn it. For example, suppose the children of high-skilled immigrants were less skilled in the sense that q^I_{33} is lower and q^I_{32} is higher than in the estimated Q^I matrix, holding all other elements constant. We find that immigrants are preferred provided $q^I_{33} \geq .32$ and $q^I_{32} \leq .65$, whereas guest workers would be preferred (i.e. $\theta^*_3 = \theta^{G*}_3 = 13\%$ and $\theta^{I*}_3 = 0$) if $q^I_{33} < .32$ and $q^I_{32} > .65$. Thus the likelihood ratio q^I_{32}/q^I_{33} would have to more than quadruple (from .325/.653 to .65/.32) for voter preferences to be reversed.

In the case of the medium-skilled, allowing for guest workers doesn't change the results since there would only be "costs" of allowing guest workers of the medium-skill type (lower wages), while there would be no benefits (no possibly advantageous change in the future composition of native workers) for the medium-skilled natives.

The main changes are observed in the low-skilled category as the majority prefers for them guest worker permits as opposed to immigration. When comparing across regimes, the quota of low-skilled guest workers is higher than the low-skilled immigration quota when guest worker permits are not available: one obtains $\theta^*_1 = \theta^{G*}_1 = 87\%$ and $\theta^{I*}_1 = 0$, whereas the model without guest worker programs produces $\theta^*_1 = \theta^{I*}_1 = 18\%$. There are two reasons for this. First, low-skilled immigrants have a much higher fertility rate than natives. Hence, allowing low-skilled immigrants can affect more easily the size and composition of the (future) native population than allowing the same number of individuals of a different type; and second, low-skill immigrants have a majority of children that become medium-skilled, which in turn would most likely compete with native children of medium-skilled. When the dynamic effects of low-skill immigration are removed (via allowing guest workers), the medium-skill majority allows low-skilled guest workers until the marginal benefit (higher wages for medium-skilled) equals the marginal cost (redistribution cost) to these workers, everything else constant.

For the interpretation, note that in absence of a large scale guest worker program (as the US currently has very few visas of this type) targeted to low-skilled jobs, a country can to some extent mimic such a program by tacitly tolerating unauthorized workers (although not everyone in this group returns to their home countries which in turn implies affecting the composition of the population). This policy can be implemented by neglecting border controls combined with measures that exclude these individuals from medium-and high-skilled jobs, e.g., background checks of licensing requirements. Thus it can be argued that the voting equilibrium in this section has resembled US immigration policy (at least prior to the Trump administration), which has allowed large quantities of high-skilled immigration (high compared to other developed destinations that absorb less high-skill individuals than the US but more low-skill immigrants, see Razin et al. (2011)) and permitted relatively large amounts of unauthorized immigration provided they were doing low-skilled work.

5 Using the Model

5.1 Is Intergenerational Mobility of Immigrants Important for Immigration Policy?

In this section we describe the effects of changing individual entries in the transition matrix of immigrants $\mathbf{Q}^I$ in the baseline case (setting (II) with $\theta_3 \leq 13\% = \theta_3^{\max}$). We use a 5 percentage points (5 p.p.) increase in each entry -one at a time, while leaving the ratio of the other two entries in the same row unchanged (since each row adds up to one). The results are presented in table 5. These effects are qualitatively robust when we perform this exercise under a wage-elastic supply for high-skill immigration in the sensitivity section.

Table 5. **Effect on Low Skill Migration of 5 p.p. Increase in Mobility Entries**

	Baseline	Δq_{11}^I	Δq_{12}^I	Δq_{13}^I	Δq_{21}^I	Δq_{22}^I	Δq_{23}^I	Δq_{31}^I	Δq_{32}^I	Δq_{33}^I
θ_1^*	.18	.152	.049	.427	.18	.18	.18	.159	.189	.174
θ_1^{*ss}	.169	.138	.087	.345	.169	.169	.169	.11	.18	.171

The most significant changes in low-skill immigration come from changes in the probability distribution of low-skilled agents. In particular, an increase of 5 p.p. in q_{13}^I (the probability that a low-skilled parent has a high-skill child) increases θ_1^* to 42.7% in the steady state without immigration (from a baseline of 18%), and a quota at the induced steady state of $\theta_1^{*ss} = 34.5\%$ (baseline of 16.9%). In turn, modifying q_{11}^I changes the low-skilled quota marginally (decreases to 15.2%), while an increase in q_{12}^I would result in much less low-skilled immigration of only 4.9%. We explain these results. Higher q_{12}^I leads to lower low-skilled immigration because those immigrant's children would compete in the most likely scenario with the children of the native medium-skilled majority (there is a 70% probability that children of medium-skilled natives remain medium skilled). In turn, higher q_{13}^I leads to more low-skilled immigration as the possible complementarity of the children of immigrants with natives who are in states "low-skilled" or "medium-skilled" outweighs the cost of the competition if the children of natives turn out to be in the "high-skilled" state.

Changing the probability distribution of high-skill immigrants affects immigration quotas just marginally at the steady state without immigration, while changes to probabilities of medium-skill parents don't affect the equilibrium quotas since the medium-skilled quota is optimally zero in the model and the relatively small changes in probabilities considered do not lead to a positive medium-skill quota. We don't elaborate on the induced steady state since the direction of the changes and the message are essentially the same.

5.2 What if Immigrants Had Identical Demographic Profiles to Natives?

From the previous section, it is clear that our baseline results are driven in part by differences in the transition matrices $\mathbf{Q}$ and $\mathbf{Q}^I$. In this section we study the effects in equilibrium immigration when we impose the demographic profiles of natives to immigrants, given the calibration of the model under setting (II).

Holding fertility rates constant at their estimated levels (η, η^I) if we set $\mathbf{Q}^I = \mathbf{Q}$, equilibrium low-skilled immigration is adversely affected because immigrants seem to have better upward mobility odds than natives. Hence with lower mobility more children of low-skilled immigrants would be in states that turn out to be undesirable for the medium-skilled majority. Quantitatively, the low-skilled quota is shut down (0%) at both the initial and induced steady states.

In order to better understand these results we also examine the effects of replacing one row at a time in $\mathbf{Q}^I$ by the respective row in $\mathbf{Q}$, thus imposing the mobility of natives to immigrants. For low-skilled agents ($\mathbf{Q}^I_{[1]} = \mathbf{Q}_{[1]}$, while $\mathbf{Q}^I_{[j]} \neq \mathbf{Q}_{[j]}$ for $j = 2, 3$), this exercise results in a shut-down of low-skilled immigration (0% in both the initial and induced steady states).

If children of high-skill immigrants have the same transition probabilities as natives, this produces more demand for low-skill immigration ($\theta_1^* = 19.7\%$ as opposed to 18%) since high-skilled natives have also less low-skilled children. Changing the medium-skilled distribution doesn't change low-skilled immigration since equilibrium medium skill migration is zero.

All these exercises are robust to either using the estimated fertility rates or using identical fertility profiles for natives and immigrants. Hence for simplicity we don't elaborate further on the alternative fertility assumption.

From this exercise we conclude that more successful children of low-skilled immigrants lends political support to a bigger low-skill quota, and the opposite is also true. And given current flows of high-skilled immigration, mobility appears to be not as important for political support as in the low-skilled case, although as previously mentioned it is important for the composition of that flow: the choice over high-skill immigration vs high-skill guest workers depends importantly on intergenerational mobility of the high-skill immigrants.

6 Sensitivity Analysis

6.1 The Model with a Wage-Elastic Supply of High-Skill Immigration

In this section we show that the qualitative predictions of our models are robust to using a wage-elastic supply of high-skill immigrants. The particular functional form used for this exercise is

$$\theta_3^{\max}(w_3) = \overline{\theta_3} \left(\frac{w_3}{\overline{w_3}} \right)^{\gamma}, \tag{16}$$

where the supply of high-skill immigrants $\theta_3^{\max}$ depends on high-skill wages w_3, given parameters $\overline{w_3}$, $\overline{\theta_3}$ and γ. The parameter that we vary in our experiments is γ, which is the elasticity of the supply with respect to w_3. This specification implies that for any arbitrary value $\gamma \geq 0$, the supply of high-skill immigrants in the space $(\theta_3^{\max}, w_3)$ goes through the point $\left(\overline{\theta_3}, \overline{w_3}\right)$ (i.e. if $w_3 = \overline{w_3} \rightarrow \theta_3^{\max} = \overline{\theta_3}$).

We proceed by studying different elasticity scenarios since it is not possible to calibrate the parameters when observed immigration choices are suboptimal (i.e. if the 13% observed doesn't reflect the supply side but rather some other constraint). The elasticities considered range from 0 to 10. In turn, the wage $\overline{w_3}$ used is the steady state wage of the high-skill agents in the absence of immigration. Finally, the parameter $\overline{\theta_3}$ ought to be higher than the observed 13% and is set to 30%, but other values deliver identical qualitative results. Results are very similar to the simpler versions of the model since we obtain immigration of the extremes, with slightly different quantitative results. In particular, under the "high" elasticity scenario we obtain less high-skilled but more low-skilled immigration than in the other cases. The additional effect considered by voters is that now low-skilled immigration helps to attract skilled immigration (by increasing skilled wages). Table 6 summarizes the numerical results.

Table 6. **The Model under a Wage-Elastic High-Skill Supply**

Experiment	γ	θ_1^{I*}	θ_3^{I*}	θ_1^{G*}	θ_3^{G*}
Sensitivity to γ	0	.259	.30	–	–
	.25	.271	.294	–	–
	1	.295	.282	–	–
	4	.361	.244	–	–
	10	.434	.199	–	–
Replace $\widehat{Q}_I$ with $\widehat{Q}$	1	0	.280	–	–
	10	0	.189	–	–
Guest Workers Available	1	0	.285	.988	0
	10	0	.209	.924	0

The shape of the preferred policies are similar to those in setting (I) (e.g. the optimal policy function involves low-skill immigration that is increasing in x_3 and decreasing in x_1 and for high-skill immigration the opposite holds), while the main qualitative findings in settings (II) and (III) are also maintained. When replacing the transition matrix of immigrants by those of natives the demand for low-skill immigration decreases; in the presence of guest workers, the medium-skill majority continues preferring low-skill guest workers and high-skilled immigrants. Finally, the low-skilled guest-worker quota is higher than the low-skilled immigration quota when guest worker programs are not available.

6.2 Production, Preference and Mobility Parameters

We finally perform sensitivity analysis of the model with respect to (1) the parameter governing the elasticity of substitution between labor inputs, (2) the curvature parameter of the period utility function and (3) the definition of the medium and high-skilled groups. The results of these exercises are summarized in table 7.

Table 7. **Sensitivity Analysis**

Case	**Experiment**	**Setting**	$\theta_3^{\max}$	β	θ_1^{I*}	θ_3^{I*}	θ_1^{G*}	θ_3^{G*}
Main	Unconstrained Supply	I	∞	$.985^{30}$	2.86	2.05	–	–
Cases	Unconstrained & Cost	I	∞	$.985^{30}$	2.49	1.98	–	–
	Constrained supply/β Calibrated	II	.13	.6325	.18	.13	–	–
	Replace Q_I by Q	II	.13	.6325	0	.13	–	–
	Guest Workers Available	III	.13	.6325	0	.13	.87	0
$\rho = 2/5$	Unconstrained Supply	I	∞	$.985^{30}$	2.77	1.53	–	–
	Unconstrained & Cost	I	∞	$.985^{30}$	2.52	1.51	–	–
	Constrained Supply/β Calibrated	II	.13	.819	.18	.13	–	–
	Replace Q_I by Q	II	.13	.819	0	.13	–	–
	Guest Workers Available	III	.13	.819	0	.13	1.08	–
$\rho = 3/5$	Unconstrained Supply	I	∞	$.985^{30}$	2.57	2.85	–	–
	Unconstrained & Cost	I	∞	$.985^{30}$	2.25	2.85	–	–
	Constrained Supply/β Calibrated	II	.13	.354	.18	.13	–	–
	Replace Q_I by Q	II	.13	.354	0	.13	–	–
	Guest Workers Available	III	.13	.354	0	.13	.54	0
$\sigma = 2$	Unconstrained Supply	I	∞	$.985^{30}$	2.86	2.05	–	–
	Unconstrained & Cost	I	∞	$.985^{30}$	2.45	1.98	–	–
	Constrained Supply/β Calibrated	II	.13	.563	.18	.13	–	–
	Replace Q_I by Q	II	.13	.563	0	.13	–	–
	Guest Workers Available	III	.13	.563	0	.13	.87	0
Alternative	Unconstrained Supply	I	∞	$.985^{30}$	2.32	2.44	–	–
Definition	Unconstrained & Cost	I	∞	$.985^{30}$	1.93	2.18	–	–
of Skills	Constrained Supply	II	.13	$.985^{30}$	1.49	.13	–	–
	Replace Q_I by Q	II	.13	$.985^{30}$	1.10	.13	–	–
	Guest Workers Available	III	.13	$.985^{30}$	0	.13	1.60	0

The baseline model sets a value of 1/2 for the production parameter ρ, which implies an elasticity of substitution of $\varepsilon = 2$. The alternative values considered are $2/5$ ($\varepsilon = 1.66$) and $3/5$ ($\varepsilon = 2.5$). Since the calibrated share parameters (ϕ_1, ϕ_2, ϕ_3) depend on the value of ρ, we obtain (given the wage premia and labor ratios discussed before) share parameters of $(.0834, .4174, .4992)$ and $(.1178, .3775, .5047)$ for $\rho = 2/5$ and $\rho = 3/5$ respectively. Our main findings remain unchanged. First, the model generates very large quotas of the extremes under setting (I) (large pool), with policy functions of the same shape as before. Second, for our main parameterization (setting (II) – inelastic supply $\theta_3^{\max} = 13\%$) we obtain similar comparative statics. Third, replacing the mobility of immigrants by those of natives shuts-down the demand for low-skill immigration. Fourth, when guest workers are available, the medium-skilled majority prefers low-skilled guest workers and high-skilled immigrants.

The period utility function used in the main analysis is log-utility, which in the more general CRRA form $u(x) = \frac{x^{1-\sigma}-1}{1-\sigma}$ corresponds to the case of $\sigma = 1$. Table 7 also displays the results when we use the other representative value used in the literature, which is $\sigma = 2$. In this case not only the qualitative effects of the baseline parameterization are maintained, but the quantitative findings are essentially unchanged. Other experiments with realistic levels for this parameter $(1 \leq \sigma \leq 4)$ yield similar results.

The last rows in table 7 display the experiments under an alternative categorization of skills. Now workers are defined as high-skilled if they have a master or a higher degree (e.g. Ph.D.) and we define as medium-skilled those workers with a high-school diploma, some college or a college degree, while the definition of the low-skilled remains unchanged. The matrices of intergenerational mobility under this definition are now

$$\widehat{\mathbf{Q}} = \begin{bmatrix} .256 & .717 & .027 \\ .053 & .875 & .073 \\ .007 & .729 & .264 \end{bmatrix} \qquad \& \qquad \widehat{\mathbf{Q}}^I = \begin{bmatrix} .211 & .720 & .069 \\ .060 & .827 & .113 \\ .013 & .671 & .315 \end{bmatrix} \quad ,$$

where we still observe higher upward mobility for immigrants than from natives. The appendix shows the details on the estimation/calibration of the parameters of this version of the model. The qualitative results are again similar.

7 Conclusions

We study a dynamic macroeconomic model of intergenerational mobility and immigration with three types of labor. In it, the demographic process is such that the medium-skill type is always the majority. We parameterize several versions of the model and study the results.

We calibrate the model for the US and among other things find that children of low-skill immigrants and medium-skill immigrants seem to be more "successful" than the children of natives (there is a higher probability for their children to become high-skilled), using data from the GSS. We find the MPE of the model where the equilibrium immigration policy is such that if the children of low-skilled immigrants are more successful than those of low-skilled natives, there is more political support for low-skilled immigration by the majority (the medium-skilled). The most preferred policy for the majority involves maximizing high-skill immigration, minimizing medium-skill immigration and for low-skill immigration it is increasing in the share of high-skilled natives and decreasing in the share of low-skilled natives.

In general, the current effect on wages and transfers from the high-skill agents are very important for the welfare of the medium-skilled and thus their intergenerational mobility is relatively unimportant for the political support of high-skilled immigration.

Under the interpretation that the observed flow of high-skill immigration is suboptimal, a "piece-meal" approach to immigration reform allowing more high-skill immigrants would also lead to an increase in the demand for low-skill immigrants.

If in addition to full immigration there are guest workers quotas available as policy tools, the mobility matrices are such that the medium-skilled would choose a guest-worker quota for low-skill immigrants, and full-immigration for the high-skill immigrants. Only if high-skill immigrants had a very large probability of having medium-skilled children (as opposed to a high probability of having high-skill children) would then the majority prefer guest worker permits for the high-skilled.

Finally, a version of the model with a positive-sloped supply of high-skill immigrants produces similar results, and it is found that the higher the elasticity of supply, the higher the level of low-skill immigration chosen optimally. Sensitivity analysis shows that the effects of the model are robust.

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References

[1] Benhabib, J, 1996. On the political economy of immigration. Eur. Econ. Rev. 40(9), 1737-1743.

[2] Bohn, H., Lopez-Velasco, A. R. 2017. Immigration and demographics: can high immigrant fertility explain voter support for immigration?. Macro. Dyn., 1-23. doi:10.1017/S1365100517000463

[3] Borjas, G., 1992. The intergenerational mobility of immigrants. NBER working paper 3972.

[4] Borjas, G., 2003. The labor demand curve is downward sloping: reexamining the impact of immigration on the labor market. Q. J. Econ. 118(4), 1335–1374.

[5] Borjas, G., 2009. The analytics of the wage effect of immigration. NBER working paper 14796.

[6] Borjas, G., Katz, L., 2007. The evolution of the Mexican born workforce in the United States. In: Borjas, G. (Ed.), Mexican Immigration to the United States. National Bureau of Economic Research Conference report, Cambridge, MA.

[7] Card, D., DiNardo, J. and Estes, E., 2000. The more things change: immigrants and the children of Immigrants in the 1940s, the 1970s, and the 1990s, in Borjas, G. (Ed.). Issues in the Economics of Immigration. Chicago: University of Chicago Press.

[8] Dolmas, J., Huffman, G., 2004. On the political economy of immigration and income redistribution. Int. Econ. Rev. 45(4), 1129-1168.

[9] Krusell, P., Rios-Rull, J. V., 1999. On the size of U.S. government: political economy in the neoclassical growth model. Am. Econ. Rev. 89(5), 1156-1181.

[10] McDaniel, C., 2012. Average tax rates on consumption, investment, labor and capital in the OECD 1950-2003. Mimeo, Arizona State University. Tax series updated April 2012.

[11] Ortega, F., 2005. Immigration quotas and skill upgrading. J. Pub. Econ. 89, 1841-1863.

[12] Ortega, F., 2010. Immigration, citizenship, and the size of government. The B.E. J. Econ. Analysis & Policy. 10(1), Contributions, Art. 26.

[13] Ottaviano, G., Peri, G., 2012. Rethinking the effects of immigration on wages. J. Eur. Econ. Assoc. 10(1), 152–197.

[14] Peri, G., 2016. Immigrants, productivity, and labor markets. J. Econ. Perspectives, 30(4): 3-30.

[15] Razin, A., Sadka, E., Suwankiri, B., 2011. Migration and the Welfare State: Political-Economy Policy Formation. The MIT press, Cambridge, Massachusetts.

[16] Ruggles, S., Genadek, K., Goeken, R., Grover,J., Sobek, M. Integrated Public Use Microdata Series: Version 7.0 [dataset]. Minneapolis: University of Minnesota, 2017. https://doi.org/10.18128/D010.V7.0.

[17] Sand, E., Razin, A. 2007. The role of immigration in sustaining the social security system: a political economy approach. CESifo working paper 1979.

[18] National Academies of Sciences, Engineering, and Medicine (2017). The Economic and Fiscal Consequences of Immigration, Blau, F. D., Mackie, C., (Eds.). Washington, DC: The National Academies Press. doi: https://doi.org/10.17226/23550.

[19] Tamura, R., 2001. Teachers, growth, and convergence. J. Political Econ. 109(5), 1021-1059.

[20] Tamura, R., Simon, C., Murphy, K. M., 2016. Black and white fertility, differential baby booms: the value of equal education opportunity. J Dem. Econ, 82(1), 27–109.