Entrepreneurship and the Efficiency Effects of Migration

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Motivation

- Migration, one of the most notorious phenomena of the 21st century
- Impact on sending and hosting economies still being assessed
- Literature has usually considered immigration as equivalent to a labor supply shift, overlooking entrepreneurship as an occupational option for immigrants

This paper

Question: What is the impact of immigration on:

1. business ownership rates
2. average firm productivity
3. income per capita among natives
4. welfare

Methodology

- Construct a two-country dynamic general equilibrium model of entrepreneurship and migration
- Calibrate model to U.S. data and evaluate impact of migratory policies on the outcomes described above

Migratory Policies Considered

1. **Total ban**: no immigration allowed
2. **Free migration**: migration barriers set to zero
3. **10% share**: immigrants as a share of the population set at 10% (Trump's proposal)
4. **Selective**: allowing only people that held a business in their country of origin

What I find

- Selective policy achieves the best outcomes in terms of average productivity and business ownership rates relative to the benchmark
- Domestic entrepreneurs are important losers

Outline

1. Model
2. Calibration
3. Results

Model

Main ingredients

- Infinite horizon agents
- Individuals can be workers or entrepreneurs, and live in the U.S. (US) or the rest of the world (RoW)
- Individuals are heterogeneous in terms of their entrepreneurial skills (z), and their asset holdings (a)
- Countries differ in terms of a baseline TFP level and in terms of their degree of financial frictions
- Individuals face fixed costs to migrate and location preference shocks

Preferences and Technologies

- Lifetime utility:

$$U(c) = \mathbb{E}\left[\sum_{t=0}^{\infty} \beta^t \frac{c_t^{1-\sigma}}{1-\sigma}\right]$$

- Production technology:

$$y_j(z,k,l) = A_j z k^{\alpha} l^{\theta}, \quad \alpha+\theta \in (0,1), \quad j \in \{US, RoW\}$$

- Country-specific TFP given by:

$$A_j = \overline{A}_j M_j^{\phi}, \quad \phi < 0$$

where M_j is total population mass in country j

Financial Markets

- Risk-free internationally-tradable one-period bond is only financial asset
- There is a perfectly competitive global financial intermediary that sells bonds backed by capital stock to households, and rents out capital to entrepreneurs at rate R
- Zero-profit condition for intermediary:

$$\underbrace{R}_{\text{rental rate}} = \underbrace{r}_{\text{risk-free rate}} + \underbrace{\delta}_{\text{dep. rate}}$$

Financial Frictions

- Capital rental k by entrepreneurs is limited by imperfect enforceability of contracts
- All contracts are incentive compatible $\rightarrow$ no default in equilibrium
- Collateral constraint:

$$k \leq \lambda_j a, \quad \lambda_j \geq 1$$

- Households not allowed to borrow: $a \geq 0$

U.S. natives

- Problem:

$$v_{US}(a,z) = \max_{c,a' \geq 0} \left\{ u(c) + \beta \mathbb{E}[v_{US}(a',z')|z'] \right\}$$

s.t.:

$$c + a' \leq \max\left\{ w_{US}, \pi_{US}(a,z;w_{US},r) \right\} + (1+r)a$$

- $\pi_{US}(a,z;w_{US},r)$ is:

$$\pi_{US}(a,z;w_{US},r) = \max_{l,k} \left\{ A_{US} z k^{\alpha} l^{\theta} - w_{US} l - Rk \right\} \quad \text{s.t.} \quad k \leq \lambda_{US} a$$

- U.S. natives do not have a migration choice

RoW natives

Potential migrants

- RoW natives that currently live in RoW and have to decide whether to migrate to the U.S. or not
- They decide whether to migrate at the end of the period
- Problem:

$$v_{RoW}(a,z) = \left\{ \underbrace{v_s(a,z)}_{\text{staying}}, \underbrace{v_m(a,z)}_{\text{migrating}} - \underbrace{\epsilon}_{\text{pref. shock}} \right\}$$

where $\epsilon \sim$ i.i.d. $\mathcal{N}(0, \sigma_\epsilon^2)$

RoW natives

Potential migrants II

- Value of staying:

$$v_s(a,z) = \max_{c,a' \geq 0} \left\{ u(c) + \beta \mathbb{E}[v_{RoW}(a',z')|z'] \right\}$$

s.t.:

$$c + a' \leq \max\left\{ w_{RoW}, \pi_{RoW}(a,z; w_{RoW}, r) \right\} + (1+r)a$$

$$\pi_{RoW}(a,z; w_{RoW}, r) = \max_{l,k} \left\{ A_{RoW} z k^{\alpha} l^{\theta} - w_{RoW} l - Rk \right\} \quad \text{s.t.} \quad k \leq \lambda_{RoW} a$$

RoW natives

Potential migrants III

- Value of migrating:

$$v_m(a,z) = \max_{c,a' \geq 0} \left\{ u(c) + \beta \mathbb{E}[v_e(a',z')|z'] \right\}$$

s.t.:

$$c + a' \leq \max \left\{ w_{US}, \pi_{US}(a,z; w_{US}, r) \right\} + (1+r)a - f$$

with f fixed cost of migrating and $v_e(a,z)$ value of being an emigrant

RoW natives

Emigrants

- Emigrants do not have a migration choice either, but face uncertainty over whether they will have to forcefully return home
- η represents probability of being forced to return
- Problem:

$$v_e(a,z) = \max_{c,a' \geq 0} \left\{ u(c) + \beta \mathbb{E}[\eta v_s(a',z') + (1-\eta) v_e(a',z') | z'] \right\}$$

s.t.:

$$c + a' \leq \max\{w_{US}, \pi_{US}(a,z;w_{US},r)\} + (1+r)a$$

Occupational Choice

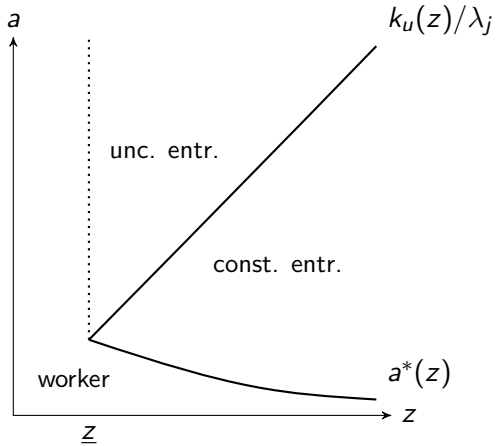
- Given lack of switching costs, occupational choice is a static decision
- Occupational choice can be characterized by cutoff rule over assets, a, given z
- Let $a^*(z)$ be the asset level that makes the individual indifferent between being a worker and a constrained entrepreneur:

$$A_j z(\lambda_j a^*(z))^\alpha (l(\lambda_j a^*(z), z; w_j))^\theta - w_j l(\lambda_j a^*(z), z; w_j) - R\lambda_j a^*(z) = w_j$$

- Let $k_{u,j}(z, r, w_j)$ be the optimal capital hiring when the entrepreneur is unconstrained:

$$k_{u,j}(z, r, w_j) = \arg\max_k A_j z k^\alpha l(k, z, w_j)^\theta - w_j l(k, z, w_j) - Rk$$

Occupational Choice II



Calibration

Assumptions

- U.S. economy has perfect capital markets, $\lambda_{US} \to \infty$, while RoW does not, $1 \leq \lambda_{RoW} < \infty$
- U.S. economy will be frontier in terms of efficiency, so A_{US} is normalized to 1
- z will follow AR(1) process in logs:

$$\ln(z') = \rho \ln(z) + \varepsilon, \quad \varepsilon \sim \mathcal{N}(0, \tau^2)$$

- Mass of U.S. native people will be set to 1, mass of RoW people will be set to ω

Calibration

Parameter	Value	Source/Target
A. Externally calibrated		
σ	1.5	Attanasio et al. (1999)
δ	0.06	Stokey and Rebelo (1995)
$\alpha/(\alpha+\theta)$	0.33	NIPA
η	0.015	ACS 2010-2014
ω	22	U.S. Census Bureau
σ_ϵ^2	8.7025	Caliendo et al. (2021)
ϕ	-0.03	Docquier et al. (2010)
$\bar{A}_H$	1.7961	Normalization
B. Internally calibrated		
β	0.9298	Real interest rate
f	7.50	Fraction of immigrants
$\alpha+\theta$	0.7918	Top 5% earnings share
τ	0.0704	Top 10 % employment
ρ	0.9793	Establishment exit rate
$\bar{A}_F$	1.3288	U.S. GDP/World GDP
λ_F	1.5055	External finance/GDP

Def. Eqm.

Results

Counterfactuals

Policies

1. No migration: $f \to \infty$
2. Free migration: $f = 0$
3. Share of immigrants equal to 10%
4. Only let people that ran businesses in their home countries to migrate

- Current state of the world as benchmark
- Change in variable X in counterfactual scenario's steady state with respect to the benchmark is given by:

$$\Delta X\%_{counterf} = \left(\frac{X_{counterf} - X_{benchm}}{X_{counterf}} \right) \times 100$$

Results I

Income per capita (% deviations from benchmark)

Variable	$f = \infty$	$f = 0$	10% share	Pro Entrep.
U.S.	-8.09	-21.28	-3.59	-3.86
R.o.W.	7.67	4.33	2.34	-5.39

Average firm productivity (% deviations from benchmark)

Variable	$f = \infty$	$f = 0$	10% share	Pro Entrep.
U.S.	-9.97	-10.59	0.60	8.14
R.o.W.	1.68	3.72	1.72	-1.36

Results II

Business Ownership

Group	$f = \infty$	$f = 0$	10% share	Pro Entrep.
U.S.	-25.44	-26.64	-3.59	56.74
R.o.W.	-10.32	-28.16	-15.06	-19.86

Results III

Consumption (% deviations from benchmark)

Group	$f = \infty$	$f = 0$	10% share	Pro Entrep.
U.S. natives	0.19	-9.47	0.39	0.06
Immigrants in the U.S.	n.a.	0.05	4.95	-16.63
Stayers in the R.o.W.	6.97	15.68	5.75	0.79
Entrepreneurs in the U.S.	19.95	8.98	-1.30	-36.40
Workers in the U.S.	-8.91	-7.74	-1.20	24.89
Entrepreneurs in the R.o.W.	21.95	36.39	21.98	16.66
Workers in the R.o.W.	3.65	19.72	4.13	1.30

Conclusions

- Effect of immigration on natives' incomes and welfare may change if one considers entrepreneurship as occupational choice
- Relative distribution of entrepreneurial ability and assets between immigrants and natives is key for direction and magnitude of impact
- Migratory policy that favors people with business ownership record lifts business ownership rates and firms' average productivity in the U.S.

Appendix

Distributions and some notation

- Let $\mu(a, z)$ be the c.d.f. for the joint distribution of a and z in the world
- Let $\nu(a, z, \chi)$ be the c.d.f. for the joint distribution of a, z, and the individual-specific migration status χ in the world
- Migration statuses:

$$\chi \in \{\text{native, emigrant,new immigrant, foreigner}\}$$

- Let $b(a, z, \chi)$ be the migration policy function for an individual with state (a, z, χ), which is only defined for people with *foreigner* migration status (born in F, residing in F)

Stationary Competitive Equilibrium (SCE)

A SCE consists of a distribution $\nu(a, z, \chi)$, allocations $c(a, z, \chi)$, $a'(a, z, \chi)$, $l(a, z, \chi)$, $k(a, z, \chi)$, $b(a, z, \chi)$, and prices w_H, w_F, r s.t.:

1. Given prices, allocations solve the problem of individuals in both countries

2. Labor, capital and good markets clear

Stationary Competitive Equilibrium (SCE) II

3. The joint distribution $\nu(a, z, \chi)$ evolves according to:

$$\begin{aligned}
\nu'(a', z', \text{native}) &= \int_{a(a,z,\text{native}) \leq a', z \leq z'} d\nu(a, z, \text{native}) \\
\nu'(a', z', \text{emig.}) &= (1-\eta) \int_{a(a,z,\text{emig.}) \leq a', z \leq z'} d\nu(a, z, \text{emig.}) \\
&\quad + \int_{a(a,z,\text{new im.}) \leq a', z \leq z'} d\nu(a, z, \text{new im.}) \\
\nu'(a', z', \text{new im.}) &= \int_{a(a,z,\text{for.}) \leq a', z \leq z', b(a,z,\chi)=m} d\nu(a, z, \text{for.}) \\
\nu'(a', z', \text{for.}) &= \eta \int_{a(a,z,\text{emig.}) \leq a', z \leq z'} d\nu(a, z, \text{emig.})
\end{aligned}$$

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