An Incentive Mechanism to Break the Low-skill Immigration Deadlock

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Research question

- Paper on South-North migration
  - ±1.5p. of the pop. of the South
  - ±8.0p. of the pop. in the North (1.5p. in 1960)

- Contrasting perceptions
  - Substantial gains for the South (lab. market, remittances)
  - Source of problems in the North (for 2/3 of natives)

- What do we do?
  - Opening borders: alternative to aid but not politically feasible
  - Design coordination mechanism to break the gridlock (i.e. incite voters to host more LS immigrants)
  - Quantitative analysis: assess its potential effectiveness
Plan of the talk

1. Approach and contribution to the literature
   - Lit1 - Migration and global welfare
   - Lit2 - Political economy of immigration
   - Lit3 - Experimental economics: aversion to extreme poverty
   - Gains from coordinating immig. policies

2. Theory: design of the scheme

3. Quantitative Assessment
Lit1 - Migration and global welfare

- **Positive approach: effect of liberalization**
  - Quantify effect of partial/total liberalization on the world economy
  - From small (DMS: +10%) to huge effects (Hamilton-Whalley: +150%)
  - Liberalization of low-skilled migration increase income in the South (Walmsley and Winters 2004, Pritchett 2006, Clemens 2011, etc.)

- **Normative approach: social planner’s problem**
  - Benevolent planner max utilitarian SWF (Benhabib-Jovanovic)
  - Move many LS workers from South to North (2 bil.)
  - No concern for political feasibility!!!

- **We care about welfare in the South (objective)**
Lit2 - Political economy

- Political economy framework explains restrictions
  - Survey data: 40-50% of voters in EU and US believe immigration reduces their income, want to decrease migration
  - Important issue for political parties (in Europe and USA)

- Voters’ attitudes are endogenous
  - Facchini-Mayda (2008): attitudes affect policy, depend on labor market and welfare state characteristics
  - Facchini-Mayda (2009): skill-heterogenous attitudes, depend on generosity of welfare benefits, tax rates/progressivity... ($R^2$ 0.1-0.2)
  - Dustmann-Preston (2007): key role of the welfare state and xenophobic preference (non-economic factors)
  - No concern for global welfare!!!

- We care about welfare in the North (impl. constraint)
Lit2 - Political economy

Effects of low-skilled migration permits on voters’ welfare

- Economic effects (income)
  - Labor market effect
  - Fiscal effect (welfare state)
  - Surplus

- Non-econ effects (residual)
  - Insecurity feelings
  - Trust, social K
  - Illegal migration
  - Xenophobic preferences

- Aversion to extreme poverty!!!
Overwhelming evidence that households care about the worst-off’s (Charness-Rabin 2002-05)

Fehr and Schmidt (2006): conditions under which the maximin motive is key
  - Not important when players view each other as agents behaving strategically;
  - Highly relevant in the context of charitable giving or in the context of elections with a large number of people, where strategic voting is unlikely to occur (Aid, S-N migration)
  - We assume voters care about extreme poverty on Earth, to a small extent!

Note: same rationale operates if improving the situation of the worst-off benefits to the donor
Lit3 - Experimental economics

- Altruism (humanitarian motive) used to explain policies towards refugees (Hatton 2004, Hatton-Williamson 2006, Bubb et al. 2011)

- What about economic migration?
  - 2006: IOM asked for EU development-friendly immigration policy
  - 2014: Obama asks for “altruistic immig policy” (deportations)
  - World Bank (David McKenzie): “improved labor mobility is by far the greatest way to give a leg up to low-income people around the globe [...] Allowing lower-skilled workers in is directly going to improve poverty in poor countries”.
In sum...

- Despite aversion to extreme poverty, the richer have no incentives to welcome more migrants.

- The welfare of worst-off’s = public good:
  - When country $j$ welcomes an additional migrant, income in source country increases.
  - Everybody on Earth enjoys it (positive externality) but country $j$ bears the cost alone.

- Use coordination gains to minimize extreme poverty.

- Secondarily, a taxation/subsidy scheme could help rich countries to internalize the externality.
1. **Approach and contribution**

2. **Theory: design of the scheme**
   - 2.1 Environment
   - 2.2 Nationalist allocation
   - 2.3 No-regret allocation
   - 2.4 Decentralization

3. **Quantitative Assessment**
Environment

- World made of $J + 1$ countries,
  - $J$ developed ($j=1...J$)
  - The developing world ($j=0$)
- Two types of national citizens: $n_j = n_j^h + n_j^l$
  - The low-skilled supply raw labor ($l_j$)
  - The high-skilled supply raw labor + human capital ($h_j$)
  - They share another fixed factor ($k_j$)
- We model low-skilled migration from 0 to $j$ ($m_j$)
  - In the South: $n_0^l - m' \mathbf{1}_j$
Environment

- Preferences in country $j$:

$$U^s_j = u(c^s_j) + \beta u(c^l_0) - \varepsilon_j \left( \frac{m_j}{n_j} \right)^2$$

- Production and surplus:

$$y_j = F_j(k_j, h_j; l_j) = f_j(l_j)$$

$$l_j = l_j(n_j, \delta_j m_j)$$

$$s_j(l_j) = f_j(l_j) - f'_j(l_j)l_j$$

- High- and low-skilled citizens share the surplus $(1 - \zeta_j, \zeta_j)$
Environment

- Consumption levels:

\[
c^l_j = f'_j(l_j)l'_{j,1}(n_j, \delta_j m_j) + \frac{\zeta_j s_j(l_j)}{n^l_j} + \tau_j
\]

\[
c^h_j = f'_j(l_j)l'_{j,1}(n_j, \delta_j m_j) + \frac{(1 - \zeta_j)s_j(l_j) - (n^l_j + \zeta_j m_j)\tau_j}{n^h_j}
\]

\[
c^m_j = f'_j(l_j)\delta_j l'_{j,2}(n_j, \delta_j m_j) + \tau_j \xi_j
\]

- In the South: \(c^l_0\) depends on \(m_j\) and \(m_i\) \((i \neq j)\)!!!

\[
c^l_0 = f'_0(n^l_0 - m' 1_j)l'_{0,1}(n^l_0 - m' 1_j, 0)
\]
Environment

- Probabilistic voting set-up:
  - Smooth aggregation of preferences instead of median voter
  - Maximization of a "political objective function":

\[
W_j = \frac{n_j^h}{n_j} U_j^h + \frac{n_j^l}{n_j} \theta_j U_j^l
\]

\[
= \frac{n_j^h}{n_j} u(c_j^h) + \frac{n_j^l}{n_j} \theta_j u(c_j^l) + \frac{n_j^h + \theta_j n_j^l}{n_j} \left( \beta u(c_0^j) - \varepsilon_j \left( \frac{m_j}{n_j} \right)^2 \right)
\]

- Note that only natives have the right to vote!
Definition (Country)

A country $j$ is a multiplet $\Omega_j = \{n^h_j, n^l_j, \tau_j, \xi_j, \theta_j, \delta_j, \zeta_j, \epsilon_j\}$ representing the size and skill structure of the population, the intensity of redistribution, the degree of political participation, the productivity of immigrants relative to low skilled nationals, the share of the surplus going to low-skilled natives, the scale of aversion to immigration, and functions $f_j(.), l_j(.)$ characterizing the production technology.
Nationalist equilibrium

2.2. Nationalist equilibrium ($\tilde{m}_j$, $j = 1, \ldots, J$):

**Definition (Nationalist)**

A nationalist allocation is a vector $\tilde{m}$ such that the objective

$$W_j(m_j) = W_j([\tilde{m}_1, \ldots, \tilde{m}_{j-1}, m_j, \tilde{m}_{j+1}, \ldots, \tilde{m}_J])$$

is maximized with respect to $m_j$ in each developed country $j$ given the migration choices of other countries ($\tilde{m}_{-j}$)

$\Rightarrow$ Nash(ionalist) equilibrium
Nationalist equilibrium

Welfare impact at the margin: $\frac{\partial W_j}{\partial m_j}$

- Income of the high-skilled:
  - ↓ in income from raw labor (-)
  - ↑ in return to human capital (+)
  - ↑ in return to physical capital (+)
  - ↑ in redistributive taxes (-)

- Income of the low-skilled:
  - ↓ in income from raw labor (-)
  - ↑ in return to physical capital (+)

- Non-econ effect: ↑ cost (-), ↓ extreme poverty (+)

FOC ($\frac{\partial W_j}{\partial m_j} = 0$): weighted sum of these effects determines $\tilde{m}_j$
Intermediate results:

**Lemma (interior solution)**

For a given country $j$, the corner solution $\tilde{m}_j = 0$ cannot be an optimum to country $j$’s problem if \( \left( \frac{n_j^l}{n_j^h}, \theta_j, \tau_j, \tilde{\xi}_j, \varepsilon_j \right) \) not too large.

**Lemma (upper bound)**

Under the condition of Lemma 1, there exists a threshold $m_{j}^{\max}$ such that $W_j(m_{j}^{\max}) = W_j(0)$. It follows $\tilde{m}_j < m_{j}^{\max}$. Then, if $\varepsilon_j$’s not to small, $\sum_j m_{j}^{\max} < m_0^{\max} \Leftrightarrow \sum_j \tilde{m}_j < m_0^{\max}$.
Nationalist equilibrium

Important results:

Theorem (tradeoff HS-LS)

*When the nationalist allocation = interior maximum, if \((\zeta_j, \tau_j, \xi_j)\) not too large, each high-skilled national prefers increasing immigration whereas each low-skilled national prefers decreasing it*

Theorem (comparative static results)

*The immigration level \(\tilde{m}_j\) is and decreasing in \(\left(\theta_j, \frac{n^l_j}{n^h_j}, \tau_j, \xi_j, \varepsilon_j\right)\) if utility not too concave; \(\tilde{m}_j\) is ambiguously affected by \((\zeta_j, \delta_j)\)*
Nationalist equilibrium

Anticipating the calibration exercise:

\[ U^h_{usa}(m_{usa}) \]

\[ U^l_{usa}(m_{usa}) \]

\[ W_{usa}(m_{usa}) \]
2.3. The no-regret solution ($\overline{m}_j$):

- **Objective**: Min extreme poverty $\iff$ Max $m' 1_J$
- **s.t.** Political Feasibility: no welfare loss for North citizens

**Definition**

No-regret allocation is a vector $\overline{m}$ such that $m' 1_J$ is maximized subject to the implementability constraint: $W_j(\overline{m}) \leq W_j(\overline{m}) \ \forall j$
No-Regret Allocation

A quick look at the first order conditions:

\[ 1 + \lambda_j \frac{\partial W_j(m)}{\partial m_j} + \sum_{k \neq j} \lambda_k \frac{\partial W_k(m)}{\partial m_j} = 0 \]

\[ \lambda_j (W_j(m) - W_j(\tilde{m})) = 0, \quad \lambda_j \geq 0, \quad W_j(m) \geq W_j(\tilde{m}). \]

The externality is now internalized: \( \frac{\partial W_k(m)}{\partial m_j} \) is given by

\[ \frac{\partial W_k(m)}{\partial m_j} = -\beta \frac{n_k^h + \theta_k n_k^l}{n_k} u'(c_0^l) f_0''(l_0^l) l_{0,1}^l (n_0^l - \bar{m}'^l - 1_j, 0) \]
No-Regret Allocation

Shape of $W_j(m_j)$ when immigration increases in other countries:
No-Regret Allocation

Theorem

In the absence of altruism, the no-regret allocation coincides with the nationalist allocation, i.e. $\beta = 0 \Rightarrow \overline{m} = \tilde{m}$

Theorem

Assume all rich countries are identical and $\beta > 0$. Then the symmetric allocations $\overline{m}$ and $\tilde{m}$ satisfy $\overline{m} > \tilde{m}$.

When countries are different:

- Not sure that $\forall j : \overline{m}_j > \tilde{m}_j$ if $\beta$ not very small
- Requires quantitative exercise
2.4. How to decentralize the no-regret?

- Delegation
  - A supranational agency manages immigration policies

- Or design a tax-subsidy scheme:
  - Vector $q$ of country-specific lump-sum taxes to be paid to agency
  - Vector $p$ of country-specific subsidy rates per migrant
Decentralization

- Agency’s budget constraint: \( p'm - q'1_j = 0 \)
- Set subsidy rate such that nationalist FOC(\( p_j, \bar{m}_j \)) = 0 at the no-regret level of immigration (\( \bar{m}_j \)):

**Theorem**

The no-regret allocation \( \bar{m} \) can be decentralized with subsidy rates \( \bar{p} \) and lump-sum taxes \( \bar{q} \) satisfying \( \bar{p}_j \bar{m}_j = \bar{q}_j \forall j \).

**Theorem**

A system of tradable quotas (constant price) cannot be used to decentralize the no-regret
Plan of the talk

1. Approach and contribution
2. Theory: Design of the scheme
3. **Application: By how much does it help?**
   3.1 Calibration
   3.2 Robustness and fit
   3.3 No-regret and decentralization
   3.4 Remittances and aid
3.1. Calibration of the nationalist eq.

- Hypothesis: situation in 2000 = nationalist equilibrium
- Two sets of host countries: G7 or HI-OECD
- Goals:
  - We choose $U(.) = \ln(.)$, $F(.)$ C-D, and $I(.)$ CES
  - Need to calibrate $\Omega_j = \{n^h_j, n^l_j, \theta_j, \tau_j, \xi_j, \delta_j, \zeta_j, \epsilon_j\}$, $\beta$
  - And the parameters of $F(.)$ and $I(.)$
  - To match some moments ($y_j$, $m_j$, $\omega^h_j$, $\omega^m_j$, $\Delta Gini$)
Calibration

- Simplest tasks:
  - We use labor force data for $(n^h_j, n^l_j)$ and $\tilde{m}_j$
  - We assume $\theta_j$ equals LS/HS wage ratio
  - Sharing the surplus ($\zeta_j$):
    - Human capital is owned by the high-skilled
    - Physical capital ownership is proportional to wages
  - Relative welfare benefits $\tilde{\zeta}_j$ from Barbone et al.

- Then...
Calibration

- Technology: \( y_j = \bar{\mu}_j k_j^\alpha_k h_j^\alpha_h l_j^\alpha_l \) with \( \alpha_j^k = 0.365 \forall j \)

- Raw labor: \( l_j = \left( \nu_j(n_j)^{\sigma-1}\sigma + (1-\nu_j)(\delta_j m_j)^{\sigma-1}\sigma \right)^{\sigma\over\sigma-1} \) with
  - Elasticity \( \sigma = 20 \)
  - Downgrading \( \delta_j \) from Coulombe-Tremblay (cognitive ability)
  - Preference \( \nu_j \) to match \( \omega_j^m \) (LS citizens/immig)
  - Elasticity \( \alpha_j^h \) to match \( \omega_j^h \) (HS/LS citizens)
  - Scale factor to \( \bar{\mu}_j k_j^\alpha_j^k \) to match GDP per capita

- Once gross income levels are identified, calibrate \( \tau_j \) to match \( \Delta Gini \) (Ratio "before/after" redistribution)
Calibration of altruism rate based on US data on Charities:

- 1.5% of US pop in extreme poverty (USD 700 per year)
- 50% of active Americans with y = USD 87,500 per year
- They give 2% of their income to organizations protecting individuals in precarious situation
  - $t = 0.02 \max \ln (y - yt) + \beta \ln (0.008y + 33ty)$ if $\beta \simeq 0.007$
  - Experimental economics: $\beta = 0.013$
  - Benchmark: $\beta = 0.007$ and robustness for $\beta \in [0; 0.013]$

- Calibrate $\epsilon_j$ to match $m_j$
### Calibration

<table>
<thead>
<tr>
<th></th>
<th>$\nu_j$</th>
<th>$\alpha_j^l$</th>
<th>$\hat{\mu}_j$</th>
<th>$\hat{\zeta}_j$</th>
<th>$\tau_j$</th>
<th>$\theta_j$</th>
<th>$\epsilon_j$</th>
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<td>7.067</td>
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<td>0.607</td>
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<td>0.237</td>
<td>0.564</td>
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<td>0.564</td>
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<td>0.228</td>
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<td>0.289</td>
<td>2.634</td>
<td>0.518</td>
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</table>
3.2. Robustness and model fit

- Counterfactual simulations: Compute $\tilde{m}_j$ with
  - No altruism ($\beta = 0$): negligible effect
  - No redistribution ($\tau_j = 0$ or $\xi_j = 0$): big effect
  - Full political power to HS ($\theta_j = 0$): big effect

- Fraction of cross-country variability explained by econ factors
  - Simulate model with $\theta_j = \theta^{med}$ and $\varepsilon_j = \varepsilon^{med}$
  - Only source of variation: economic factors
  - $R^2 = 0.5$ (1/2 explained by econ, 1/2 by non econ factors)
## Robustness and fit

### Counterfactual experiments

<table>
<thead>
<tr>
<th>G7</th>
<th>Obs</th>
<th>no altr</th>
<th>no redist</th>
<th>Full power to HS</th>
<th>Remove non econ</th>
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<tr>
<td></td>
<td>$\tilde{m}$</td>
<td>$\beta = 0$</td>
<td>$\tau_j = 0$</td>
<td>$\xi_j = 0$</td>
<td>$\theta_j = 0$</td>
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<td>Can</td>
<td>2.1</td>
<td>2.1</td>
<td>2.7</td>
<td>3.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Fra</td>
<td>3.0</td>
<td>3.0</td>
<td>7.3</td>
<td>8.2</td>
<td>9.8</td>
</tr>
<tr>
<td>Ger</td>
<td>4.7</td>
<td>4.7</td>
<td>11.3</td>
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<td>1.0</td>
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<td>1.8</td>
<td>1.8</td>
<td>2.4</td>
<td>3.3</td>
<td>7.1</td>
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<tr>
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<td>16.0</td>
<td>15.6</td>
<td>34.3</td>
<td>37.9</td>
<td>48.3</td>
</tr>
</tbody>
</table>

DdIC & FD  | Int’l Migration Fund
Robustness and fit

Counterfactual vs observed immigration rates: $R^2 = 0.5$
3.3. How much does the no-regret help?

<table>
<thead>
<tr>
<th>Additional migration (×1000)</th>
<th>Nationalist</th>
<th>No-regret</th>
</tr>
</thead>
<tbody>
<tr>
<td>G7</td>
<td>1,660</td>
<td>2,603</td>
</tr>
<tr>
<td>OECD</td>
<td>+5.7%</td>
<td>+7.4%</td>
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<tr>
<td>Ratio of US/Developing GDP</td>
<td>7.07</td>
<td>7.05</td>
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<tr>
<td></td>
<td>-0.3%</td>
<td>-1.7%</td>
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</tbody>
</table>

Additional migration (×1000) and GDP gap with $\beta = 0.007$.
No-regret & decentralization

- Who takes more migrants?
  - Countries with small immigration rates

- Subsidy per million of migrants
  - Decrease with country size
  - Increase with productivity

- Comparison with Utilitarianism
  - Benthamite is less effective (max gains for the rich)
  - Millian is more effective (loss for large countries)
  - Not Pareto-improving!!! No incentive to participation
## Approach and contribution

### Theory: Design of the scheme

### Quantitative assessment

### Conclusion

#### 3.1. Calibration

#### 3.2. Robustness and fit

#### 3.3. No regret

#### 3.4. Remittances and aid

### No-regret & decentralization

<table>
<thead>
<tr>
<th>Selected $j$</th>
<th>$\tilde{m}_j$</th>
<th>$\bar{m}_j$</th>
<th>$\Delta m_j / m_j$</th>
<th>$p_j / n_j$</th>
<th>Benth.</th>
<th>Millian</th>
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<tr>
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<td>1010.8</td>
<td>1056.6</td>
<td>+4.5%</td>
<td>$100$</td>
<td>1031.5</td>
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<td>Korea Rep</td>
<td>71.8</td>
<td>97.7</td>
<td>+36.1%</td>
<td>$105$</td>
<td>73.5</td>
<td>74.8</td>
</tr>
<tr>
<td>Portugal</td>
<td>307.7</td>
<td>327.7</td>
<td>+6.5%</td>
<td>$125$</td>
<td>314.6</td>
<td>309.5</td>
</tr>
<tr>
<td>Switzerland</td>
<td>525.4</td>
<td>547.9</td>
<td>+4.3%</td>
<td>$222$</td>
<td>537.8</td>
<td>527.6</td>
</tr>
<tr>
<td>UK</td>
<td>1837.9</td>
<td>1984.2</td>
<td>+8.0%</td>
<td>$26$</td>
<td>1900.8</td>
<td>1938.4</td>
</tr>
<tr>
<td>USA</td>
<td>16000.2</td>
<td>17071.9</td>
<td>+6.7%</td>
<td>$4$</td>
<td>16955.1</td>
<td>24335.6</td>
</tr>
<tr>
<td>All</td>
<td>35227.0</td>
<td>37830.8</td>
<td>+7.4%</td>
<td>-</td>
<td>37128.6</td>
<td>45050.3</td>
</tr>
</tbody>
</table>
Robustness

Additional migration ($\times 1000$) as a function of $\beta$

- $\beta = 0.007$ (US charities)
  - Emmig incr. by 7.4%
  - Income incr. by 1.5%
- $\beta = 0.013$ (Exp. Econ)
  - Emmig incr. by 15%
  - Income incr. by 3.0%
With remittances and aid

3.4. Accounting for remittances and aid

- Introducing recorded remittances boosts the results:
  - Hyp: migrants sent back $\eta = 3\%$ of $c^m_j$ (Bollard et al. 2011)
  - In country 0:

$$c^l_0 = f'_0(l_0)l^l_0(n^l_0) + \eta \sum_j \frac{m_j c^m_j}{l_0}$$

- The value of the externality increases!!
- More migrants & greater effect on poverty
- No-regret is much more effective (+17% rather than +7%)

- Introducing aid does not modify the results
With remittances

Total additional migration ($\times 1000$) with recorded remittances

- $\beta = 0.007$ (US charities)
  - Emig incr. by 17%
  - Income incr. by 4%

- $\beta = 0.013$ (Exp. Econ)
  - Emig incr. by 33%
  - Income incr. by 8%
Conclusion

- Small aversion to extreme poverty ($\beta = .007$):
  - Negligible role in determining nationalist immigration policies
  - Significant gains from coordination
  - With remittances (+17% of mig., +4% in inc.)

- Greater effectiveness if $\beta = .013$ (+33% of mig., +8% in inc.)

- Greater effectiveness with unofficial remittances...

- Our treaty is unlikely... but highlights the "free-riding" consequences of uncoordinated visa restrictions