Global Impact of Migration: Level, Distribution, Winners and Losers

Frédéric Docquier

UCL

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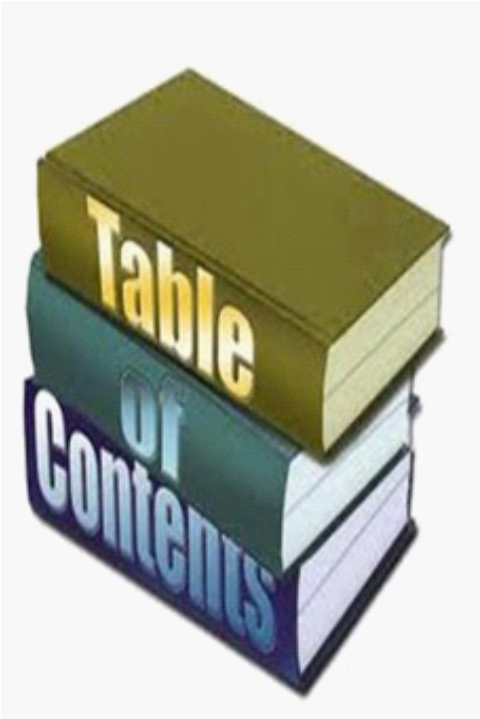
Map of the talk

Research on the macroeconomics of int'l migration:



Plan:

1. **General introduction**
2. Data development (paper #1)
3. Unified model of migration and inequality (paper #2)
4. Conclusion

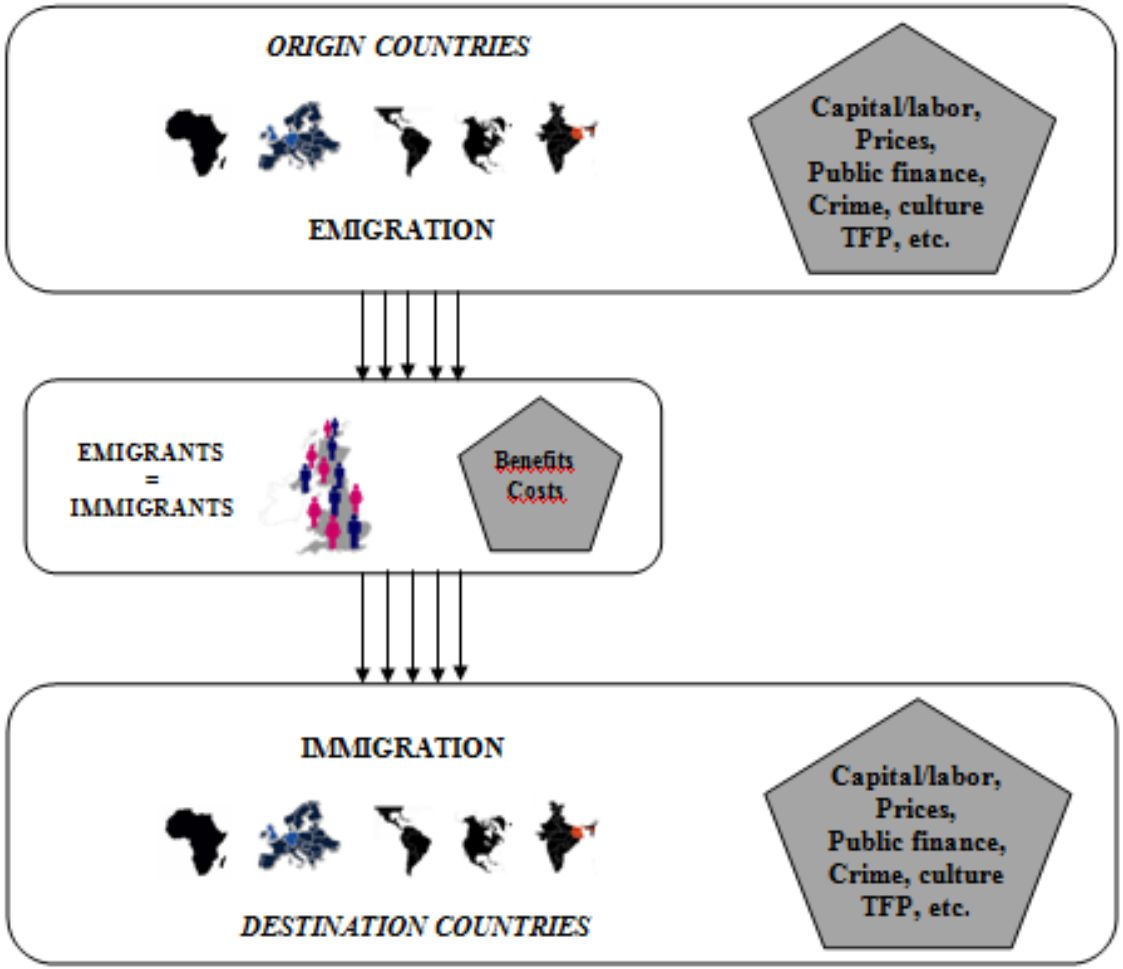
General introduction

The **macroeconomics of int'l migration**, a large and complex field of research:

- Literature on measurement (paper #1)
- Consequences of migration for sending and receiving countries
- Determinants of migration, selection, location
- Global analysis (paper #2)

More details...

General introduction - Measurement



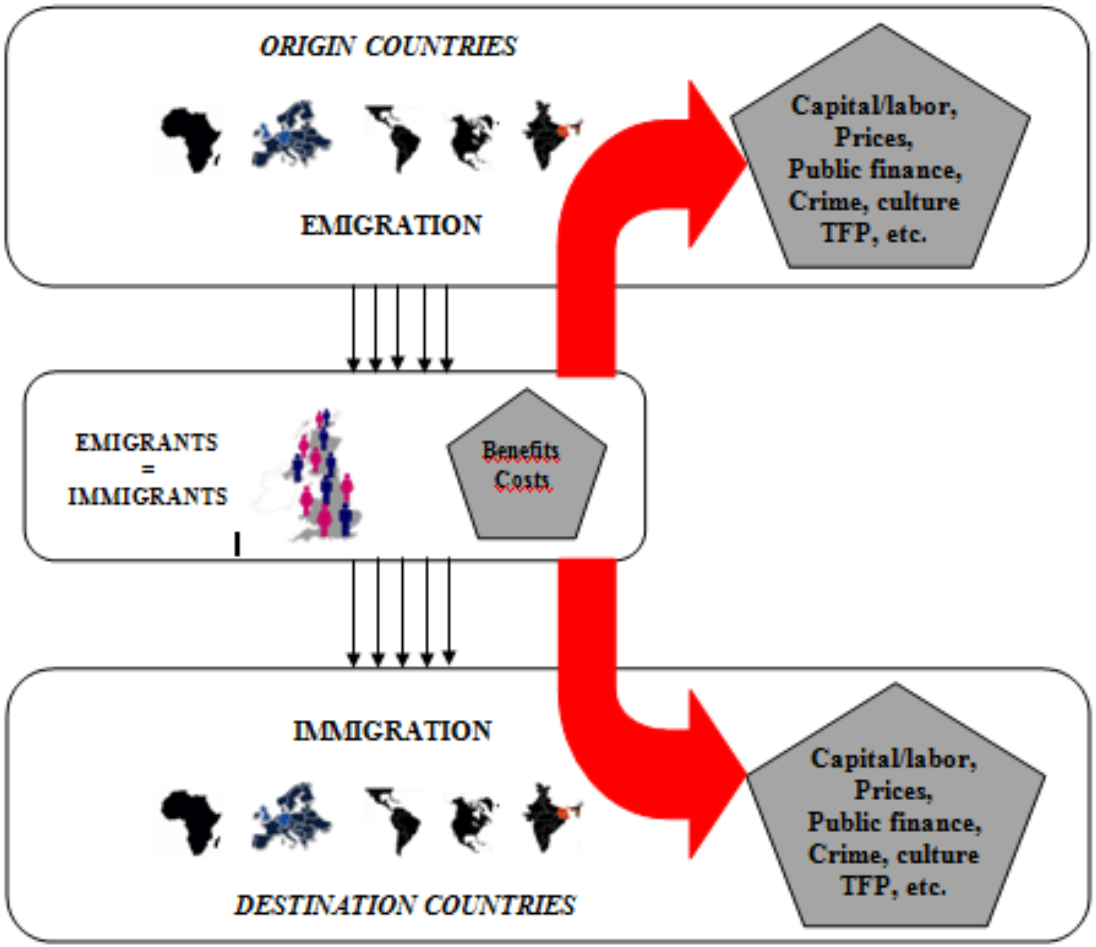
General introduction - Measurement

Data development since the late 1990s:

- Bilateral data: Eurostat, Ozden et al. (2010)
- Pioneering study by education level: Carrington and Detragiache (1998)
- DM (2004-06), DLM (2009): emig to 30 OECD dest. in 1990 and 2000
- Defoort (2008): emig to 6 OECD dest. 1975 to 2000
- OECD (2007-09): emig to 29 OECD dest. in 2000

Paper #1 extends these works

General introduction - Consequences

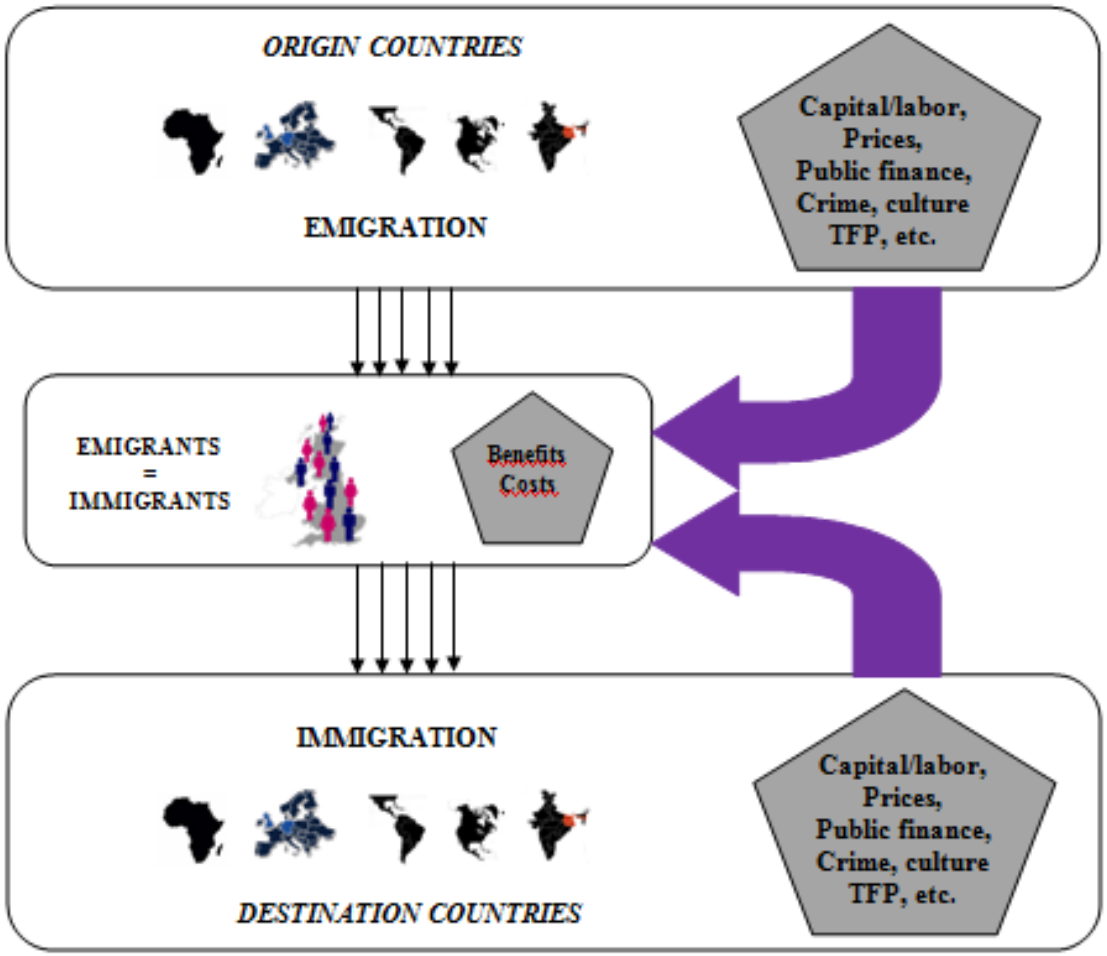


General introduction - Consequences

On migration impact on origin and destinations countries...

- Large literature on the consequences of immigration (Borjas, Card, Ottaviano-Peri, Chiswick, Auerbach-Oreopoulos, Storesletten, etc.)
- Old and newer literatures on the consequences of emigration. Controversial debates on high-skilled emigration:
  - Optimistic view of the 1960s (Grubel-Scott, Johnson, Berry-Soglio)
  - Pessimistic view of 1970-1995 (Bhagwati-Hamada, McCulloch-Yellen, Miyagiwa, Haque-Kim)
  - Mitigated view of 1995-2011 (Docquier-Rapoport, JEL 2011)

General introduction - Determinants

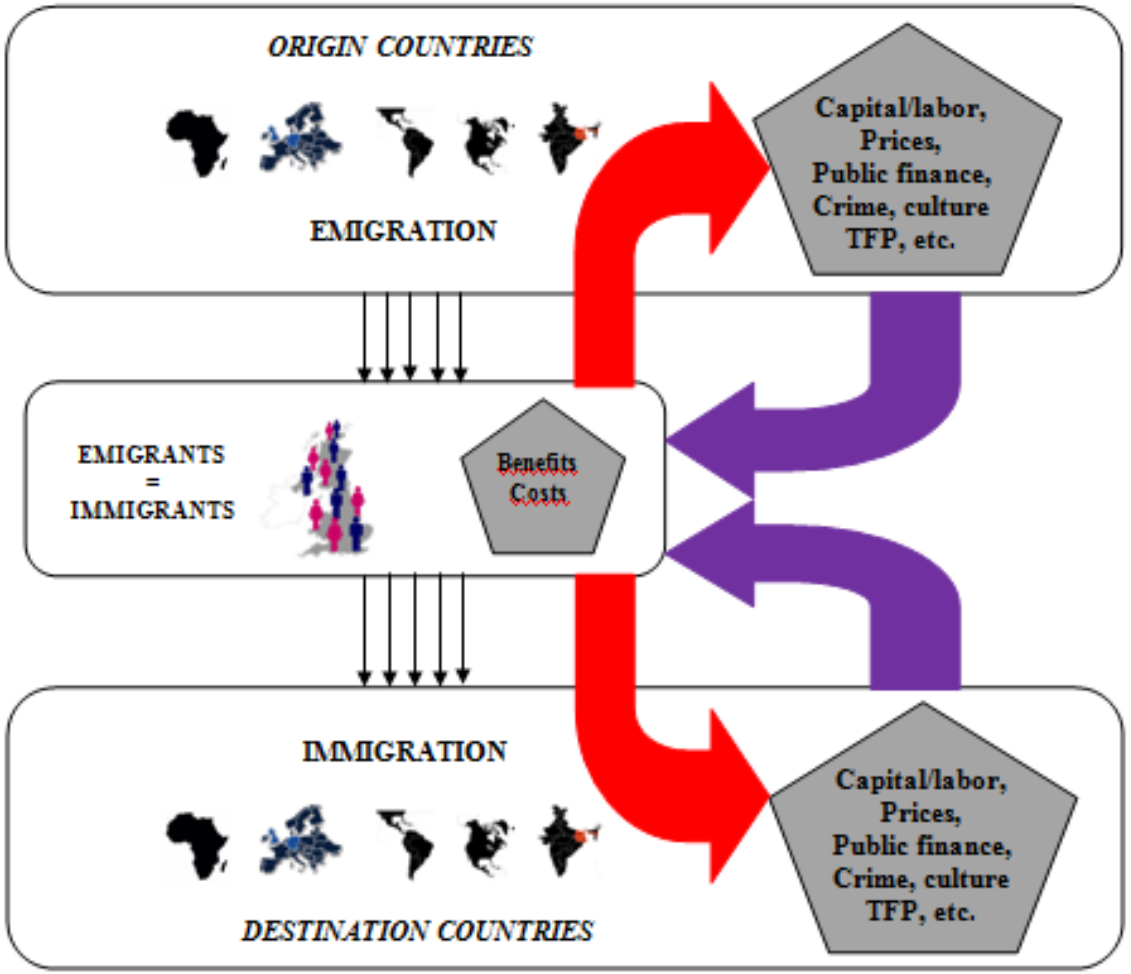


General introduction - Determinants

On the determinants of migration...

- Old literature on migration (in)flows
- New studies by education level and by gender:
  - DLM07 - aggregate emigration rates and positive selection increase with poverty, instability, etc.
  - Determinants of gender gaps in emigration
- New bilateral studies on selection, location
  - Grogger-Hanson (2008), Belot-Hatton (2008) - income differentials matter
  - Rosenzweig (2007, 2008) - students' migration and return migration depend on differentials in "skill prices"
  - Beine et al. (2010, 2011): importance of network effects

General introduction - Joint analysis



General introduction - Joint analysis

Need for joint analysis:

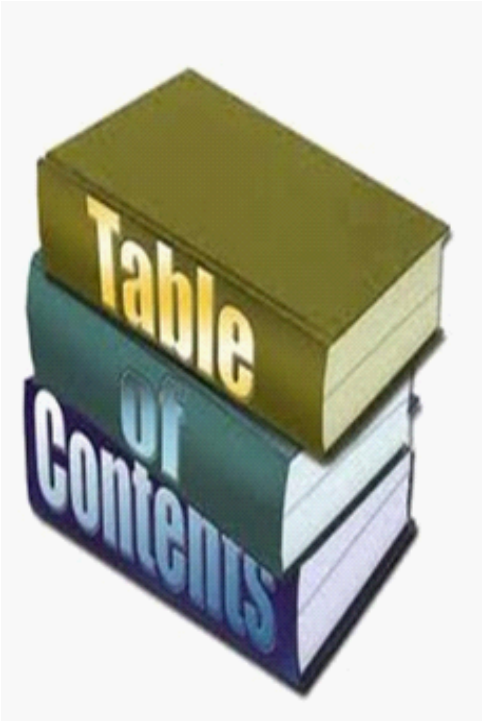
- vicious/virtuous circles at the level of sending countries (de la Croix and Docquier, 2010)
- idem at the level of receiving countries (no study)
- analysis at both levels (no study)

Migration = propagation channel of economic shocks

Paper #2 addresses this issue

Map of the talk

Research on the macroeconomics of int'l migration:



Plan:

1. General introduction
2. **Data development (paper #1)**
3. Unified model of migration and inequality (paper #2)
4. Conclusion

Co-authors on paper #1

Docquier F., A. Marfouk, C. Ozden, C. Parsons, *"Geographic, gender and skill structure of international migration"*

Abdeslam Marfouk
(IRES-UCL)

Caglar Ozden
(World Bank)

Chris Parsons
(Univ Notthingham)

1.a. Objective

- Disentangle the volume of migration by country of origin/destination, gender and education level is crucial to understand the demographic, economic, political and sociological consequences of int'l migration
- Develop comprehensive matrices of bilateral migration stocks by education level and gender for 1990 and 2000
- First assessment of brain drain and low-skilled migration to South destinations, to non-OECD high-income countries

1.b. Source and method

Structure of the database:

- 195 countries (38,025 country pairs)
- Migrants = foreign-born population
- Population aged 25 and over
- College graduates and the less educated
- Men and women

1.b. Source and method

Three steps:

1. DLM immigration data for 30 OECD destination countries: 57.4 mio migrants in 2000, incl 20.3 mio coll grad
2. Collection of similar data for non-OECD destinations
   - 46* dest in 2000 (20.2 mio migrants, incl 3.1 mio coll grad)
   - 31 dest in 1990 (14.9 mio migrants, incl 1.6 mio coll grad)
3. Use primary data from these 195x76 and 195x61 matrices to estimate the size and structure of remaining stocks
   - 119 dest in 2000 (22.9 mio migrants, incl 2.8 mio coll grad)
   - 134 dest in 1990 (25.4 mio migrants, incl 2.5 mio coll grad)

1.b. Source and method

Non-OECD census data (step 2):

- 10 European non-OECD: Bulgaria, Croatia, Cyprus, Estonia, Latvia°, Lithuania, Macedonia, Malta, Romania, Slovenia
- 14 Latin American: Argentina, Belize*, Bolivia*, Brazil, Chile°, Colombia, Costa Rica, the Dominican Republic*, Honduras*, Nicaragua*, Panama*, Paraguay*, Trinidad and Tobago*, Venezuela
- 15 Asian: Bahrain^{lfs}, Belarus, Hong Kong*, Iraq*, Israel°, Kuwait^{lfs}, Kyrgyzstan*, Malaysia*, Mongolia*, Oman^{lfs}, Philippines, Qatar^{lfs}, Saudi Arabia^{lfs}, Singapore, United Arab Emirates^{lfs}
- 7 African: Guinea*, Ivory Coast, Kenya, Morocco*, Rwanda, South Africa, Uganda

1.b. Source and method

Gravity-type equations by education level and gender (step 3):

$$M_{ijt}^{g} = \gamma_{it}^{g} + \alpha_{0t}^{g} + \alpha_{1t}^{g} X_{ijt}^{g} + \alpha_{2t}^{g} A_{jt}^{g} + \epsilon_{ijt}^{g}$$

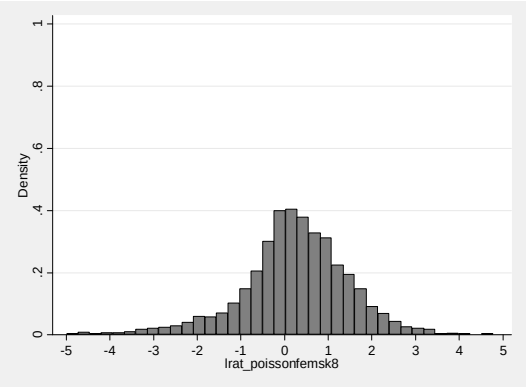
- M_{ijt}^{g} = bilateral migration stock
- γ_{it}^{g} = FE for origin countries
- X_{ijt}^{g} = distances + OPSW aggregate stocks
- A_{jt}^{g} = variables for destination countries (regional FE, English, native LF size, proportion of coll grad, GDP per capita, fertility, LF participation rate, GCC dummy, compulsory military service, poligamy)

Large number of zero or undefined obs (48%) + heteroskedasticity: Poisson regressions with robust standard errors and weighted obs.

1.b. Source and method

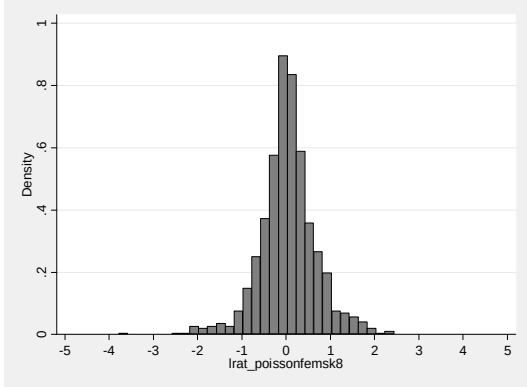
In-sample validation: quality of the fit is excellent for corridors greater than 250 (e.g. high-skilled females):

Fewer than 250 (<1%)



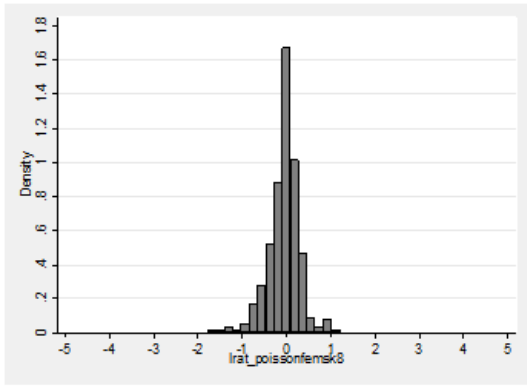
Corr: .60, overestimated

Greater than 250



Corr: .99, unbiased

Greater than 5,000



Corr: .99, unbiased

$\Rightarrow$ We exclude predicted corridors with less than 250 migrants

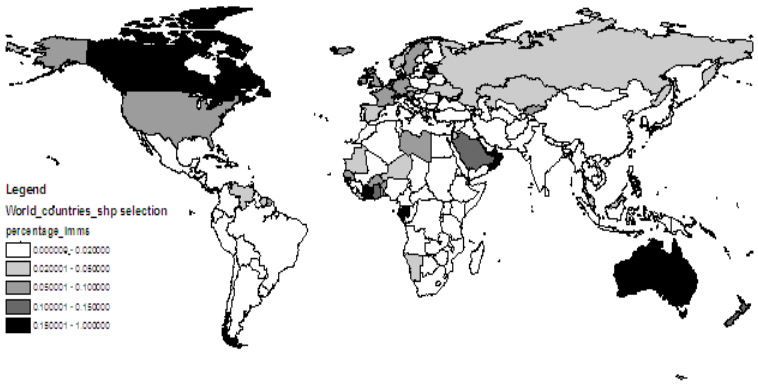
1.c. Main patterns - South-North

Migration stocks in 2000 (x1,000)

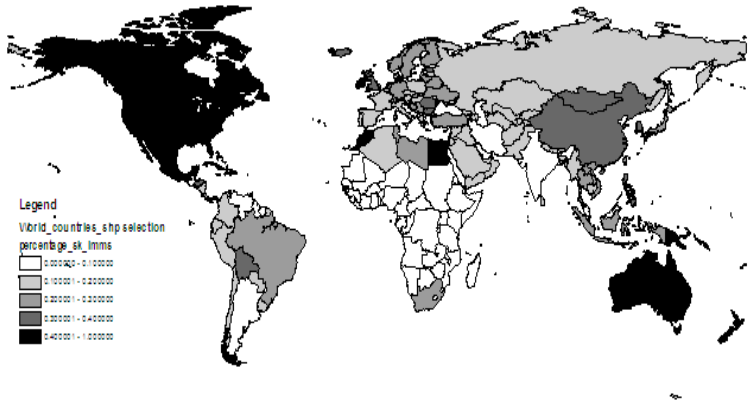
	OECD	non-OECD	Imputed	Imp %	Total
Males	28,170	11,856	11,478	0.22	51,504
College	10,310	1,903	1,583	0.11	13,796
Less educ	17,859	9,953	9,896	0.26	37,708
Females	29,209	8,354	11,464	0.23	49,027
College	10,021	1,156	1,215	0.10	12,393
Less educ	19,188	7,198	10,249	0.28	36,634
Total	57,379	20,210	22,942	0.23	100,531
College	20,332	3,060	2,798	0.11	26,189
Less educ	37,047	17,151	20,144	0.27	74,342

1.c. Main patterns - Immigration

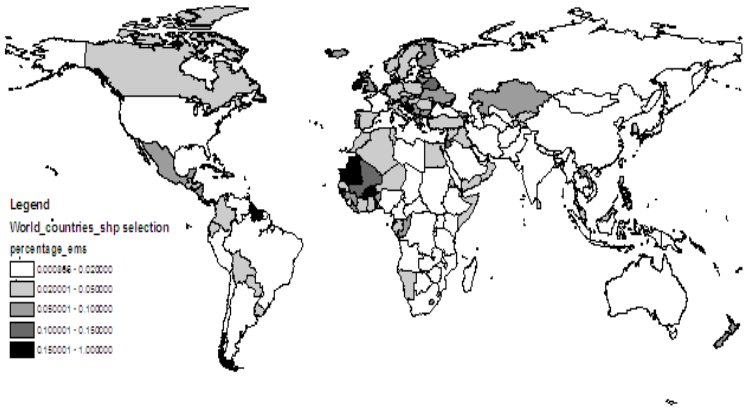
Immigration/Population



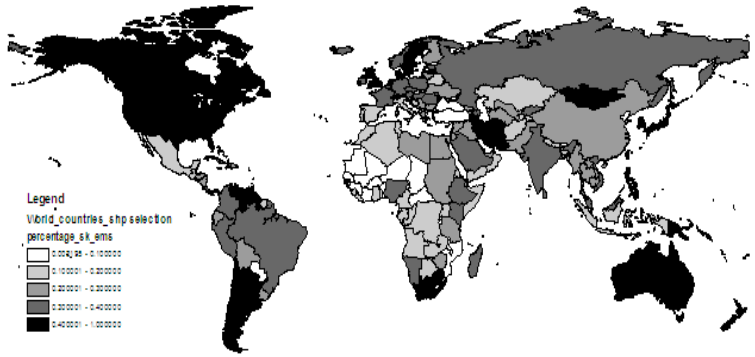
High-skill immig/total immig



Emigration/Population



High-skill emig/total emig



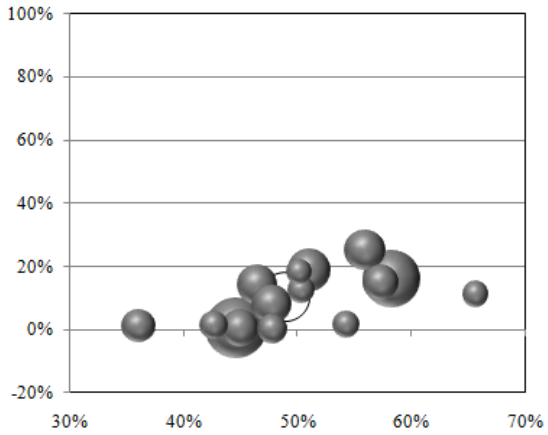
1.c. Main patterns - South-North

Migration between North and South countries in 2000

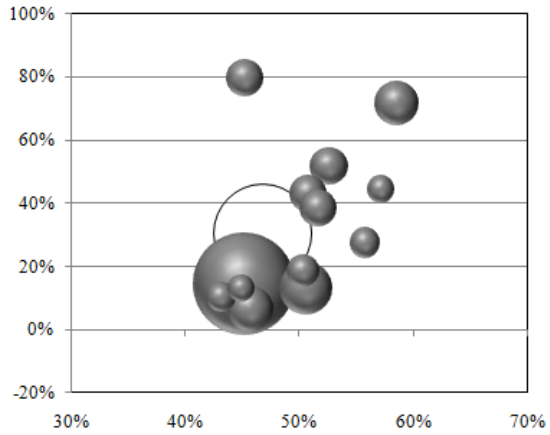
		HI dest	Dev dest
HI origin	Stock (mio)	22.5	3.3
	College	38.2%	21.5%
	Women	52.6%	47.7%
	Growth	8.6%	12.5%
Dev origin	Stock (mio)	45.4	29.4
	College	30.5%	10.4%
	Women	46.8%	48.9%
	Growth	55.6%	7.0%

1.c. Main patterns - corridors

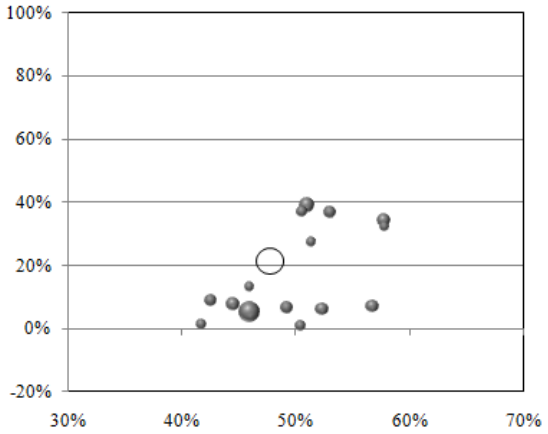
South-South corridors



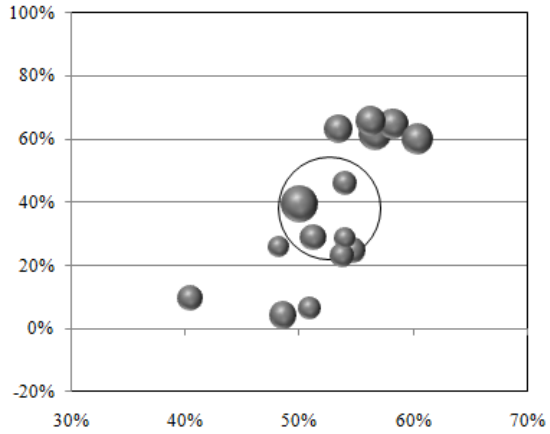
South-North corridors



North-South corridors



North-North corridors



1.c. Main patterns - MENA

Results for selected Maghreb and Mashreq countries (x1,000)

	Population	Total			College grad		
	25+	Immig	Emig	Em/Im	Immig	Emig	Em/Im
Algeria	13,184	112	681	6.1	18	100	5.5
Libya	2,294	426	65	0.2	112	16	0.1
Morocco	13,198	35	1,485	43.0	15	205	13.5
Tunisia	4,686	59	375	6.3	16	57	3.5
Egypt	29,171	137	1,481	10.8	57	401	7.1
Jordan	1,977	201	595	3.0	32	124	3.8
Lebanon	1,719	221	496	2.2	46	174	3.8
Syria	6,185	166	372	2.3	21	102	3.8

Map of the talk

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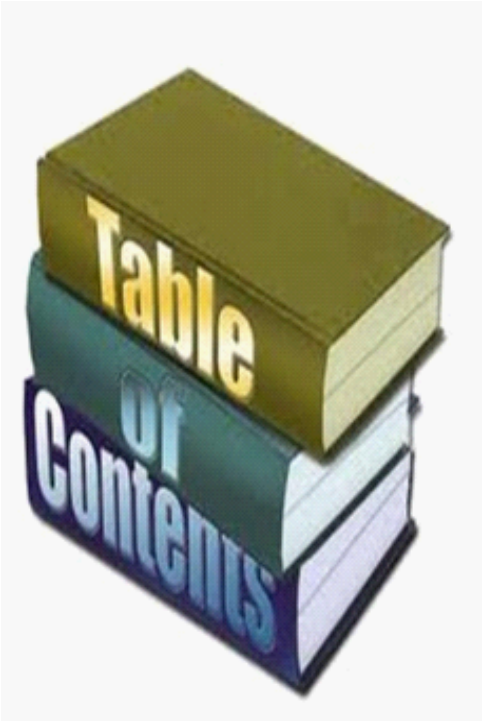

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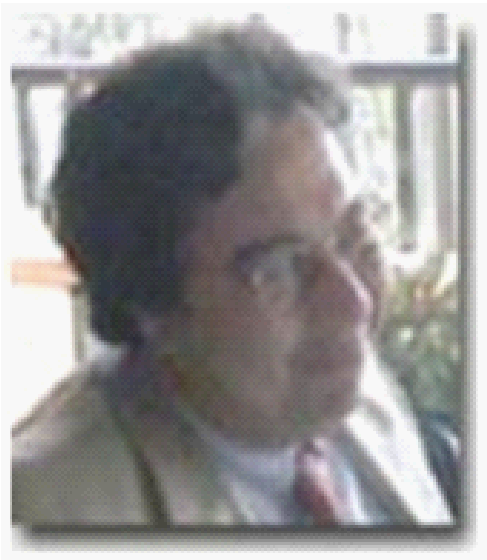
Co-author on paper #2

Docquier F., and K. Sekkat, *"A unified analysis of international migration and cross-country inequality"*.

Khalid Sekkat

ULB and ERF



2.a. Objectives

- Causal impact of economic push/pull factors on migration and causal impact of migration on economic performances have been studied separately
- We study these interdependencies in a supply-side model of the world economy with heterogeneous workers
- Key positive/normative questions:
  - Country/region-specific shocks are propagated across countries through labor mobility: is this mechanism important?
  - How do exogenous changes in migration restrictions affect world output and inequality?
  - Given externalities (TFP, diaspora), are there corridors with too many migrants and others which should have a larger size?

2.a. Objectives

- We reconcile multiple strands of literature:
  - determinants of migration (Roy's model)
  - effect on destination countries (wages, TFP)
  - effect on sending countries (wages, TFP)
  - diaspora externalities and migration multiplier
  - welfare benefits from int'l migration
- Calibration on 195x195 migration matrices and GDP data, using econometric techniques and identification strategies

2.b. World equilibrium model

Migration decisions

- Roy's model: utility-maximizing location

$$u_{ii,s} = w_{i,s} + z_{i,s} + \epsilon_{ii,s} \lessgtr u_{ij,s} = w_{j,s} + z_{j,s} - c_{ij,s} + \epsilon_{ij,s}$$

- If $\epsilon_{ik,s}$ follows an iid extreme-value distribution

$$\ln\left[\frac{L_{ij,s}}{L_{ii,s}}\right] = (w_{j,s} - w_{i,s}) - x_{ij,s}$$

with $x_{ij,s} \equiv c_{ij,s} - z_{j,s} + z_{i,s}$, and $x_{ii,s} = 0$.

- Migration costs $x_{ij,s} = X_{ij,s}(L_{ij,t}, I_{j,t})$: diaspora externalities + endogenous policy restrictions (not internalized by migrants)

2.b. World equilibrium model

Production and wages

- Homogenous firms: $Y_i = A_i Q_i$
- Labor in efficiency unit: $Q_i = \left[\theta_h Q_{i,h}^{\frac{\sigma-1}{\sigma}} + \theta_l Q_{i,l}^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}}$
- Endogenous TFP: $A_i = a_i F\left(\frac{Q_{i,h}}{Q_{i,h}+Q_{i,l}}\right)$
- Firms do not internalize TFP externalities
- Wages: $w_{i,s} = A_i \frac{\partial Q_i}{\partial Q_{i,s}} = \theta_s A_i \left(\frac{Q_i}{Q_{i,s}}\right)^{1/\sigma}$

2.b. World equilibrium model

Definition

For a given distribution of the native population $\{N_{i,s}\}_{\forall i,s}$, an equilibrium allocation of labor is a set $\{L_{ij,s}\}_{\forall i,j,s}$ satisfying (i) aggregate constraints $N_{i,s} \equiv \sum_{k \in J} L_{ik,s}$ and $Q_{i,s} \equiv \sum_{k \in J} L_{ki,s}$, (ii) utility maximization conditions, (iii) endogenous migration costs, and (iv) profit maximization conditions for all i, j and s.

System of $4 \times J \times (J+1)$: $2 \times J \times J$ bilateral migration stocks, $2 \times J \times J$ bilateral migration costs, $2 \times J$ wage rates, and $2 \times J$ aggregation constraints. With $J = 195$: 152,880 simultaneous equations

2.b. World equilibrium model

Parametrization (production technology):

- We use data on human capital ($Q_{i,s}$) and GDP (Y_i)
- With $\sigma = 3.0$ and $\theta = 0.6$, realistic skill premia for poor countries and we compute Q_i
- TFP and wages ($A_i, w_{i,s}$) can be identified
- Panel regressions for the TFP externality (1985-2005):

$$\ln\left(\frac{A_{i,t+1}}{A_{i,t}}\right) = \alpha_i + \alpha_t - .5\ln(A_{i,t}) + .17\ln(H^+_{i,t}) + \varepsilon_{i,t}$$

- Long-run elasticity: $A_i = a_i \left[Max\left(0.015; \frac{Q_{i,h}}{Q_{i,h}+Q_{i,l}}\right)\right]^{0.32}$
- Scale factor a_i identified to match A_i

2.b. World equilibrium model

Parametrization (migration technology):

- Costs $x_{ij,s}$ identified as residuals of the migration equation (set to 1,000 when migration equals zero)
- Log diaspora externalities and policy reponses $\forall j \neq i$:

$$x_{ij,s} = a_{i,s} + a_{j,s} + b_s \ln(d_{ij}) + c_s \ln(1 + L_{ij,t}) + d_s \ln(1 + I_{j,t})$$

- Identification using $\ln(1 + I_{j,t}) = \ln(1 + L_{ij,t}) + \ln(1 + M_{ij,t})$
- IV-Tobit to account for truncation and endogeneity:
  - College grads: $b_h = .129^*$, $c_h = -.109^*$, $d_h = .217^*$
  - Less educated: $b_l = .135^*$, $c_l = -.130^*$, $d_h = .267^*$

2.c. Numerical experiments

- Four economic shocks
  - 10% decline in TFP fixed effect in GCC
  - 10% increase in TFP fixed effect in China+India
  - 2% point increase in % of college graduates in SSA
  - 1% decrease in South-North low-skilled migration costs (with exogenous $x_{ij,s}$)
- Variables of interest
  - GDP per worker
  - GDP per natural (incl. emigrants' income)
  - Income per native stayers (incl. remittances)

2.c. Numerical experiments

Main insights:

- Migration propagates the effects of economic shocks all over the world
  - Acts as a multiplier when income shocks affect a rich immigration region (GCC) or poor emigration region (SSA)
  - Induces compensating effects when income shocks affect middle-income emigration regions (China/India)
- Accounting for general equilibrium effects strongly dampens the efficiency gains of reducing migration restrictions (+4 mio migrants = +3.9%; and +0.2% in world income; +0.6% in South income per natural).

2.c. Numerical experiments - productivity shocks

Migration response to economic shocks

	Observed	GCC prod. decline[a]		China-India growth[b]		African Education[c]	
	Stock	Stock	Change	Stock	Change	Stock	Change
World	100.5	97.6	-2.9%	98.4	-2.1%	103.3	2.8%
Less educated	74.3	72.0	-3.1%	73.0	-1.8%	76.0	2.2%
North-North	13.9	14.3	2.8%	14.0	1.0%	13.8	-0.6%
North-South	2.6	4.5	72.2%	2.7	5.6%	2.8	6.1%
South-North	31.5	27.0	-14.3%	29.3	-7.1%	32.1	1.9%
South-South	26.3	26.3	-0.2%	26.9	2.3%	27.3	3.6%
College graduates	26.2	25.6	-2.3%	25.4	-3.1%	27.3	4.3%
North-North	8.6	8.7	1.8%	8.7	1.7%	8.5	-1.3%
North-South	0.7	0.8	14.1%	1.0	46.3%	0.7	-0.4%
South-North	13.8	13.0	-6.3%	11.8	-14.4%	14.8	6.8%
South-South	3.1	3.1	0.3%	3.8	23.1%	3.4	9.7%

2.c. Numerical experiments - productivity shocks

Income response to economic shocks

	Obs	GCC prod. decline[a]			China-India growth[b]			African Education[c]		
		Gen. Eq.	Change	Cst. Mig[d]	Gen. Eq.	Change	Cst. Mig[d]	Gen. Eq.	Change	Cst. Mig[d]
World income	14,213	14,139	-0.5%	-0.1%	14,443	1.6%	1.7%	14,292	0.6%	0.5%
GDP per capita										
North	37,002	36,935	-0.2%	-0.2%	36,890	-0.3%	0.0%	37,073	0.2%	0.1%
South	7,854	7,865	0.1%	0.0%	8,234	4.8%	3.9%	7,920	0.8%	0.9%
Income per natural										
North	36,569	36,441	-0.3%	-0.1%	36,569	-0.2%	0.0%	36,605	0.1%	0.1%
South	8,451	8,391	-0.7%	-0.1%	8,757	3.6%	3.6%	8,542	1.1%	0.9%
Income per stayer										
North	36,517	36,477	-0.1%	-0.1%	36,461	-0.2%	0.0%	36,565	0.1%	0.1%
South	7,829	7,840	0.1%	0.0%	8,308	4.9%	4.0%	8,025	0.8%	0.8%

2.c. Numerical experiments - Focus on MENA

Income response to economic shocks in the MENA

Country	GCC Productivity decline[a]			China-India Growth[b]			African Education[c]		
	Per capita	Per Natural	Per Stayer	Per capita	Per Natural	Per Stayer	Per capita	Per Natural	Per Stayer
Algeria	0,0%	0,0%	0,0%	0,0%	-0,1%	0,0%	0,1%	0,5%	0,1%
Egypt	0,8%	-5,5%	0,8%	-0,5%	0,3%	-0,5%	0,1%	0,0%	0,1%
Jordan	-0,9%	-25,4%	-0,4%	-1,5%	2,9%	-1,5%	0,1%	-0,1%	0,1%
Lebanon	-0,1%	-4,9%	0,1%	-2,1%	1,4%	-1,7%	0,8%	-0,8%	0,9%
Libya	0,2%	0,0%	0,2%	-0,3%	-0,2%	-0,2%	0,1%	0,1%	0,0%
Morocco	0,1%	-0,5%	0,1%	-0,1%	-0,3%	-0,1%	0,3%	0,8%	0,3%
Syria	0,4%	-10,3%	0,5%	-0,6%	0,4%	-0,5%	0,1%	0,3%	0,0%
Tunisia	0,1%	-0,2%	0,1%	-0,1%	-0,1%	-0,1%	0,1%	0,5%	0,1%
Yemen	11,9%	-26,0%	12,2%	-3,1%	1,8%	-3,0%	0,3%	0,0%	0,3%
Saudi A.	-14,4%	-19,9%	-11,9%	-0,2%	0,0%	0,1%	0,0%	0,0%	0,0%
U.A.E	-14,5%	-31,8%	-12,9%	-0,3%	-0,1%	0,1%	0,0%	0,0%	0,0%

2.c. Numerical experiments - Focus on MENA

Income response to reduced immigration restrictions (MENA)

Country	Lower S-N restrictions[a]		
	Per capita	Per Natural	Per Stayer
Algeria	0.3%	0.6%	0.4%
Egypt	0.0%	1.7%	0.6%
Jordan	0.1%	5.7%	3.5%
Lebanon	0.7%	1.8%	1.3%
Libya	0.0%	0.0%	0.0%
Morocco	0.7%	1.6%	1.1%
Syria	0.2%	3.9%	0.5%
Tunisia	0.4%	0.5%	0.5%
Yemen	-1.5%	9.5%	2.4%
Saudi Arabia	-0.1%	0.0%	0.0%
United Arab Emirates	-0.1%	0.0%	0.0%

2.d. Normative analysis - Theory

- Due to externalities (TFP + migration costs), the market allocation is not optimal
- Maximizing global welfare:

$$\Omega = \sum_j \left[A_j Q_j + \sum_s Q_{j,s} z_{j,s} - \sum_{i,s} L_{ij,s} c_{ij,s} + \sum_{i,s} L_{ij,s} \varepsilon_{ij,s} \right]$$

- Optimal allocation of labor such that

$$\ln \left[\frac{L^*_{ij,s}}{L^*_{ii,s}} \right] = (w_{j,s} - w_{i,s} - x_{ij,s}) + (\Pi_{ij,s} - \Psi_{ij})$$

where $\Pi_{ij,s}$ captures net TFP externalities, and Ψ_{ij} captures marginal impact on migration cost.

2.d. Normative analysis - Theory

Definition

For a given distribution of the native population $\{N_{i,s}\}_{\forall i,s}$, an optimal allocation of labor is a set $\{L_{ij,s}\}_{\forall i,j,s}$ satisfying (i) aggregate constraints $N_{i,s} \equiv \sum_{k \in J} L_{ik,s}$ and $Q_{i,s} \equiv \sum_{k \in J} L_{ki,s}$, (ii) **global welfare maximizing conditions**, (iii) endogenous migration costs, and (iv) profit maximization conditions for all i, j and s.

A transition to the optimal allocation requires drastic changes in migration. We simulate the impact of a partial transition:

$$\ln \left[\frac{L_{ij,s}^{\varphi}}{L_{ii,s}^{\varphi}} \right] = (w_{j,s} - w_{i,s} - x_{ij,s}) + \varphi(\Pi_{ij,s} - \Psi_{ij}) \quad \textit{with } \varphi = .05$$

2.d. Normative analysis - Results

Improved labor allocation

	Observed Stock	Better allocation Stock	Change
World	100.5	104.9	4.3%
Less educated	74.3	79.0	6.2%
North-North	13.9	13.7	-1.2%
North-South	2.6	3.0	17.1%
South-North	31.5	29.6	-6.1%
South-South	26.3	32.6	23.9%
College graduates	26.2	25.9	-1.0%
North-North	8.6	7.8	-9.1%
North-South	0.7	1.4	97.9%
South-North	13.8	11.8	-14.9%
South-South	3.1	4.9	61.3%

World income

	Observed	Better allocation Gen. Eq.	Change
World income	14,213	14,409	1.4%
GDP per capita			
North	37,002	37,201	0.5%
South	7,854	8,110	3.3%
Income per natural			
North	36,569	36,923	1.0%
South	8,451	8,607	1.8%
Income per stayer			
North	36,517	36,849	0.9%
South	7,829	8,000	2.2%

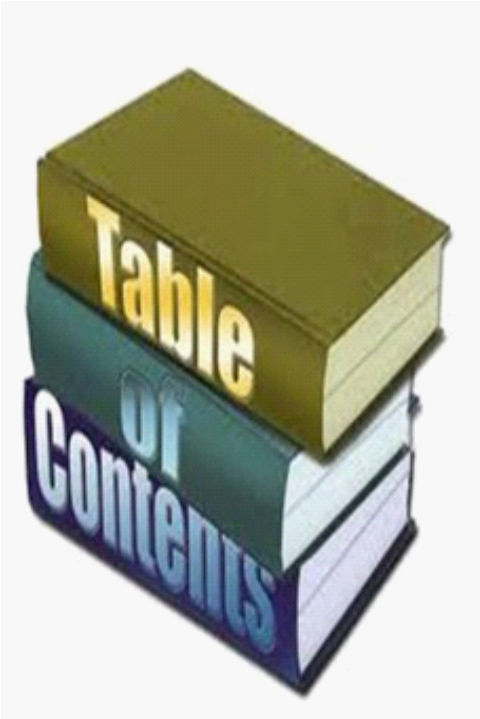
2.d. Normative analysis - Focus on MENA

Income response to an improved allocation (MENA region)

Country	Accounting for techological externalities[a]		
	Per capita	Per Natural	Per Stayer
Algeria	4,4%	1,3%	4,0%
Egypt	-0,8%	6,9%	-0,8%
Jordan	-5,0%	9,5%	-4,8%
Lebanon	4,9%	-3,0%	4,9%
Libya	17,0%	11,3%	12,5%
Morocco	4,5%	0,3%	4,3%
Syria	-8,7%	19,9%	-8,6%
Tunisia	11,0%	3,8%	9,3%
Yemen	14,2%	-7,7%	13,2%
Saudi Arabia	-1,1%	-0,1%	-0,1%
United Arab Emirates	-1,2%	-0,4%	-0,4%

Map of the talk

Research on the macroeconomics of int'l migration:



Plan:

1. General introduction
2. Data development (paper #1)
3. Unified model of migration and inequality (paper #2)
4. **Conclusion**

Conclusion - Insights

- We endogenize bilateral migration and economic performance
- Calibration on a unique database
- Migration propagates economic shocks: acts as a multiplier or induces compensating effects depending on the region shocked
- General equilibrium effects dampens the efficiency gains of reducing migration restrictions
- A transition toward the optimal allocation requires
  - increasing the world stock of migrants
  - relocating migrants from the North to the South and within developing countries
  - reducing the South-North brain drain

Conclusion - Extension

The model could be extended in many directions:

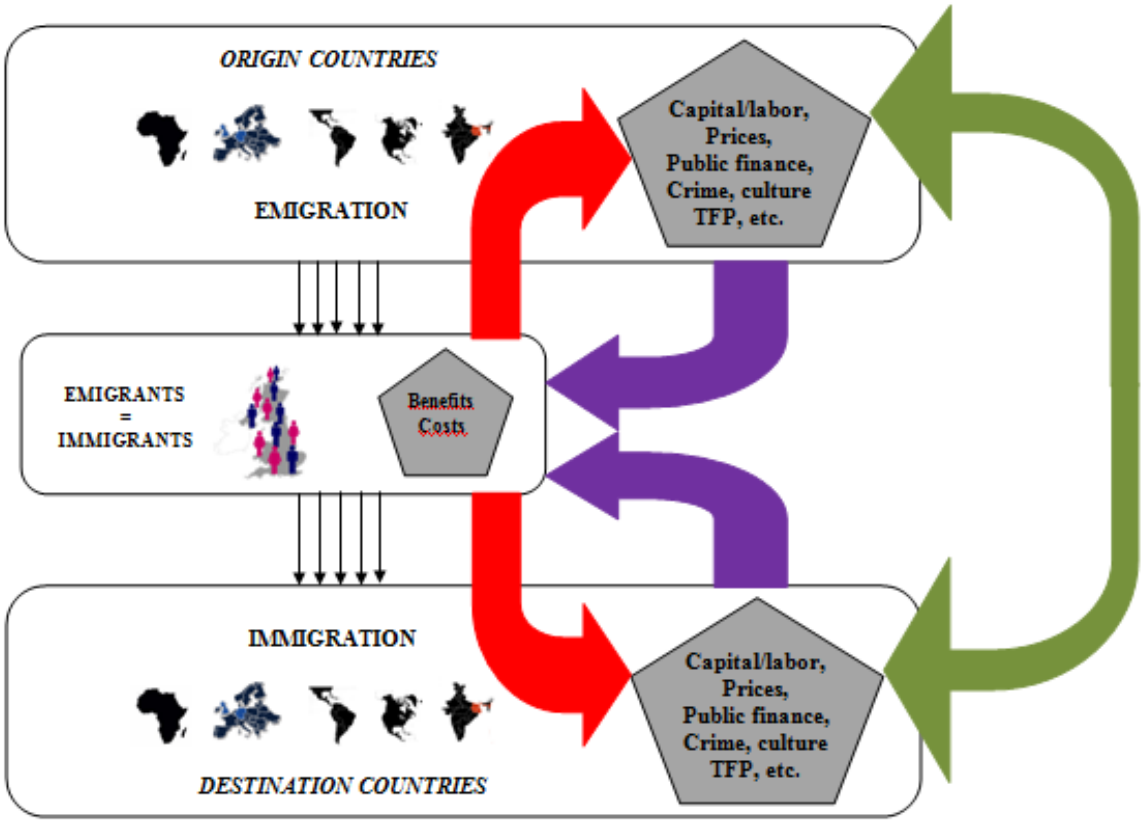
- Modeling complementarities between natives and immigrants at destination (Card, Ottaviano-Peri)
- Account for brain gain effects (Beine et al.)
- Model temporary migration with experience premium (Stark, Dustmann et al, Mayr-Peri)
- And...

Conclusion - Extension

Migration is not the only propagation channel:

- Connection with trade (Gould, Rauch-Casella, Combes et al., Felbermayr-Jung)
- With FDI (Kugler-Rapoport, Javorcik et al.)
- With technology transfers (Agrawal et al, Kerr, Gaillard-Gaillard, Meyer)
- With behavioral norms (Spilimbergo, Fargues, Beine et al.)

Conclusion - Extension



Thanks for your attention!

frederic.docquier@uclouvain.be

a.marfouk@skynet.be

cozden@worldbank.org

chrisparsons25@yahoo.co.uk

ksekkat@ulb.ac.be