

Migration and FDI

The role of job heterogeneity

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If I were a country.....I would be a big one

Population

- 1 China 1,366,900,000
- 2 India 1,249,620,000
- 3 United States 318,787,000
- 4 Indonesia 252,164,800
- 5 **Migrants 215,000,000**
- 6 Pakistan 188,020,000
- 7 Nigeria 178,517,000
- 8 Bangladesh 157,019,000
- 9 Russia 146,149,200
- 10 Japan 127,040,000
- 11 Mexico 119,713,203
- 12 Philippines 100,286,600
- 13 Vietnam 89,708,900

GDP (billions of \$)

- 1 United States 18,036
- 2 **Trade 16,576**
- 3 Japan 4,383
- 4 Germany 3,363
- 5 United Kingdom 2,861
- 6 France 2,419
- 7 India 2,419
- 8 **FDI 2,136**
- 9 Brazil 1,804
- 10 Canada 1,553
- 11 Korea 1,378
- 12 Russia 1,366
- 13 Australia 1,339

It's who you know

- Most of the foreign direct investment that flows into China is handled by the Chinese diaspora, loosely defined.
- Of the \$105 billion of FDI in 2010, some two thirds came from places where the population is more or less entirely ethnic Chinese

It's who you know

China's top providers of foreign direct investment*
2010

Country/territory	Sbn	As % of total	Chinese residents, m
Hong Kong	67.5	63.8	6.58
Taiwan	6.7	6.3	23.16
Singapore	5.7	5.4	2.79
Japan	4.2	4.0	0.52
United States	4.1	3.8	3.46
South Korea	2.7	2.5	0.70
Britain	1.6	1.6	0.30
France	1.2	1.2	0.23
Netherlands	1.0	0.9	0.15
Germany	0.9	0.9	0.07
Others	10.2	9.6	31.88

Sources: CEIC; OCAC;
US Census Bureau

*Including through tax havens

What do we do?

- This paper seeks to explain the role of migrants with heterogeneous levels of human capital in cross-border investments.
 - measured either by education or occupational categories (education-occupation mismatch)
- We construct model to explain how migration stocks affect foreign direct investment (FDI) intensive and extensive margin.
 - In this model, a key feature is factor unbundling along with labor and firm heterogeneity.
- We estimate the effect of migrant managers, professionals and non-qualified on a global FDI gravity dataset
 - Margins
 - Firm activity
 - firm size (FDI level)

Outline

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- 3 Economists do it with models
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- 4 Empirics
 - Data
 - Results: job heterogeneity
 - Results: education heterogeneity
- 5 Conclusions

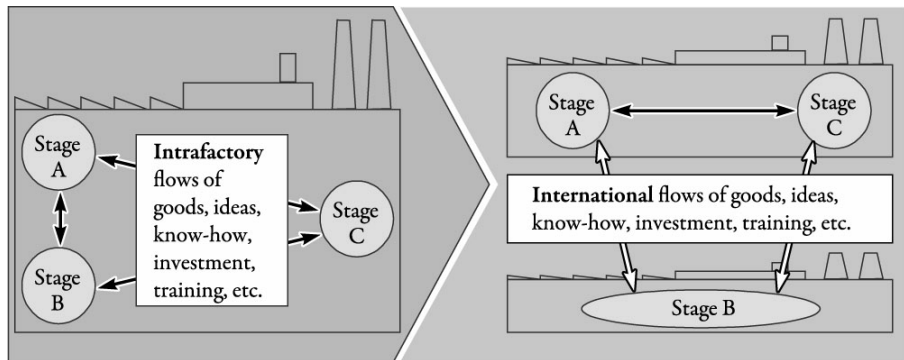
STUDY	COUNTRY / PERIOD	MAIN RESULTS
Kugler and Rapoport (2007)	United States 1990 and 2000	Higher unskilled emigration in 1990 is associated with higher growth of total FDI inflows over the following decade. Negative impact for migrants secondary education manufacturing sector
Docquier and Lodigiani (2010)	Cross section 114 countries. Panel data/ 83 countries	Strong network externalities mainly associated with the skilled diaspora
Ilevs and De Melo (2010)	1990-2000 103 migration sending countries	If exports are low skill intensive, emigration of high-skill labour leads to positive FDI
Flisi and Murat (2011)	Immigrant networks for France, Germany, UK, Italy and Spain	Skilled immigrants increase bilateral FDI in UK, France and Germany. In Italy and Spain, FDI is influenced by their emigrant diaspora network. Negative impact for unskilled migrants: substitution effect between low skilled immigration and investment abroad
Javorcik et al (2011)	United States 1990 and 2000	Outward FDI (stock) positively related with the presence of migrants in US (stock). Stronger effect for the share of tertiary educated migrants
Leblang (2011)	26 OECD reporting countries and 120 destination countries 2000 and 2001	Migrant networks encourage cross-border investments (FDI and portfolio). The effect on FDI is substantially larger. Stronger for migrants with tertiary education
Foad (2012)	50 US states, 10 source countries 1990 and 2000 for immigration	Presence of immigrants leads to new FDI from immigrants native countries. This effect is stronger for skilled migrants and might take a few years to occur
Gheasi et al (2013)	United Kingdom 2001-2007	FDI abroad positively related with the presence of migrants. More educated migrants have a higher positive effect on FDI. Negative impact of low skill migrants on FDI
Akinori (2017)	Japan 1996-2011	FDI inflows become more dominant compared to imports when skilled immigration flows increase and less dominant

Holes

- Intensive vs. extensive margin
- Negative effect of non-qualified migrants?
- Multi-country panel studies
- Activity vs sector
- Firm heterogeneity
- Education-occupation mismatch

Unbundlings

Baldwin (2016)



The model in 53 words

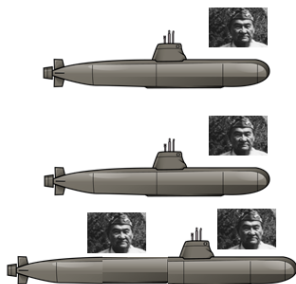
- Heterogeneous subsidiaries combine high-skilled labor in a first step with capital and low-skilled labor in a second step
 - We use a Cobb-Douglas variant of a two-level CES production function
- High-skilled labor translates HQ's blueprints needed for production
 - HS costs are bilateral (also capital costs)
- Low-skilled labor is sourced domestically
 - LS are a country-specific

The model in 3 pictures : Navajo Code Talkers

HQ
(country i)



Production
(country j)



The firm's problem

- The firm uses three inputs capital K , skilled inputs or services S (which are provided by high-skilled labor) and low-skilled inputs or L services (which are provided by high-skilled labor) in the production of the goods x_{iz} .

$$x_{iz} = S^s [K^k L^l]^{1-s}, \quad (1)$$

- Upon entry, the firm discovers its productivity $1/\alpha$ and the problem of heterogeneous firms are:

$$\max_{K,S,L} \pi_{iz}^{Dom} = \max\{P_i S^s [K^k L^l]^{1-s} - \alpha(\bar{w}_i S + r_i K + w_i L) - f_i\}. \quad (2a)$$

$$\max_{K,S,L} \pi_{iz}^{Exp} = \max\{P_j S^s [K^k L^l]^{1-s} - \alpha\tau_{ij}(\bar{w}_i S + r_i K + w_i L) - f_i\}. \quad (2b)$$

$$\max_{K,S,L} \pi_{iz}^{FDI} = \max\{P_j S^s [K^k L^l]^{1-s} - \alpha(\bar{w}_{ij} S + r_{ij} K + w_j L) - f_{ij}\}. \quad (2c)$$

where $\bar{w}_{ij} > \bar{w}_i$, $r_{ij} > r_i$, $w_j < w_i$, and $f_{ij} > f_i$

Foreign capital

- In equilibrium the market clears and the firms determines the optimal level of capital investment and labor according the first order condition of:

$$sP_j S^{s-1} [K^k L^l]^{1-s} = \alpha \bar{w}_{ij} \quad (3a)$$

$$(k - sk)P_j S^s K^{k-sk-1} L^{l-sl} = \alpha r_{ij} \quad (3b)$$

$$(l - sl)P_j S^s K^{k-sk} L^{l-kl-1} = \alpha w_j \quad (3c)$$

- The optimal equilibrium for capital is:

$$K_{ij}^* = \left(\frac{(k - sk)P_j}{\alpha r_{ij}^{1-\eta-sk+k} \left(\frac{k}{k-sk} \bar{w}_{ij}\right)^{sk} \left(\frac{k-sk}{l-sl} w_j\right)^{ls-l}} \right)^{\frac{1}{1-\eta}}$$

Should I stay or should I go?

- The firm gauges production costs to determine the productivity level at which it enters the foreign market (Melitz 2003; Helpman et al. 3004).
- The firms setups a foreign production plant if $\pi_{ijz}^{FDI} > \pi_{iz}^{Exp}$. Therefore, the cut-off productivity is:

$$\alpha^* = \frac{f_i - f_{ij}}{\tau_{ij}((r_{ij} - r_i)K + (\bar{w}_{ij} - \bar{w}_i)S + (w_j - w_i)L)}$$

- \uparrow Migrants in $i \Rightarrow \downarrow f_{ij} \Rightarrow \uparrow \alpha^*$
- \uparrow high-skilled migrants in $j \Rightarrow \downarrow (\bar{w}_{ij} - \bar{w}_i) \Rightarrow \uparrow \alpha^*$
- \uparrow low-skilled migrants in $j \Rightarrow ?(w_j - w_i) \Rightarrow ?\alpha^*$
- \uparrow low-skilled migrants ratio in $j \Rightarrow \uparrow (\bar{w}_{ij}/w_j) \Rightarrow \downarrow \alpha^*$

Multiple firms

- Aggregating across firms with pareto-distributed productivity, we obtain the aggregate greenfield capital investment from the most productive firm $1/\alpha_L$ to the least productive firm $1/\alpha^*$.

$$\begin{aligned}\tilde{K}_{ij} &= N_i \int_{\alpha_L}^{\alpha^*} G_{ijz}^* \frac{g(\alpha)}{G(\alpha^{EXP})} d\alpha = \\ &= N_i \left(\frac{(k-sk)P_j}{r_{ij}^{1-\eta-sk+k} \left(\frac{s}{k-sk} \bar{w}_{ij}\right)^s \left(\frac{k-sk}{l-sl} w_j\right)^{lh-l}} \right)^{\frac{1}{1-\eta}} \int_{\alpha_L}^{\alpha^*} \alpha^{\frac{1}{1-\eta}} \frac{g(\alpha)}{G(\alpha^*)} d\alpha,\end{aligned}$$

- Which after some math turns into a gravity equation:

$$FDI \equiv \ln \tilde{K}_{ij} = \theta_0 + n_i + n_j - \frac{1-\eta-sk+k}{1-\eta} \ln r_{ij} - \frac{s}{1-\eta} \ln \bar{w}_{ij} + \omega_{ij},$$

where $n_i = \ln N_i$ and $n_j = \frac{1}{1-\eta} \ln P_j - \frac{ls-l}{1-\eta} \ln w_j$ are home and host country fixed effects respectively.

Take aways

- High-skilled migration in country j has a positive effect on extensive & intensive margins
- Low-skilled migration in country j has no effect on the intensive margin
 - uncertain effect on the extensive margin
- Low-skilled migration ratio has a negative effect on extensive & intensive margins
- Stock of migrants in country i has a positive effect on the extensive margin

Data & Datasets

- FDI Markets: covers firm level greenfield investments
 - Official source of greenfield investment for the UNCTAD & EIU.
 - 190 countries from 2003 to 2012
 - Firm-level data, that we aggregate by country (and activity)
 - 4500+ firms
 - 44000+ investments
 - Database is efficiently constructed with over 70% zeros (Paniagua, 2016)
 - FDI Markets allows to use unidirectional FDI data (i.e. $FDI_{ij} \neq FDI_{ji}$)
 - intensive & extensive margins

Estimation

We use the the Pseudo-Poisson Maximum likelihood (PPML) estimator proposed by Silva and Tenreyro (2006), based on their (2015) critique to HRM:

$$FDI_{ijt} = \exp \left(\begin{array}{l} \beta_1 \ln(Y_{it} * Y_{jt}) + \beta_2 \ln(D_{ij}) + \beta_3 border_{ij} + \beta_4 colony_{ij} + \\ \beta_5 lang_{ij} + \beta_6 smctry_{ij} + \beta_7 rel_{ij} + \beta_8 locked_{ij} + \\ \beta_9 BIT_{ijt} + \beta_{10} FTA_{ijt} + \rho^X m_{ij}^X + \lambda_{it} + \lambda_{jt} \end{array} \right) + \varepsilon_{ijt}$$

Data

FDIMarkets: covers firm level greenfield investments

- 108 countries (excluding those for which there is no migration data, OECD)
- *Host migration* countries are OECD and *Home migration* countries are mixed
- FDI data from 2004 and 2008 and migration data from 2001 and 2005

Results (baseline)

	(1)	(2)	(3)	(4)	(5)	(6)
	Intensive margin, capital flows			Extensive margin, number of projects		
Managers	0.245*** (0.07)			0.173*** (0.07)		
Professionals		0.180*** (0.06)			0.162*** (0.06)	
Non-qual			0.139** (0.06)			0.082 (0.07)
Observations	1021	1066	1041	1021	1066	1041
R^2	0.620	0.602	0.613	0.562	0.563	0.589

PPML estimation Robust standard errors in parentheses (clustered by country pair).
 FDI in levels, Jobs in logs, home*year & host*year FE and gravity variables included
 * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results

	(1)	(2)	(3)	(4)	(5)	(6)
	Intensive margin, capital flows			Extensive margin, number of projects		
Managers	0.553*** (0.20)			0.636*** (0.14)		
Other jobs	-0.133 (0.08)			-0.209*** (0.06)		
Professionals		0.257 (0.24)			0.562** (0.22)	
Other jobs		-0.006 (0.13)			-0.190 (0.12)	
Non-qual			-0.325** (0.14)			-0.539*** (0.10)
Other jobs			0.313*** (0.08)			0.395*** (0.06)
Observations	998	998	998	998	998	998
R ²	0.641	0.633	0.638	0.672	0.615	0.714

PPML estimation Robust standard errors in parentheses (clustered by country pair).

FDI in levels, Jobs in logs, home*year & host*year FE and gravity variables included

Results (robustness)

	(1)	(2)	(3)	(4)	(5)	(6)
	Intensive margin, capital flows			Extensive margin, number of projects		
Manager share	0.349*** (1.17)			0.342*** (0.71)		
Professional share		0.235** (0.99)			0.362*** (0.74)	
Non-qual share			-0.195** (0.95)			-0.350*** (0.62)
migrant stock ($i \rightarrow j$)	0.234*** (0.07)	0.191*** (0.07)	0.230*** (0.07)	0.163** (0.07)	0.176*** (0.05)	0.222*** (0.06)
Observations	1009	1023	1014	1009	1023	1014
R^2	0.612	0.606	0.626	0.578	0.657	0.699

PPML estimation Robust standard errors in parentheses (clustered by country pair).

FDI in levels, Jobs in logs, home*year & host*year FE and gravity variables included

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results (cont)

	(1)	(2)	(3)	(4)	(5)	(6)
	Intensive margin, capital flows			Extensive margin, number of projects		
Managers	0.583*** (0.17)			0.344*** (0.09)		
Other jobs	-0.165 (0.10)			-0.188*** (0.07)		
Professionals		0.298 (0.37)			0.354*** (0.24)	
Other jobs		0.038 (0.15)			-0.279** (0.11)	
Non-qual			-0.290* (0.15)			-0.358*** (0.09)
Other jobs			0.323*** (0.07)			0.202*** (0.04)
migrant stock ($j \rightarrow i$)	0.137* (0.08)	0.066 (0.09)	0.077 (0.08)	0.286*** (0.06)	0.166*** (0.06)	0.239*** (0.05)
Observations	998	998	998	998	998	998
R^2	0.641	0.633	0.638	0.672	0.615	0.714

Results (Quantiles)

	(1) Q(0.25)	(2) Q(0.50)	(3) Q(0.75)	(4) Q(0.90)
Managers	0.933*** (0.10)	0.818*** (0.16)	0.342*** (0.11)	0.363*** (0.10)
Professionals	0.544*** (0.11)	0.307*** (0.08)	0.544*** (0.08)	0.254* (0.13)
Non-qual	-0.263*** (0.08)	-0.581*** (0.07)	-0.540*** (0.07)	-0.814*** (0.07)
migrant stock ($j \rightarrow i$)	0.677*** (0.11)	0.631*** (0.07)	0.409*** (0.06)	0.483*** (0.09)
Observations	269	269	269	269

PPML estimation Robust standard errors in parentheses (clustered by country pair).
 FDI in levels, Jobs in logs, home*year & host*year FE and gravity variables included
 Other jobs and migrant stock ($j \rightarrow i$) included

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results (Firm activity)

	(1) Manufacturing	(2) Sales	(3) Construction	(4) Services
Managers	0.626*** (0.22)	0.530*** (0.20)	0.142 (0.25)	-0.001 (0.16)
Professionals	0.412 (0.55)	1.068*** (0.41)	0.891 (0.58)	0.244 (0.42)
Non-qual	-0.716*** (0.23)	-0.283* (0.16)	-0.174 (0.21)	-0.114 (0.17)
migrant stock ($j \rightarrow i$)	0.169 (0.16)	0.702*** (0.16)	0.212 (0.15)	0.582*** (0.16)
Observations	241	248	147	217
R^2	0.716	0.869	0.730	0.886

PPML estimation Robust standard errors in parentheses (clustered by country pair).

FDI in levels, Jobs in logs, home*year & host*year FE and gravity variables included

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results (education levels)

	(1)	(2)	(3)	(4)	(5)	(6)
	Intensive margin, capital flows			Extensive margin, number of projects		
Higher edu	0.890*** (0.30)			0.549*** (0.20)		
Other levels	-0.197** (0.10)			-0.195** (0.09)		
Secondary edu		-0.742*** (0.26)			-0.441** (0.21)	
Other levels		0.514*** (0.15)			0.241** (0.12)	
Primary edu			-0.061 (0.14)			-0.131 (0.12)
Other levels			0.148 (0.10)			0.065 (0.07)
migrant stock ($j \rightarrow i$)	0.148* (0.09)	0.095 (0.08)	0.172** (0.08)	0.268*** (0.06)	0.222*** (0.06)	0.290*** (0.07)
Observations	263	263	263	263	263	263
R^2	0.736	0.727	0.732	0.901	0.904	0.913

Lessons learned

- Migrant's human capital heterogeneity is relevant for FDI
 - job categories reveal interesting traits (hidden in education levels)
 - Migrant managers have a positive effect on both margins (bilateral wage effect)
 - Non-qualified migrants have a negative effect on extensive margin (composition effect)
 - Results vary with firm size and firm activity
- To understand these effects, it is necessary to look inside the firm
 - factor unbundling
 - labor heterogeneity

Thanks!! Questions?

