North-North Migration and Agglomeration in the EU-15

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Motivation

- Most theories of migration good for explaining South-North flows
  - Low-educated migrate to the relatively high-educated country
- We document: some foreign-born workers in EU15 live in countries where their type is more abundant
  - This is at odds with traditional models of migration
- We propose a model that
  - Allows for labor flows between similar countries (North-North)
  - Rationalizes this observation

Today

- Empirical findings: Concentration and migration patterns
- Model: where an IRS technology can account for these patterns in high-educated (HE) occupations
- Main Result:
  In an integrated area, the country with more workers in the IRS sector will attract the foreigners
- Additional Result:
  Mobility itself generates incentives to become high educated in both the source and the host country

Empirical Findings

Data: European Union Labor Force Survey ▸ EU-LFS Details

- Sample: EU-15, 1996-2010, total of 31,663,252 observations
- ISCO88 occupations classification
  - High Educated (tertiary): groups 1-3
  - Low Educated (<tertiary): groups 4-9

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1. Migration occupational patterns:

   Do engineers go where there are more or less engineers?

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2. Concentration: distribution of total workers across countries
   Do some occupations concentrate in a country?

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1. Migration occupational patterns:

   Do engineers go where there are more or less engineers? More

2. Concentration: distribution of total workers across countries
   Do some occupations concentrate in a country? Yes

   - HE occupations do

Migration Patterns

Compute the correlation between the occupational distribution of

- Native workers
- EU15 foreign-born workers

$$Native_t^{oc} = \alpha + \beta For15_t^{oc} + year_t + \varepsilon_t^{oc}$$

Migration Patterns

Compute the correlation between the occupational distribution of

- Native workers
- EU15 foreign-born workers

$$Native_t^{oc} = \alpha + \beta For15_t^{oc} + year_t + \varepsilon_t^{oc}$$

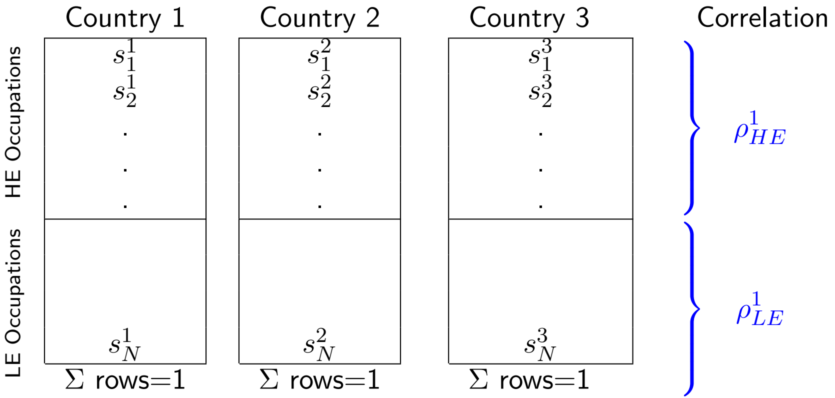
Results: $\beta = 0.66$, significant at the 1% level

- Foreign-EU15 workers go where there are more of their type
  → North-North migration

Concentration Patterns

- Take the occupational distribution of the total population
- Compute pairwise correlations across countries, for HE and LE

This is:



Concentration Patterns

- Take the occupational distribution of the total population
- Compute pairwise correlations across countries, for HE and LE

Results:

1. For LE occupations, countries maintain a balanced structure
   - Correlations are positive and high in general
   - Range from .39 to .79
2. For HE occupations, we observe patterns of concentration
   - Correlations range from -.43 to .58

Table

From Data to Model

Occupation Type	Data	Model
HE	People go where there are more of their type	Agglomeration Mechanism IRS Technology

Model Set-Up

- 2 countries
- 2 goods: Y (IRS) and Z (CRS)
- 2 factors of production: HE and LE workers
- Workers are heterogeneous in ability and mobility
  - worker $j \in [0, 1]$ consumes both goods and works for one sector
  - choose HE and pay or to remain LE
- Government collects education payments and transfers them to household in a lump sum fashion

IRS Sector

Aggregate externality: IRS are external to the firm

$$Y^i = A(H^i)h^i, \qquad P_Y^i \equiv 1$$

Demand for HE workers: $w_H^i = A(H^i)$

CRS Sector:

$$Z^i = B^i L^i$$

Demand for LE workers: $w_L^i = P_Z^i \cdot B^i$

Autarky
Household Problem

Each worker j makes an ability draw that determines $\theta_j \sim U\left[0, \bar{\theta}\right]$

- Households choose: $\left\{e^j \in \{HE, LE\}\,,\ \ c_Y^j, c_Z^j\right\}_{j\in[0,1]}$ to solve:

$$\max_{\{e, c_Y, c_Z\}} \lambda \log c_Y + (1-\lambda) \log c_Z$$
$$s.t. \quad P_Y c_Y^j + P_Z c_Z^j \leq W^j$$
$$W^j = w_H - \theta_j \qquad \text{if } e^j = HE$$
$$W^j = w_L \qquad \text{if } e^j = LE$$

Equilibrium: HE Aggregate Supply

- Supply of HE: $e_j = HE$ if $\quad w_H - \theta_j \geq w_L$
- Using $\theta_j \sim U(0, \bar{\theta})$, aggregate supply of HE

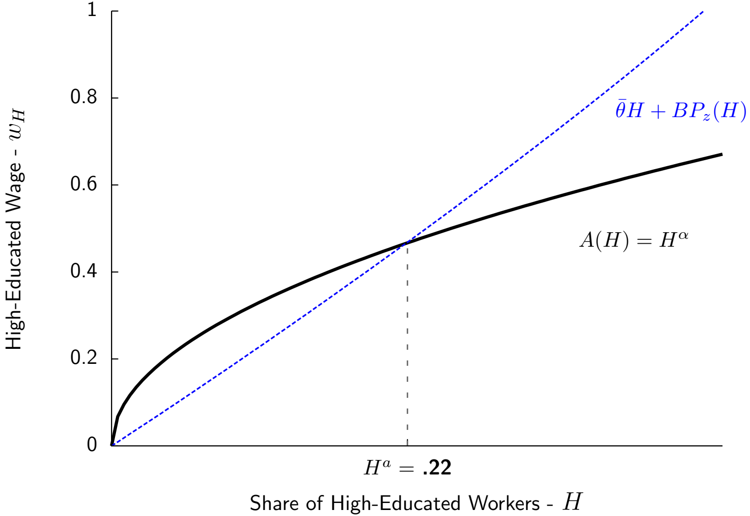
$$H = F(w_H - w_L) = \frac{w_H - w_L}{\bar{\theta}}$$

- The equilibrium is characterized by:

$$A(H^*) = w_H^* = \bar{\theta} H^* + BP_Z^*(H^*)$$

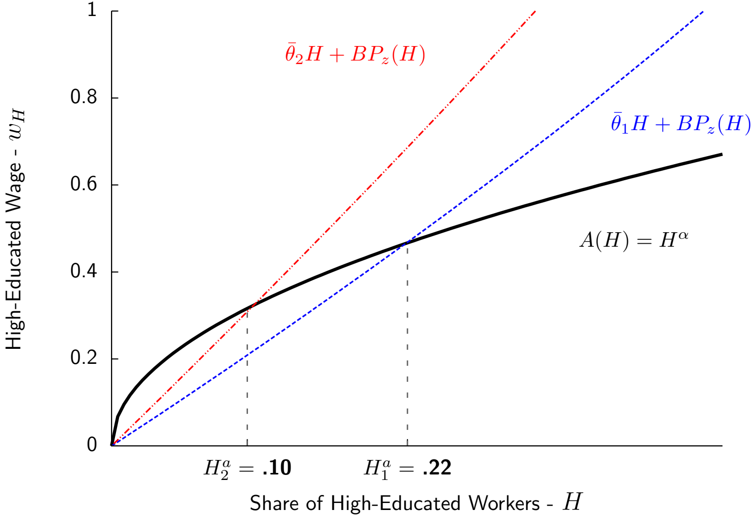
Labor Market Equilibrium: HE

Using $A(H) = H^{\alpha}$ $\lambda = 0.8$ $\alpha = 0.5$ $\bar{\theta} = 2$



HE Equilibrium: Different Costs

Using $A(H) = H^{\alpha}$ $\lambda = 0.8$ $\alpha = 0.5$ $\bar{\theta_1} = 2$ $\bar{\theta_2} = 3$



Open Economy Set-up

- Mobility: share $\gamma < 1$ of perfectly mobile workers
- Countries differ only in $\bar{\theta}^1 < \bar{\theta}^2$
  $\Rightarrow$ $H_a^1 > H_a^2$ and $w_H^1 > w_H^2$
- People get education in the country of origin
- For mobile households, the working decision:
  - Education level: $e_j \in \{HE, LE\}$
  - Migration status : $m_j \in \{N, M\}$

Mobility and Working Decision

- If immobile:

$$e_j^i = HE \qquad \text{if} \quad w_H^i - \theta_j^i \geq w_L$$

- If mobile:

$$e_j^i = HE \qquad \text{if } \max\left\{w_H^i, w_H^{-i}\right\} - \theta_j^i \geq w_L$$
$$m_j^i = M \qquad \text{if} \quad ej = HE \text{ and } w_H^{-i} - \geq w_H^i$$

Working decisions have a cutoff rule with thresholds:

- $\theta^{i*}_{\text{immobile}} = w_H^i - w_L \quad \rightarrow \quad$ Education Premium
- $\theta^{i*}_{\text{mobile}} \; = \max\left\{w_H^i, w_H^{-i}\right\} - w_L$

Mobility and Working Decision

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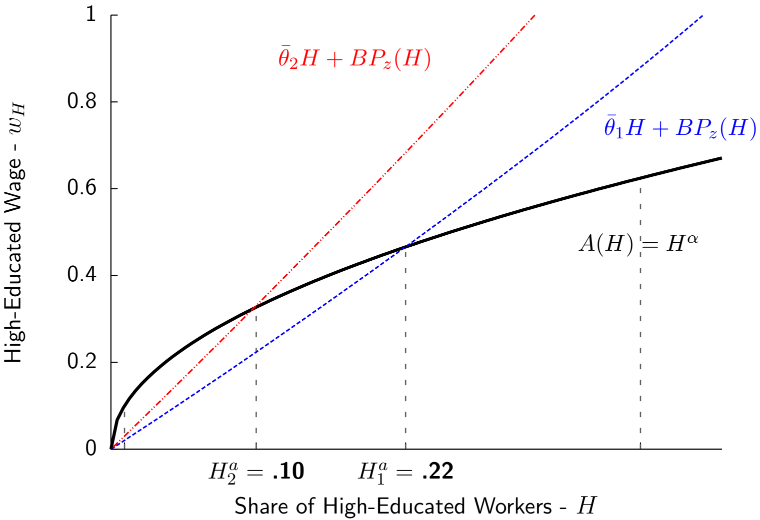
Working decisions have a cutoff rule with thresholds:

- $\theta_{\text{immobile}}^{i*} = w_H^i - w_L$
- $\theta_{\text{mobile}}^{i*} = \underbrace{\max\left\{w_H^i, w_H^{-i}\right\} - w_H^i}_{\text{Migration Premium}} + \underbrace{w_H^i - w_L}_{\text{Education Premium}}$

Integrated Economy



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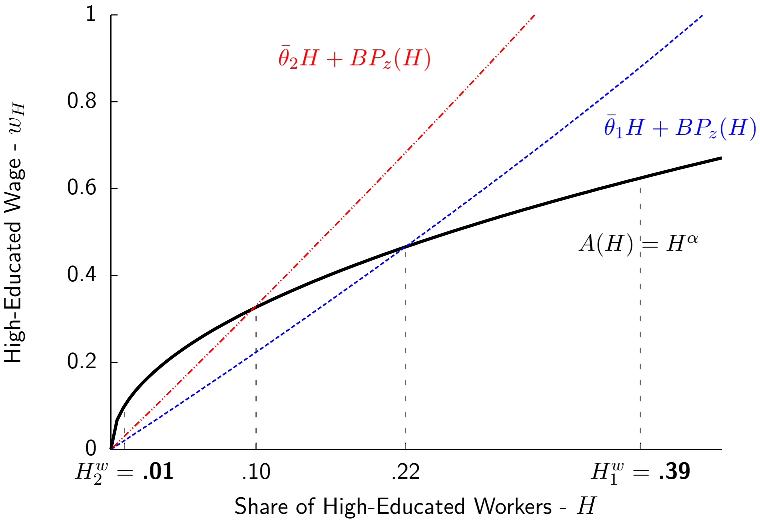


Main Result

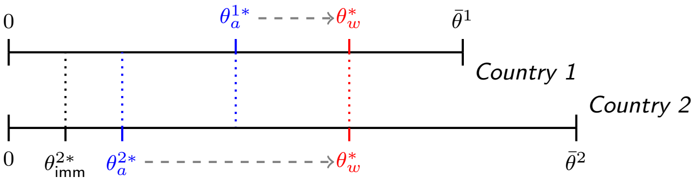
- In an integrated area, the country with more HE workers in the IRS (HE) sector will attract the mobile HE foreigners
- Consistent with positive correlations found in HE occupations

Second Result: Education and Mobility

- In a human capital free mobility area with
  - Free mobility of labor Schengen
  - Transferability of education (EHEA)
- Migration and education decisions interact
- In our model:
  - HE workers go where there are more of their type but also
  - Other workers decide to become HE to take advantage of migration and Spillovers (IRS)

Second Result: Education and Mobility

- Mobility itself generates incentives to become HE
- both in the host and source the country
  - Host: because of IRS (with immigrants)
  - Source: because mobile workers can go abroad and benefit from spillovers



Where:

$$\theta^{i*}_{\text{immobile}} = w_H^i - w_L \quad \text{is} \quad \text{Education Premium at home}$$
$$\theta^{i*}_{\text{mobile}} = \max\left\{w_H^i, w_H^{-i}\right\} - w_L$$

Second Result: Education and Mobility

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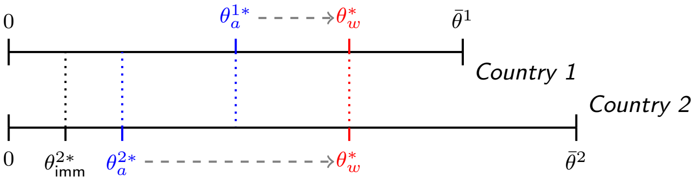

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Conclusions

- In an integrated area, the country with more educated workers will attract the mobile educated foreigners
- In our model, migration and education decisions interact
- Workers decide to become HE to take advantage of migration and Spillovers (IRS)
- This is important to analyze flows in a free mobility area where degrees are transferable

EU-LFS

- Harmonized (across countries) household-level survey
- Available for 28 European countries (our sample: 15)
- From 1983-2012 (our sample: 1996-2010)
- Focus on employment, education & socioeconomic characteristics
  - Our Variables: country of residence, country of birth, educational attainment, employment status, hours worked and occupation

Back to Slide

ISCO: International Standard Classification of Occupations (ILO)

Table: ISCO-88 Major Groups and Education Level

	Major Group	Education Level
1	Legislators and Managers	Tertiary
2	Professionals	Tertiary
3	Technicians & Associate professionals	Tertiary*
4	Clerks	Secondary
5	Service and Sales	Secondary
6	Skilled Agricultural and Fishery	Secondary
7	Craft and Related	Secondary
8	Plant and Machine Operators	Secondary
9	Elementary Occupations	Primary

* Not leading to a college degree

Back to Slide

Table: Share of Natives and Immigrants by Country of Residence Back to Slide

12: Corporate Managers, 2010

Country	Share Natives	Share Foreign EU-15
Austria	3.56	6.02
Belgium	7.40	14.12
Denmark	2.81	4.40
Spain	2.52	3.64
Finland	6.51	4.70
France	5.88	5.95
Greece	1.69	2.00
Ireland	9.08	14.60
Italy	2.09	2.75
Luxembourg	1.51	3.36
Netherlands	5.38	4.72
Norway	5.48	5.75
Portugal	2.07	3.98
Sweden	4.57	3.74
United Kingdom	12.07	11.53

Back to Slide

Table: Concentration Patterns (1996-2010)

Country	Average Correlation High Skill	Average Correlation Low Skill
Austria	.31	.75
Belgium	.34	.65
Denmark	.49	.76
Spain	.58	.69
Finland	.58	.68
France	.47	.77
Greece	.15	.39
Ireland	-.15	.79
Italy	.25	.66
Luxembourg	.57	.53
Netherlands	.58	.76
Norway	.38	.64
Portugal	.45	.44
Sweden	.57	.67
United Kingdom	-.43	.74

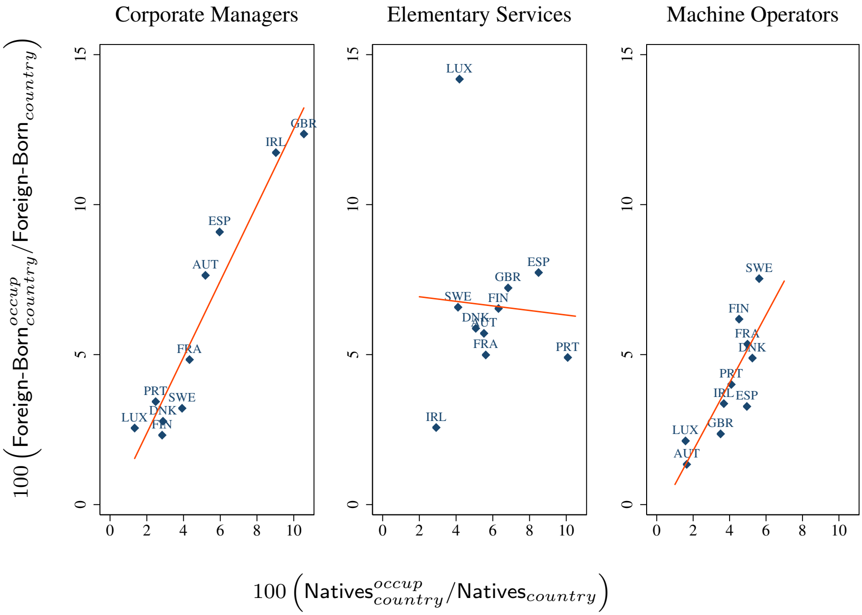
Corporate Managers
Elementary Services
Machine Operators
GBR
IRL
ESP
AUT
FRA
PRT
SWE
DNK
LUX
FIN
LUX
ESP
GBR
SWE
FIN
DNK
AUT
FRA
PRT
IRL
SWE
FIN
FRA
DNK
PRT
IRL
ESP
GBR
LUX
AUT
0
5
10
15
0
2
4
6
8
10
100 (Foreign-Born$^{occup}_{country}$/Foreign-Born$_{country}$)
100 (Natives$^{occup}_{country}$/Natives$_{country}$)

TABLE: Occupational Distribution Correlation at ISCO-88 2-Digit Level

Code	Occupation	Correlation
11	Legislators and Senior Officials	0.26
12	Corporate Managers	0.96
13	General Managers	0.96
21	Physical Mathematical & Engineering Science Professionals	0.63
22	Life Science and Health Professionals	0.48
23	Teaching Professionals	0.52
24	Other Professionals	0.35
31	Physical and Engineering Science Associate Professionals	0.82
32	Life Science and Health Associate Professionals	0.70
33	Teaching Associate Professionals	0.71
34	Other Associate Professionals	0.73
41	Office Clerks	0.49
42	Customer Services Clerks	0.53
51	Personal and Protective Service Workers	0.81
52	Models, Salespersons and Demonstrators	0.85
61	Market-Oriented Skilled Agricultural and Fishery Workers	0.76
71	Extraction and Building Trade Workers	0.00
72	Metal, Machinery and Related Trades Workers	0.32
73	Precision Handicraft, Printing & Related Trades Workers	0.71
74	Other Craft and Related Trades Workers	0.98
81	Stationary-Plant and Related Operators	0.81
82	Machine Operators and Assemblers	0.82
83	Drivers and Mobile-Plant Operators	0.52
91	Sales and Services Elementary Occupations	-0.05
92	Agricultural, Fishery and Related Labourers	0.78

Autarky Equilibrium

Back to Slide Given $U[0,\bar{\theta}]$, an ACE is: $\left\{e^j, c_Y^j, c_Z^j\right\}_{j\in[0,1]}$, C_Y^E,C_Z^E Y, h, H, Z, L, $\{P_Z, P_Y, w_H, w_L\}$, θ^* such that:

1. Given prices and ability draw θ_j: c_Y^j, c_Z^j, e^j solve j's problem, $\forall j$
2. Given prices, C_Y^E,C_Z^E solve the ES problem
3. Given prices, Y, h solve the IRS firms problem
4. Given prices, Z, L solve the CRS firm problem
5. Labor markets clear
6. Good markets clear

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$$H + L = 1$$

$$h = H = \int_{\mathcal{H}} j dj$$

6. Good markets clear

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$$Y = \int_{\mathcal{H}} c_Y^j dj + \int_{\mathcal{H}^c} c_Y^j dj + c_Y^E$$
$$Z = \int_{\mathcal{H}} c_Z^j dj + \int_{\mathcal{H}^c} c_Z^j dj + c_Z^E$$

Agents: Open Economy

Firms problems and ES remain unchanged

Household Problem

Now they can migrate

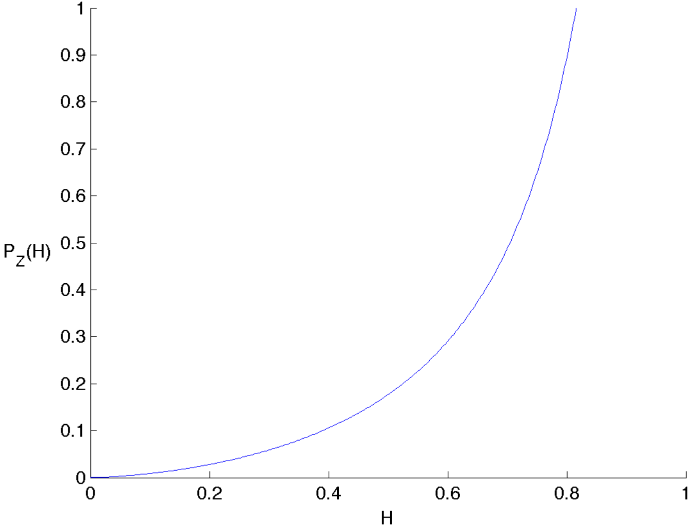
- Given prices, γ, θ_j^i,
- Households choose: $e_j^i \in \{HE, LE\}, m_i^j \in \{N, M\}, \;\; cy_j^i, cz_j^i$ to:

$$\max_{\{e,m,c_Y,c_Z\}} \lambda \log c_Y + (1-\lambda) \log c_Z$$

$$\begin{aligned}
s.t. \quad & P_Y cy_j^i + P_Z cz_j^i \leq W^j \\
& W_j^i = w_H^i - \theta_j^i \qquad \text{if } e_j^i = HE \quad m_j = N \\
& W_j^i = w_H^{-i} - \theta_j^i \quad \text{if } e_j^i = HE \quad m_j = M \\
& W_j^i = w_L^i \qquad\qquad \text{if } e_j^i = LE \qquad \forall m_j \;\; \text{(w.l.o.g)}
\end{aligned}$$

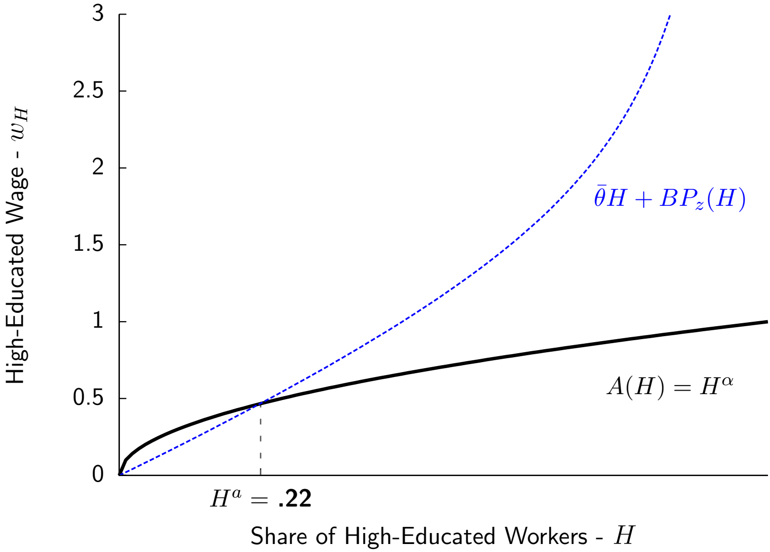
Price Function

$A(H) = H^{\alpha} \qquad \alpha = 0.5 \quad \lambda = 0.8 \quad B = 1$



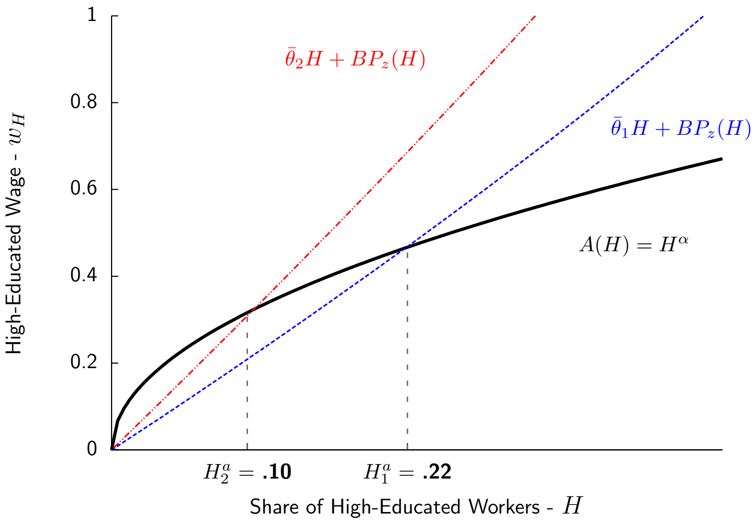
Back to Slide

Curvature of $\bar{\theta}H + BP_z(H)$



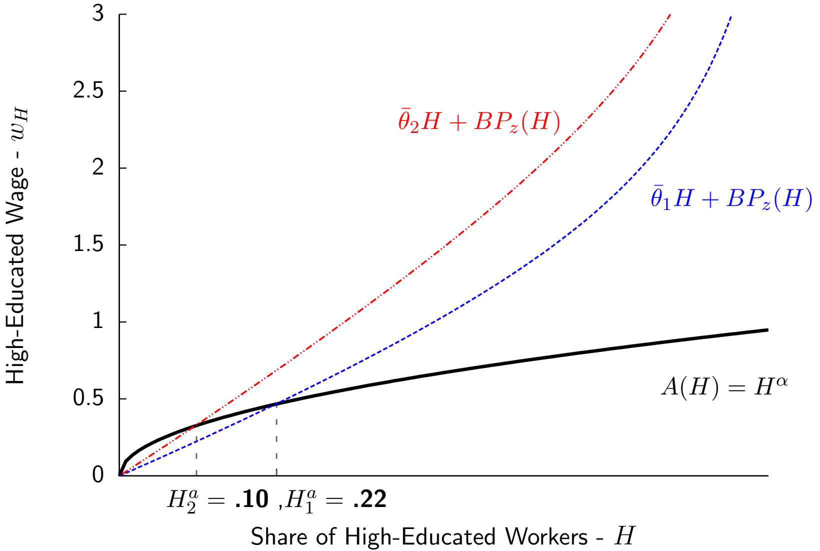
Sensitivity Equilibrium to θ

$\theta_1 < \theta_2 \quad \theta_1 = 2 \quad \theta_2 = 3$



Back to Slide Curvature

Curvature of $\bar{\theta}H + BP_z(H)$

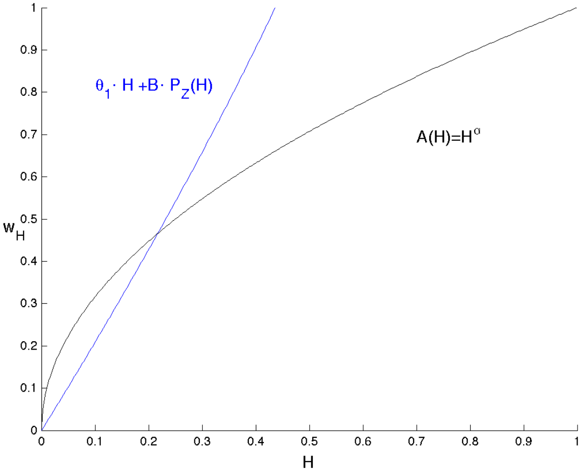


Back to Slide M

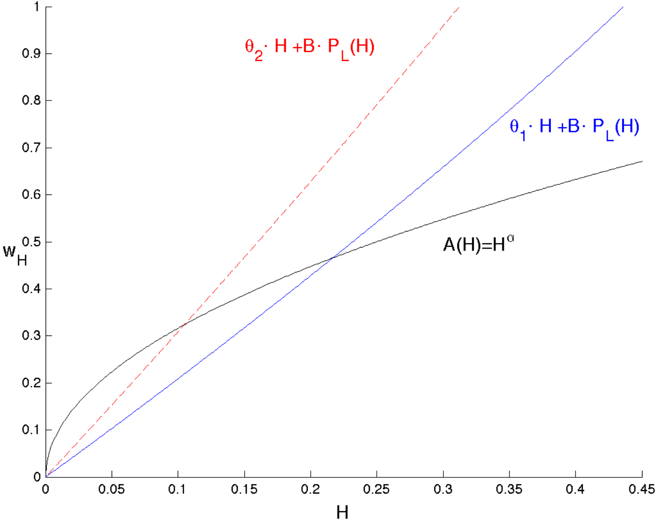
Back to Slide A

Labor Market Equilibrium (HS): Sensitvity

- Using $A(H) = H^{\alpha}$ $\lambda = 0.8$ $\alpha = \theta = 0.5$

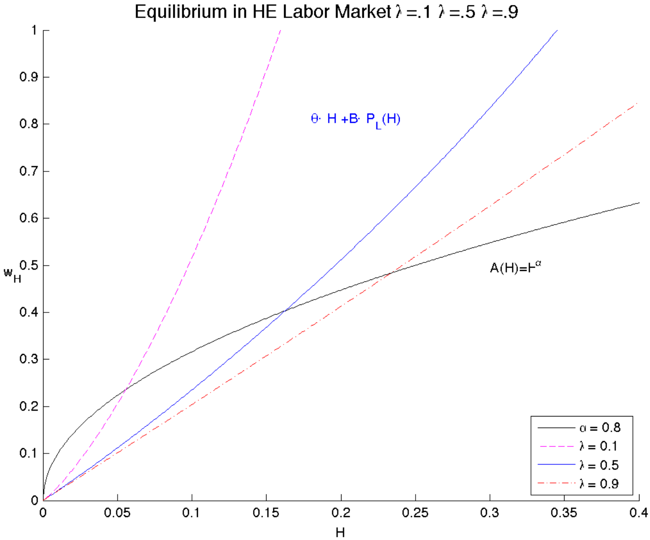


Sensitivity Equilibrium to θ



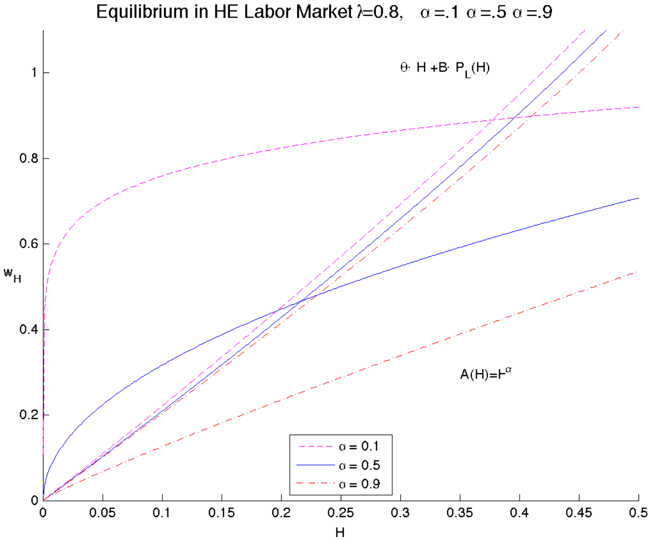
Back to Slide

Sensitivity Equilibrium to λ



Back to Slide

Sensitivity Equilibrium to α



Sensitivity Equilibrium to B

- Recall price function $P_Z(H)$: $P_Z(H) = \frac{H(1-\lambda)A(H)}{\lambda B(1-H)}$
- Eq in HE labor market given by: $A(H) = H\bar{\theta} + P_Z(H) \cdot B$
- Combining: $A(H) = H\bar{\theta} + \frac{H(1-\lambda)A(H)}{\lambda(1-H)}$
- Operating

$$RHS = \frac{(\lambda\bar{\theta}(1-H)H + (1-\lambda)HA(H))}{\lambda(1-H)}$$

Note: RHS does not depend on B, CRS productivity ∴ equilibrium is not sensitive to B Back to Slide

Supply of LE Workers Case 1: $w_H^1 > w_H^2$

Mobile HE decision rule: $w_H^1 - \theta_j^i \geq w_L$

LE Supply:

- Since LE do not migrate $(B_1 = B_2) \Rightarrow (L^i = N_L^i)$:

$$L^1 = \underbrace{1 - \frac{w_H^1 - w_L}{\bar{\theta}^1}}_{\text{LE in country 1}}$$

$$L^2 = \underbrace{\gamma \left(1 - \frac{w_H^1 - w_L}{\bar{\theta}^2}\right)}_{\text{mobile LE in country 2}} + \underbrace{(1-\gamma)\left(1 - \frac{w^2 - w_L}{\bar{\theta}^2}\right)}_{\text{imobile LE in country 2}}$$

Back to Slide

Open Economy Equilibrium

Given γ and $\theta_j \sim U^i(0, \bar{\theta}^i)$, a CE is $\left\{e^i_j, m^i_j, c^i_{Y_j}, c^i_{Z_j}\right\}_{j\in[0,1],\ i\in\{1,2\}}$, $\left\{c^{E_i}_Y, c^{E_i}_Z\right\}$, $\left\{Y^i, h^i, H^i\right\}$, $\left\{Z^i, L^i\right\}$, $\left\{p_Z, p_Y, w^i_H, w_L\right\}$, and $\left\{\theta^i_{\text{immobile}}, \theta^i_{\text{mobile}}\right\}$ such that

1. Given prices and θ_j, $\left\{e^i_j, m^i_j, c^i_{Y_j}, c^i_{Z_j}\right\}$ solve j problem, $\forall i$
2. Given prices, $\left\{Y^i, h^i, H^i\right\}$ solve IRS firm problem, $\forall i$
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Back to Slide

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4. Labor markets clear

$$H^i = H_N^i + H_M^{-i} - H_M^i$$

$$h^i = H^i = \int_{\mathcal{H}^i} j dj$$

$$1 = H_N^i + H_M^i + L^i$$

5. Good markets clear

Back to Slide

Open Economy Equilibrium

Given γ and $\theta_j \sim U^i(0, \bar{\theta}^i)$, a CE is $\left\{e^i_j, m^i_j, c^i_{Y_j}, c^i_{Z_j}\right\}_{j\in[0,1],\ i\in\{1,2\}}$, $\left\{c^{E_i}_Y, c^{E_i}_Z\right\}$, $\left\{Y^i, h^i, H^i\right\}$, $\left\{Z^i, L^i\right\}$, $\left\{p_Z, p_Y, w^i_H, w_L\right\}$, and $\left\{\theta^i_{\text{immobile}}, \theta^i_{\text{mobile}}\right\}$ such that

1. Given prices and θ_j, $\left\{e^i_j, m^i_j, c^i_{Y_j}, c^i_{Z_j}\right\}$ solve j problem, $\forall i$
2. Given prices, $\left\{Y^i, h^i, H^i\right\}$ solve IRS firm problem, $\forall i$
3. Given prices, $\left\{Z^i, L^i\right\}$ solve CRS firm problem, $\forall i$
4. Labor markets clear
5. Good markets clear

$$Z^1 + Z^2 = C^1_{Z_H} + C^2_{Z_H} + C^1_{Z_L} + C^2_{Z_L} + c^{E_1}_Z + c^{E_2}_Z$$
$$Y^1 + Y^2 = C^1_{Y_H} + C^2_{Y_H} + C^1_{Y_L} + C^2_{Y_L} + c^{E_1}_Y + c^{E_2}_Y$$

Back to Slide

Open Economy Equilibrium

Given γ and $\theta_j \sim U^i(0, \bar{\theta}^i)$, a CE is $\left\{e^i_j, m^i_j, c^i_{Y_j}, c^i_{Z_j}\right\}_{j\in[0,1],\ i\in\{1,2\}}$, $\left\{c^{E_i}_Y, c^{E_i}_Z\right\}$, $\left\{Y^i, h^i, H^i\right\}$, $\left\{Z^i, L^i\right\}$, $\left\{p_Z, p_Y, w^i_H, w_L\right\}$, and $\left\{\theta^i_{\text{immobile}}, \theta^i_{\text{mobile}}\right\}$ such that

1. Given prices and θ_j, $\left\{e^i_j, m^i_j, c^i_{Y_j}, c^i_{Z_j}\right\}$ solve j problem, $\forall i$
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3. Given prices, $\left\{Z^i, L^i\right\}$ solve CRS firm problem, $\forall i$
4. Labor markets clear
5. Good markets clear

$$Y^1 + Y^2 = \int_{\mathcal{H}^1} c^H_Y dj + \int_{\mathcal{H}^2} c^H_Y dj + \int_{\mathcal{L}^1} c^L_Y dj + \int_{\mathcal{L}^2} c^L_Y dj + c^{E^1}_Y + c^{E^2}_Y$$

$$Z^1 + Z^2 = \int_{\mathcal{H}^1} c^H_Z dj + \int_{\mathcal{H}^2} c^H_Z dj + \int_{\mathcal{L}^1} c^L_Z dj + \int_{\mathcal{L}^2} c^L_Z dj + c^{E^1}_Z + c^{E^2}_Z$$

Back to Slide

Equilibrium in the HE market (Case 1)

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- Using:

$$H_1 = N_H^1 + M_H^2$$
$$H_2 = N_H^2$$
$$P_Z^w(H_1, H_2) = \frac{(1-\lambda)\left(H_1 A(H_1) + H_2 A(H_2)\right)}{\lambda B\left(2 - H_1 - H_2\right)}$$

- H^{1*} and H^{2*} are given by the system:

$$H_1 = \left(\frac{\bar{\theta}^2 + \gamma\bar{\theta}^1}{\bar{\theta}^1\bar{\theta}^2}\right)\left(A(H_1) - \frac{(1-\lambda)\left(H_1 A(H_1) + H_2 A(H_2)\right)}{\lambda\left(2 - H_1 - H2\right)}\right)$$
$$H_2 = \frac{(1-\gamma)}{\bar{\theta}^2}\left(A(H_2) - \frac{(1-\lambda)\left(H_1 A(H_1) + H_2 A(H_2)\right)}{\lambda\left(2 - H_1 - H2\right)}\right)$$

Back to Slide

Case 1: Numerical Exercise

	Autarky		Integrated	
	Country 1	Country 2	Country 1	Country 2
Residents	1	1	$1 + H_M^2$	$1 - H_M^2$
HE	21.66	10.74	39.14	1.13
LE	78.34	89.53	70.64	89.08

Back to Slide

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Equilibrium Case 2: $w_H^1 < w_H^2$

- Even though $H_1^a > H_2^a$, $\quad w_H^2 > w_H^1$
- Mobile HE decision rule: $w_H^2 - \theta_j^i \geq w_L$
- Since $w_H^2 > w_H^1$ all mobiles will work in $i = 2$

HE labor market *equilibrium*:

$$H_1 = \underbrace{(1-\gamma)\left(\frac{w_H^{1^*} - w_L^*}{\bar{\theta}^1}\right)}_{N_H^1} + \underbrace{\quad 0 \quad}_{M_H^2}$$

$$H_2 = \underbrace{\frac{w_H^{2^*} - w_L}{\bar{\theta}^2}}_{N_H^2} + \underbrace{\gamma\left(\frac{w_H^{2^*} - w_L^*}{\bar{\theta}^1}\right)}_{M_H^1}$$

Back to Slide

Characterizing Integrated Equilibrium

Recall $\bar{\theta}^1 < \bar{\theta}^2 \rightarrow H_a^1 > H_a^2$ and $w_H^{1a} > w_H^{2a}$

Case where $w_H^1 > w_H^2$

- Mobile HE decision rule: $w_H^1 - \theta_j^i \geq w_L$

- HE Aggregate *Supply*:

  Since $w_H^1 > w_H^2$ all mobiles will work in $i = 1$

$$N_H^1 = \frac{w_H^1 - w_L}{\bar{\theta}^1} \qquad M_H^1 = 0$$

$$N_H^2 = (1-\gamma)\left(\frac{w_H^2 - w_L}{\bar{\theta}^2}\right) \qquad M_H^2 = \gamma\left(\frac{w_H^1 - w_L}{\bar{\theta}^2}\right)$$

case 2

Characterizing Integrated Equilibrium

Recall $\bar{\theta}^1 < \bar{\theta}^2 \rightarrow H_a^1 > H_a^2$ and $w_H^{1a} > w_H^{2a}$

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case 2

Characterizing Integrated Equilibrium

Recall $\bar{\theta}^1 < \bar{\theta}^2 \rightarrow H_a^1 > H_a^2$ and $w_H^{1a} > w_H^{2a}$

Case where $w_H^1 > w_H^2$

- Mobile HE decision rule: $w_H^1 - \theta_j^i \geq w_L$

- HE *Equilibrium*:

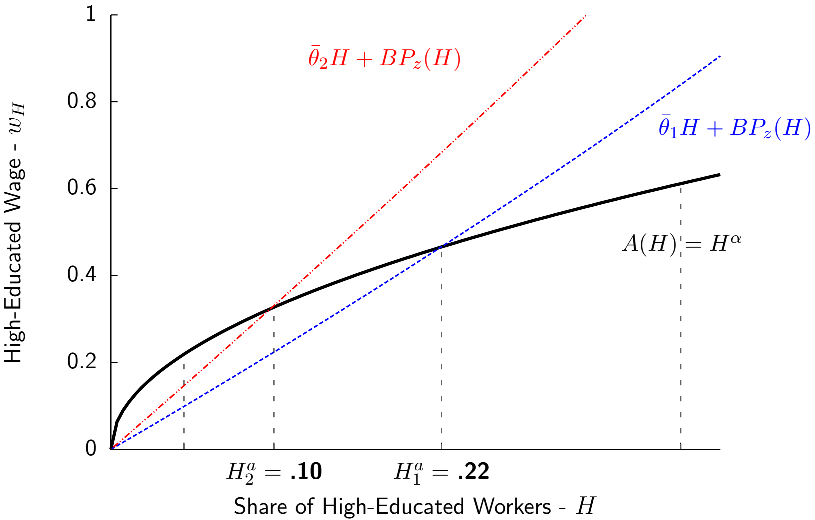
  Since $w_H^1 > w_H^2$ all mobiles will work in $i = 1$

$$H_1 = \underbrace{(1-\gamma)\left(\frac{w_H^{1^*} - w_L^*}{\bar{\theta}^1}\right)}_{N_H^1} + \underbrace{\gamma\left(\frac{w_H^{2^*} - w_L^*}{\bar{\theta}^1}\right)}_{M_H^2}$$

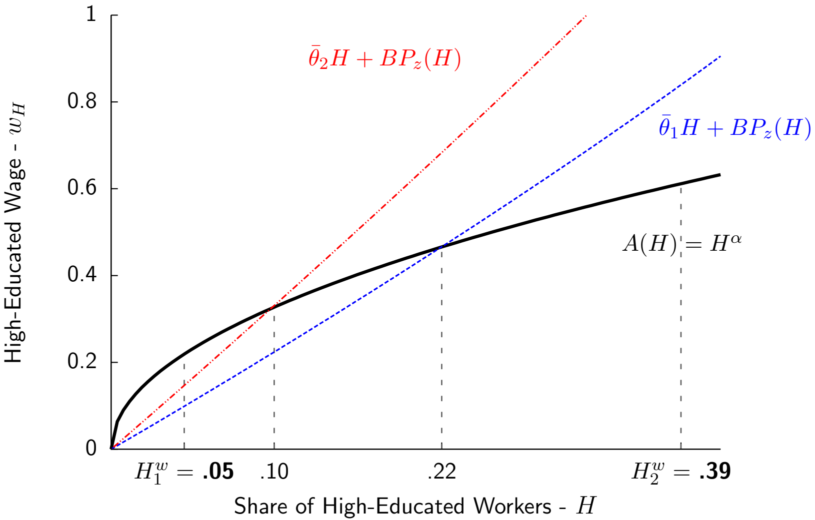
$$H_2 = \underbrace{\frac{w_H^{2^*} - w_L^*}{\bar{\theta}^2}}_{N_H^2} + \underbrace{0}_{M_H^1}$$

case 2

Integrated Economy - Case 2



Integrated Economy - Case 2



Output Comparison: Case 1 and Case 2

Table: World GDP, Sectoral and Total Output

	Output		
	$Y_1 + Y_2$	$Z_1 + Z_2$	Total GDP
Case 1	0.25	1.60	0.31
Case 2	0.18	1.64	0.23

Equilibrium in the HE market (Case 2)

- Using:

$$H_1 = N_H^1$$
$$H_2 = N_H^2 + M_H^1$$
$$P_Z^w(H_1, H_2) = \frac{(1-\lambda)\left(H_1 A(H_1) + H_2 A(H_2)\right)}{\lambda B\left(2 - H_1 - H_2\right)}$$

- H^{1*} and H^{2*} are given by the system:

$$H_1 = \frac{(1-\gamma)}{\bar{\theta}^1} \left(A(H_1) - \frac{(1-\lambda)\left(H_1 A(H_1) + H_2 A(H_2)\right)}{\lambda\left(2 - H_1 - H2\right)} \right)$$
$$H_1 = \left(\frac{\bar{\theta}^1 + \gamma \bar{\theta}^2}{\bar{\theta}^1 \bar{\theta}^2} \right) \left(A(H_2) - \frac{(1-\lambda)\left(H_1 A(H_1) + H_2 A(H_2)\right)}{\lambda\left(2 - H_1 - H2\right)} \right)$$

Back to Slide

Case 2: Numerical Exercise

	Autarky		Integrated (Case2)	
	Country 1	Country 2	Country 1	Country 2
Residents	1	1	$1 - H_M^1$	$1 + H_M^1$
HE	21.66	10.74	4.78	30.74
LE	78.34	89.53	95.22	69.26

Back to Slide