Open Borders in the European Union and Beyond

John Kennan
University of Wisconsin-Madison and NBER

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The Economics of Immigration

A huge literature, addressing a limited set of questions

1. Assimilation
2. Selection
3. Effects on Wage Levels and Skill Premia in Host Countries

These questions are interesting
But the most interesting question is largely ignored

The Economics of Immigration

What would happen if we let people choose where they want to live?

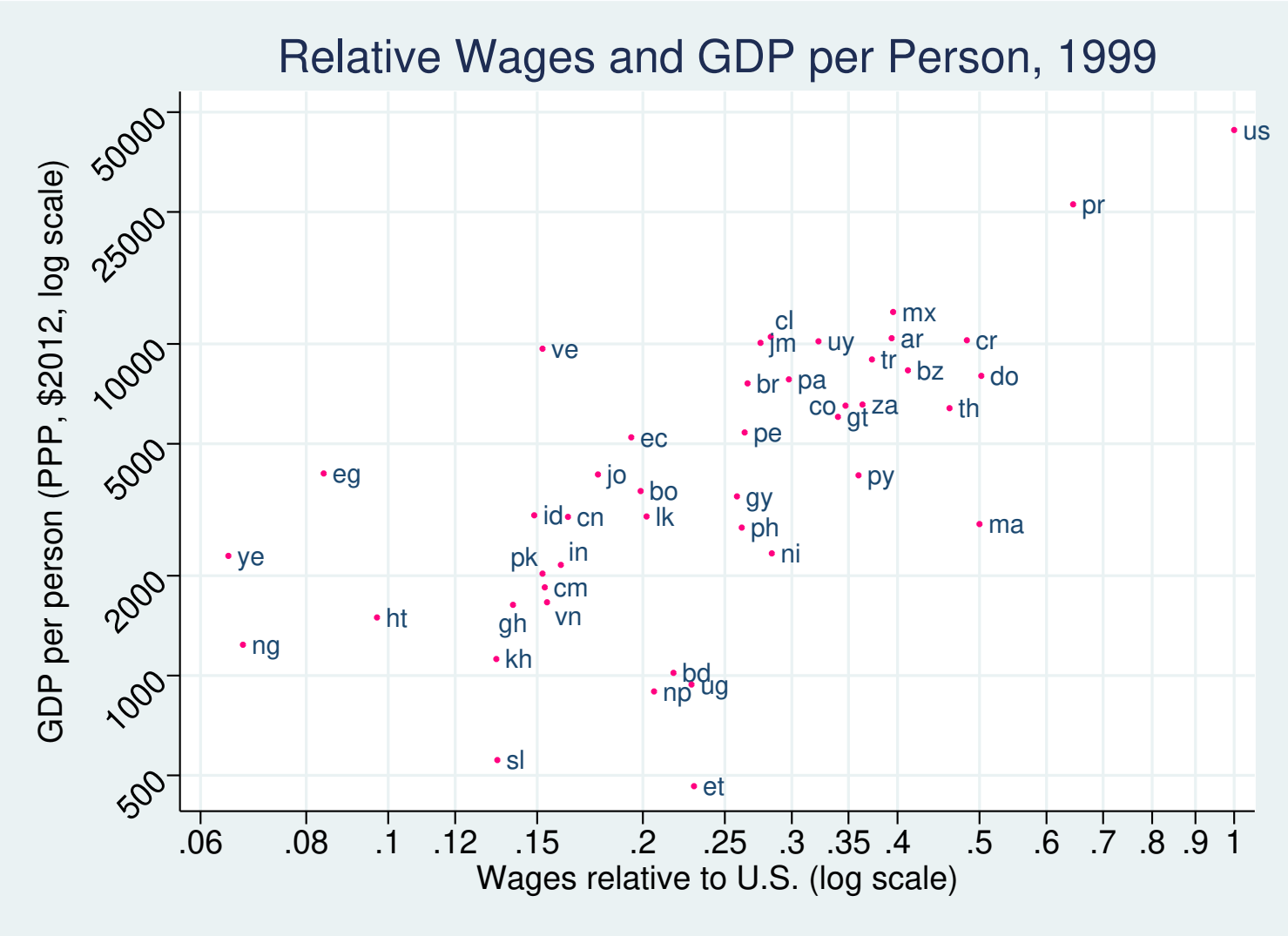
- The immigrants who would not otherwise have moved would be better off
- By how much?
- Who would lose, and how much?
- Would skilled workers gain at the expense of unskilled workers?

The European Union has tried this. And?

Focus of this paper:

- Long Run Effects (background for policy analysis)
- Only Labor Market Effects
  - nothing about culture, national identity, etc
- Effects of open borders on wages (skilled and unskilled workers)
- Gains and losses due to international migration
  - nothing about fiscal effects, costs of social welfare programs

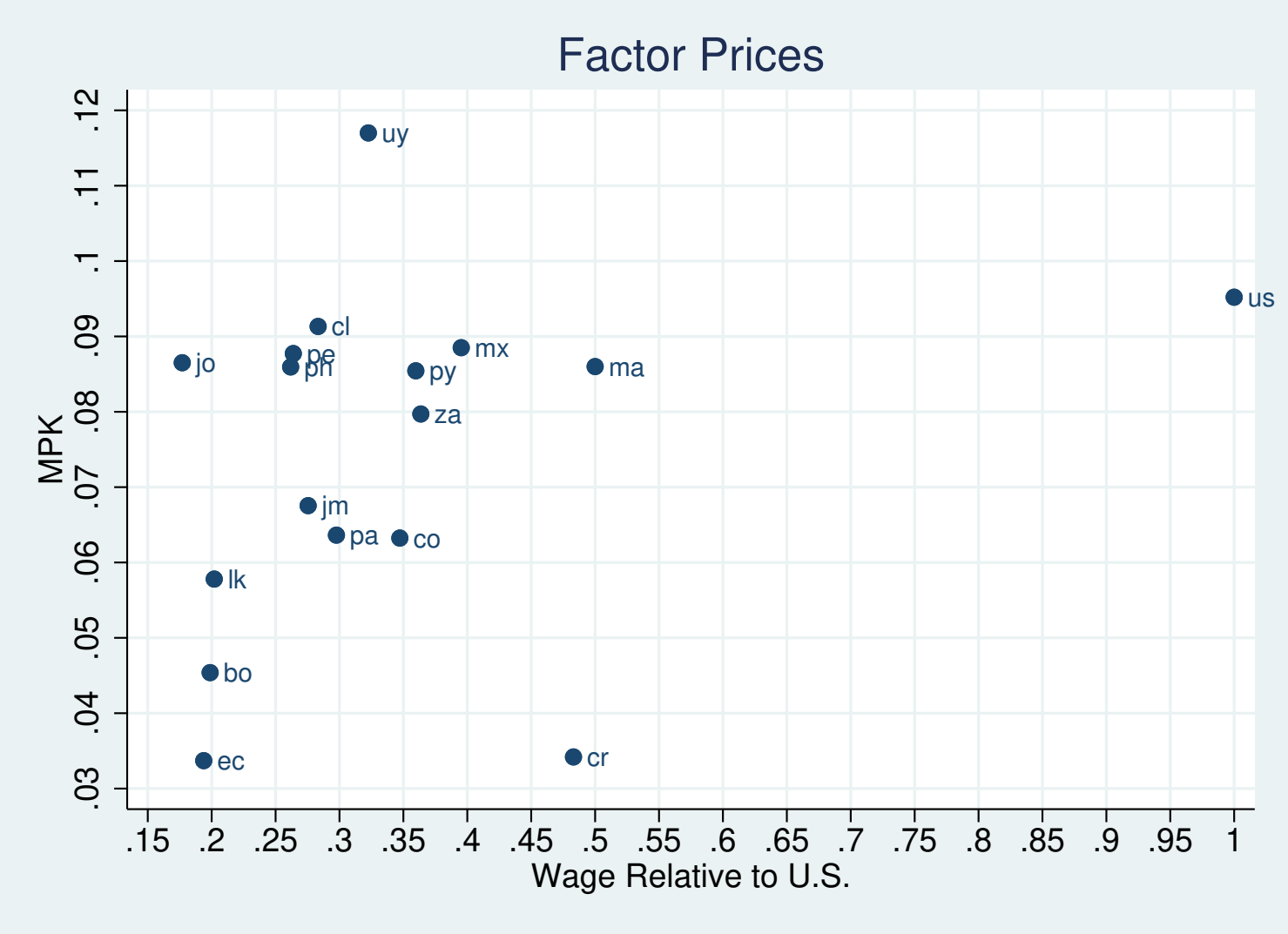
International Wage Differentials



Clemens, Montenegro and Pritchett (2009)

Foreign-born, -educated workers, U.S. Census; similar workers at home

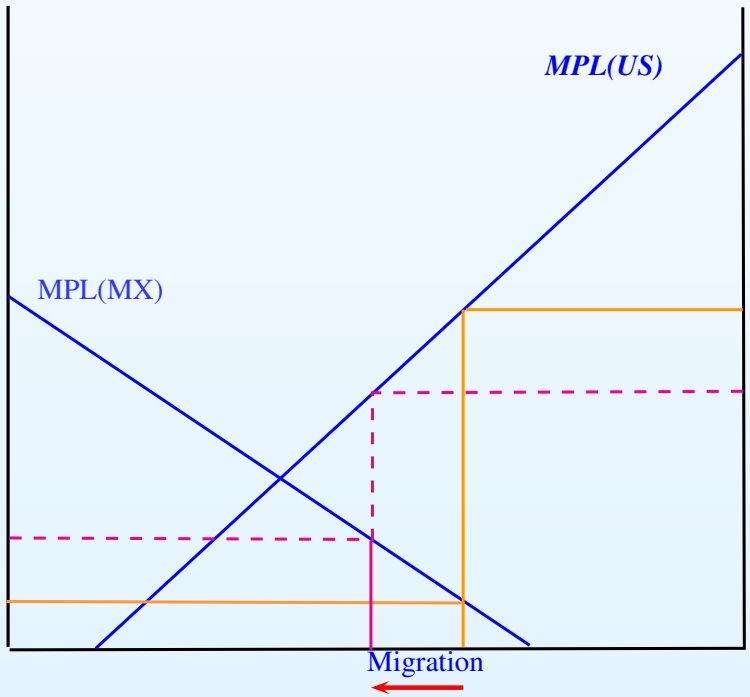
Wages and the Marginal Product of Capital



Caselli and Feyrer *QJE* (2007); Clemens, Montenegro and Pritchett (2009)

Standard (One-Good) Model

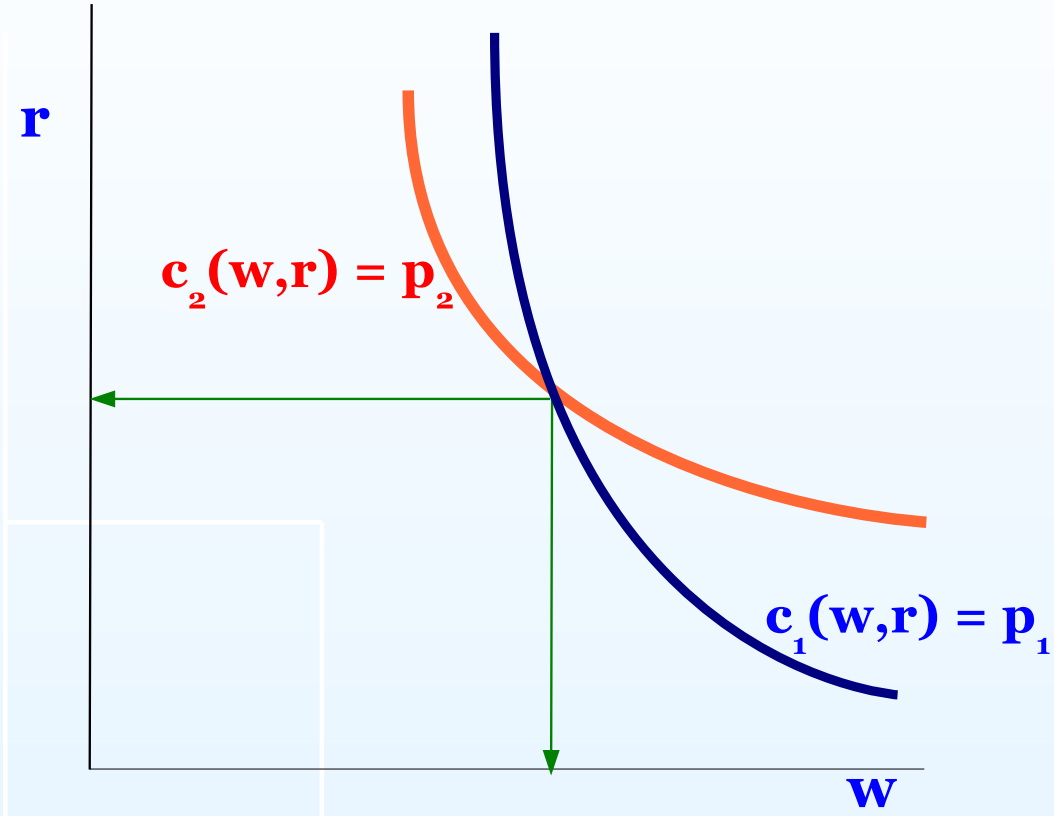
"the very large wage ratios we observe for many countries are sustained by policy barriers to movement" [Clemens et al, (2008)]
"In theory, moving labor from a poor to rich country ... lowers (raises) incomes for laborers in the receiving (sending) country" [Hanson (2010)]
Not in the HO model: removing the barriers has no effect on wage ratios; emigration does not raise wages



Wage Effects of Immigration

Rybczynski theorem: an increase in the supply of one factor
increases production of goods that use that factor intensively
(and decreases production of other products),
with no effect on relative factor prices.
This is in a small open economy that takes product prices as given.
What are the effects of changing the skill mix in a big open economy?

Factor Price Equalization



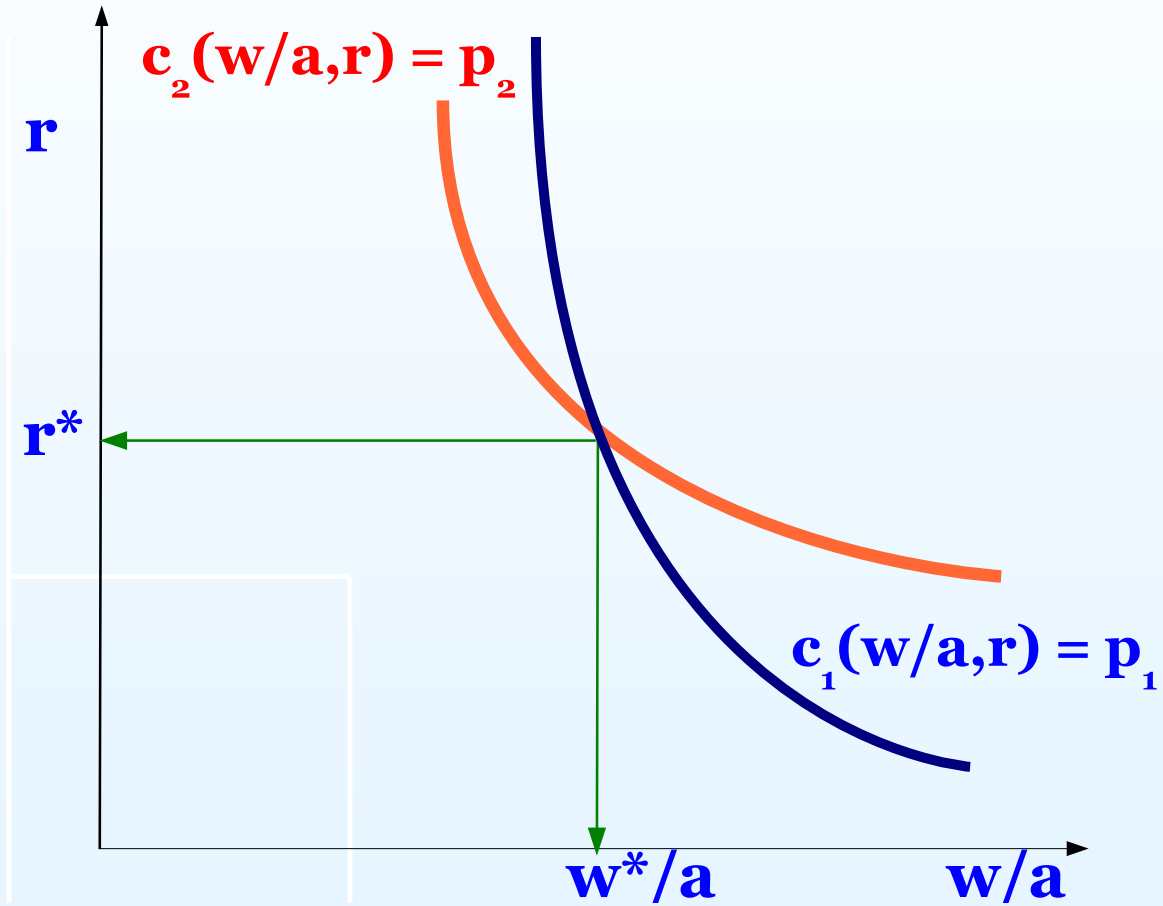
Two locations, Two products

Producers like lower wages (w) and lower capital prices (r)

Equilibrium: producers of each good indifferent between (w_1, r_1) and (w_2, r_2)

Factor Price Equalization: Labor-Augmenting Productivity Differences

Trefler (JPE, 1993)



$\frac{w}{a}$: wage per efficiency unit of labor

Simple Migration Model

Proportion of people who move determined by the relative wage
– ratio of income at home $\left(y_{js}\right)$ to the highest income elsewhere (y_{0s})
– for someone at skill level s
Assume utility is loglinear, so indirect utility is $\log(y)$. Stay if

$$\log(y_{0s}) - \delta_s \leq \log\left(y_{js}\right)$$

δ_s: disutility of moving (attachment to home), randomly distributed
If the distribution of δ is exponential: $F_s(t) = 1 - e^{-\omega_s t}$
then the probability of staying is

$$\text{Prob}\left(\delta \geq \log\left(\frac{y_{0s}}{y_{js}}\right)\right) \quad = \quad e^{-\varsigma_s \log\left(\frac{y_{0s}}{y_{js}}\right)} = \left(a_j\right)^{\omega_s}$$

So if the proportion who stay is $\mathscr{S}_{js}$ then

$$\log\left(\mathscr{S}_{js}\right) = \omega_s \log\left(a_{js}\right)$$

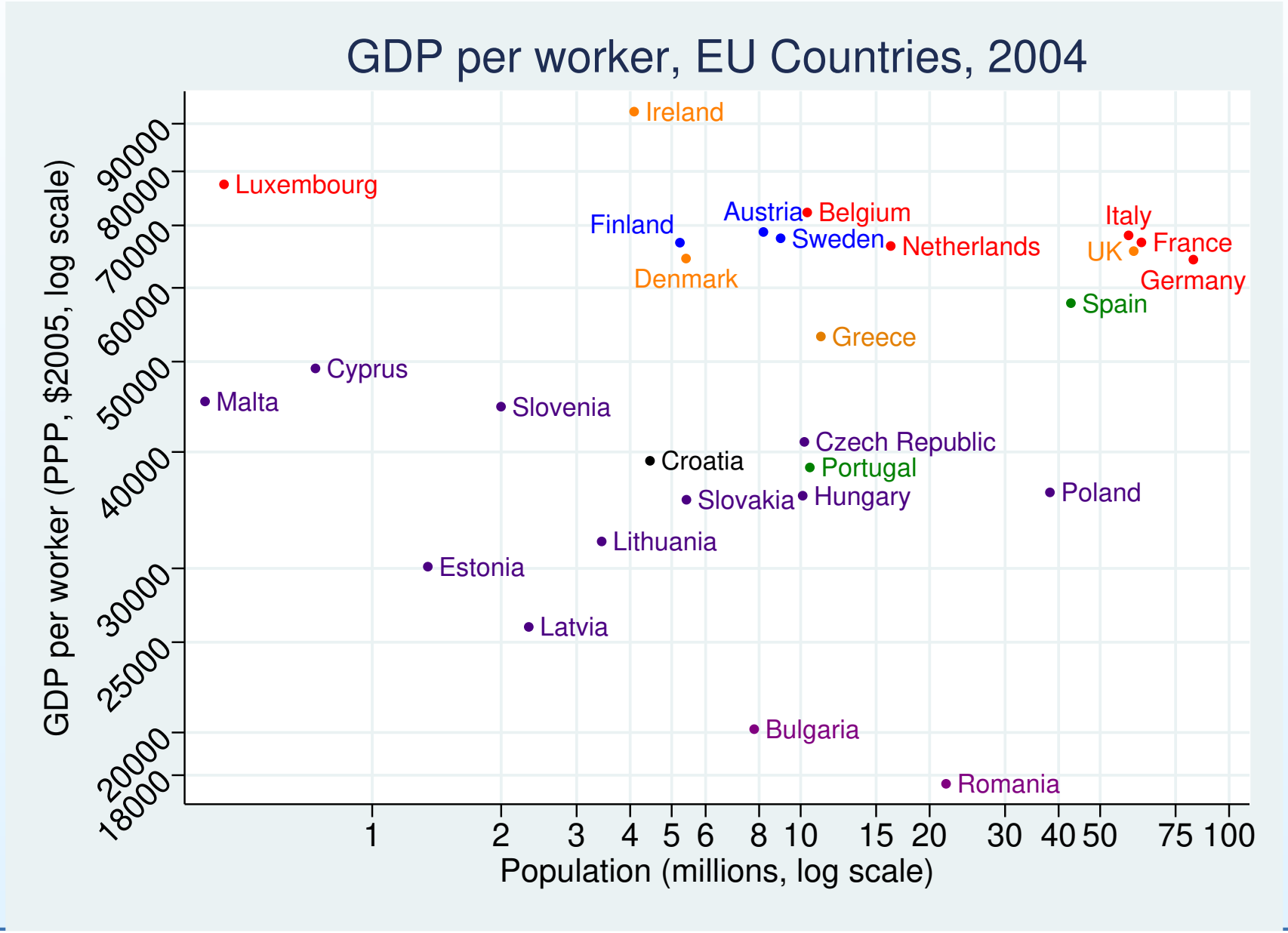
The European Union: Entry and Exit

The European Union, 1958 – 2004					
1958	1973	1981	1985	1986	1995
Belgium	Denmark	Greece	~~Greenland~~	Portugal	Austria
France	[Greenland]			Spain	Finland
Germany	Ireland				Sweden
Italy	UK				
Luxembourg					
Netherlands					
6	3	1	-1	2	3

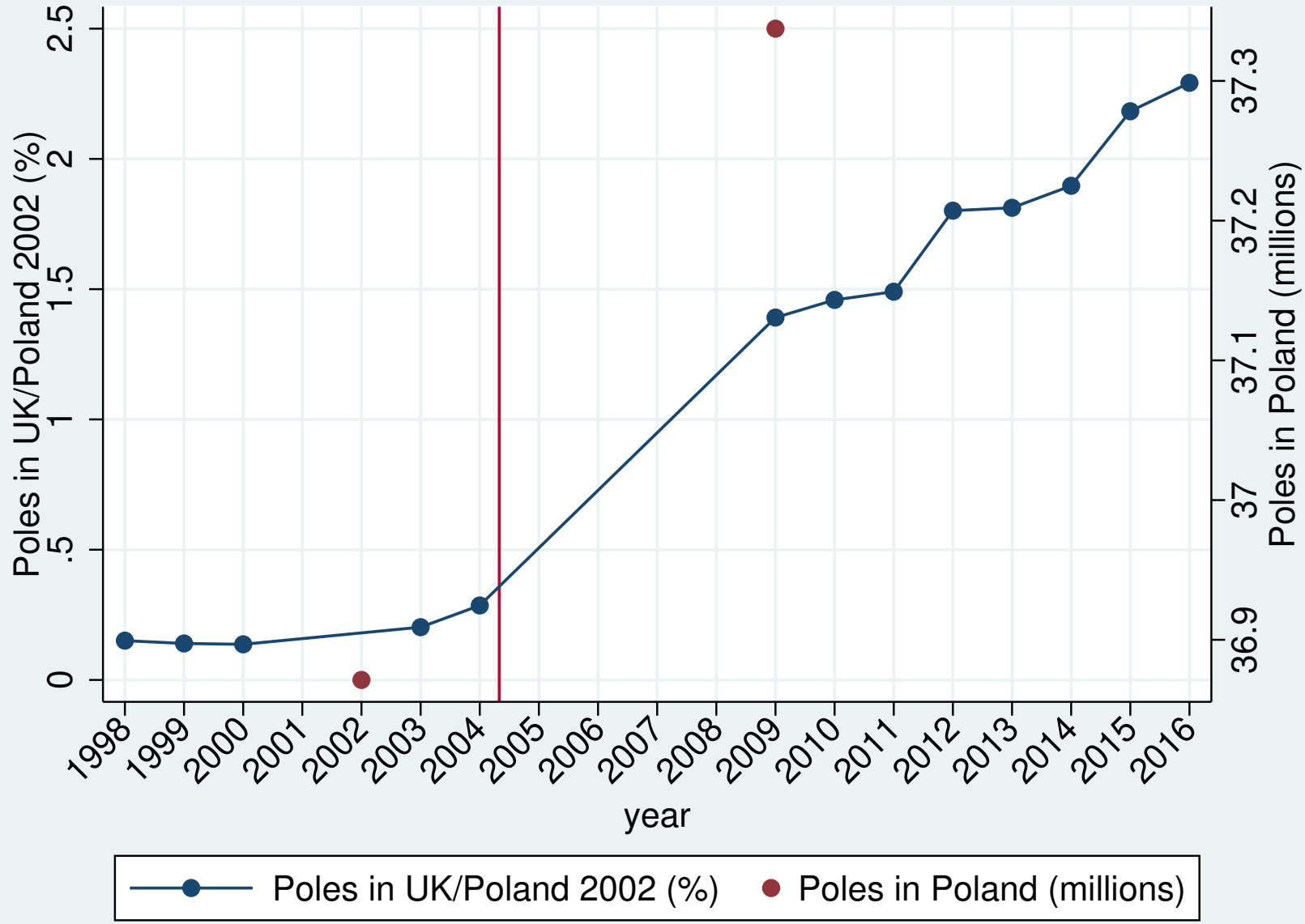
The European Union: Entry and Exit

The European Union, 2004 – 2019			
2004	2007	2013	2019
Poland	Bulgaria	Croatia	~~UK~~[?]
Czech Republic	Romania		
Estonia			
Hungary			
Latvia			
Lithuania			
Slovenia			
Slovakia			
Cyprus			
Malta			
10	2	1	-1

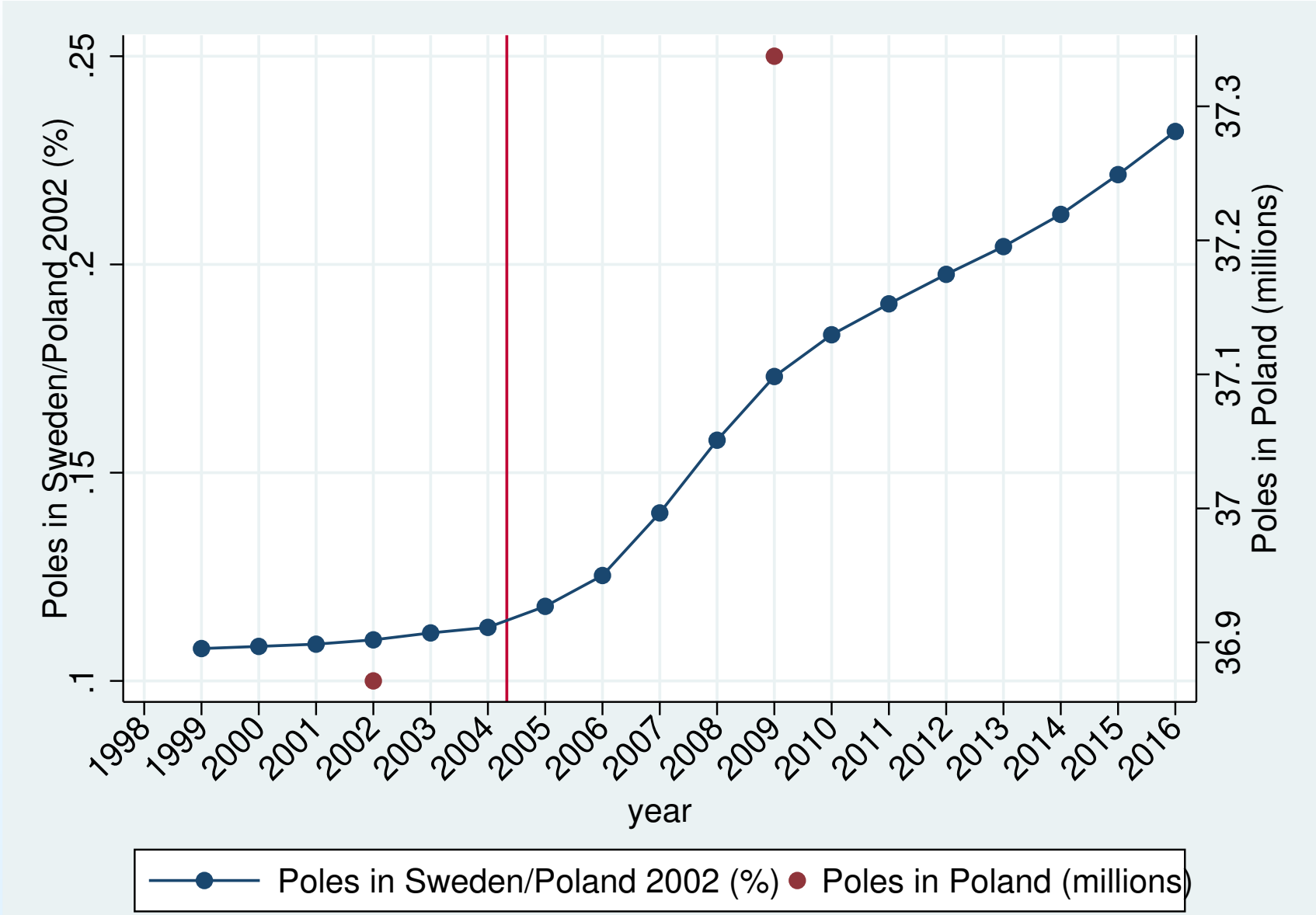
Income Levels



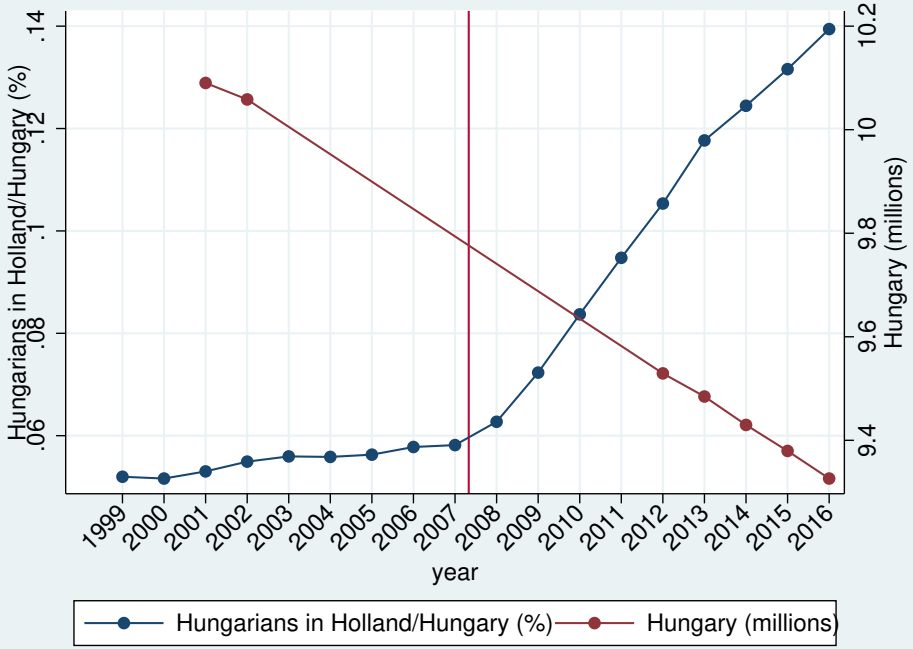
Migration: Poland and the UK

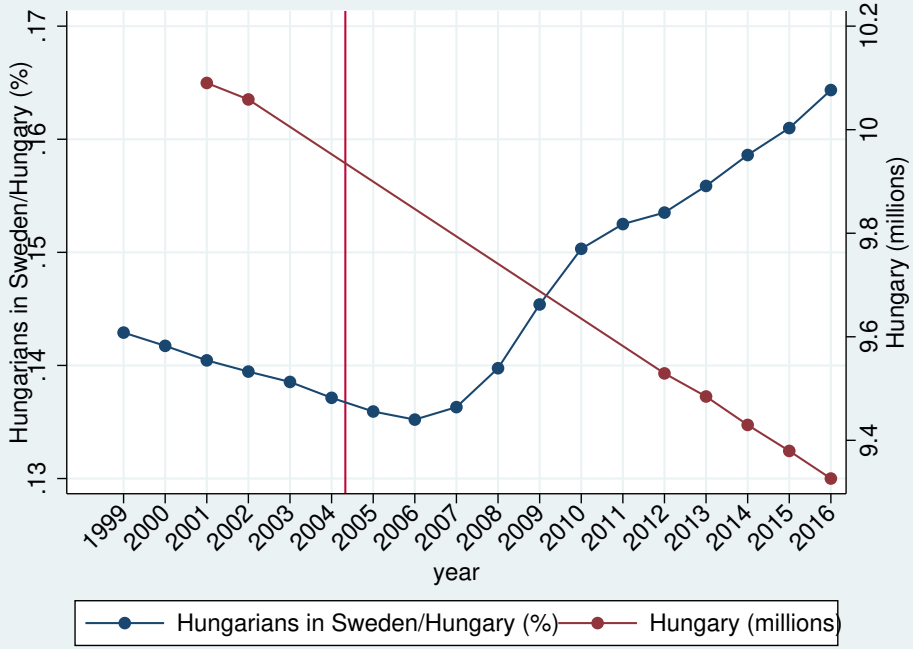


Migration: Poland and Sweden



Migration: Hungary, Holland and Sweden





General Equilibrium

Start from preferences, technology and factor endowments
Generate wages and prices as equilibrium outcomes
Factor endowments change due to migration
Compute equilibrium real wage changes and welfare gains

Treat EU as a closed economy (exaggerates real wage effects of migration)

Given factor prices, goods prices are determined by the cost functions
Given goods prices, quantities determined by preferences and income (where income depends on factor prices)
Given quantities and factor prices, producers choose factor quantities
Given factor demands, factor prices determined by market clearing

Technology

Nested CES

Labor composite (skilled and unskilled): a power-linear function

$$L^\kappa = \gamma S^\kappa + (1-\gamma) U^\kappa$$

$\zeta = \frac{1}{1-\kappa} \geq 0$: elasticity of substitution between skilled and unskilled labor

$\gamma \in [0,1]$: skill-intensity (relative importance of skilled and unskilled labor)

Output is a power-linear function of capital and (composite) labor.

$$Y^\rho = \alpha K^\rho + (1-\alpha) L^\rho$$

$\sigma = \frac{1}{1-\rho} \geq 0$: elasticity of substitution between capital and labor

$\alpha \in [0,1]$: capital-intensity (relative importance of capital and labor)

Alternative nesting: interchange K, U

Technology

The substitution elasticities are the same for all products
but the factor intensities may differ
No loglinear relationship between factor price and (aggregate)
quantity ratios.

Preferences

Utility function is CES, with inelastic labor supply

$$\mathcal{U}(Q) = \sum_r \theta_r \frac{Q_r^{\varrho} - 1}{\varrho}$$

Elasticity of Substitution in Consumption

$$\beta = \frac{1}{1-\varrho}$$

expenditure shares

$$\Theta_r = \frac{\theta_r^{\beta} p_r^{1-\beta}}{\sum_s \theta_s^{\beta} p_s^{1-\beta}}$$

Cobb-Douglas (log-linear) Preferences $(\beta = 1)$

$$\Theta_r = \theta_r$$

General Equilibrium: Uniqueness

1. Any solution of the market-clearing equations gives a competitive equilibrium.
2. Every competitive equilibrium is Pareto optimal.
3. A Pareto optimum maximizes the utility of an aggregate consumer

   (a) identical homothetic preferences – everyone on the same ray

4. All Pareto optima must have the same total outputs

   (a) strictly convex preferences, convex production set

5. The production function for each good is strictly quasiconcave.
6. All optimal production plans must use the same input vectors.

Immigration and Wages

The effective total supply of labor (aggregated over countries) is

$$\begin{aligned} S_0 &= \sum_j a_{j1} S_j \\ U_0 &= \sum_j a_{j2} U_j \end{aligned}$$

When workers move to a country with higher productivity, effective supply of labor increases, capital labor ratio falls
If M_{jk} workers migrate from j to k,

$$\begin{aligned} \Delta S_0 &= \sum_j \sum_k \left(a_{k1} - a_{j1}\right) M_{jk}^S \\ \Delta U_0 &= \sum_j \sum_k \left(a_{k2} - a_{j2}\right) M_{jk}^U \end{aligned}$$

Immigration and Real Wages (Cobb-Douglas Case)

Simple Case: Cobb-Douglas Preferences and Technology
$(\beta = \sigma = \zeta = 1)$

$$\begin{aligned} u(q) &= \sum_r \theta_r \log(q_r) \\ \log(q_r) &= \sum_i \alpha_{ir} \log(x_i) \end{aligned}$$

Product Prices (ignoring constants)

$$\log(p_r) = \textstyle\sum_i \alpha_{ir} \log(w_i)$$

Real Wages

$$\begin{aligned} \log\left(y^*\right) &= \log y - \textstyle\sum_i \alpha_i \log(w_i) \\ \log\left(y_k^*\right) &= \textstyle\sum_i \alpha_i \log(X_i) - \log(X_k) \end{aligned}$$

X_i: endowment of factor i

α_i: weighted factor shares (preference weights): $\alpha_i = \sum_r \theta_r \alpha_{ir}$

Immigration and Real Wages (Cobb-Douglas Case)

Aggregation:

$$\log Q = \sum_i \alpha_i \log(X_i)$$

Real Wage Changes

$$\Delta \log(w_k) = \sum_{i \neq k} \alpha_i \Delta \log(X_i) - (1 - \alpha_k) \Delta \log(X_k)$$

In the Cobb-Douglas case only aggregate factor share data are needed to compute the effects of changes in effective factor supplies

Efficiency Ratio Estimates

Efficiency Ratios													
	bg	cy	cz	ee	hr	hu	lt	lv	mt	pl	ro	sk	si
unskilled	.31	.71	.47	.34	.64	.43	.45	.30	.68	.45	.27	.42	.66
skilled	.38	1.00	.57	.41	.76	.78	.54	.33	.86	.64	.40	.47	.94

Skills and Migration Rates: Puerto Rico and Portugal

Migration from Puerto Rico to U.S.		
Schooling	**Secondary**	**Post-Secondary**
Wage Ratio	0.52	0.64
Migration Rate	0.40	0.30
ω	**0.79**	**0.82**
N	718,559	445,435

Wage (efficiency) ratios vary a lot across finer education levels (from 0.46 for primary education to 0.72 for postgraduate)

Portugal

Joined EU in 1986

Relative wage below 50%, over the period 2000 – 2015

Emigration rate is roughly 15%

Implied migration cost parameter: $\omega = 0.2$

Net Gains from Migration

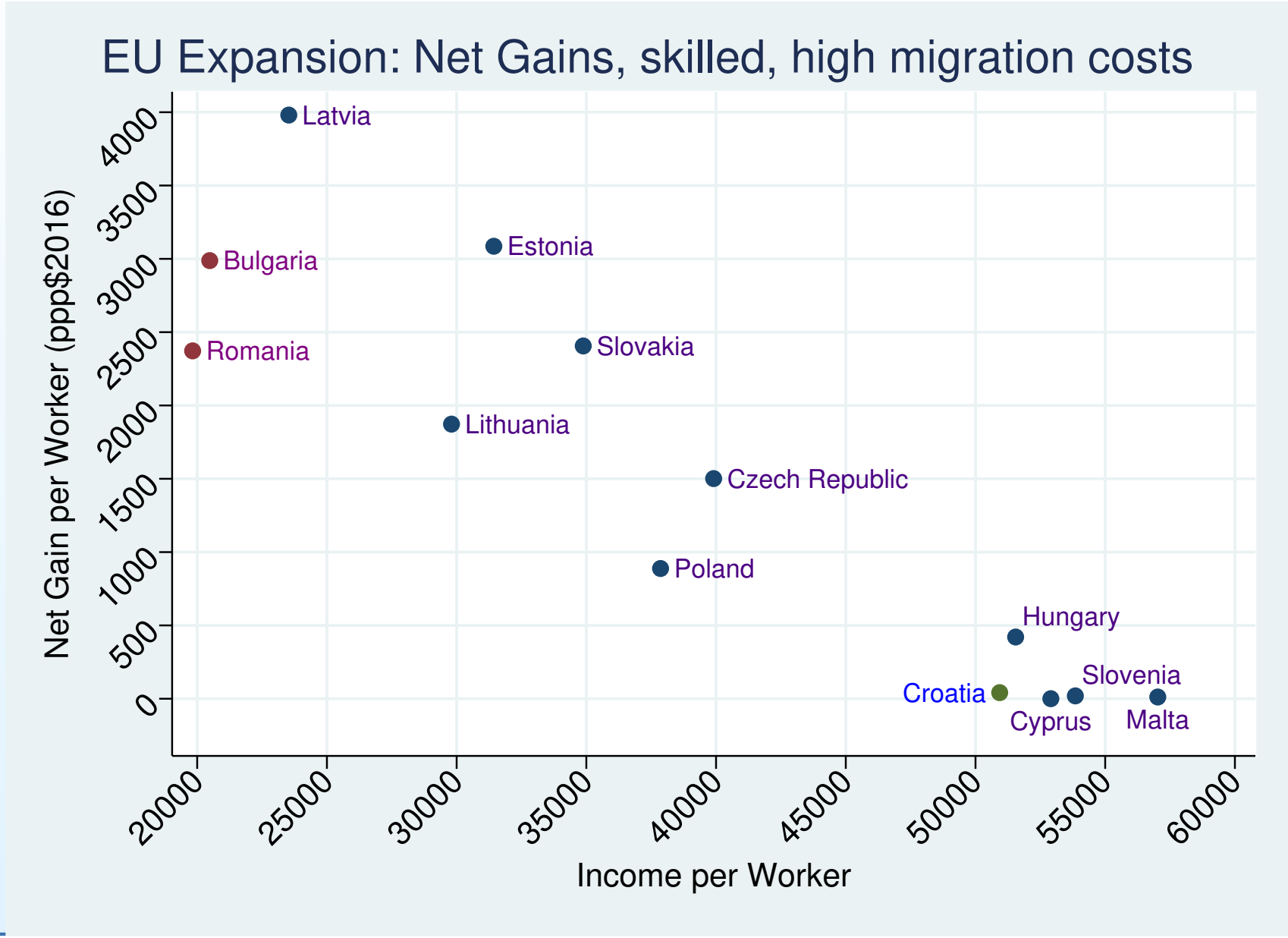
Gross income gains

$$\begin{aligned} \Delta y &= \left(1 - a_{js}\right) y_{0s} \\ &= \frac{1 - a_{js}}{a_{js}} y_{js} \end{aligned}$$

For the average migrant, the net gain is roughly half of this (if the lowest migration cost is zero)
Proportion of people who do not migrate is $a_{js}^{\omega_s}$
Average net income gains (including nonmigrants)

$$\bar{g}_{js} = \frac{1}{2} \frac{\left(1 - a_{js}^{\omega_s}\right)\left(1 - a_{js}\right)}{a_{js}} y_{js}$$

Net Gains from EU Migration: high migration cost



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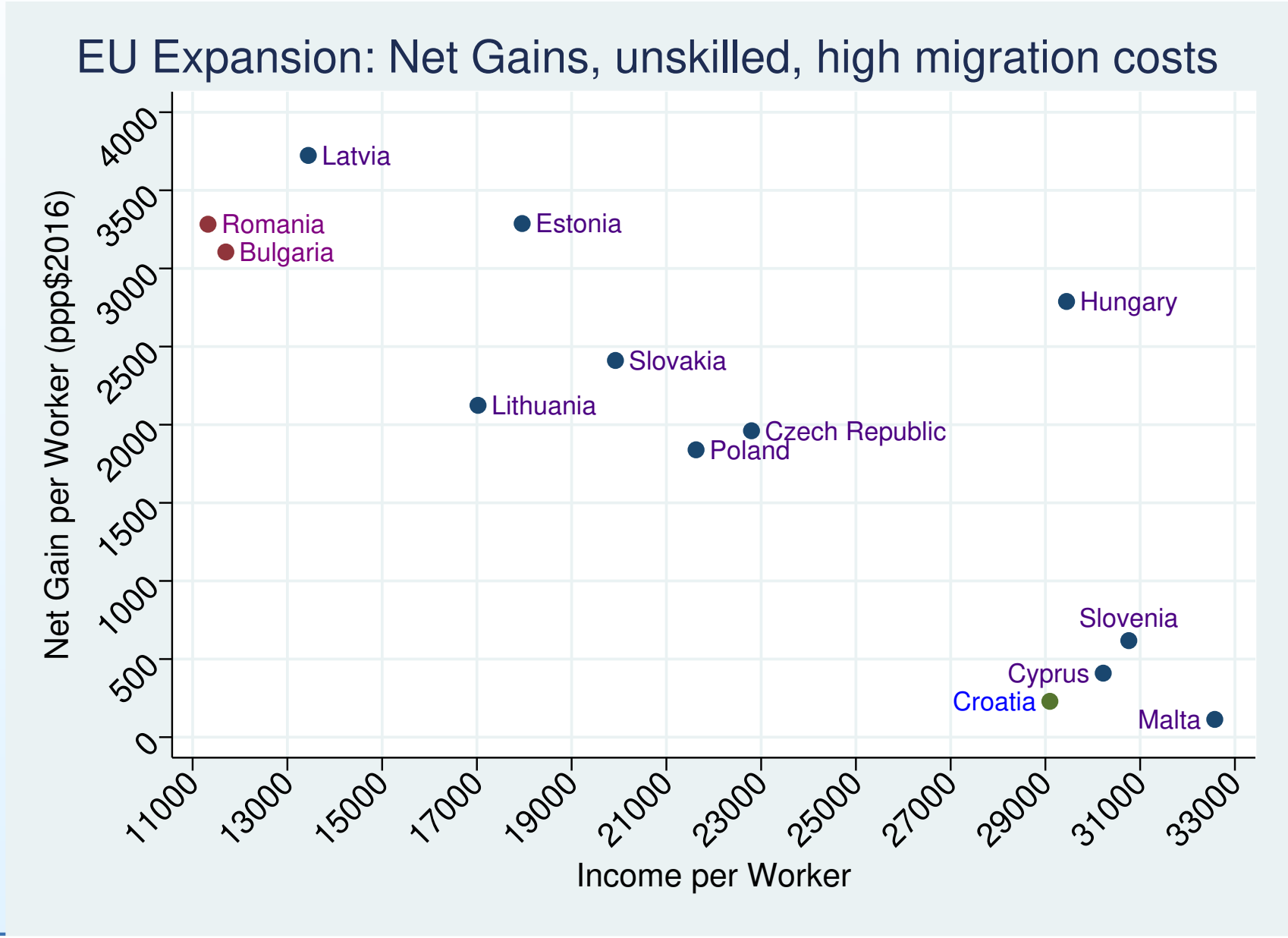

Immigration and Real Wage Changes

Choose parameter values so that equilibrium matches the data
Then change labor endowments, and compute the new equilibrium
Real wage change is the equivalent income change:
income that yields the new utility level in the old equilibrium

Immigration and Real Wage Changes

Real Wage Changes: EU Expansion		
Schooling	**Secondary**	**Post-Secondary**
Immigration (millions)	16.42	4.11
Percentage Increase in Effective Labor	14.5%	6.7%
Real Wage Change	−6.1%	+0.8%
Employment in EU15 (millions)	113.0	61.5
Employment in EU+13 Countries	32.2	10.9

Conclusion

The welfare cost of immigration restrictions is very high

Real wage effects of open borders in the EU are surprisingly small

- unskilled real wage falls by less than 6% in the short run
- and migration is a slow process
- meanwhile investment restores the real wage

Migration changes proportions of skilled and unskilled workers

- efficiency ratios may be different, affecting migration rates
- skilled workers have lower migration costs
- but there are many more unskilled workers

Big incentives to invest in capital

- Big incentives to invest in human capital

Other Questions

- Consider alternative CES nesting structures
- Allow general substitution elasticities in consumption and production