The Wage Effects of Immigration and Emigration

Frederic Docquier (UCL)

Caglar Ozden (World Bank)

Giovanni Peri (UC Davis)

Context: Immigration in Europe

- The perception of the scale and of economic effects of immigration in the public opinion may be exaggerated

- Eurobarometer (in 2007): 31% of EU citizens believe that immigration reduces natives' employment, 42% believe it reduces natives' wage. Most economic studies find small evidence in favor of this.

- But also the average american think that 35% of US pop is foreign born and Europeans' estimate is 24%

  Actual shares = 14, and 10%, respectively.

Context: Immigration and Emigration in Europe

- Almost daily debate on immigrants and their effects on:
  - Labor Markets
  - Crime
  - Culture
  - Fiscal impact

- Debate on emigration: almost absent, except in the occasional news on brain drain.

- Why are there so few studies on the empirical effect of emigration? Not very visible. Very hard to measure.

Popular perception and Public Discourse

- Europe has received large masses of uneducated workers, they depressed wages, worsened skill-intensity of the economy, hurt native unskilled.

- Europe may be loosing some of the high skilled workers but those numbers are small and do not matter much.

- Also there may be brain circulation which is good.

- Policy implications: We should discourage/regulate immigration, while emigration is a non-issue.

Goals of the Paper

- Use a simple "consensus" model of National economies to evaluate the long run aggregate (national) impact of immigrants and emigrants on wages.

- Focus on European Countries, using some other countries of immigration and emigration as comparison.

- How relevant are different assumptions about substitutability, skill externalities, agglomeration externalities to evaluate these aggregate impacts?

Reality from the data

- We update the only good quality data we have on immigration, emigration and net migration from national census, by education groups (update of Docquier and Marfouk 2005). Data limited to 1990-2000

- Immigrants to Europe are more skilled than the average non-migrants. Emigrants are also more skilled than the average non migrants.

- This imply a positive contribution of immigrants to average wages, as well as to wages of unskilled, through complementarities and positive externalities of schooling.

- It also imply a negative contribution of emigration (of comparable size) to average wages and wages of unskilled.

	Immigration as % of nationals		Emigration as % of nationals	
	Low Education	High education	Low Education	High education
U.S.	5.8	4.4	0.0	0.2
Canada	0.8	8.0	-1.0	1.2
Australia	-0.6	10.6	0.3	1.3
U.K.	0.4	8.5	-0.7	5.0
Belgium	1.7	4.4	-0.2	2.5
France	0.1	2.8	0.3	1.4
Germany	2.2	3.1	-0.1	1.2
Greece	0.2	0.2	-0.3	3.5
Italy	0.9	0.8	-0.5	1.3
Netherlands	1.3	5.1	0.0	2.3
Portugal	1.3	1.9	2.1	8.9
Spain	2.7	3.8	-0.2	2.1
Sweden	1.5	5.1	0.3	1.8
Czech R.	-0.1	3.9	0.6	1.2
Hungary	-0.2	0.1	0.0	0.3
Poland	-1.1	-0.7	-0.3	5.6
Turkey	0.3	3.1	1.8	2.7
Mexico	0.0	0.6	7.8	11.2

Key Message

- People, especially unskilled workers of Spain, Greece, Italy, Portugal but also France and Germany should be concerned not because Polish and Rumanians migrate to their shores but because their engineers go to the UK, Switzerland, Canada and the US.

- In most European countries international mobility hurts the less educated workers mostly because of emigration of the highly educated. Immigration, actually, helps the average wage of non-migrants.

Outline of the Paper

- Model and key parameters

- Data

- Results of the Simulated Wage Effects

- Extensions

- Some thoughts

Simple aggregate representation of Production

$$Y_t = \widetilde{A}_t K_t^{1-\alpha} Q_t^{\alpha}$$

- Total Factor Productivity $\quad \widetilde{A}_t$
- Aggregate of effective labor $\quad Q_t$
- Stock of Physical Capital $\quad K_t$

- Assuming that returns to capital are equalized (open economy) or that they depend on savings or discount rates we have:

$$R^* = (1-\alpha)\widetilde{A}_t K_t^{-\alpha} Q_t^{\alpha}$$

continued

- Substituting and solving out the capital stock, output is linear in the effective labor composite

$$Y_t = A_t Q_t$$

Modified TFP, increasing function of TFP and return to capital

$$A_t \equiv \widetilde{A}_t^{1/\alpha} \left[(1-\alpha)/R^*\right]^{(1-\alpha)/\alpha}$$

Labor Aggregate:

$$Q_t = \left[\theta_q Q_{h,t}^{\frac{\sigma_q - 1}{\sigma_q}} + (1 - \theta_q) Q_{l,t}^{\frac{\sigma_q - 1}{\sigma_q}} \right]^{\frac{\sigma_q}{\sigma_q - 1}}$$

- Q_h and Q_h are the aggregate employment of highly educated (College graduates) and less educated (high school graduates). σ_q is the high-low educated elasticity.

- The specification above is consistent with many Labor Market, Growth and International productivity papers (Katz and Murphy 1992, Caselli and Coleman 2006, Acemoglu and Zilibotti 2001 etc)

Native and Immigrant Labor

$$Q_{s,t} = \left[\theta_s N_{s,t}^{\frac{\sigma_I - 1}{\sigma_I}} + (1 - \theta_s) I_{s,t}^{\frac{\sigma_I - 1}{\sigma_I}} \right]^{\frac{\sigma_I}{\sigma_I - 1}}$$

- N_s, I_s are natives and immigrants (of schooling s) and σ_I is their elasticity of substitution.

- Consistent with the recent immigration literature: Ottaviano and Peri (forthcoming), Manacorda, Manning and Wadsworth (forthcoming), Borjas and Katz (2007).

Wages

- Considering wages as equal to the marginal productivity of labor, we can calculate the wages of non-migrant nationals.

$$w_{h,t} = A_t \theta_q \theta_h \left(\frac{Q_t}{Q_{h,t}} \right)^{\frac{1}{\sigma_q}} \left(\frac{Q_{h,t}}{N_{h,t}} \right)^{\frac{1}{\sigma_I}}$$

$$w_{l,t} = A_t (1 - \theta_q) \theta_l \left(\frac{Q_t}{Q_{l,t}} \right)^{\frac{1}{\sigma_q}} \left(\frac{Q_{l,t}}{N_{l,t}} \right)^{\frac{1}{\sigma_I}}$$

New immigrants affect the wages through the aggregates Q,
new emigrants through Q and N

Experiment and Counterfactual

- To evaluate the effect of immigration:
  - Calculate the wages of native non movers in 2000 and the counterfactual wage keeping stock of immigrants at levels of 1990. Take the difference and express it as percentage of wage value.

    To evaluate the effect of emigration:

    Calculate the wages of native non-movers in 2000 and the counter-factual wages including among them those who emigrated between 1990 and 2000. Take the difference and express it as percentage of 1990 value.

Formally

$$(\Delta w_{2000})^{IMMI} = (w_{h,2000} - w_{h,2000}^{IMMI})\frac{N_{h,2000}}{N_{h,2000} + N_{l,2000}} + (w_{l,2000} - w_{l,2000}^{IMMI})\frac{N_{l,2000}}{N_{h,2000} + N_{l,2000}}$$

$$(\Delta w_{2000})^{EMI} = (w_{h,2000} - w_{h,2000}^{EMI})\frac{N_{h,2000}}{N_{h,2000} + N_{l,2000}} + (w_{l,2000} - w_{l,2000}^{EMI})\frac{N_{l,2000}}{N_{h,2000} + N_{l,2000}}$$

Externality of schooling

$$A_t = A_0 \left(\exp \left(\frac{Q_{h,t}}{Q_t} \right) \right)^{\lambda}$$

- Following Moretti 2004a-2004b, Acemoglu and Angrist 2001, Peri and Iranzo 2009 we consider that the share of college graduates may have a positive productive externality. λ is the elasticity of productivity to the share of college graduates.

- Learning, adoption of better technologies, improvement of firm-worker matching, better institutions, embodied ideas, are the channels of these externalities.

Parameterization

- **Key parameters:**
  - σ_q: Elasticity of Substitution between highly and less educated. It determines the relative H-L wage effect given the change in relative supply. It affects native average wages if relative supply of H-L for immigrants/emigrants is very different than natives and if it is small.

  - σ_I: Elasticity of Substitution between immigrants and natives. The smaller it is the more natives benefit from inflow of immigrants, who are complementary to them. Does not matter for impact of emigrants.

Parameterization

- λ: Elasticity of productivity to the share of college graduates. It regulates the strength of the "schooling externality". The larger it is the more positive is an effect on average wages from increasing the ratio H/L. If immigration and emigration affect that ratio the parameter λ regulates the consequences on TFP.

Range from the Literature

Parameter Estimates (source of estimates)	Low value	Intermediate Value	High value
σ_q (source)	1.3 (Borjas 2003)	1.5 (Katz and Murphy 1992)	2.0 (Angrist 1995)
σ_I (source)	6.0 (Manacorda et al. forthcoming)	20.0 (Ottaviano and Peri forthcoming, Card 2009)	Infinity (Borjas et al. 2008)
λ (source)	0.0 (Acemoglu and Angrist 2000)	0.44 (Iranzo and Peri 2009)	0.75 (Moretti 2004a, 2004b)

Data

- **Statistics on labor force per education level**
  - Labor force proxied by population aged 25-65
  - Skill composition taken from different data sources
  - Census data on labor mobility per education level

- **Docquier and Marfouk (2005):** collection of immigration data in 30 OECD destinations

- Here: collection of data in 46 (2000)/31 (1990) additional destinations.

- Here: estimate of bilateral missing migration stocks

- **Final database:** comprehensive migration matrices for 195 countries, 1990 and 2000, stock of college graduates and less educated by country of residence and origin. Allows to measure total emigration flows!

This paper focuses on

- 10 large Western European countries
- 3 non-EU English-speaking countries (US, Canada, Australia)
- 3 Large Eastern European countries (Poland, Hungary and Czech republic)
- Large countries of emigration (Turkey and Mexico) and NON-OECD countries of immigration

- Measure of recent migration flows = migration stock in 2000-migration stock in 1990
  - Net (of remigration) values
  - Includes all immigrants, including those with visas and sometimes irregular
  - Has a break-down by schooling

	Immigration as % of nationals		Emigration as % of nationals	
	Low Education	High education	Low Education	High education
U.S.	5.8	4.4	0.0	0.2
Canada	0.8	8.0	-1.0	1.2
Australia	-0.6	10.6	0.3	1.3
U.K.	0.4	8.5	-0.7	5.0
Belgium	1.7	4.4	-0.2	2.5
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Germany	2.2	3.1	-0.1	1.2
Greece	0.2	0.2	-0.3	3.5
Italy	0.9	0.8	-0.5	1.3
Netherlands	1.3	5.1	0.0	2.3
Portugal	1.3	1.9	2.1	8.9
Spain	2.7	3.8	-0.2	2.1
Sweden	1.5	5.1	0.3	1.8
Czech R.	-0.1	3.9	0.6	1.2
Hungary	-0.2	0.1	0.0	0.3
Poland	-1.1	-0.7	-0.3	5.6
Turkey	0.3	3.1	1.8	2.7
Mexico	0.0	0.6	7.8	11.2

How can perception be so wrong?

- 1) People make mistakes, we need to look at the numbers.

- 2) Stock of immigrants are less skilled than recent flows, se 1990. (however stock of emigrants are very highly skilled too).

- 3) People are conditioned by absolute numbers which are not the relevant ones for labor market effects.

- 4) Here we consider total migration (including between rich countries) while people have in mind migration from poor countries. However 78% of stock of migrants (and fully 75% of the less educated) in a country like Germany in 2000 were from other rich (EU and non EU-Anglo Saxon) countries.

Stock 1990

	Immigrants		Emigrants	
	Low schooling	High schooling	Low schooling	High schooling
U.S.	8,9	9,7	0,4	0,6
Canada	18,2	23,9	4,5	5,2
Australia	27,1	34,7	1,2	2,4
U.K.	6,8	9,2	6,4	20,7
Belgium	12,3	6,1	4,8	5,5
France	10,7	4,2	2,4	3,8
Germany	6,1	4,5	3,7	7,0
Greece	6,0	8,6	11,3	20,2
Italy	1,4	1,5	7,1	6,2
Netherlands	16,1	14,2	4,6	11,7
Portugal	0,7	1,7	20,1	15,7
Spain	2,8	4,2	3,9	3,8
Sweden	10,8	7,9	1,9	4,2
Czech R.	6,0	3,0	1,7	12,0
Hungary	0,8	0,8	3,4	19,1
Poland	4,1	5,7	4,1	16,5
Turkey	1,9	4,6	5,8	10,4

	Composition 2000		
	Low schooling	High schooling	Total
U.S.	48,7	51,3	100,0
Canada	48,5	51,5	100,0
Australia	66,0	34,0	100,0
U.K.	80,2	19,8	100,0
Belgium	72,6	27,5	100,0
Portugal	76,1	23,9	100,0
Germany	74,5	25,5	100,0
Greece	84,8	15,2	100,0
Italy	82,0	18,0	100,0
Netherlands	78,0	22,0	100,0
Portugal	87,2	12,8	100,0
Spain	84,8	15,2	100,0
Sweden	72,5	27,5	100,0

Or did we make a mistake in calculating the intensity of highly educated?

- What about illegal immigrants? We will use some estimates

- What about downgrading of skills and lower quality of schooling? We will consider a correction based on relative test scores (from Canada) and one from relative wages (in the US)

Basic results: median parameter values

1a. Impact on average wages of non-movers

1c. Impact on wages of less educated non-movers

Western Europe

12

8

4

0

-4

U.S. | Canada | Australia | U.K. | Belgium | France | Germany | Greece | Italy | Netherl. | Portugal | Spain | Sweden | Czech R. | Hungary | Poland | Argentina | Turkey | Mexico | Singapore | South Af.

········· Immigration — — — Emigration ———— Net immigration
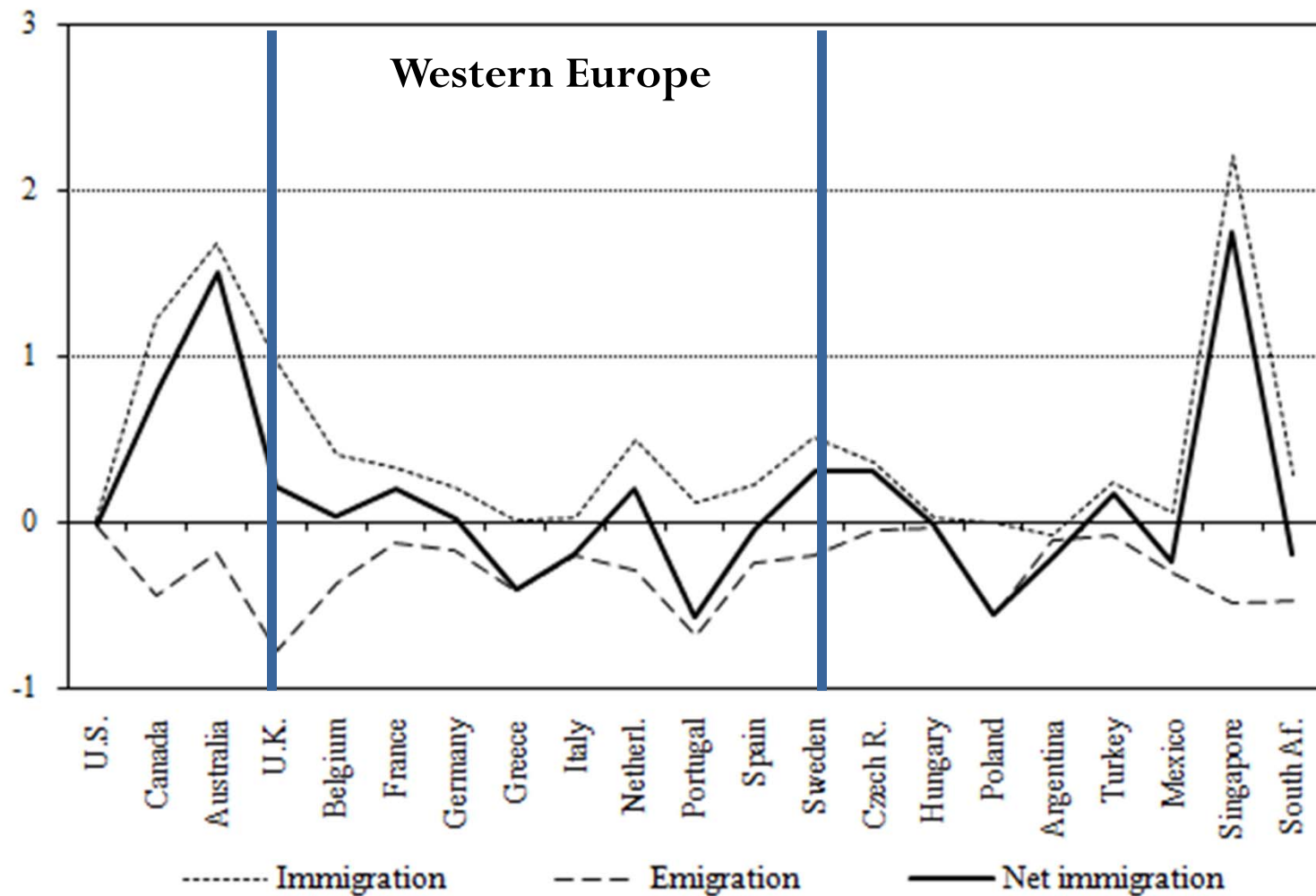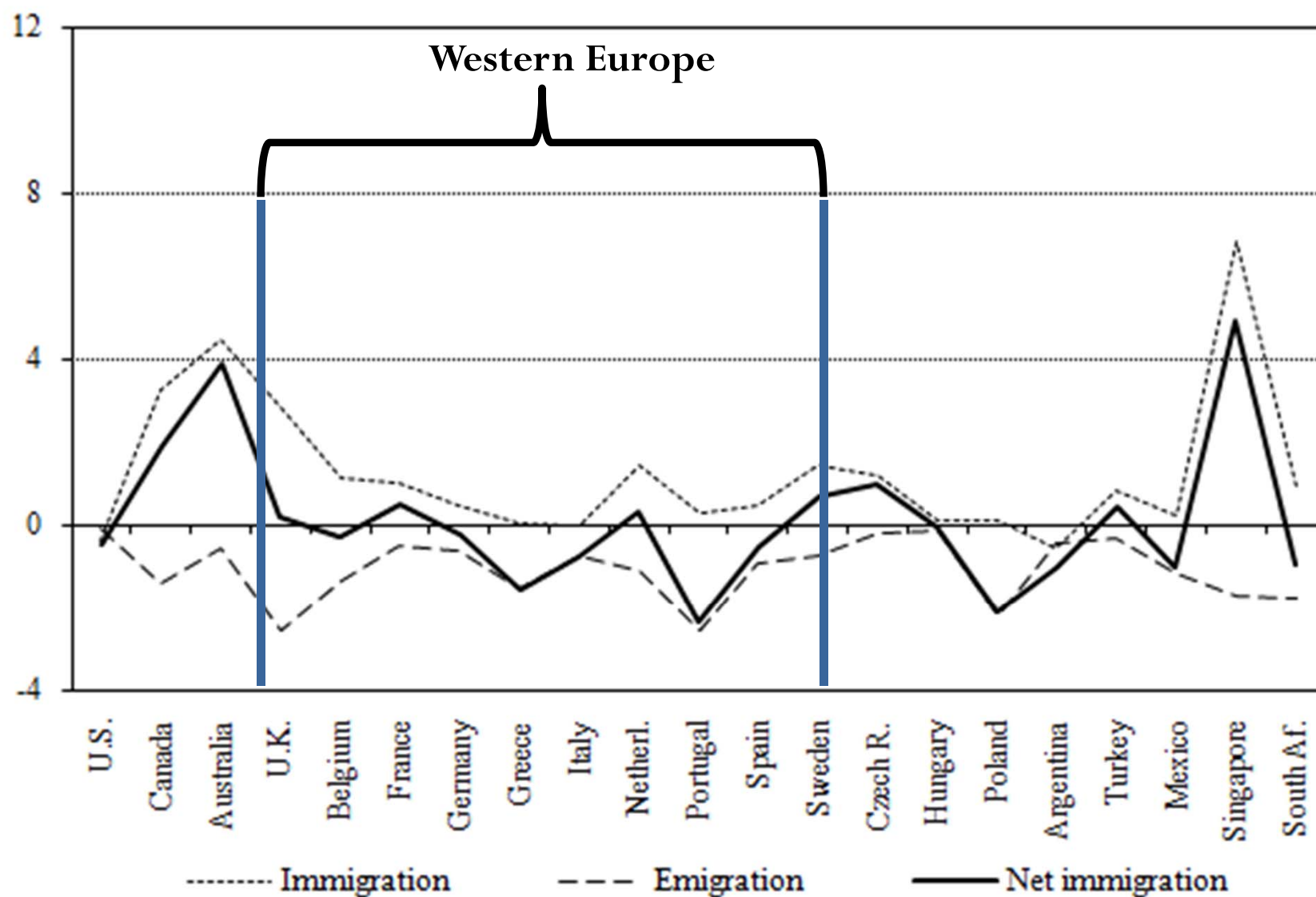
1b. Impact on wages of highly educated non movers

Western Europe
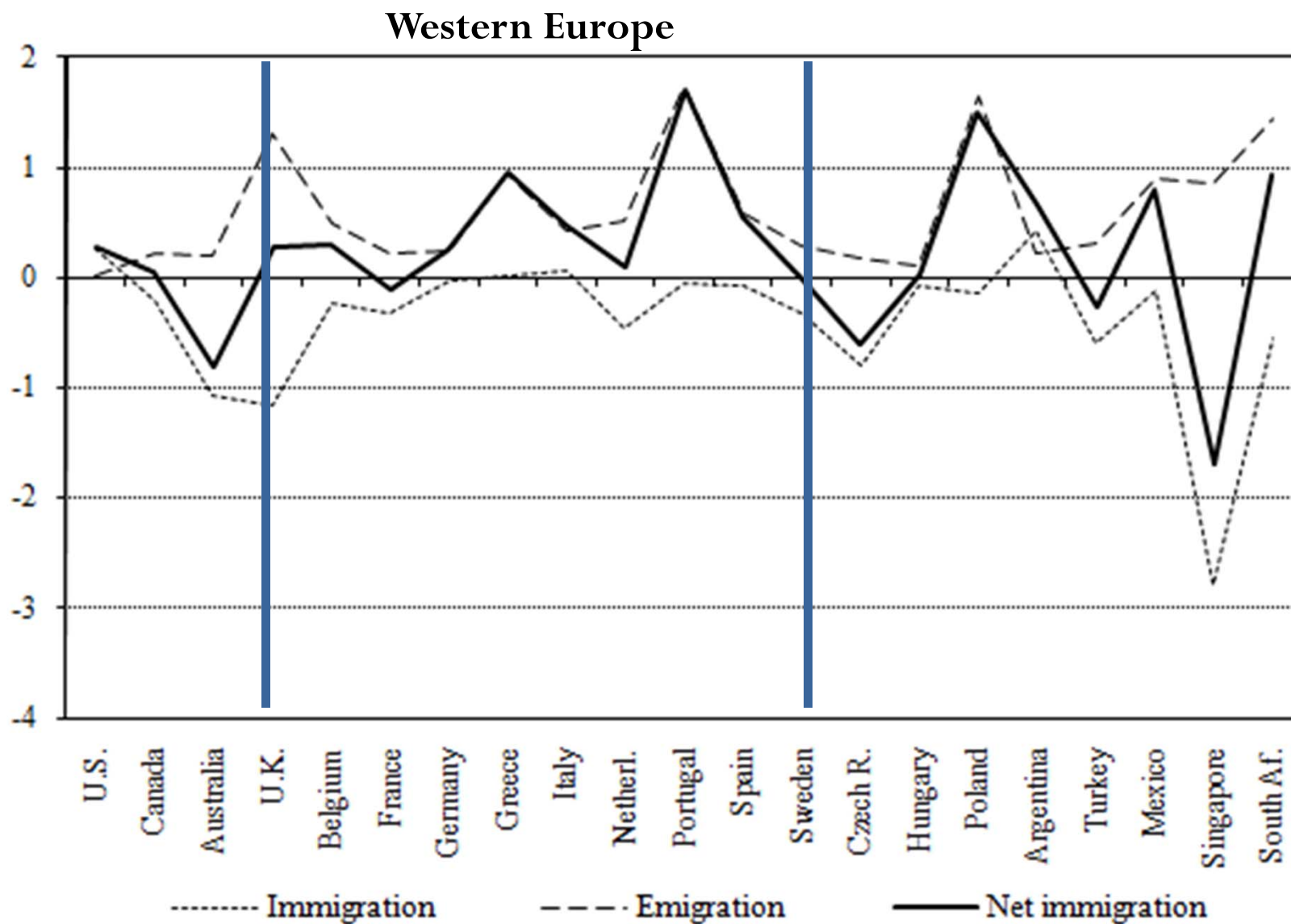
Robustness: parameter σ_q

2a. Impact on average wages of
non-movers
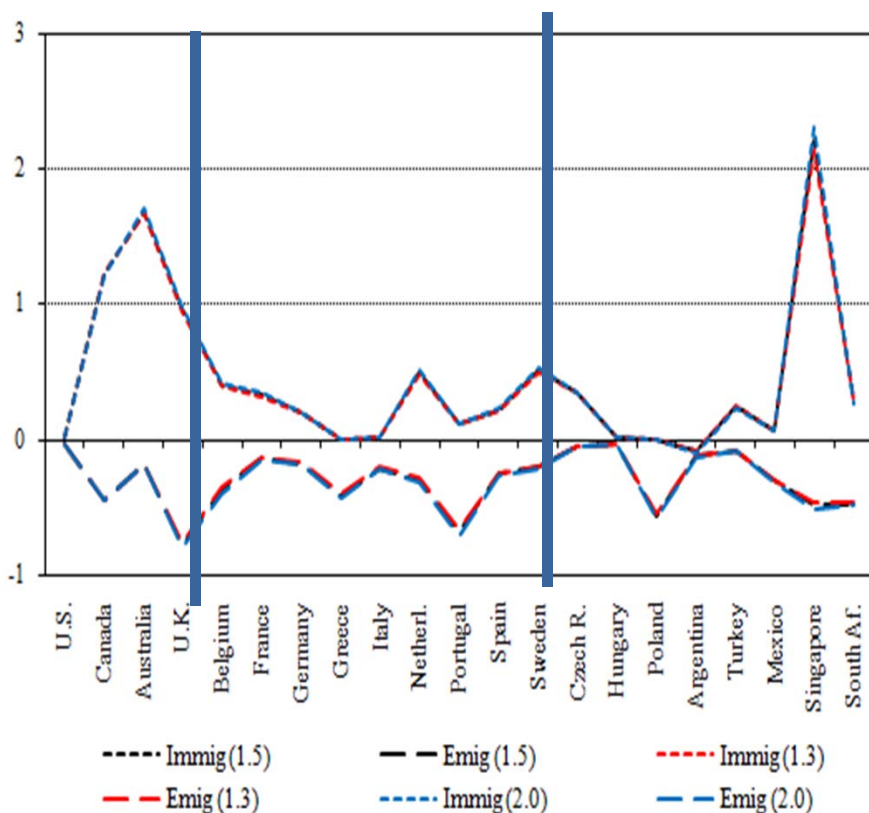
2c Impact on wages of less educated
non movers
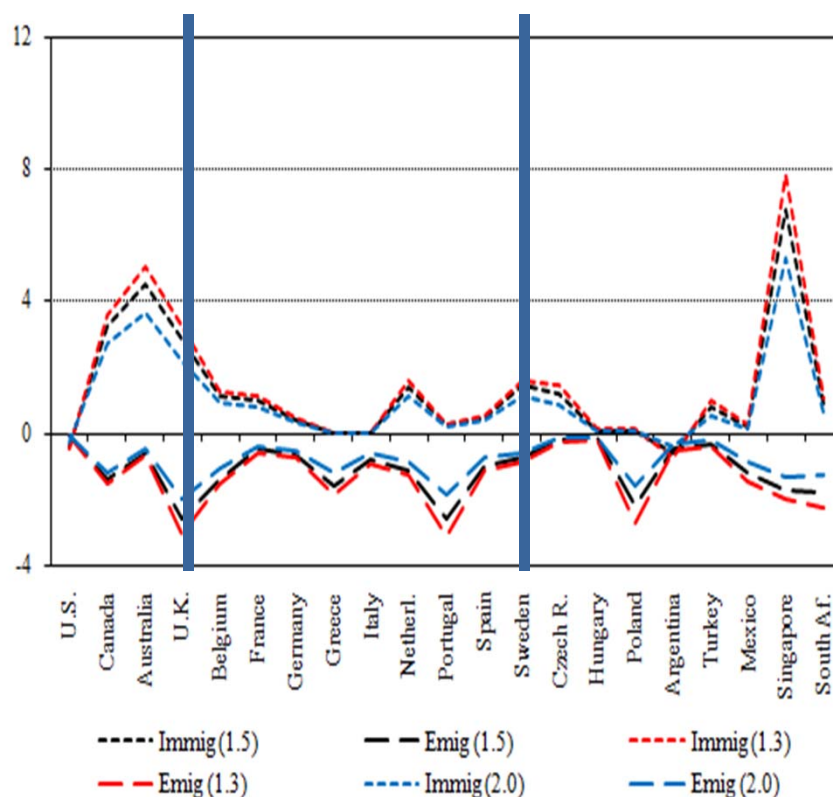
Robustness: parameter σ_l

3a. Impact on average Wages of non-movers
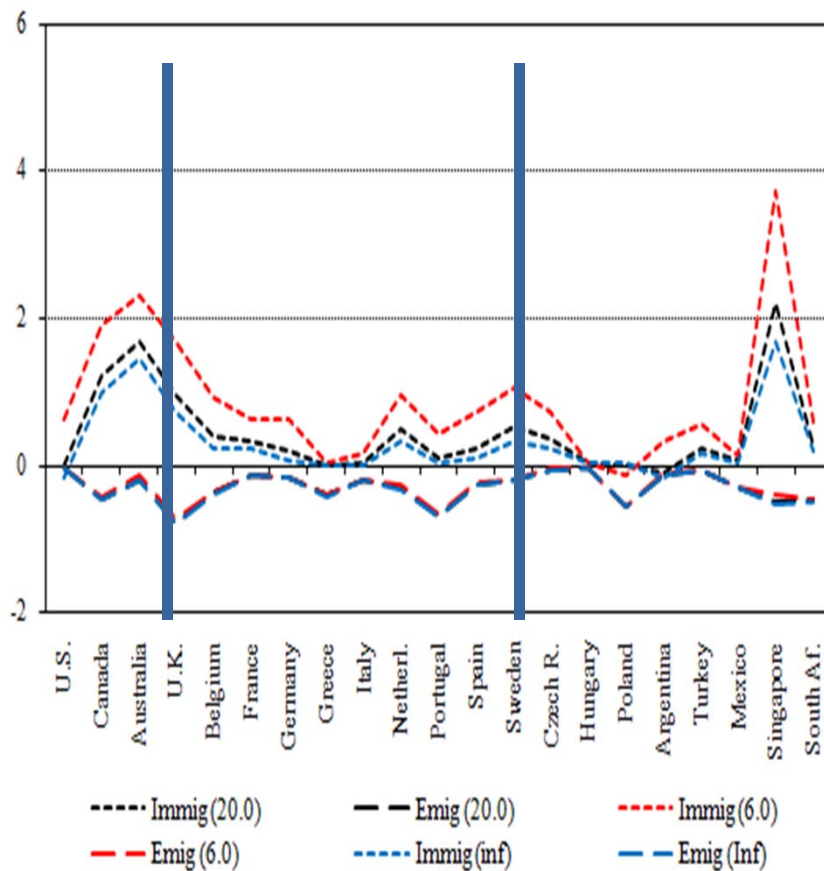
3c. Impact on Wages of less educated non-movers
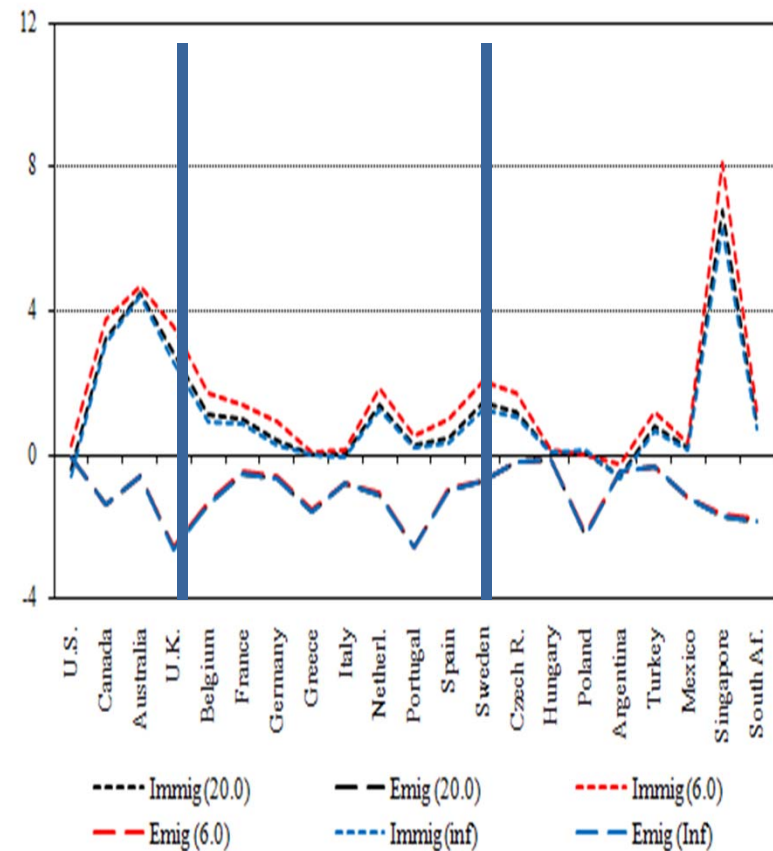
Robustness: parameter λ

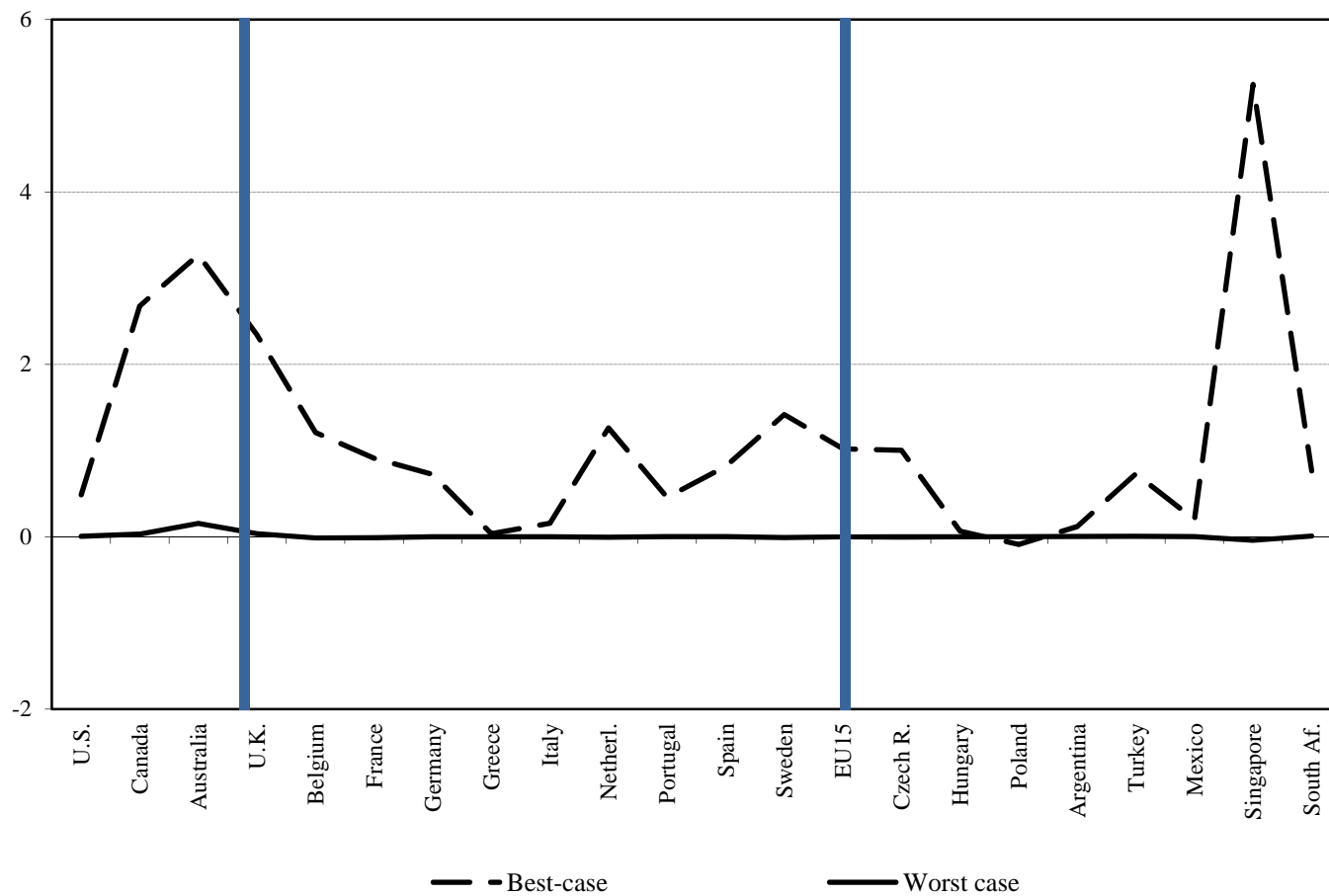4a. Impact on average
Wages of non-movers
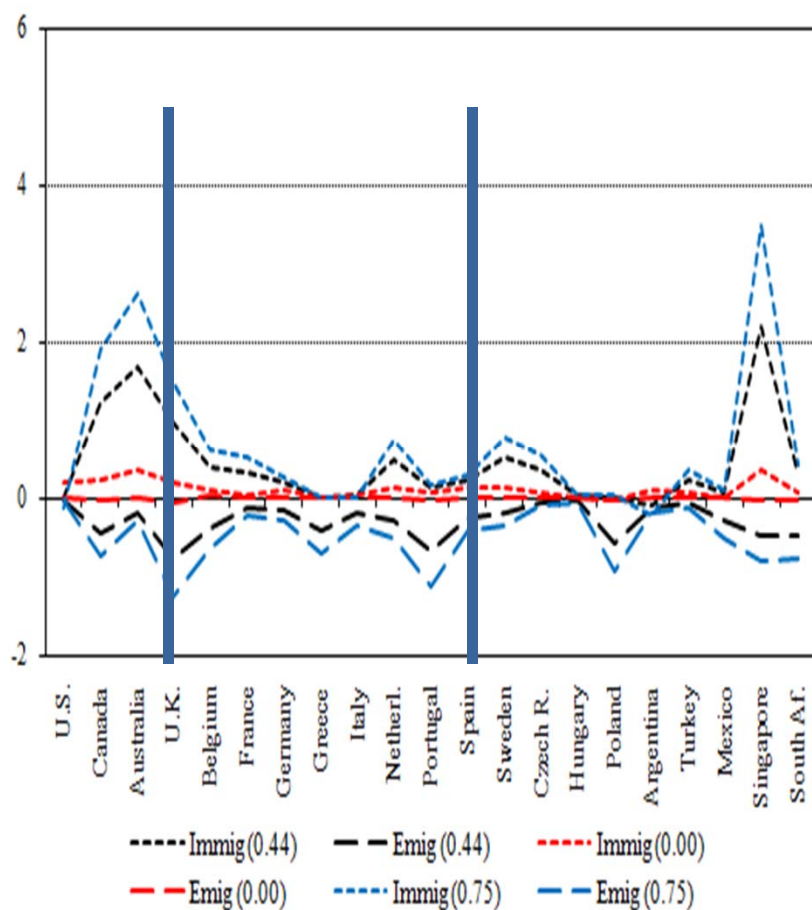
4c Impact on Wages of less
educated non-movers
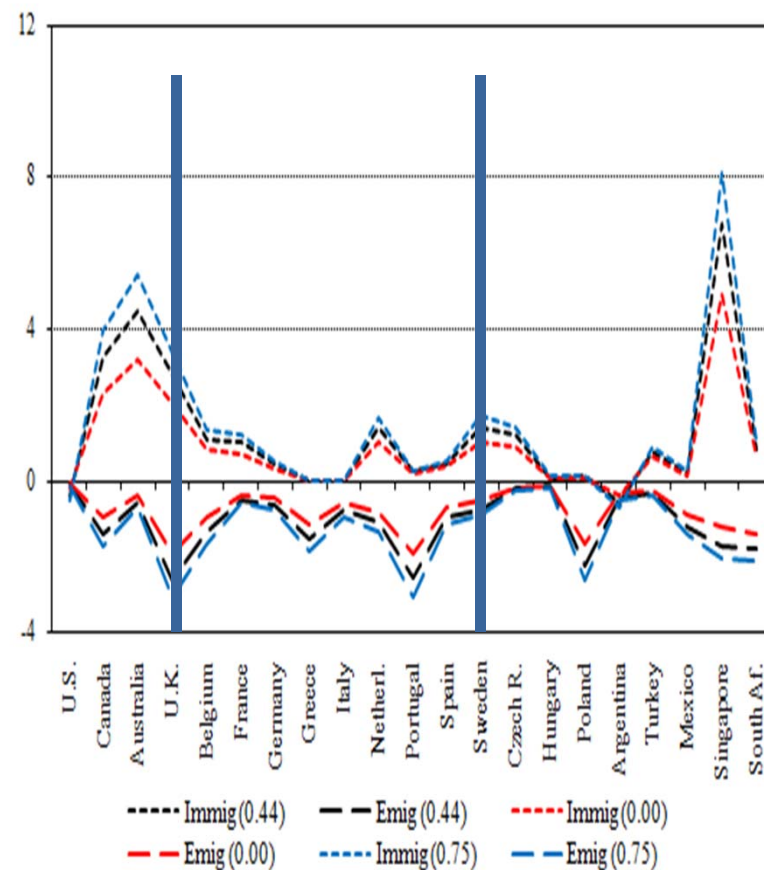
Best Case and Worst-Case scenario on Average wages: Immigration

Best Case and Worst-Case scenario on Average wages: Emigration
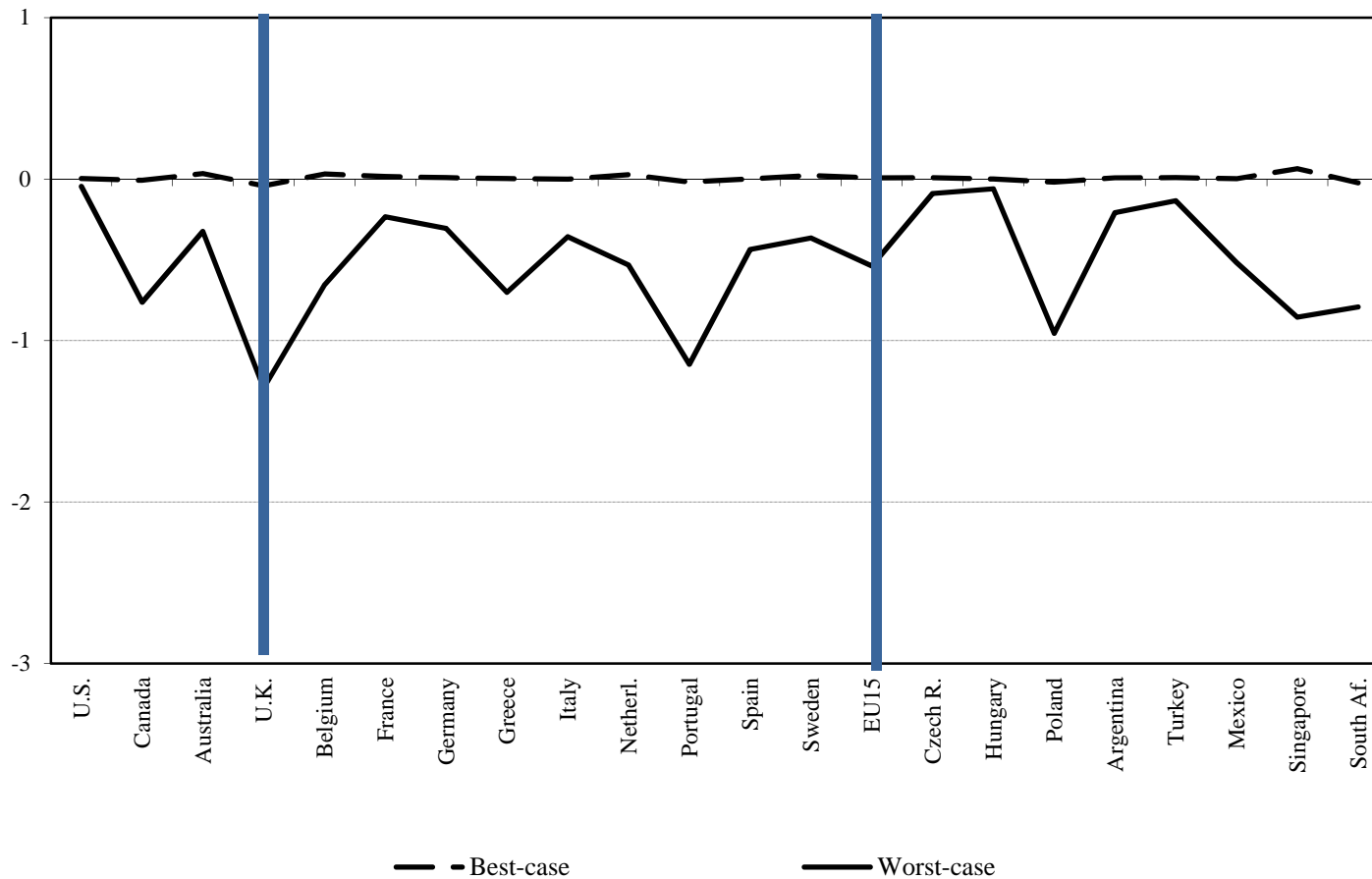
Extensions

- Accounting for undocumented migrants:

- HWWI database (Kovacheva and Vogel, 2009)

- Variants: Estimates of lower/upper-bounds for illegals as % of foreigners as of early 2000's

- Belgium (11-18%), France (9-15%), Germany (14-20%), Greece (42-63%), Italy (53-75%), Netherlands (11-26%), Portugal (18-89%), Spain (8-29%), Sweden (1.7-2.5%), and the U.K. (11-21%)

- Assume that ALL Undocumented migrants are low-skilled

Figure 6
Extension: Including undocumented immigrants, Western European Countries
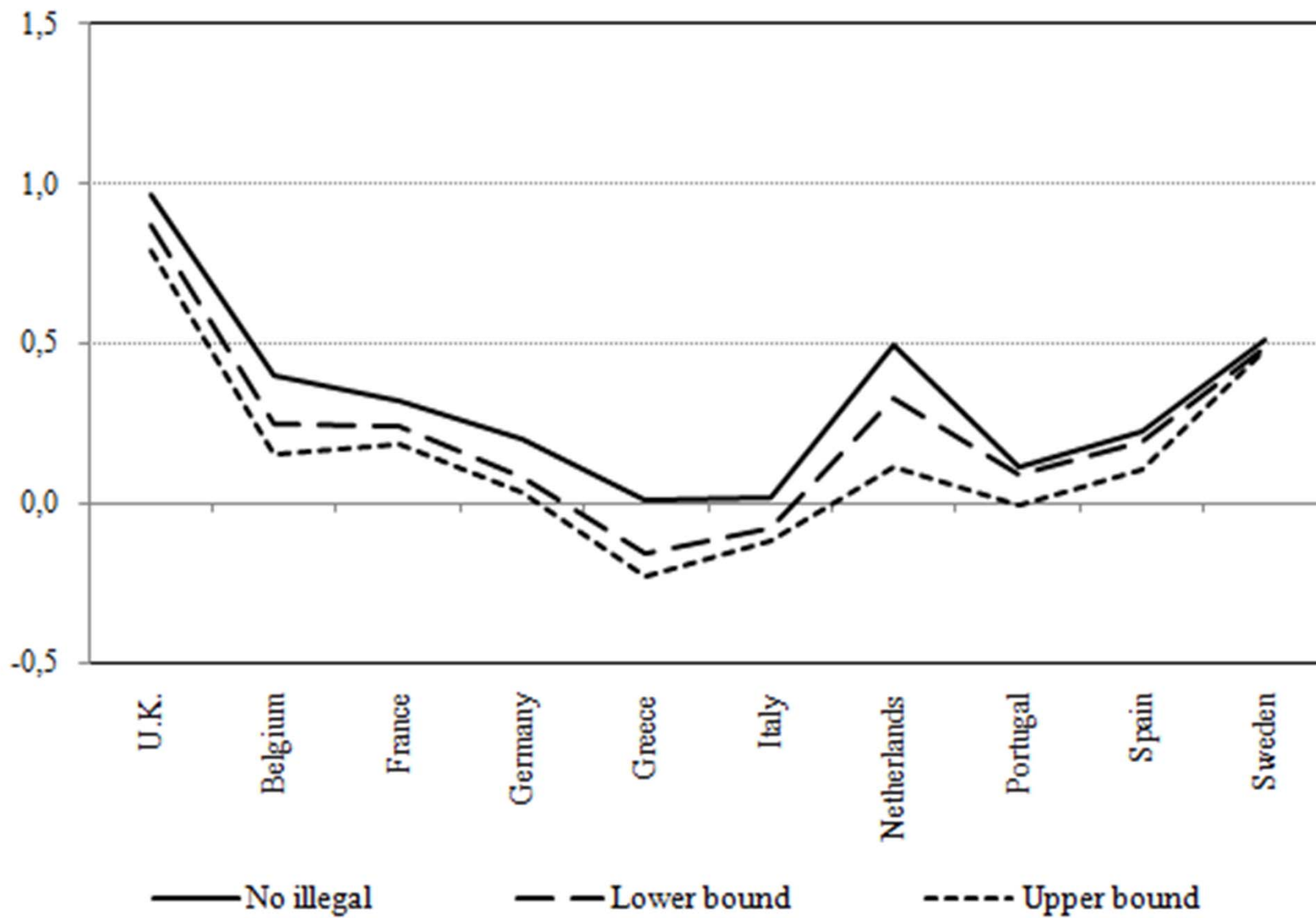
Accounting for Skill "quality"

- Downgrading the value of education obtained in poor countries
- Measure of proficiency of high-skill migrants to Canada (based on standardized test in numeracy, literacy, problem solving)
- Variants: Canadian adjustment from Coulombe and Tremblay (2009). Use a linear skill conversion or a quadratic one.

- Adjust high educated as a combination of high and low educated.
- E.g. a high-skilled from Angola = 0.73 high skilled Canadian and 0.27 unskilled .

Figure 7
Extension: Effects of Immigration Adjusting for Education Quality
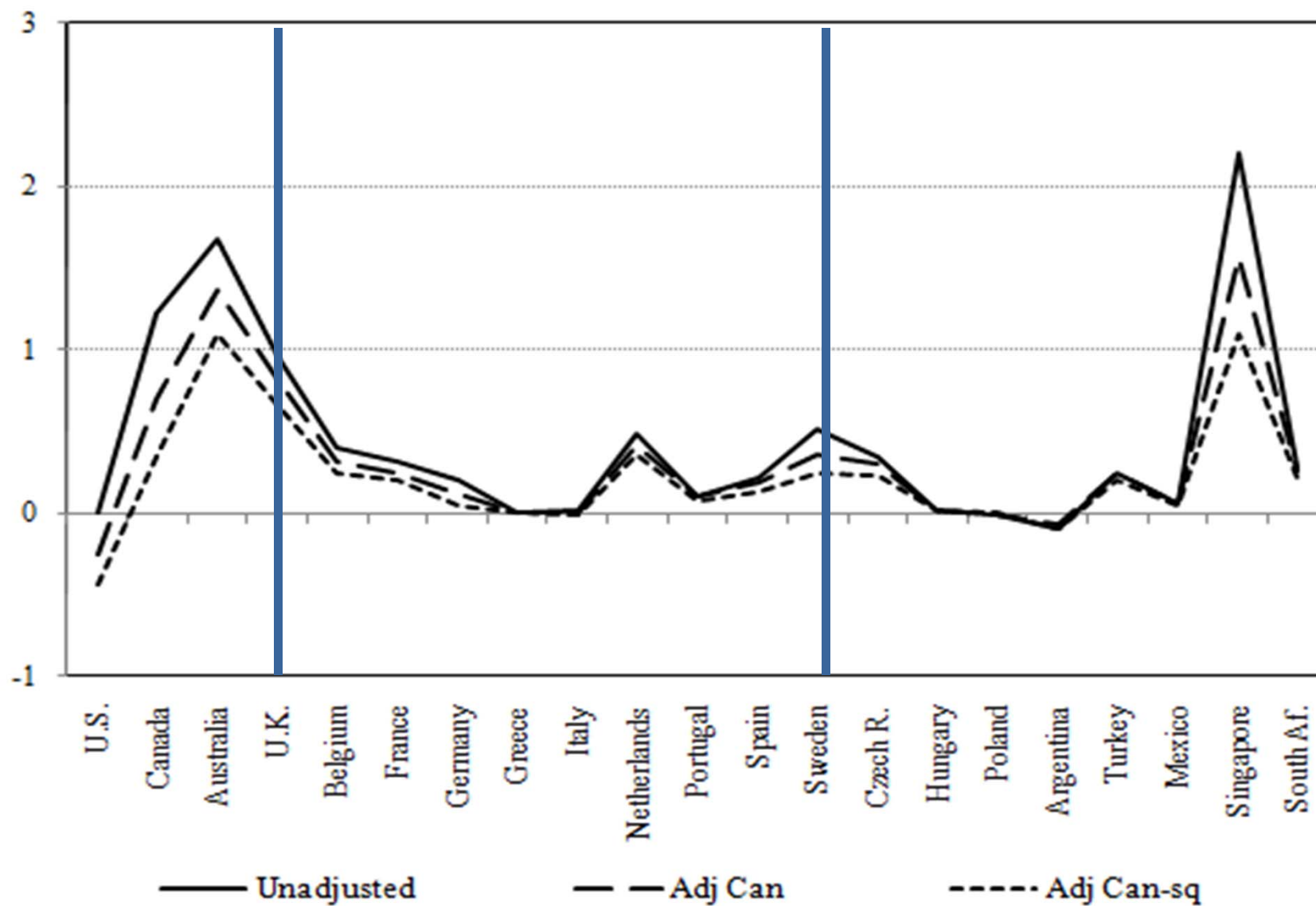
Crowding or density externality?

- The simple increase in crowding may have a negative productivity effect if there is a fixed factor (land) or may be positive external effect if there is a density externality (a' la Ciccone and Hall 1996).

- Lowest elasticity estimated of productivity to density -0.03 , highest: 0.06

Figure 8
Extension: Effects of Immigration including density/crowding
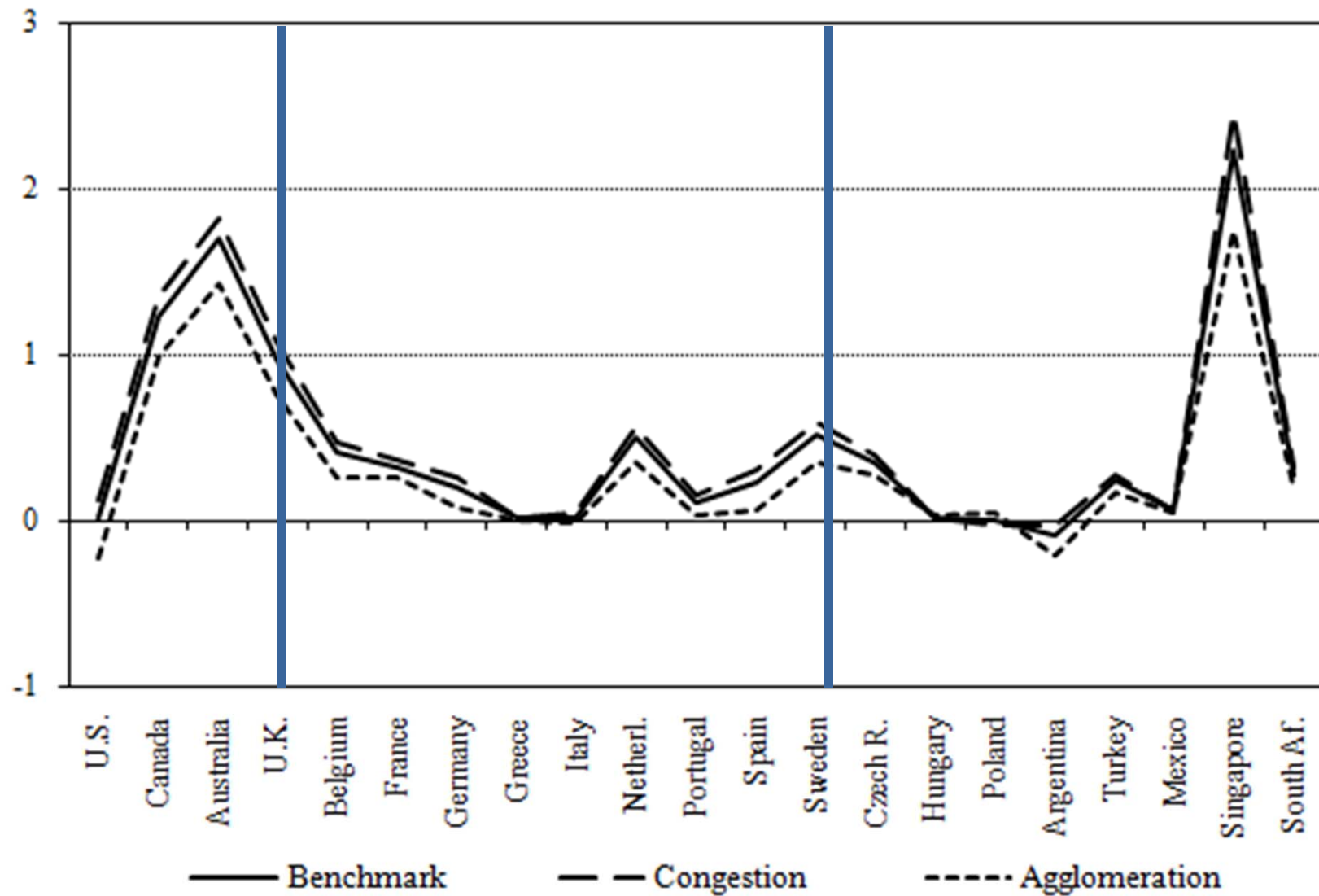
Conclusions and Thoughts

- Labor market popular view: intl. migration hurts the EU economy on two counts
  - Immigration hurts national wages (by crowding, diluting skills)
  - It mostly hurts less educated ones (competition)

- The most likely results supported by this paper:
  - At the recent level and types of immigration there are gains for natives, especially low skilled. Gains are not large but losses are very unlikely.
  - Emigration from some European countries (mostly high skilled) is costly for non-movers, especially low educated

Are there economic reasons to reduce immigration?

- Not in an average wage sense.
- Not in a distributional sense.

- Curbing emigration of educated Europeans could be important, at least for some countries if not for EU as a whole

  - Economically more important than combatting immigration
  - Management of emigration problem can be improved, if there is freedom of moving there should be more freedom of immigration, besides freedom of emigration.

Further Questions

- How did this change in the 2000's? Certainly for some countries (Italy and Spain) immigration increased much, but the skill composition of immigrants relative to natives is not clear.

- Why do countries of origin not care at all about their emigrants?

- Increased international mobility would be disproportionately for highly educated. Would a more open attitude towards immigrants in general attract also highly educated?