High-Skilled Migration and Imperfect Labor Markets: Cross-Country Evidence from Europe

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Introduction

- High-skilled migration has substantially increased in Europe during the last decade, particularly in the UK, Germany and Scandinavia, slightly less so in Italy and Spain
- Although high-skilled immigration is much more popular than less-skilled migration, there are widespread concerns that it might increase unemployment and reduce wages of natives
- This paper addresses the impact of high-skilled migration on wages and employment in a setting with imperfect labor markets drawing on Brücker *et al*. (*EER* 2014)
- It applies a cross-sectional approach assuming that institutions of the labor market and the welfare state affect the way how wages and employment respond to labor supply changes through immigration

Three different institutional settings

- This paper focuses on three countries – Denmark, Germany and the UK – featuring different institutions of the labor market and the welfare state:
  - The "Flexicurity model" (DK): Moderate employment protection, extremely high union density, coverage of collective wage contracts and unemployment benefits, intermediate levels of product market regulation, but high trade exposure
  - The "Continental European model" (DE): High employment protection, low union density but high collective bargaining coverage, relatively high unemployment benefits, high product market regulation, but high trade exposure
  - The "Anglo-Saxonian model" (UK): Low employment protection, moderate union density and low collective bargaining coverage, relatively low unemployment benefits, low product market regulation, but low trade exposure ▸ Institutional Indicators

State of research

- Since the 1980s, a large empirical literature examines wage and employment effects of immigration using the spatial variance of immigrant share for identification
  - Partial correlation models (e.g. Card *ILRR* 1990, Hunt *ILRR* 1992, Pischke/Velling *RES* 1997)
  - 'Structural models' deriving wage equations from CES- or Translog production functions (Grossmann JPE 1982)
- New generation of models using national variance across labor market cells for identification (Borjas *QJE* 2003, D'Amuri *et al.*, *EEA* 2010; Ottaviano/Peri *JEEA* 2012, Manacorda *et al. JEEA* 2012)
- Most structural models either ignore unemployment or assume that labor supply is inelastic
- Few exceptions consider wage and employment response to migration simultaneously in a joint framework
(Bentolila *et al. EER* 2010, Brücker *et al. EER* 2014, Brücker/Jahn *ScJE* 2011, Felbermayr *et al. RWE* 2010)

Sketch of the theoretical approach

- The study is based on a 'wage-setting' framework in the spirit of Layard *et al.* (2005) which assumes that wages respond imperfectly to changes in the unemployment rate
- Replaces conventional labor supply curve by wage-setting curve and derives labor demand from production function based on right-to-manage assumption
- Micro foundations: collective bargaining, efficiency and fair wage models
- Institutions such as collective bargaining and other wage-setting mechanisms, employment protection, transfers to the unemployed and product market competition affect slope of wage-setting curves

Outline of the empirical framework

- The labor force is grouped by education, work experience, native and immigrant workers using micro data ▸ Data
- First, we estimate the wage-setting equations. Following Card (*JEL* 1995) we assume that wage-setting curves vary across education groups ▸ Wage-setting equations
- Assuming that firms adjust employment once wages are fixed, we then estimate a bundle of labor demand equations, which yield the elasticities of substitution between natives and immigrants, work experience- and education groups ▸ Labor demand equations
- We apply in all estimates an instrumental variable approach addressing the potential endogeneity of wages and employment
- This set of estimates parameters is used for the simulation of the wage and employment impact of high-skilled and other migration

Estimation results I: High variance of wage flexibility

- The elasticity of the wage with respect to the unemployment rate, and, hence, with respect to labor supply shocks, varies across countries and education groups
- At the aggregate level, the elasticity of the wage-setting curve is higher in the UK (-0.133) than in DK (-0.115) and DE (-0.116)
- In UK and DE, the elasticity of the wage-setting curve is substantially higher in the high-skilled segment compared to the less- and medium skilled one
- The converse is true in DK. This surprising result might be traced back to a high share of public sector employment and a high union density of the high-skilled there

▸ Estimates of the wage-setting equations

Estimation results II: Natives and immigrants are imperfect substitutes

- Our results confirm the findings of Ottaviano and Peri (*JEEA* 2012) that immigrants and natives are imperfect substitutes.
- This result is robust to a classification by occupation groups and to all specifications suggested by Borjas *et al.* (*JEEA* 2012)
- The elasticity of substitution between natives and immigrants is highest in DK, intermediate in the UK and very low in DE
- Note that a small elasticity of substitution between natives and immigrants implies that the effects of high-skilled migration are concentrated on a very small labor-market segment
- The elasticities of substitution across experience and education groups display no country-specific patterns and are similar to those found in other studies ▸ Estimates of the labor demand equation

Outline of simulations

- Based on the parameters we estimate a short-run and a long-run scenario:
  - Short-run: fixed physical capital stock.
  - Long-run: fixed capital-output ratio.
- A fixed capital-output-ratio implies that the capital stock adjusts completely to the increase in employment and that, hence, aggregate wages remain constant
- Our estimates suggest that immigration and other labor supply shocks have either no measurable effect on the capital-output-ratio or that these effects disappear in a small period of time supporting the stylized fact by Kaldor (1961)
- We simulate the increase of the labor force by 1 percent through (i) high-skilled immigration and (ii) immigration at the average skill-level of the migrant labor force

Simulation results: aggregate findings

- Following the elasticities of the wage-setting curve, the wage response to immigration is higher in the UK, the impact on unemployment higher in DK and DE ▸ Aggregate results
- In the long-term, high-skilled migration reduces unemployment in the UK (-0.3 percentage points) substantially, but increases it slightly in DE and DK (+0.1 percentage points)
- Compared to immigration at the average skill level of the labor force, high-skilled migration affects employment positively in the UK and DE, but negatively in DK as a consequence of the low wage-flexibility in the high-skilled segment there
- Note that the aggregate impact of high-skilled migration is larger in all directions, since a 1 percent immigration of high-skilled increases the productivity adjusted labor composite more than a 1 percent immigration of less-skilled workers

Simulation results: impact on labor market groups

- Not surprisingly, less- and medium skilled workers benefit from high-skilled immigration, while the converse is true for high-skilled workers ▸ Results by education
- In the long-term, native workers benefit more from high-skilled migration than from average-skilled migration in the UK, while migrant workers lose more in terms of wages, but less in terms of employment opportunities there ▸ Results by origin
- Native workers benefit more from average-skilled immigration than from high-skilled immigration in DE, while high-skilled immigration mitigates the adverse impact on migrant workers
- The impact of high-skilled compared to average-skilled immigration on native workers is ambiguous in DK, while migrant workers lose more in both in terms of wages and employment opportunities ▸ Total results

Summary of key findings

- Our findings suggest that the labor market effects of high-skilled and other immigration depend on the responsiveness of wages to labor supply shocks and the elasticities of substitution between different groups in the labor market
- The responsiveness of wages and the elasticities of substitution vary across countries reflecting institutional differences
- As our results for the UK compared to Denmark and Germany suggest, a higher wage flexibility increases the benefits from migration at least in the long-term
- As long as the wage flexibility is higher in the high-skilled segments of the labor market, high-skilled immigration can reduce unemployment or is at least more favorable than other migration
- This is the case in the UK and Germany, Denmark is most likely an exceptional case

Welfare gains from high-skilled migration

- Natives benefit from immigration (i) if the elasticity of substitution between immigrants and natives is low and (ii) if the skill-structure of immigrants differs from their one
- Thus, natives do not necessarily benefit from high-skilled immigration in the labor market, but can do so as in the case of the UK
- However, the total gains from immigration can be enhanced and inequality reduced by (i) labor market policies which tempt to increase wage flexibility, (ii) immigration policies which target immigrants in flexible labor market segments, and (iii) integration policies, which tempt to increase the elasticity of substitution between native and foreign workers
- High-skilled immigration increases welfare if the wage flexibility in the high-skilled segment is relatively high

Conclusions: Limitations of the analysis

- The results presented here refer to three European countries. Most likely, the results for the US will look relatively similar to the UK case, but evidence which addresses the wage and employment response in a similar setting with imperfect labor markets is missing
- The results presented here refer to only one channel by which high-skilled immigration can affect the labor market: a change in the factor proportions
- If high-skilled immigrants increases innovation and productivity, it lifts all boats and hence increases potential welfare gains further (e.g. Kerr/Lincoln *JLE* 2010, Kerr *et al*. *JLE* 2013, Peri *et al*., *JLE* 2013)
- The labor supply response of natives to high-skilled and other migration is not considered here (Borjas 2005; Borjas 2006; Peri *et al*. 2013), which may change the findings in one direction or another

Institutional indicators for DK, DE and UK

	DK	DE	UK
employment protection index	1.50	2.12	0.75
principal bargaining level	industry	industry	firm
collective bargaining coverage in %	82	63	35
union density in %	68	19	27
minimum wage	no	no	yes
net income of unemployed in % of net income of employed households			
single, no children	83	59	55
married, two children	88	80	77
product market regulation index	1.06	1.33	0.84
import penetration in % of GDP	54	44	31
export propensity in % of GDP	50	46	29
net migration 1990-2010 in % of pop.	4.3	8.6	4.2

Sources: OECD (2014), Venn (2009), WDI (2014).

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Three data sets

- Denmark: IDA dataset
  - Administrative data derived from social security and tax records
  - Covers entire labor force. Sample period: 1990-2006.
- Germany: IEB dataset
  - Administrative data derived from social security records and pension data
  - 5% sample. Sample period: 1992-2009.
- UK Labor force survey.
  - Quarterly survey data
  - 60,000 households. Sample period: 1993-2009.

Data: Problems and definitions

- Identification of foreigners
  - Danish and UK data define foreigners by foreign-born concept
  - German data define foreigners by nationality
    - Control for naturalizations by treating individuals as foreigners if they are reported as foreign nationals in first spell
    - Ethnic Germans ("Spätaussiedler") identified by programme participation
    - 2nd and 3rd generation immigrants remain in data if they possess foreign citizenship when joining the labor market
- Other issues
  - Males and females considered in all three data sets
  - Only full-time employed considered since German data do not provide hourly wage information
  - Censored wage information imputed in DE
  - Missing education information imputed in DE

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Wage-setting equations

- Wage setting equation:

$$\ln w_{ijt} = \beta_i \ln u_{ijt} + \lambda_{ij} \tau_{ijt} + \eta' \mathbf{X}_t + e_{ijt} \quad (1)$$

- We distinguish wage setting curves by education
- Macroeconomic controls: logs of real GDP, CPI, oil price index, export performance index
- Instrumental variable estimation strategy with two IVs:
  - **Industry mix:** measures how much of deviation in employment is caused by concentration of workers in fast/slow growing industries
  - **Export demand:** GDP of trading partners in OECD weighted by average export share 1980-2004.

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Labor demand equations

- Following Borjas (*QJE* 2003) and Ottaviano/Peri (*JEEA* 2012) we apply a nested CES-famework
- However, following the right-to-manage-assumption of our model, we treat employment as the endogenous and wages as the exogenous variable of the labor demand equations
- Three labor demand equations identify the elasticity of substitution between natives and immigrants, across experience groups and across education groups
- Again in contrast to the literature, we consider the potential endogeneity of our RHS variable by applying an instrumental variable estimation strategy
- We use the number of children, minimum wages and a government ideology index as IVs

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IV-Estimates of the wage-setting curve

Education level	Coeff.	SE	R^2	Obs.
		Denmark[a]		
All	-0.115***	(0.028)	0.98	192
Low	-0.121***	(0.035)	0.98	64
Medium	-0.093***	(0.017)	0.95	64
High	-0.065***	(0.021)	0.98	64
		Germany[b]		
All	-0.116***	(0.031)	0.99	192
Low	-0.047**	(0.021)	0.99	64
Medium	-0.116***	(0.038)	0.98	64
High	-0.167**	(0.078)	0.96	64
		UK[c]		
All	-0.133***	(0.030)	0.99	192
Low	-0.072**	(0.030)	0.99	64
Medium	-0.143***	(0.035)	0.99	64
High	-0.249***	(0.083)	0.97	64
Hansen-J-Statistics	0.93[a]	0.59[b]	0.74[c]	
Kleibergen-Pap rk-F-Statistics	6.65[a]	14.61[b]	36.91[c]	

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IV-Estimates of elasticities of substitution

	Denmark		Germany		United Kingdom	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
	Elasticity of substitution between natives and immigrants					
σ	-16.90***	(2.26)	-6.71***	(0.80)	-8.89***	(1.25)
	Elasticity of substitution across experience groups					
ρ	-7.74***	(1.64)	-5.57**	(2.47)	-7.15*	(4.09)
	Elasticity of substitution across education groups					
δ	-2.71***	(0.96)	-4.36***	(0.651)	-3.95***	(0.253)
	Quality of instruments					
	Elasticity of substitution between natives and immigrants					
Hansen *J*-stat. (p-value)	0.52		0.20		0.76	
Kleibergen Paap rk *F*-stat.	19.67***		20.59***		11.02***	
	Elasticity of substitution across experience groups					
Kleibergen-Pap rk Wald F-stat.	24.82***		30.59***		4.61	
	Elasticity of substitution across education groups					
Kleibergen Pap rK Wald F-stat.	118.56***		72.90***		51.02***	

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Simulation results: aggregate effects

Simulation of a 1 percent increase of the labor force through average-skilled- and high-skilled immigration

Wage: change in %, unemployment rate: in %-points

	Denmark				Germany				United Kingdom			
	wage		unempl. rate		wage		unempl. rate		wage		unempl. rate	
	aver.	high	aver..	high	aver.	high	aver.	high	aver.	high	aver.	high
short-run scenario												
All	**-0.16**	**-0.27**	**0.12**	**0.23**	**-0.16**	**-0.05**	**0.34**	**0.15**	**-0.27**	**-0.40**	**0.17**	**0.05**
long-run scenario												
All	–	–	**0.06**	**0.13**	–	–	**0.14**	**0.09**	–	–	**-0.08**	**-0.30**

Source: Own calculations based on Brücker *et al.* (EER 2014)

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Simulation results: effects by education groups

Simulation of a 1 percent increase of the labor force through average-skilled- and high-skilled immigration

Wage: change in %, unemployment rate: in %-points

	Denmark				Germany				United Kingdom			
	wage		unempl. rate		wage		unempl. rate		wage		unempl. rate	
	aver.	high	aver..	high	aver.	high	aver.	high	aver.	high	aver.	high
short-run scenario												
All	**-0.16**	**-0.27**	**0.12**	**0.23**	**-0.16**	**-0.05**	**0.34**	**0.15**	**-0.27**	**-0.40**	**0.17**	**0.05**
Ed-1	-0.10	0.03	0.16	-0.01	-0.23	0.00	1.38	0.03	-0.06	0.03	0.12	-0.05
Ed-2	-0.18	0.03	0.09	-0.01	-0.15	0.01	0.22	0.01	-0.31	0.04	0.23	-0.02
Ed-3	-0.32	-3.90	0.25	3.03	-0.21	-1.96	0.09	1.05	-0.51	-1.18	0.14	0.32
long-run scenario												
All	–	–	**0.06**	**0.13**	–	–	**0.14**	**0.09**	–	–	**-0.08**	**-0.30**
Ed-1	0.06	0.29	0.08	-0.15	-0.17	0.02	0.95	-0.11	0.15	0.34	-0.20	-0.56
Ed-2	-0.02	0.31	0.04	-0.09	0.01	0.04	0.04	-0.05	-0.01	0.47	0.06	-0.28
Ed-3	-0.17	-3.64	0.18	2.91	-0.01	-1.89	0.02	1.03	-0.18	-0.70	0.07	0.21

Source: Own calculations based on Brücker *et al.* (EER 2014)

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Simulation results: effects by natives and immigrants

Simulation of a 1 percent increase of the labor force through average-skilled- and high-skilled immigration

Wage: change in %, unemployment rate: in %-points

	Denmark				Germany				United Kingdom			
	wage		unempl. rate		wage		unempl. rate		wage		unempl. rate	
	aver.	high	aver..	high	aver.	high	aver.	high	aver.	high	aver.	high
short-run scenario												
All	-0.16	-0.27	0.12	0.23	-0.16	-0.05	0.34	0.15	-0.27	-0.40	0.17	0.05
Natives	-0.13	-0.20	0.05	0.15	-0.07	-0.02	0.09	0.07	-0.16	-0.23	0.07	0.00
Immigrants	-1.23	-2.40	1.27	1.57	-0.94	-0.29	2.20	0.82	-1.03	-1.52	-0.82	0.36
long-run scenario												
All	–	–	0.06	0.13	–	–	0.14	0.09	–	–	-0.08	-0.30
Natives	0.04	0.08	0.00	0.06	0.09	0.03	-0.10	0.01	0.11	0.16	-0.18	-0.35
Immigrants	-1.08	-2.14	1.10	1.29	-0.81	-0.25	1.91	0.72	-0.74	-1.10	0.59	0.03

Source: Own calculations based on Brücker *et al.* (EER 2014)

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Simulation of a 1 percent immigration shock: short-run

	Denmark				Germany				United Kingdom			
	wage		u-rate		wage		u-rate		wage		u-rate	
skill-level	aver.	high	aver.	high	aver.	high	aver.	high	aver.	high	aver.	high
	wage: change in %, unemployment rate: in %-points											
	total labor force											
All	**-0.16**	**-0.27**	**0.12**	**0.23**	**-0.16**	**-0.05**	**0.34**	**0.15**	**-0.27**	**-0.40**	**0.17**	**0.05**
Ed-1	-0.10	0.03	0.16	-0.01	-0.23	0.00	1.38	0.03	-0.06	0.03	0.12	-0.05
Ed-2	-0.18	0.03	0.09	-0.01	-0.15	0.01	0.22	0.01	-0.31	0.04	0.23	-0.02
Ed-3	-0.32	-3.90	0.25	3.03	-0.21	-1.96	0.09	1.05	-0.51	-1.18	0.14	0.32
	native labor force											
All	-0.13	-0.20	0.05	0.15	-0.07	-0.02	0.09	0.07	-0.16	-0.23	0.07	0.00
Ed-1	-0.08	0.03	0.05	-0.01	-0.04	0.00	0.28	0.03	-0.03	0.03	0.05	-0.05
Ed-2	-0.14	0.03	0.04	-0.01	-0.07	-0.01	0.08	0.01	-0.19	0.04	0.11	-0.02
Ed-3	-0.25	-3.01	0.16	1.96	-0.10	-0.64	0.04	0.38	-0.33	-0.78	0.07	0.15
	immigrant labor force											
All	-1.23	-2.40	1.27	1.57	-0.94	-0.29	2.20	0.82	-1.03	-1.52	-0.82	0.36
Ed-1	-1.12	0.03	1.30	-0.03	-0.60	-0.01	3.71	0.03	-0.67	0.03	1.64	-0.06
Ed-2	-1.25	0.03	1.18	-0.02	-1.06	-0.01	1.65	0.02	-0.97	0.04	0.78	-0.03
Ed-3	-1.37	-16.18	1.54	18.67	-1.28	-14.49	0.68	9.36	-1.17	-2.66	0.39	0.84

Simulation of a 1 percent immigration shock: long-run

	Denmark				Germany				United Kingdom			
	wage		u-rate		wage		u-rate		wage		u-rate	
skill-level	aver.	high	aver.	high	aver.	high	aver.	high	aver.	high	aver.	high
	wage: change in %, unemployment rate: in %-points											
	total labor force											
All	–	–	**0.06**	**0.13**	–	–	**0.14**	**0.09**	–	–	**-0.08**	**-0.30**
Ed-1	0.06	0.29	0.08	-0.15	-0.17	0.02	0.95	-0.11	0.15	0.34	-0.20	-0.56
Ed-2	-0.02	0.31	0.04	-0.09	0.01	0.04	0.04	-0.05	-0.01	0.47	0.06	-0.28
Ed-3	-0.17	-3.64	0.18	2.91	-0.01	-1.89	0.02	1.03	-0.18	-0.70	0.07	0.21
	native labor force											
All	0.04	0.08	0.00	0.06	0.09	0.03	-0.10	0.01	0.11	0.16	-0.18	-0.35
Ed-1	0.08	0.29	-0.02	-0.13	0.02	0.01	-0.15	-0.11	0.35	0.03	-0.29	-0.55
Ed-2	0.02	0.31	-0.01	-0.08	0.10	0.04	-0.10	-0.05	0.47	0.04	-0.05	-0.26
Ed-3	-0.09	-2.75	0.09	1.85	0.10	-0.57	-0.02	0.36	-0.30	-1.18	0.00	0.06
	immigrant labor force											
All	-1.08	-2.14	1.10	1.29	-0.81	-0.25	1.91	0.72	-0.74	-1.10	0.59	0.03
Ed-1	-0.97	0.27	1.11	-0.35	-0.53	0.02	3.28	-0.11	-0.48	0.31	1.18	-0.74
Ed-2	-1.09	0.29	1.03	-0.26	-0.90	0.04	1.41	-0.06	-0.69	0.45	0.56	-0.36
Ed-3	-1.22	-15.94	1.38	18.40	-1.09	-14.43	0.58	9.33	-0.84	-2.19	0.28	0.69

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