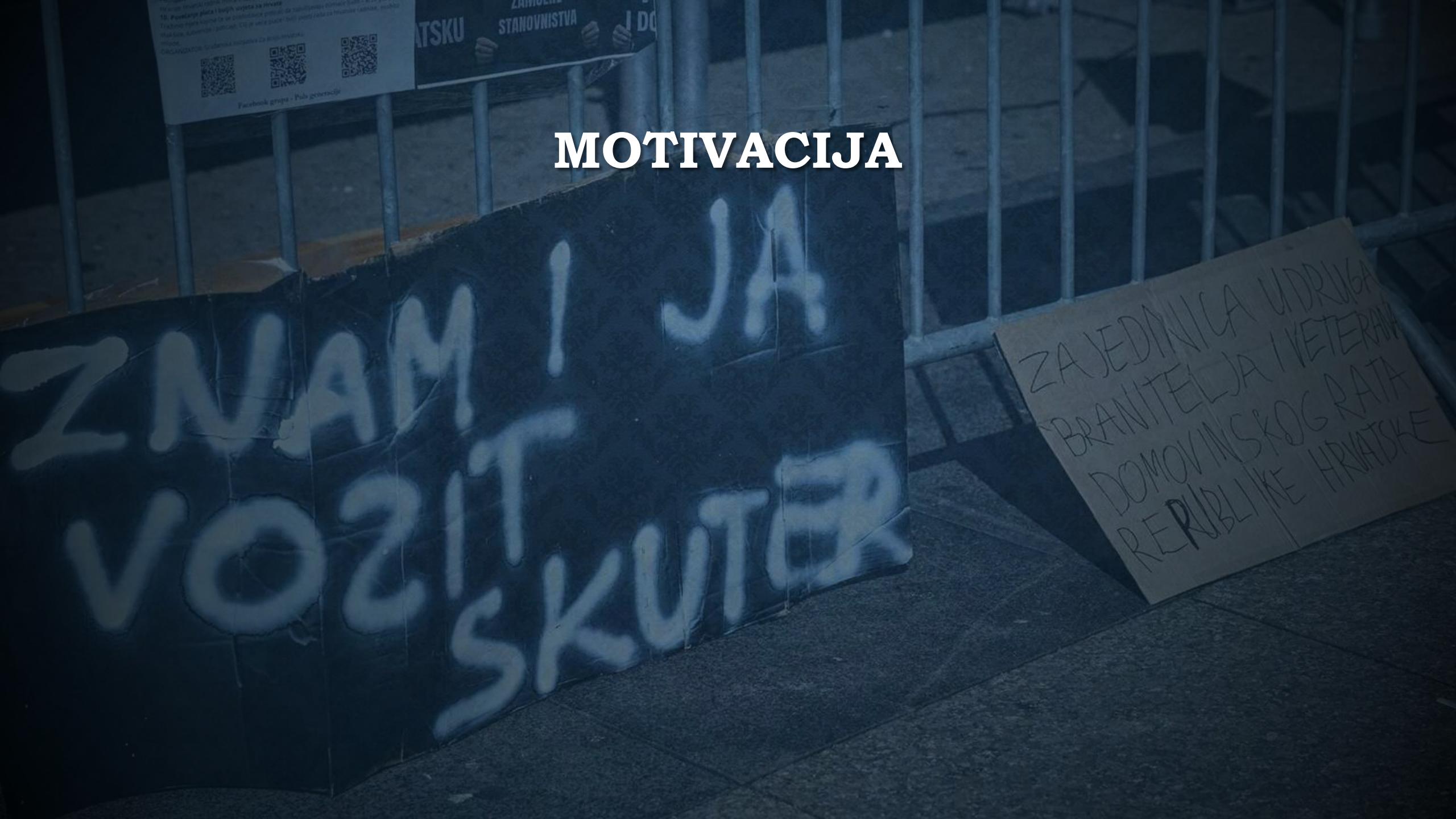


# **NATIVES SORTING AND THE IMPACT OF IMMIGRATION ON EUROPEAN LABOR MARKETS**

**Michał Burzyński**, Luxembourg Institute of Socio-Economic Research  
(LISER), Luxembourg

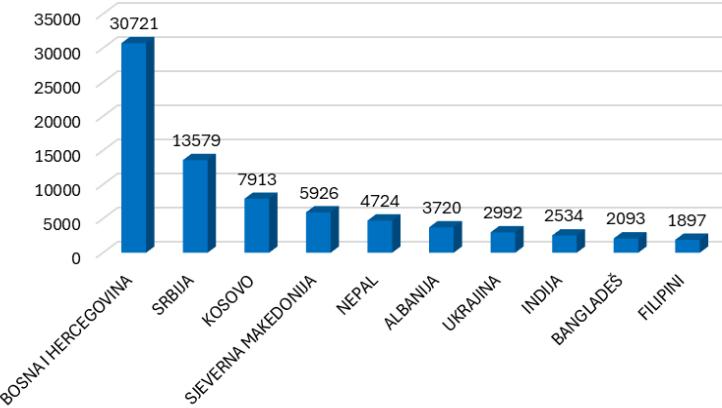
**Giovanni Peri**, University of California, USA

# MOTIVACIJA

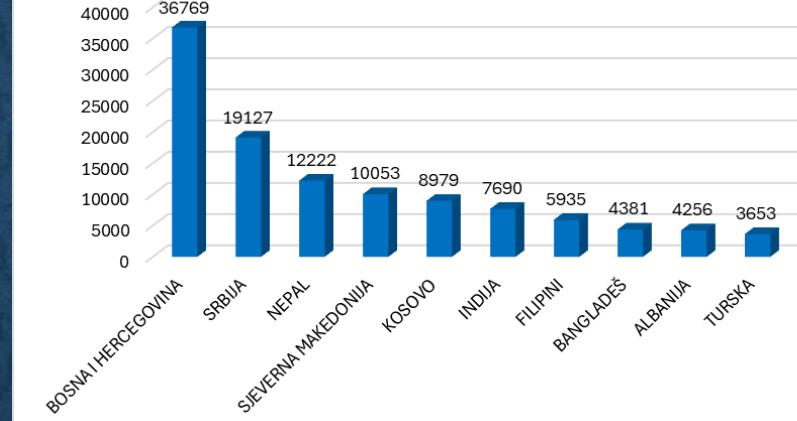


# IZDANE RADNE DOZVOLE PREMA DRŽAVLJANSTVU

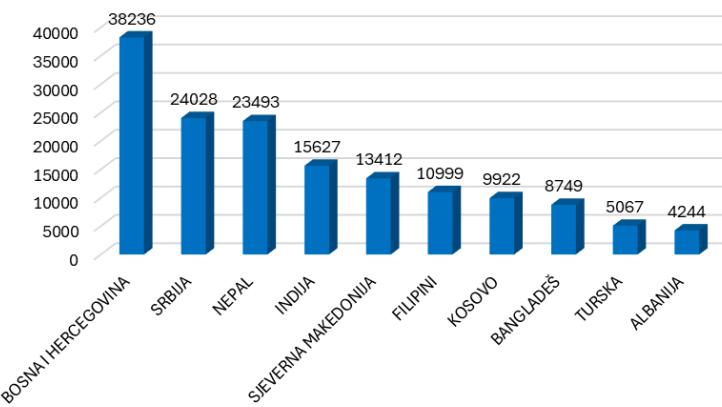
2021.



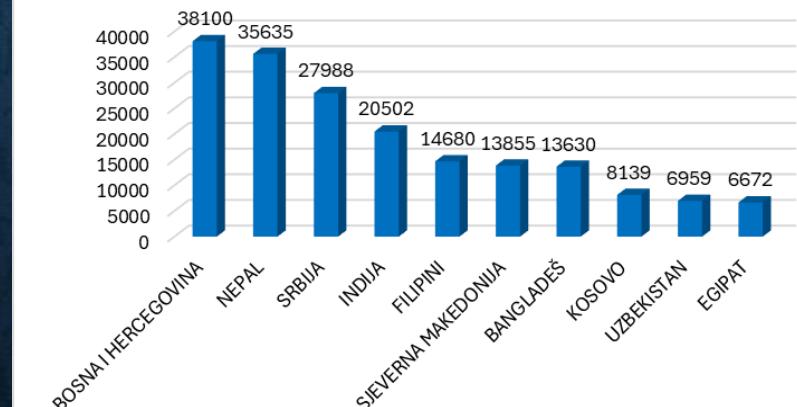
2022.



2023.



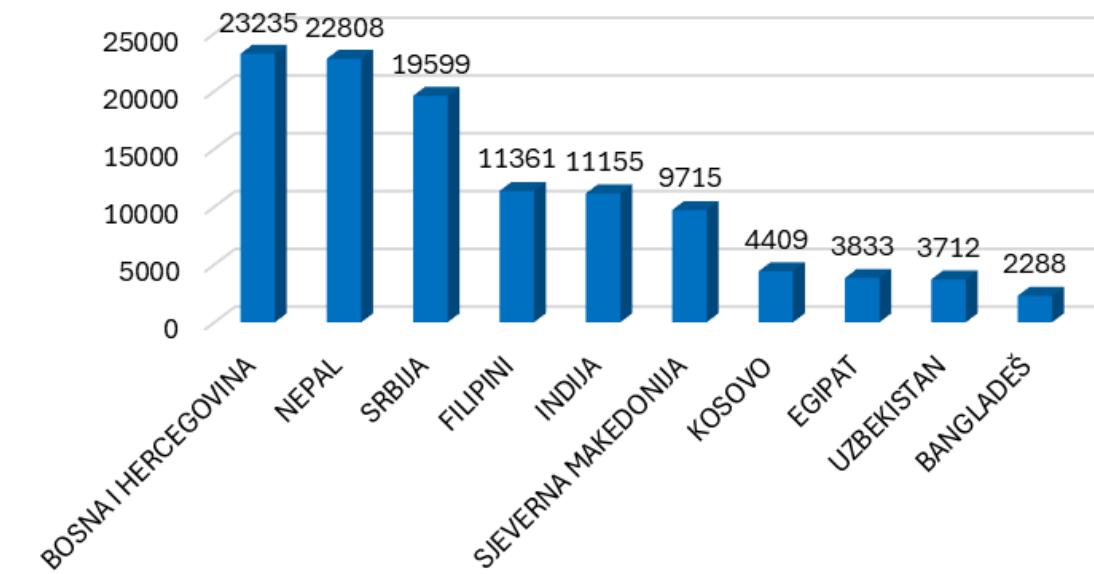
2024



Izvor: [MUP](#)

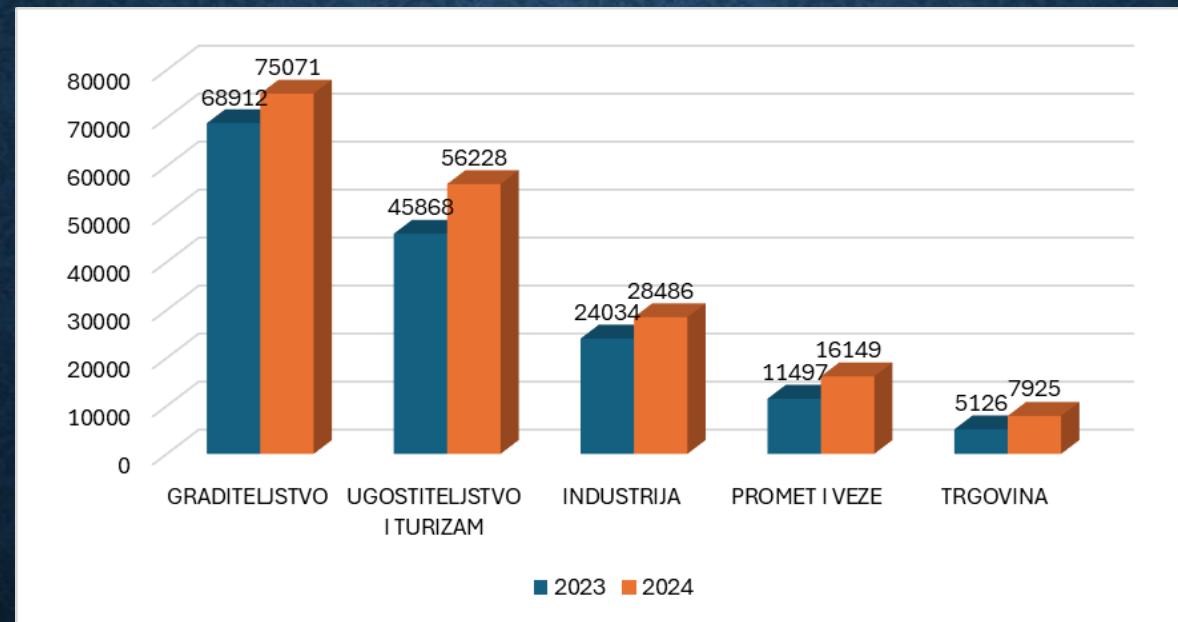
# IZDANE RADNE DOZVOLE PREMA DRŽAVLJANSTVU

31.8.2025.



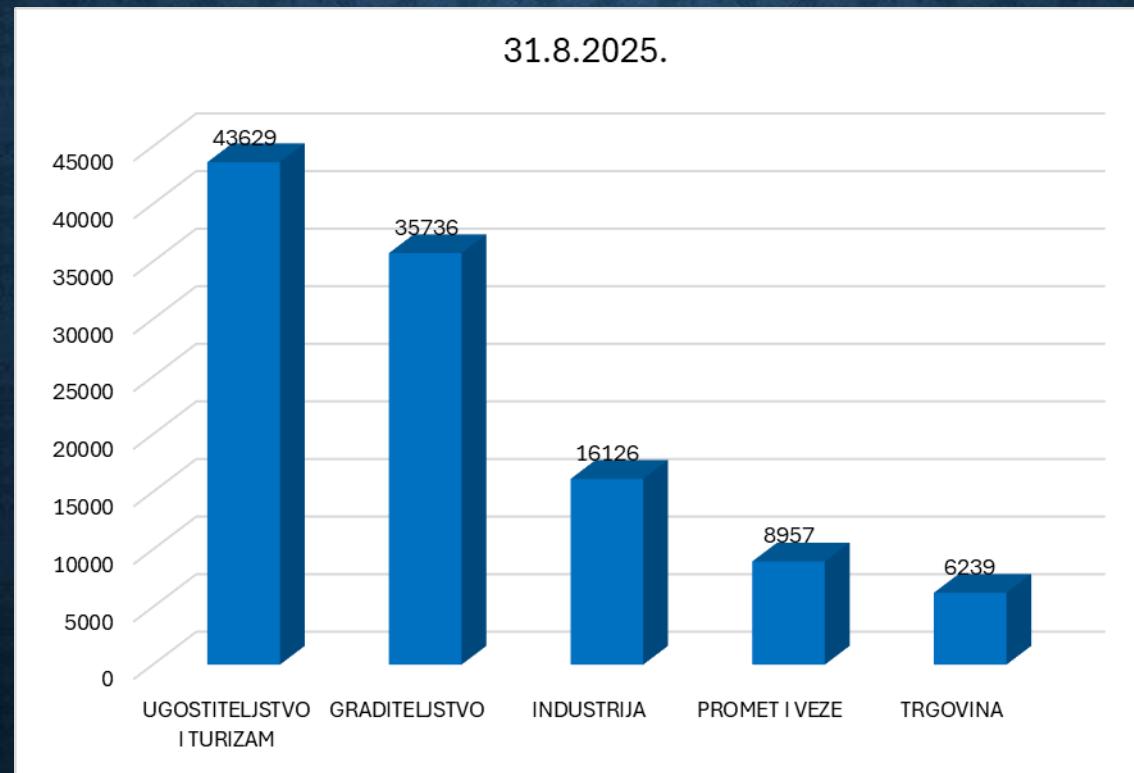
Izvor: [MUP](#)

# IZDANE RADNE DOZVOLE PREMA DJELATNOSTIMA, TOP 5



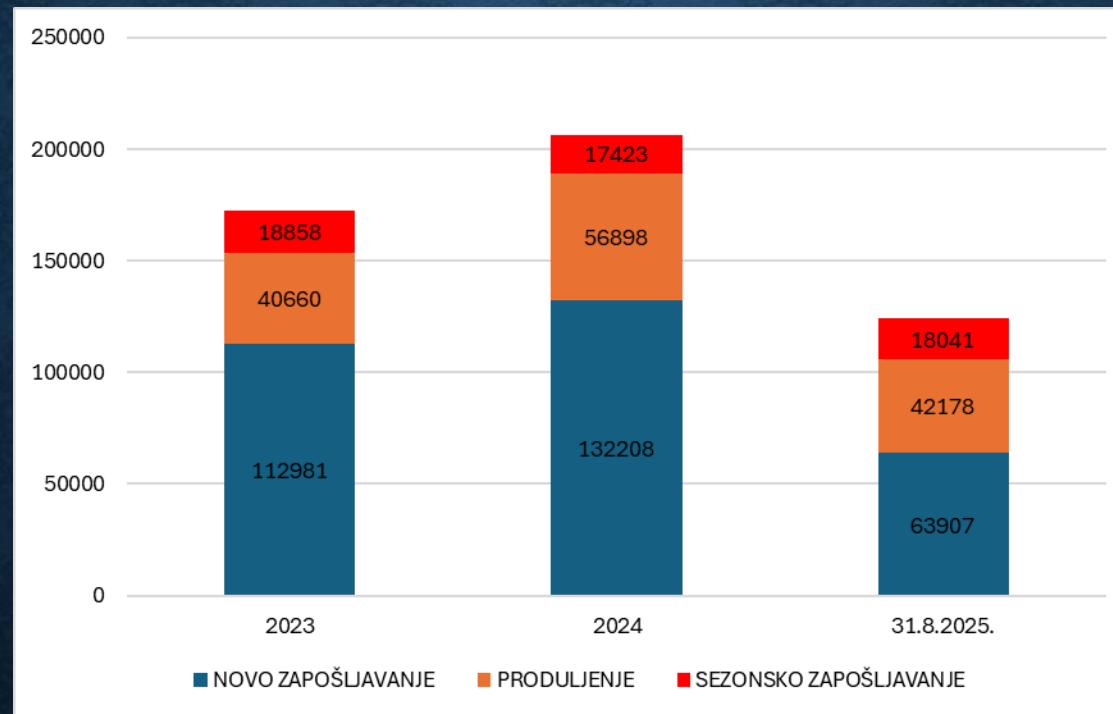
Izvor: [MUP](#)

# IZDANE RADNE DOZVOLE PREMA DJELATNOSTIMA, TOP 5

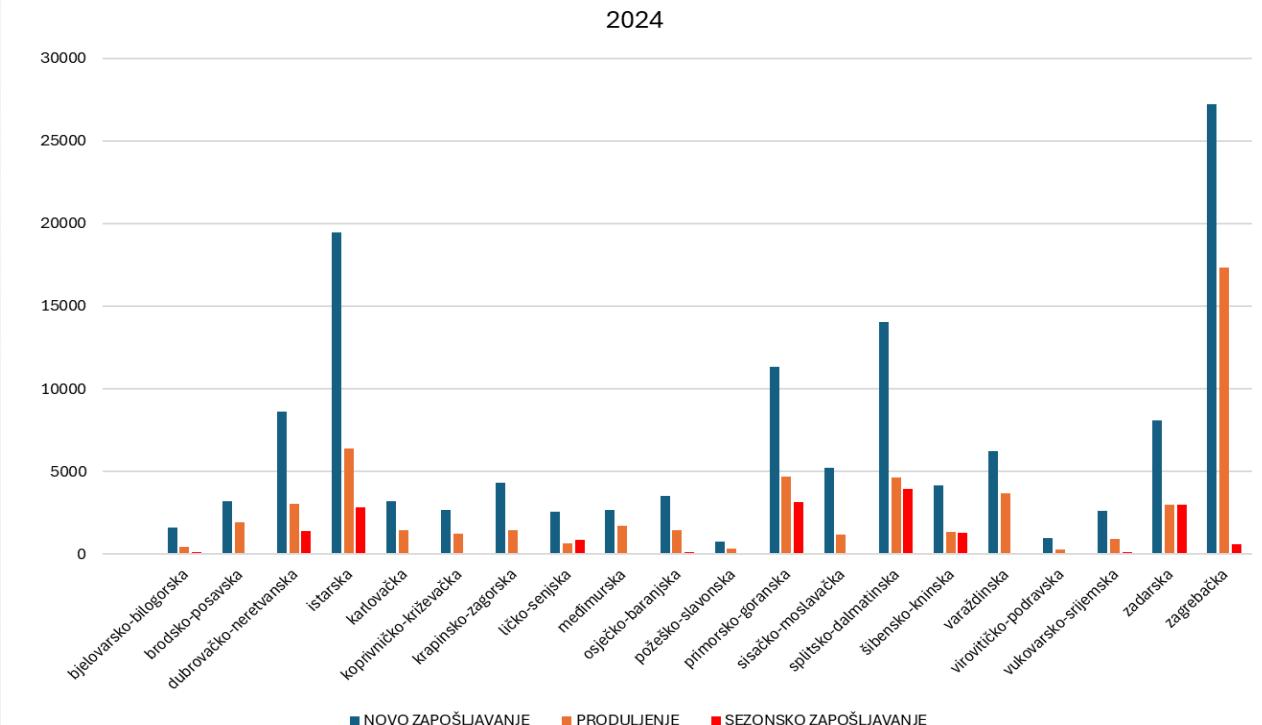
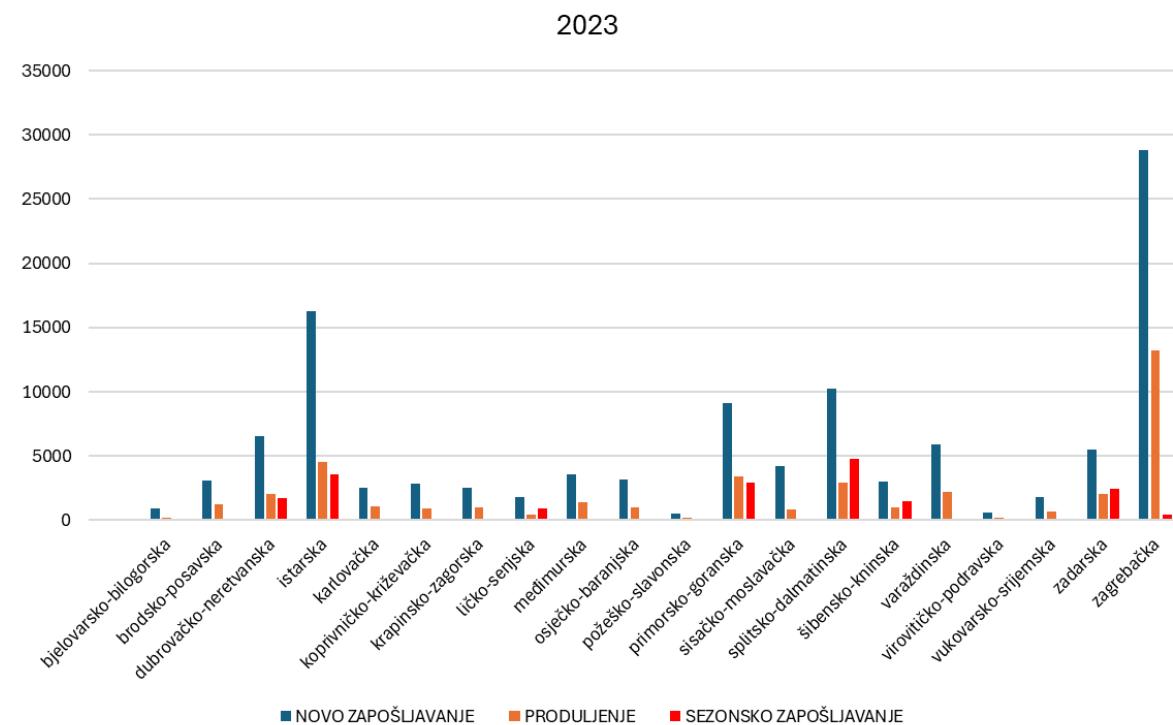


Izvor: [MUP](#)

# KATEGORIJE RADNIH DOZVOLA

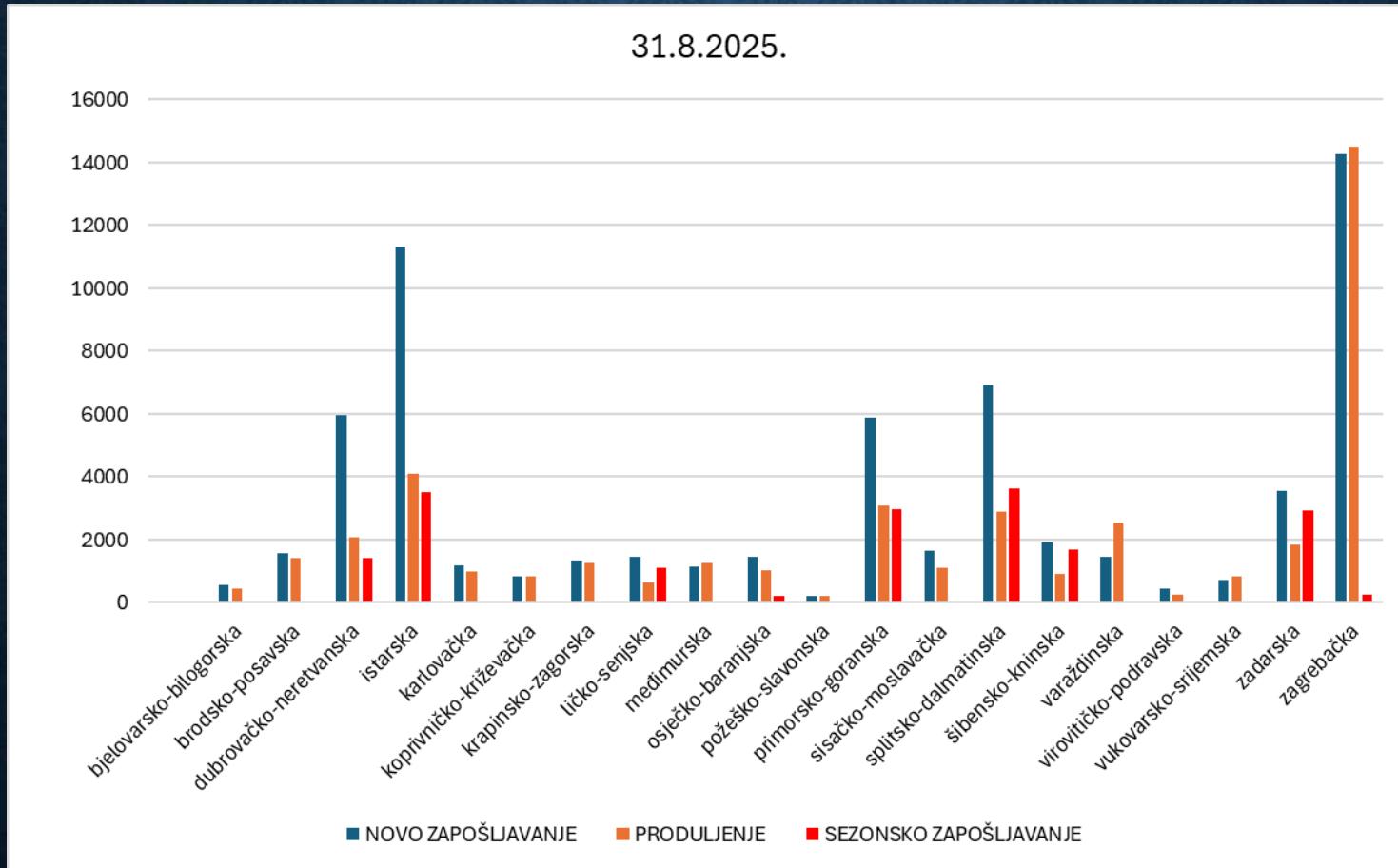


# KATEGORIJE RADNIH DOZVOLA, PO PU



Izvor: [MUP](#)

# KATEGORIJE RADNIH DOZVOLA, PU



Izvor: [MUP](#)

# CILJ RADA

- Analizirati implikacije non-EU imigracija na distribuciju plaća i nejednakosti europskih radnika
- To rade pomoći modeliranja europskog tržišta rada na način da uključuje različite sektore, djelatnosti i regije
  - Takva specifikacija omogućava proučavanje utjecaja na plaće uzimajući u obzir potencijalnu realokaciju radnika
- Koriste podatke od 2008. do 2018.

# O PODACIMA

- Tržište rada:
  - LFS – NUTS1 regije
    - Porijeklo, obrazovanje, zanimanje
    - Stope neaktivnosti po regijama
  - SES – procjene distribucije plaća domaćih radnika, po obrazovanju za 100 NUTS1 regija
  - EU-SILC – izračun razlika u (log) plaćama između domaćih radnika, EU-imigranata i NON-EU imigranata

# O PODACIMA

- Migracije:
  - EUROSTAT – popis stanovništva iz 2010.
  - OECD – DIOC za 2010.
  - CEPPI
- Regionalna razmjena između sektora:
  - OECD - Trade in Value Added (TiVA)
  - EU regional trade baza

# O PODACIMA

- Makro indikatori
  - EUROSTAT
    - Stock rada i kapitala po sektoru
    - GDP po sektoru – dekompozicija na manje dijelove
    - PPP, kamatne stope
    - Podaci o otvaranju/zatvaranju poduzeća
  - Egzogeni parametri:
    - Na temelju literature

# O PODACIMA

Table 1: Education and Occupation Structures of EUR Citizens and Immigrants

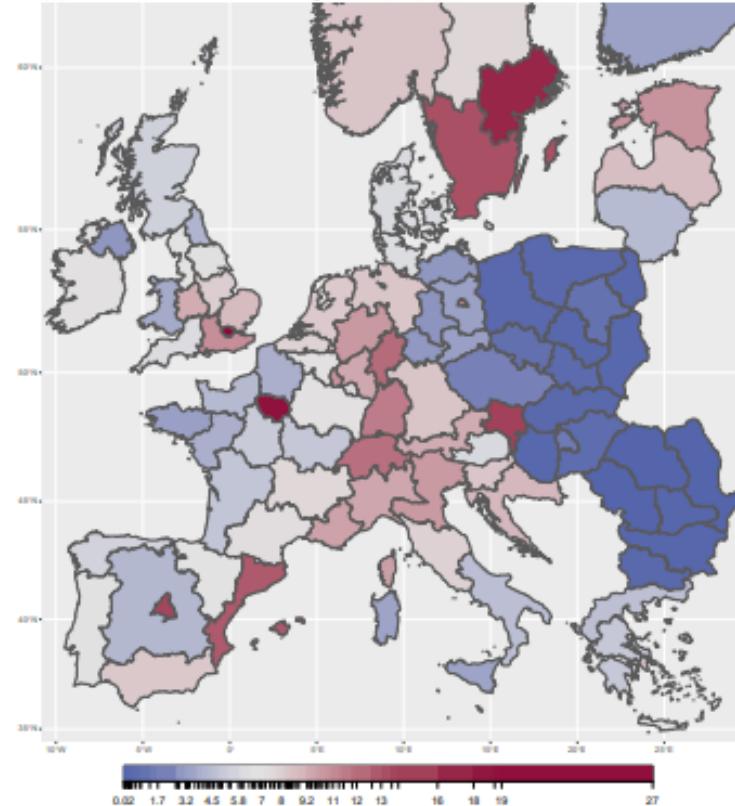
Groups	EUR Citizens			Immigrants - Stocks			Difference		
	2010	2014	2018	2010	2014	2018	2010	2014	2018
<b>Education</b>									
Total Workers	198,5	196,4	199,9	12,6	12,9	17,2	-	-	-
College Educated	57,5	64,3	70,4	3,7	4,4	5,9	-	-	-
College Share	29,0%	32,7%	35,2%	29,2%	34,4%	34,5%	0,3%	1,6%	-0,7%
<b>Occupations</b>									
PRO (O1)	40,8%	42,1%	43,8%	29,6%	31,2%	32,1%	-11,2%	-10,8%	-11,8%
SER (O2)	25,8%	27,2%	26,8%	28,8%	28,6%	27,7%	1,0%	1,5%	1,0%
CRA (O3)	17,4%	15,9%	14,9%	15,7%	12,8%	12,9%	-1,7%	-3,1%	-2,1%
ELE (O4)	16,0%	14,8%	14,4%	28,0%	27,3%	27,3%	11,9%	12,5%	12,9%
<b>Sectors</b>									
MANU (S1)	31,6%	29,7%	28,7%	27,5%	23,7%	24,1%	-4,1%	-6,0%	-4,5%
SALE (S2)	19,7%	19,7%	19,5%	19,7%	20,3%	20,3%	0,0%	0,6%	0,9%
LSER (S3)	11,5%	12,0%	12,4%	23,1%	23,5%	23,4%	11,6%	11,5%	11,0%
PSER (S4)	37,1%	38,6%	39,5%	29,6%	32,5%	32,1%	-7,5%	-6,1%	-7,3%

This table summarizes the descriptive statistics on the composition of populations of European Citizens and Immigrants in 2010, 2014 and 2018. Columns *Difference* calculate differences in shares between Immigrants and EU Citizens. *Total Workers* and *College Educated* are expressed in millions of people. Four occupation groups include PRO (O1): managers and professionals, SER (O2): service workers, CRA (O3): craftsmen, and ELE (O4): elementary occupations. Four sectors groups include MANU (S1): manufacturing and construction, SALE (S2): sale and transportation services, LSER (S3): accommodation and administrative services, and PSER (S4): financial, public and professional services. All numbers are aggregates over 31 European countries (27 EU, Iceland, Norway, Switzerland and the UK).

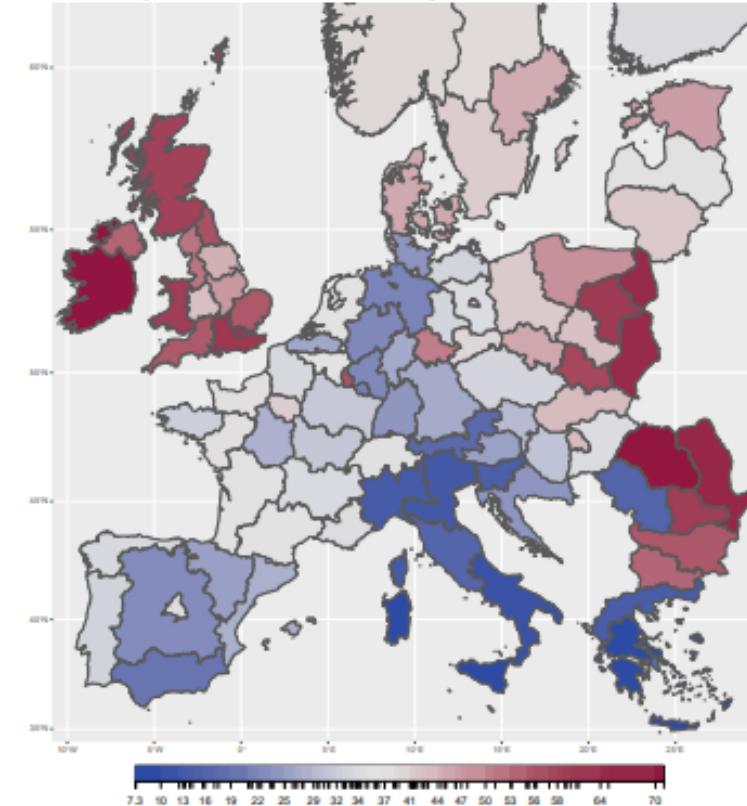
# O PODACIMA

Figure 1: Descriptives of Non-EU Immigration to Europe

(a) Share of Non-EU Immigrants (in p.p.)



(b) College-Educated Non-EU Immigrants (in p.p.)



Note: Characteristics in all panels are expressed in percent. Dissimilarity index equals to the sum of absolute differences between two share structures.

# STILIZIRANE ČINJENICE

- 1. Imigracija i prostorna mobilnost domaćih radnika

Table 2: Immigration and Natives' Spatial Sorting

VARIABLES	(1) Net Flow	(2) Net Flow IV	(3) Gross Flow	(4) Gross Flow IV
Share Mig	0.603 (1.127)	0.789 (1.215)	3.270*** (1.086)	4.000*** (1.432)
Observations	100	100	100	100
R-squared	0.003	0.003	0.085	0.081

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# STILIZIRANE ČINJENICE

- 2. Imigracija i alokacija domaćih stanovnika po zanimanjima

Table 3: Immigration and Natives' Sorting Across Occupations

VARIABLES	(1) PRO	(2) PRO IV	(3) SER	(4) SER IV	(5) CRA	(6) CRA IV	(7) ELE	(8) ELE IV
Share Mig	8.791*** (2.942)	8.619*** (2.839)	-7.410*** (2.056)	-7.844*** (2.366)	0.611 (0.723)	1.316** (0.605)	-1.991*** (0.698)	-2.090*** (0.789)
Observations	100	100	100	100	100	100	100	100
R-squared	0.182	0.182	0.171	0.171	0.03	0.03	0.046	0.046

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3 summarizes regressions of time differences in occupational shares of native workers across 2008–2019 (PRO: managers and professionals, SER: service workers, CRA: craftsmen, ELE: elementary occupations) on the aggregated yearly inflows of non-EU immigrant as shares of regional populations. Odd columns show results for OLS, while even columns implement a 2SLS with a shift-share instrument.

# STILIZIRANE ČINJENICE

- 3. Imigracija i alokacija domaćih stanovnika po sektorima

Table 4: Immigration and Natives' Sorting Across Sectors

VARIABLES	(1) MANU	(2) CONS	(3) SALE	(4) TRAN	(5) LSER	(6) FSER	(7) PSER	(8) PUBL
Share Mig	0.395 (0.783)	0.511 (0.629)	-2.669*** (0.812)	-1.764*** (0.292)	0.252 (0.501)	-0.435** (0.212)	2.858*** (0.477)	0.852 (0.813)
Observations	100	100	100	100	100	100	100	100
R-squared	0.05	0.004	0.119	0.126	0.003	0.006	0.170	0.005

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4 summarizes regressions of time differences in sectoral shares of native workers across 2008–2019 (MANU: manufacturing, CONS: construction, SALE: wholesale and retail trade, TRAN: transport and storage, LSER: low-skilled services, FSER: financial services, PSER: professional services, PUBL: public administration, education, and health) on the aggregated yearly inflows of non-EU immigrants as shares of resident populations. All regressions implement a 2SLS with a shift-share instrument.

# STILIZIRANE ČINJENICE

- 4. Imigracija i vještine domaćih radnika

Table 5: Immigration and Natives' Self-Selection

VARIABLES	(1) PRO	(2) PRO IV	(3) SER	(4) SER IV	(5) CRA	(6) CRA IV	(7) ELE	(8) ELE IV
Share Mig	-14.35 (12.66)	-5.20 (7.162)	-1.865 (3.894)	-3.101 (4.818)	-5.638 (4.261)	-6.703* (3.783)	6.402*** (2.043)	5.288*** (1.606)
Observations	100	100	100	100	100	100	100	100
R-squared	0.019	0.012	0.002	0.001	0.010	0.010	0.066	0.064

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 5 summarizes regressions of time differences in college-educated shares of native workers across 2008–2019 (PRO: managers and professionals, SER: service workers, CRA: craftsmen, ELE: elementary occupations) on the aggregated yearly inflows of non-EU immigrants as shares of resident populations. Odd columns show results for OLS, while even columns implement a 2SLS with a shift-share instrument.

# STILIZIRANE ČINJENICE

- 5. Imigracija i agregati tržišta rada

Table 6: Immigration and Natives' Employment and Inactivity Shares

VARIABLES	(1) INA	(2) INA IV	(3) EMP	(4) EMP IV	(5) AVG	(6) AVG IV	(7) VAR	(8) VAR IV
Share Mig	2.733** (1.058)	3.688** (1.641)	-1.777* (0.936)	-3.536* (1.822)	1.079 (0.805)	1.562** (0.661)	0.255 (0.189)	0.304** (0.153)
Observations	100	100	100	100	84	84	84	84
R-squared	0.052	0.046	0.010	0.002	0.144	0.144	0.031	0.031

Robust standard errors in parentheses

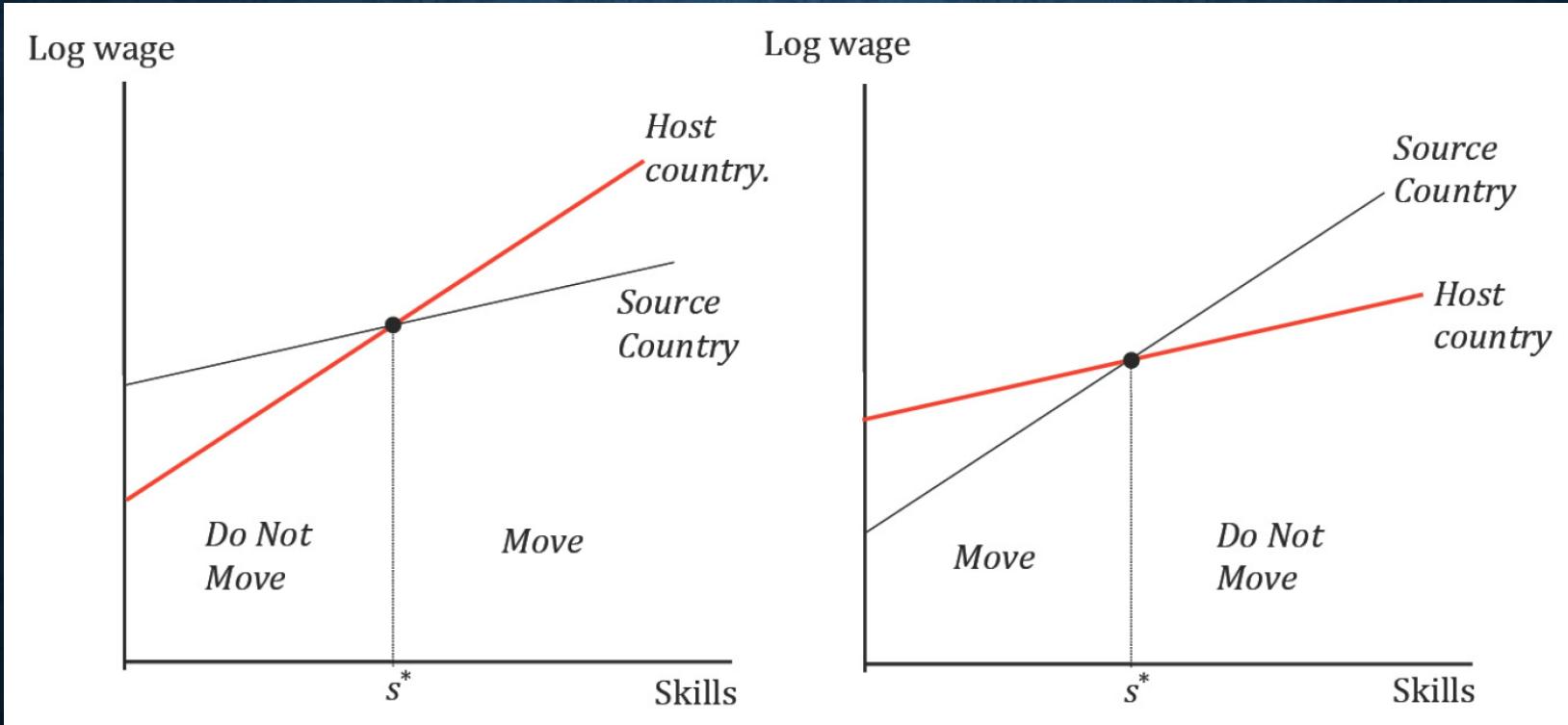
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 6 summarizes regressions of time differences in shares of inactive natives (INA), shares of employed natives (EMP), average native wages (AVG), and variance in log wages (VAR) on the aggregated yearly inflows of non-EU immigrants as shares of resident populations. Odd columns run OLS regressions, while even columns implement a 2SLS with a shift-share instrument.

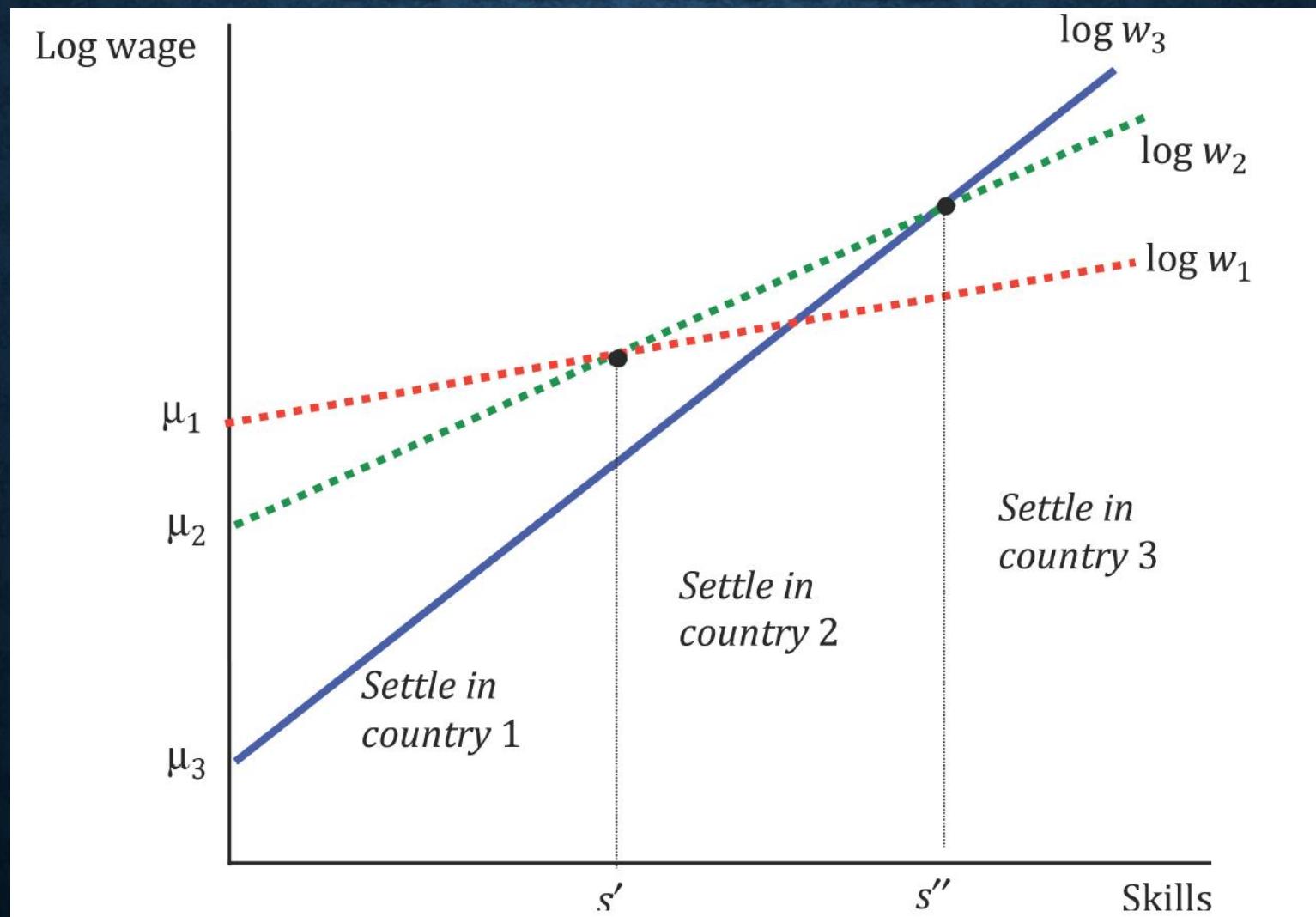
# MODEL

- Baziran na Royevom modelu

# ROYEV MODEL



# ROYEV MODEL



# MODEL

- Baziran na Royevom modelu
- GE okvir s endogenom proizvodnjom, potrošnjom, migracijama i razmjenom
- Tržište:
  - svaka firma proizvodi i diferenciranih proizvoda i zna potrošačevu funkciju potražnje
  - cijena je konstantna i iznad graničnog troška
  - firme su jednake, a produktivnost im je nasumično dodijeljena
  - u ravnoteži očekivani profit je jednak ulaznim troškovima
  - firma s nultim profitom je „zadnja“ po produktivnosti i ostale napuštaju tržište

# MODEL

- Proizvodnja:
  - Rad i kapital, elastičnost ovisi o sektoru
  - U ravnoteži se prilagođava kapital, odnosno imamo konstantne kamatne stope
  - Radnici se dijele prema zemlji porijekla i obrazovanju
  - Dodana vrijednost u regijama-sektorima je jednaka dohotku inputa
- Potrošnja i migracije
  - CES preferencije; čitav dohodak se troši
  - Svaki pojedinac maksimizira svoju funkciju korisnosti o tome gdje živjeti
- Regionalna tržišta rada:
  - Potražnja za radom je određena proizvodnom funkcijom i potražnjom za proizvodima
  - Ponuda rada je određena distribucijom vještina, migracijom radnika i njihovim „sortiranjem”

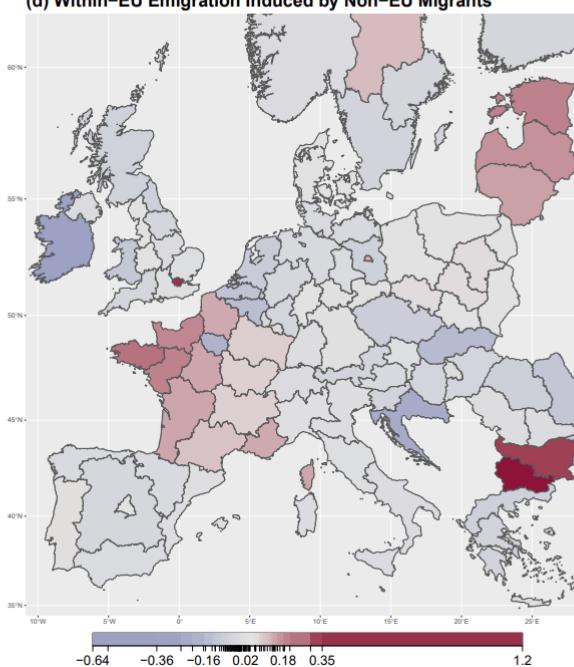
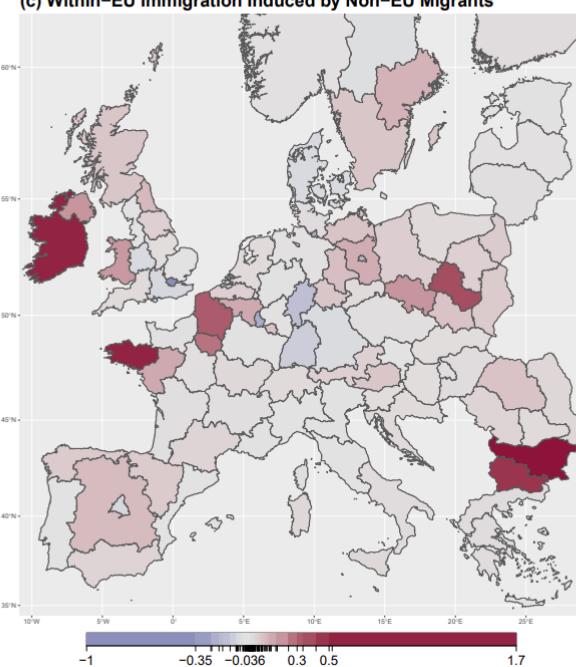
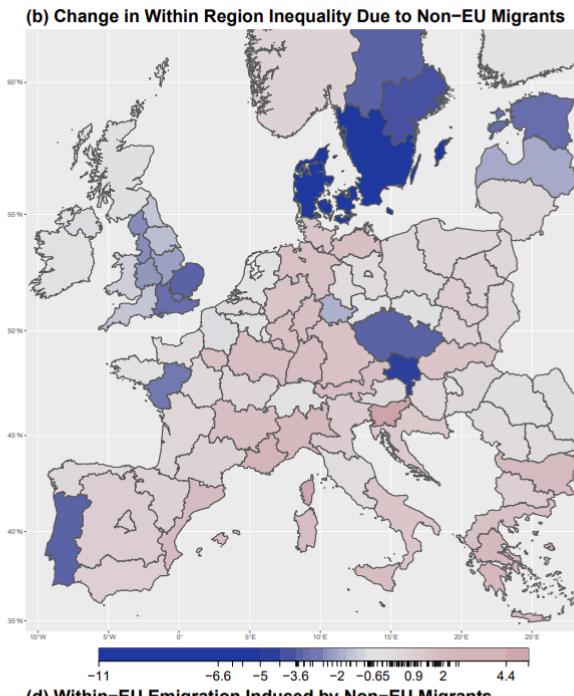
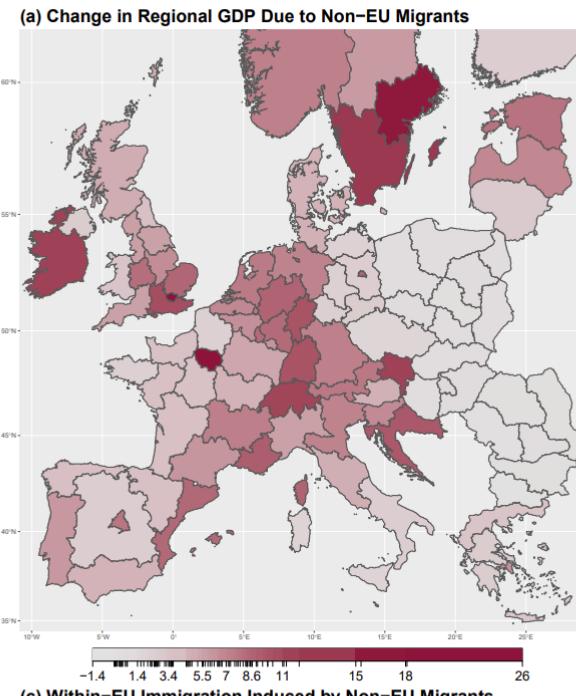
# MODEL

- Ravnoteža:
  - Radnici biraju zanimanje i regiju tako da maksimiziraju svoju očekivanu korist
  - Firme minimiziraju troškove i racionalno ulaze/izlaze s tržišta
  - Pojedinci troše cijeli dohodak na potrošnju, ovisno o svojim preferencijama i dobrima u njihovim regijama/sektorima
  - Tržište rada se „čisti“ kada se plaće izjednače s graničnom produktivnošću inputa u svim regijama

# EKONOMSKI EFEKTI

- Procjena modela bez non-EU imigranata - razlika od stvarnog stanja se pripisuje njima
- 7,9% BDP-a EU dolazi od non-EU imigranata
- Različit utjecaj na nejednakost plaća domaćih radnika
- Različit utjecaj na mobilnost EU imigranata i domaćih radnika

- Procjena utjecaja migracija na regionalni BDP
- 7,9% BDP-a u EU
- Različit utjecaj na različite regije
- Različit utjecaj na različite regije



ripisuje

# „SORTIRANJE” RADNIKA PO ZANIMANJIMA I REGIJAMA

- Mobilnost po regijama:
  - Utjecaj na blagostanje zbog mogućnosti migriranja kao odgovora na non-EU imigracije
  - Utjecaj na nejednakost plaća u slučaju da domaći radnici ne mogu odgovoriti migracijom
- Mobilnost po zanimanjima:
  - Utjecaj na blagostanje ako se zabrani migriranje po zanimanjima
- Mobilnost unutar zanimanja

# MOBILNOST PO REGIJAMA

Figure 6: Changes in Native Workforce by Region

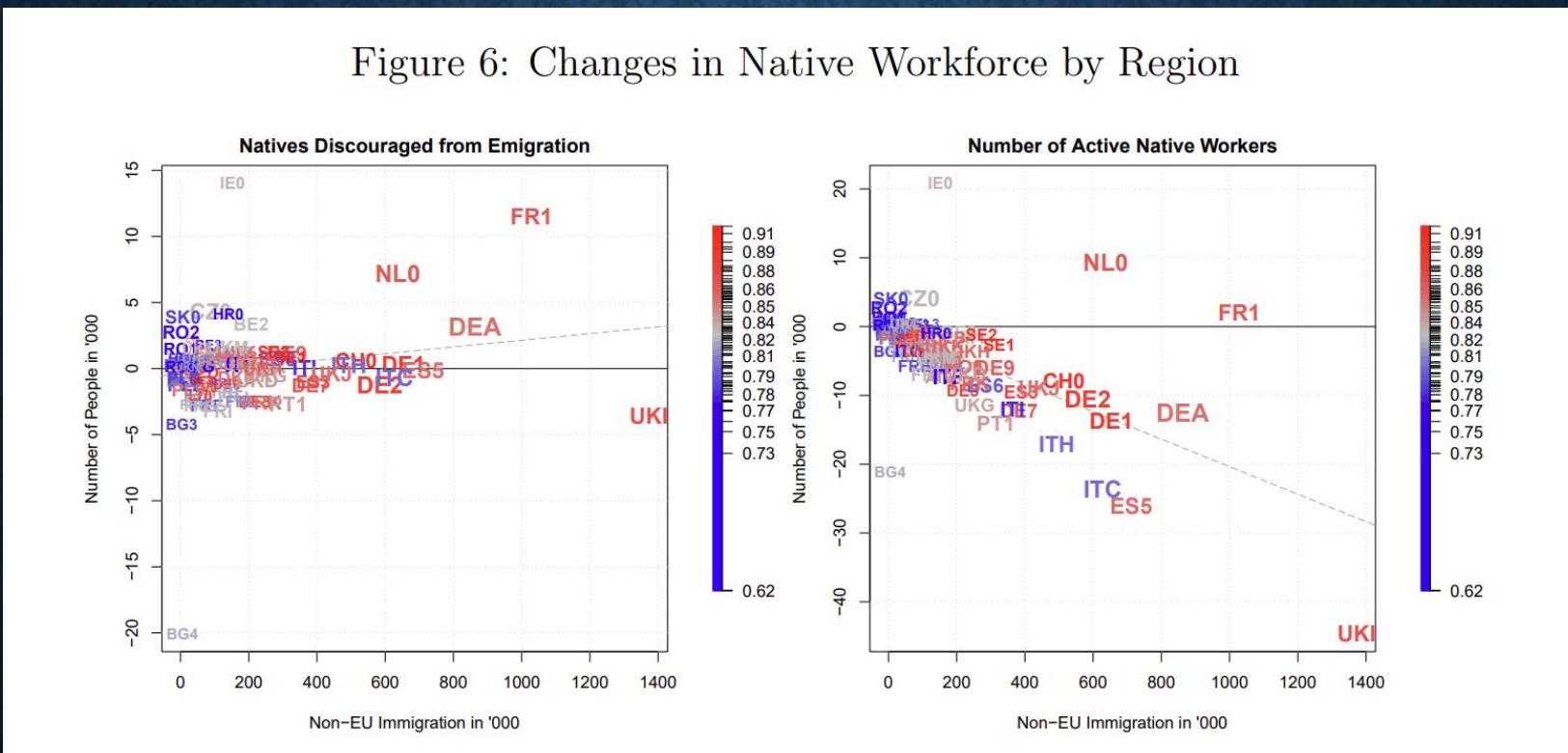
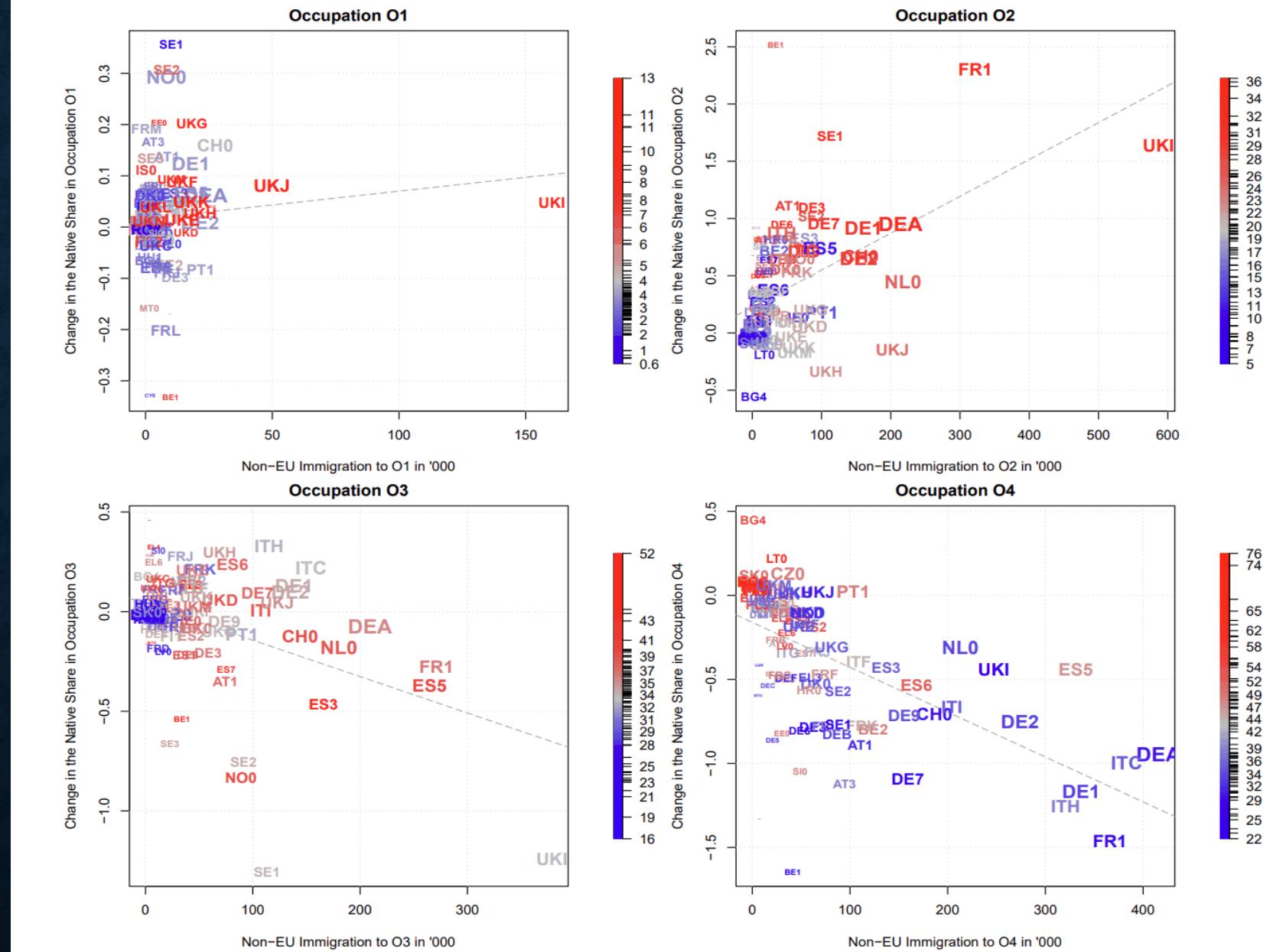
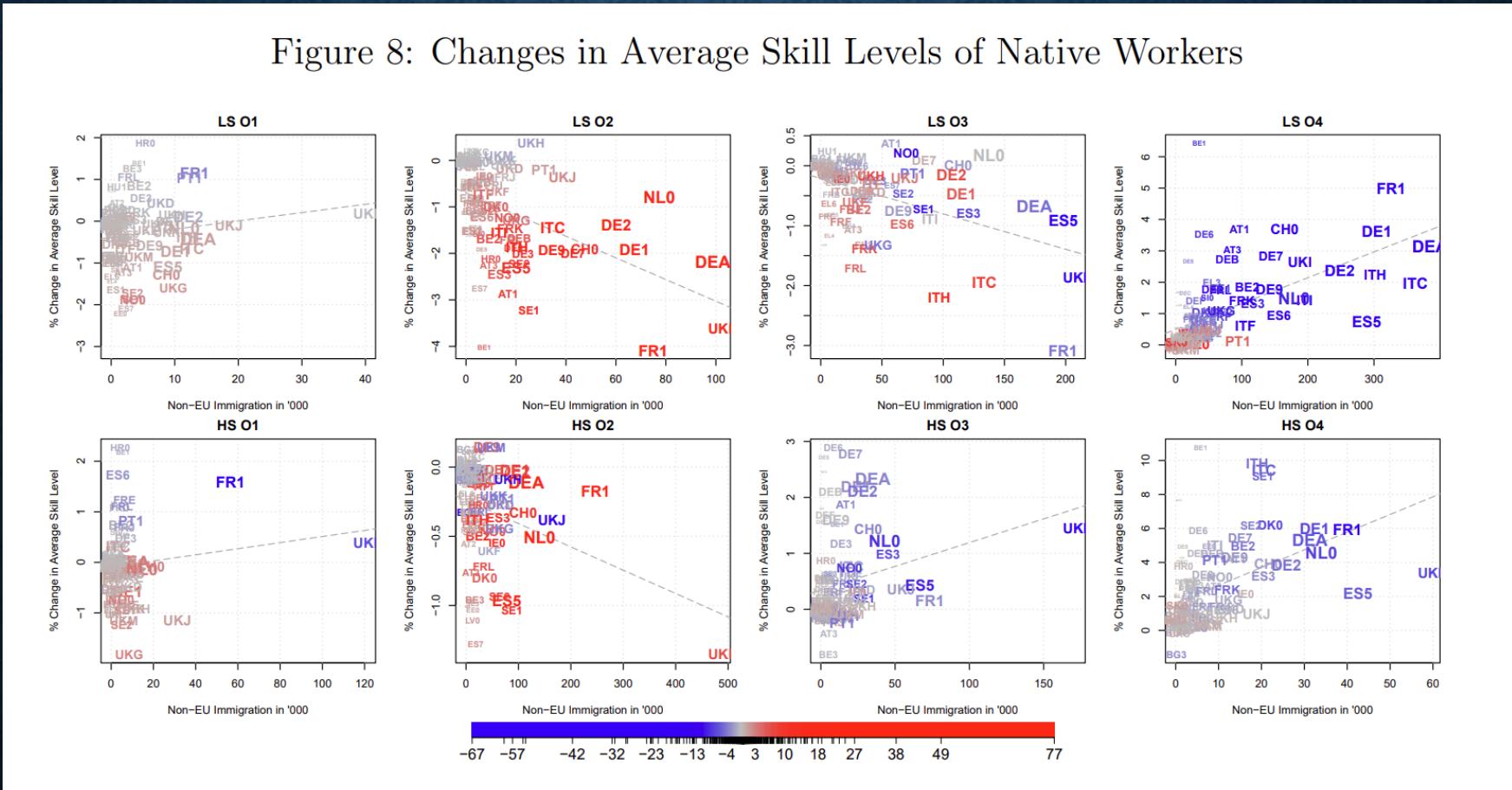


Figure 7: Changes in Shares of Natives by Occupation



# MOBILNOST UNUTAR ZANIMANJIMA

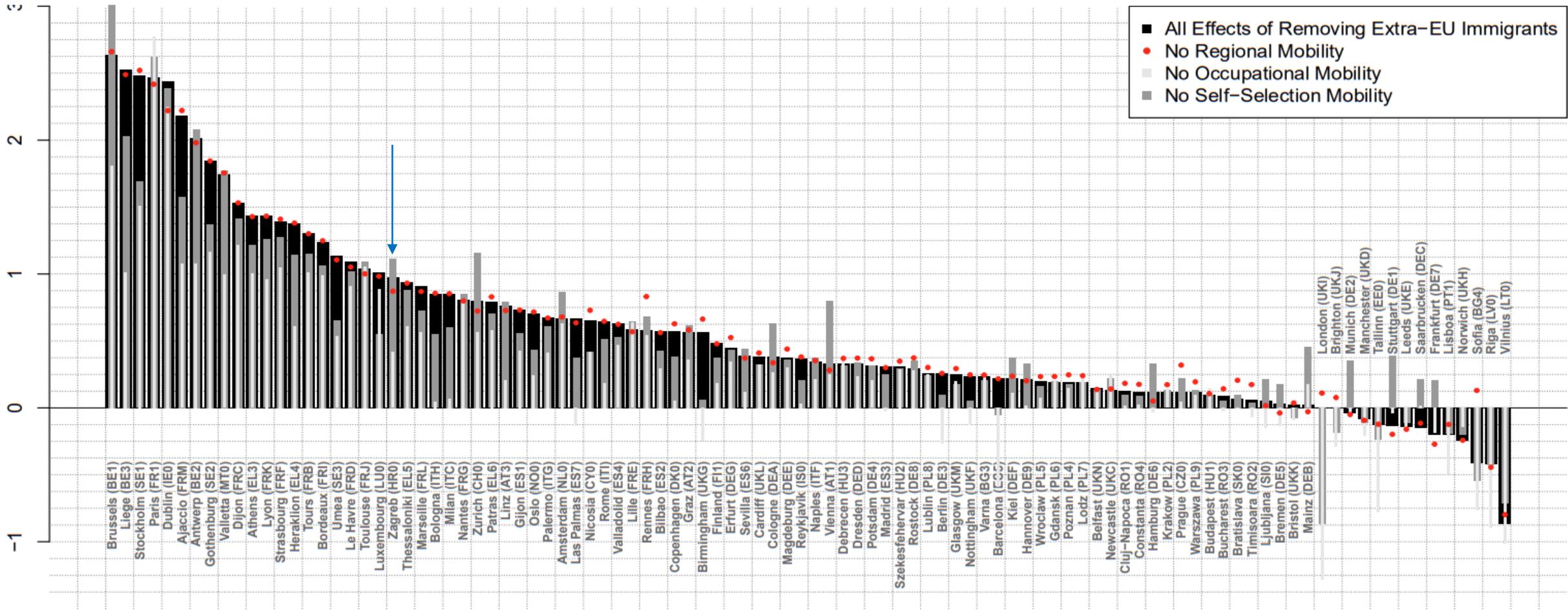
Figure 8: Changes in Average Skill Levels of Native Workers



# UTJECAJ NA BLAGOSTANJE I NEJEDNAKOST

- Daje odgovor na pitanje koja mobilnost/sortiranje najznačajnije utječe na blagostanje
- Procjena modela bez non-EU imigranata i bez mobilnosti po regijama i između/unutar zanimanja
- 86 od 100 regija ima benefite od non-EU migracija (crno)
- Mali učinak mobilnosti po regijama (crveno)
- Najznačajniji utjecaj vidi se kroz mobilnost po zanimanjima

Figure 9: Changes to Average Real Wages in European Regions



Note: This Figure illustrates the population-weighted average changes in real wages in 100 NUTS1 regions in Europe. All indicators represent the effects caused by the presence of non-EU immigrants (relative change between the observed state of the world with non-EU migration, and counterfactual state without non-EU migration). Black bars indicate the benchmark results with all effects. Red dots assume no sorting of European workers across NUTS1 regions. Light gray bars assume no sorting of European workers across occupations (within NUTS1 regions). Dark gray bars assume no within occupation sorting due to self-selection of native workers. All changes are in percent.

# NEJEDNAKOST

Table 9: Inequality Effects of Types of Worker Sorting

Inequality Measures	Reference		Presence of non-EU Immigrants			
	Index	Share	All Effects	NoMig	NoOcc	NoSel
Total Theil	0,395	-	0,20%	0,20%	0,24%	-0,08%
Within Region-Occupation	0,241	61,1%	-0,08%	-0,01%	0,10%	-0,48%
Between Occupations	0,041	10,3%	3,23%	2,75%	2,02%	1,64%
Between Regions	0,113	28,6%	-0,27%	-0,24%	-0,08%	0,16%

This table summarizes the inequality impact of non-EU immigration to Europe on native wage distributions. Columns in **Reference** display Theil indexes of inequality and their shares in Total Theil Index in the current state of the world with non-EU immigration. Columns in **Presence of non-EU Immigrants** indicate the changes in Theil indexes caused by non-EU immigration with all effects, without spatial sorting (NoMig), without occupational sorting (NoOcc) and without self-selection (NoSel).