

Immigration and Inequality: New Macroeconomic Evidence

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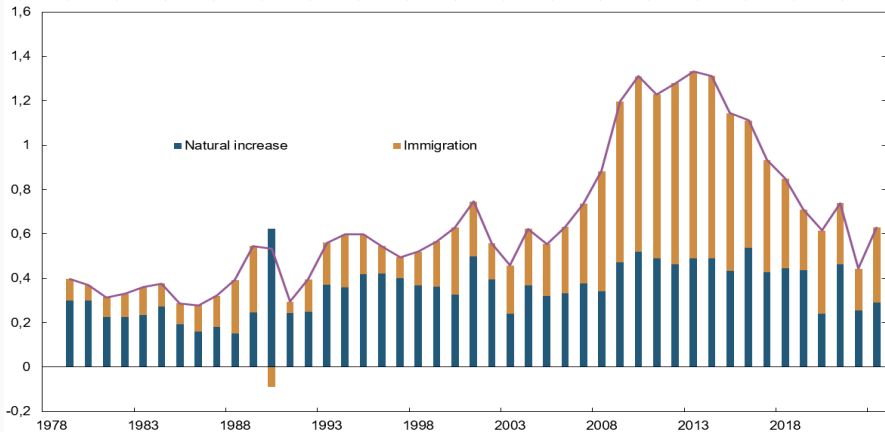
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European Economic Association, Barcelona, 2023

Population growth in Norway

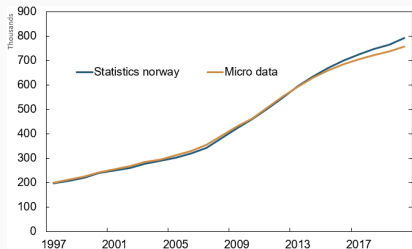


Source: Statistics Norway, quarterly series used in Furlanetto and Robstad (2019)

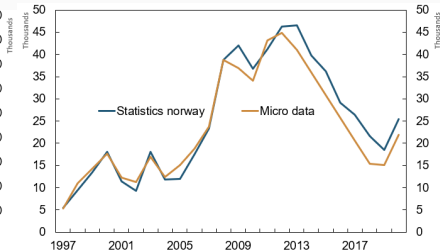
Research question

- Investigate the dynamic causal link between **Immigration** and **Labor Income Inequality**
- Effect of immigration on wage inequality hotly debated in the literature
 - Immigration depresses wages of low skilled workers (e.g., Borjas, 2003; Borjas and Katz, 2007)
 - No (or small) effects of immigration on wage inequality (e.g., Card, 2009; Ottaviano and Peri, 2012)

Why Norway? Because of the data on immigration: Official quarterly data and the micro data

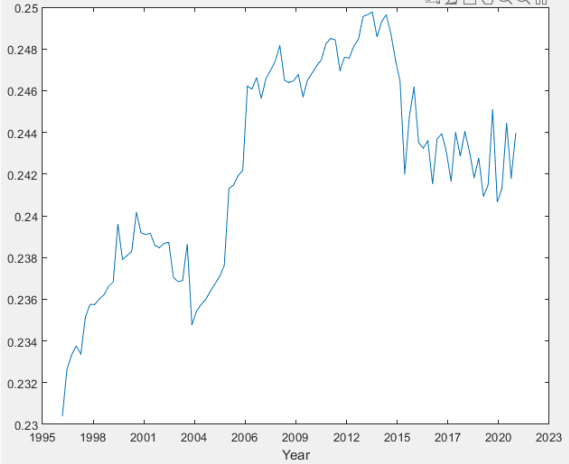


(a) Stock of immigrants



(b) Net immigration

Why Norway? Because of the data on earnings: Gini index based on the earnings micro data for Norway



- VAR approaches on immigration and overall economy:
 - [Furlanetto and Robstad \(2019\)](#) for Norway, Kiguchi and Mountford (2019) for the US, Maffei Faccioli and Vella (2021) for Germany, Schiman (2021) for Austria, D'Albis, Boubtane and Coulibaly (2021) for several OECD countries
 - Focus only on [aggregate wages](#) and not on wage inequality
- Studies on immigration and wage inequality
 - Cross-city studies
 - amongst others, Card (2001), Friedberg (2001), Lewis (2005), Card and Lewis (2007)
 - Aggregate (short) time series approaches
 - amongst others, Borjas, Freeman and Katz (1997), Borjas (2003), Ottaviano and Peri (2008)
 - Focus is on [partial equilibrium](#) effects
 - Estimates mostly [theory based](#), especially those based on aggregate times series

What we do

- Trace the effects of various immigration shocks on the labor earnings distribution
 1. Model income distribution as a function of observed and unobserved factors
 2. Disentangle immigration shocks from other shocks driving the business cycle in an SVAR including macro variables, immigration and factors
- To do this, we combine micro data on labor income and population:
 - Country of origin, labor income, employment status, age, gender, reason for immigration, education, and occupation for the entire population

What we contribute

- Model the dynamics of income distribution using a factor approach
- Extend VAR literature on immigration by incorporating income distribution
- Estimate general instead of partial equilibrium effects in a flexible SVAR environment

Econometric Framework

Econometric framework: a FAVAR model

- Extend factor model with macro and immigration series

$$y_{jt} = \lambda_j \mathbf{F}_t + \beta_j \mathbf{X}_t + \epsilon_{jt}$$

where $\beta_j = [\beta_{1j} \ \dots \ \beta_{Mj}]$ and $\mathbf{X}_t = [x_{1t} \ \dots \ x_{Mt}]'$

- Assume VAR(q) for factors and added variables

$$\underbrace{\begin{bmatrix} \mathbf{F}_t \\ \mathbf{X}_t \end{bmatrix}}_{\mathbf{Z}_t} = \begin{bmatrix} \mathbf{c}_f \\ \mathbf{c}_x \end{bmatrix} + \mathbf{B}_1 \underbrace{\begin{bmatrix} \mathbf{F}_{t-1} \\ \mathbf{X}_{t-1} \end{bmatrix}}_{\mathbf{Z}_{t-1}} + \dots + \mathbf{B}_q \underbrace{\begin{bmatrix} \mathbf{F}_{t-q} \\ \mathbf{X}_{t-q} \end{bmatrix}}_{\mathbf{Z}_{t-q}} + \underbrace{\begin{bmatrix} \mathbf{v}_{ft} \\ \mathbf{v}_{xt} \end{bmatrix}}_{\mathbf{v}_t}$$

where $\mathbf{v}_t = \mathbf{A}\mathbf{u}_t$ with $\mathbf{v}_t \sim N(\mathbf{0}, \Sigma)$, $\mathbf{u}_t \sim N(\mathbf{0}, \mathbf{I})$ and $\Sigma = \mathbf{A}\mathbf{A}'$

- The model has the following **state space representation**
 - **Observation equation:**

$$y_{j,t} = \theta_j \mathbf{Z}_t + \epsilon_{j,t}$$

where $\theta_j = [\lambda_j \ \beta_j]$

- **State equation:**

$$\mathbf{Z}_t = \mathbf{c} + \sum_{l=1}^q \mathbf{B}_l \mathbf{Z}_{t-l} + \mathbf{v}_t$$

- Exploit relationship between adjacent income classes:

$$\theta_j = \alpha + \sum_{i=1}^p \mathbf{T}_i \theta_{j-i} + \zeta_j$$

- α is a vector of constants and $\zeta_j \sim N(0, \Omega)$
- where \mathbf{T}_i and Ω are diagonal matrices

Identification strategy: sign and magnitude restriction

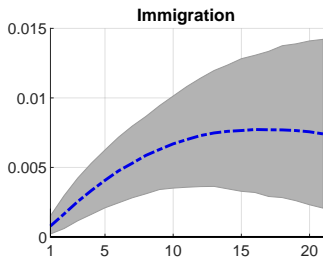
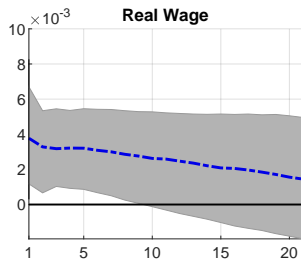
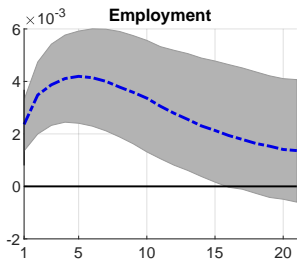
	Business Cycle	Immigration
Employment	+	+
Immigration	+	+
Real Wages	+	NA
Employment per Immigrant	+	-

- Use Norwegian data over the period 1997Q1-2019Q4
 - Labor income
 - Overall, natives and foreign-born
 - Immigration
 - Overall, reasons of immigration, education, country of origin
 - Macro series
 - Real wage and employment
- Bayesian estimation procedure
 - Specify diffuse priors
 - Markov Chain Monte Carlo methods

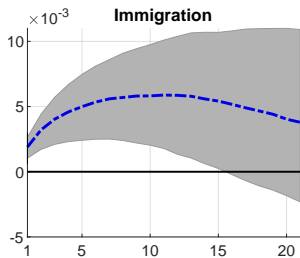
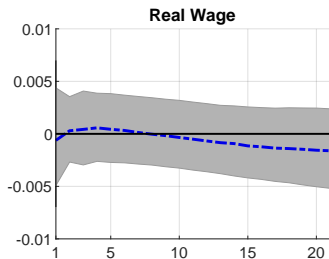
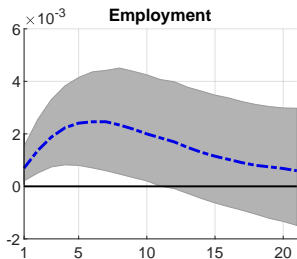
Empirical results

1. **Baseline model:**
 - Overall immigration
 - Income distribution for whole population
2. Subdivide income distribution into
 - **Natives vs. foreign-born**
3. Subdivide immigration into
 - **Reasons for immigration**
 - **Education level**
 - **Country of origin**

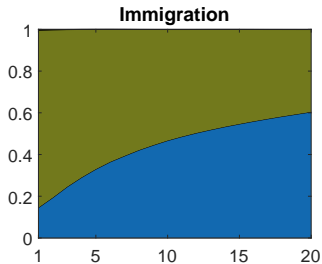
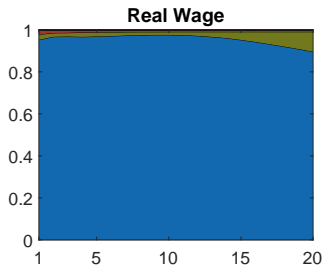
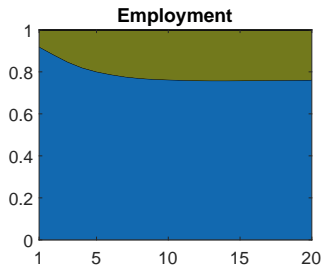
Baseline model: Business cycle shock



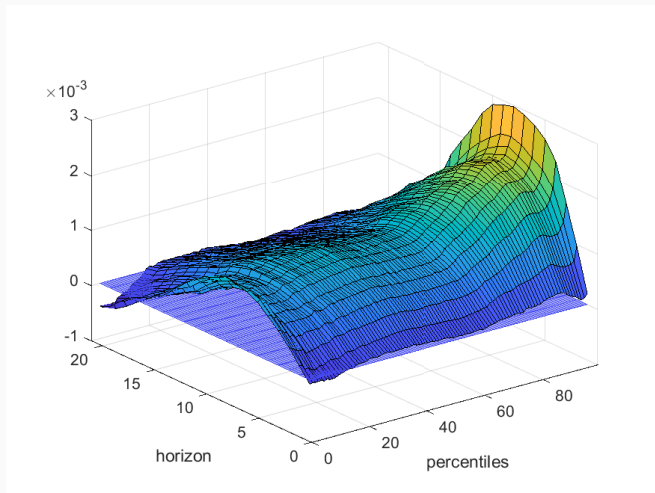
Baseline model: Immigration shock



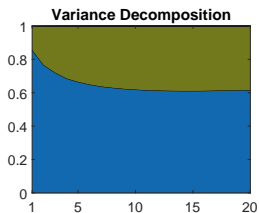
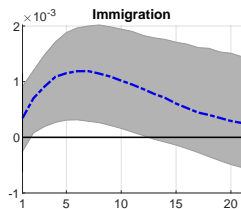
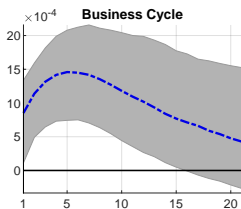
Baseline model: Variance decomposition



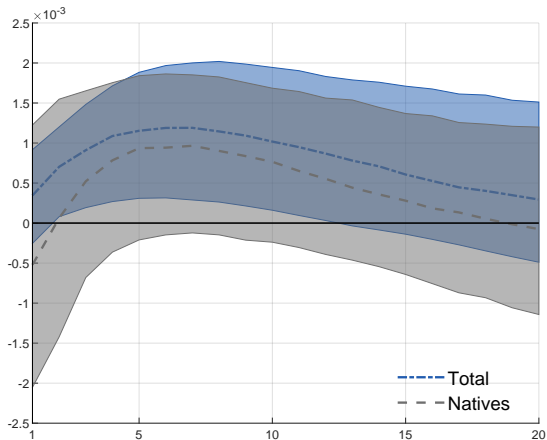
Immigration shock all percentiles



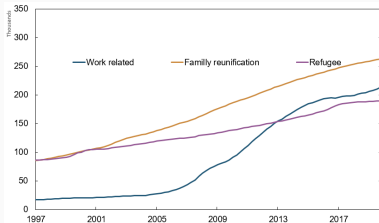
Percentile 90 minus Percentile 10 (P90-P10)



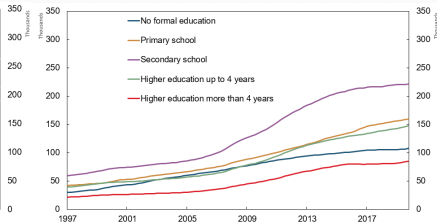
P90-P10 Overall population versus natives



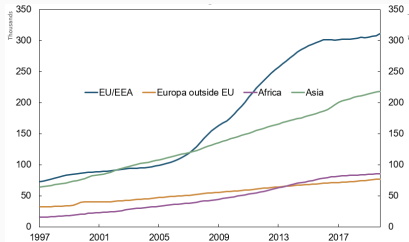
Different sources of immigration



(c) Reason for immigration

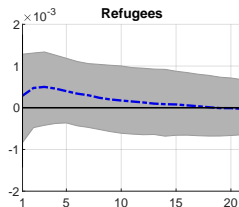
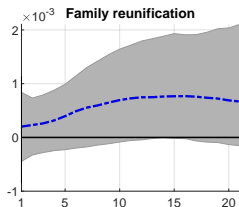
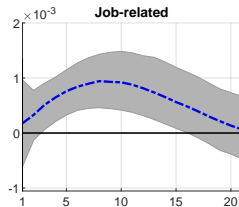
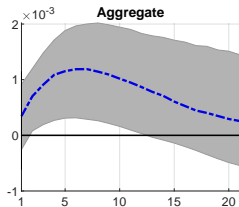


(d) Education level

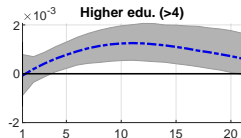
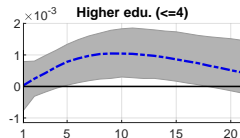
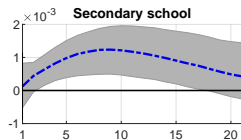
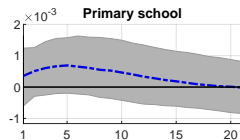
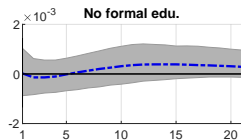
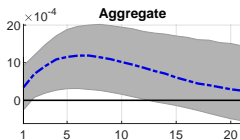


(e) Country of origin

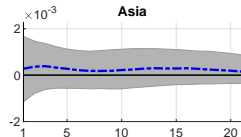
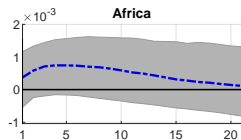
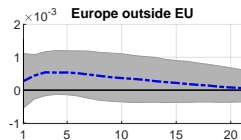
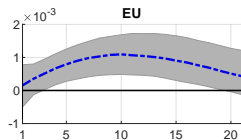
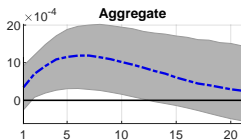
P90 minus P10: Job related immigration is driving the results



P90 minus P10: High (medium) skilled immigration is driving the results



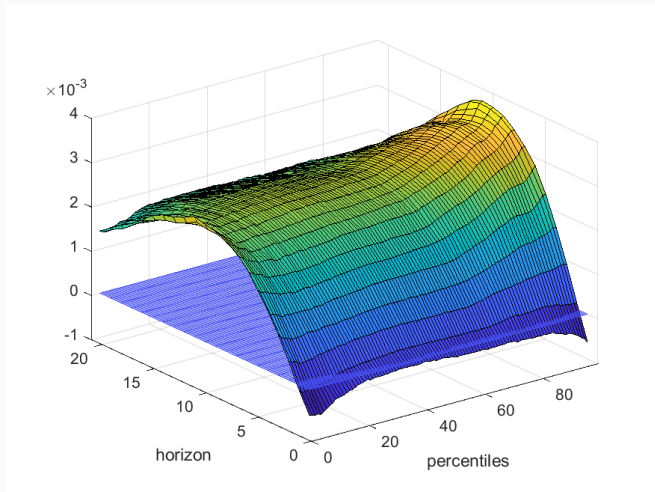
P90 minus P10: Immigration from EU countries is driving the results



Conclusion

1. We find evidence that immigration shocks lead to an increase in earnings inequality
2. Natives are partially insulated
3. Larger effects for job related immigration, high/medium-skilled immigration and immigration from Europe
4. Relative benign effects of immigration on labor earnings and on the macroeconomy

IRF job related immigration shock bird's eye view



Alternative identification strategy: Cholesky order

