Dynamic Macroeconomic Implications of Immigration

Conny Olovsson, Karl Walentin and Andreas Westermark

EEA Milan Aug 2022

Background/motivation

- Immigration an important policy issue
- Immigration flows are volatile and vary in their composition
- We ask how migration "shocks" dynamically affect the macroeconomy, with an emphasis on:
  - GDP per capita
  - Unemployment
  - Real wages

Background/motivation

- Immigration an important policy issue
- Immigration flows are volatile and vary in their composition
- We ask how migration "shocks" dynamically affect the macroeconomy, with an emphasis on:
  - GDP per capita
  - Unemployment
  - Real wages
- We are the first to do this in a search and matching model

What we do

1. **Long-term, non-EU immigration (family, work, refugees)**

   - Set up a general equilibrium model to quantify the effects of immigration in **Sweden**
     - Centered on the labor market
     - Builds on detailed labor market data of various groups
     - Focus on supply effects in the short to medium term
   - We study the **dynamic** effects of immigration shocks on the economy
     - Simple data indicates that macro effects of immigration are largest in the short run
       $\Rightarrow$ steady state analysis insufficient (i.e. most of the literature)
   - Can use model to:
     1. Quantify how migration affects unemployment
     2. Relate productivity growth and migration flows
     3. Quantify fiscal effects of migration
     4. Spell out the macroeconomic effects of policies that improve integration

2. **Work-permit immigration (less well calibrated)**

Outline of the presentation

- Literature
- Data
- Model
- Effects of an immigration shock

Literature on macroeconomic implications of immigration

- Fiscal effects - Storesletten (JPE 2000)
  - Effects depend a lot on individual characheristics
  - Compositional effects important
- Macro/modelling perspective:
  - Some research on aggregate implications
  - Canova and Ravn, (1998, 2000)
    - No search and matching framework
  - Busch, Krueger, Ludwig, Popova and Iftikhar (JME, 2020)
    - Study the refugee wave around 2015 in Germany
    - But, focus on welfare implications and abstract from unemployment.

Literature on macroeconomic implications of immigration

- Empirical:
  - Mainly study wages of natives: no or small affects
  - Dustmann, Fabbri, and Preston (EJ, 2005):
    - UK: No clear effect of immigration on aggregate employment or unemployment
  - **Furlanetto and Robstad (RED, 2019)**:
    - Norway: Immigration reduces unemployment and lowers productivity (SVAR)
    - But, study limited to effect of job-related migration, mainly from EU

Data used for calibration

- Obtained rich dataset on entire Swedish population of 20-64 year olds 2000-2017 (from the population registry) with:
  - Country of birth (actually continent) - use group averages
  - Date and reason for migration
  - Labor status
  - Labor income
  - Demographic info

Integration is a gradual process...
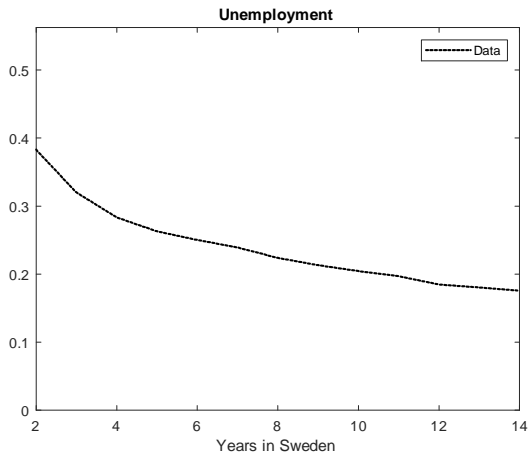
Unemployment

- Unemployment rate of immigrants as a function of number of years in the country.
- Labor force participation rate slowly increasing over time

Education and relative productivity of immigrants

- Formal education levels are similar between groups:

	Natives	Immigrants	Refugees
Fraction college educated	36%	34%	29%

- **Our view**: Unemployment rates are higher for immigrants because of lower productivity compared to natives
  - Sweden-specific skills (Swedish language skills!)
  - Lower individual productivity (e.g. worse/different education system), or
  - Worse match between worker and employer
  - Discrimination
- Lower productivity of immigrants supported by estimates of Ek (2019)
  - Matched employer-employee data

Immigration can have both positive and negative effects on the economy

- "Demographic dividend" (fiscal)
  - Lowers the age-dependency ratio
- Positive or negative effects depending on relation between natives and immigrants in terms of:
  - Education and productivity
  - Unemployment rates
  - Labor force participation rates
    $\Rightarrow$ **Composition of immigrants key**

Model overview

- Search and matching labor market
- Permanent exogenous immigration
    - No emigration
- Model of Perpetual Youth" approach of Blanchard-Yaari
- Agents are born/immigrate as workers
- Retire with some exogenous probability
    - Higher probability for immigrants - capture that arrive in country at average age of 31 years.
- Retirees die with some exogenous probability
    - Different probabilities a short-cut to capture shorter time in non-working age (childhood) for immigrants
    ⇒ "Demographic dividend"
- Labor of natives and immigrants perfect substitutes in production

Model overview, part II

- Two education groups, college (high) and non-college (low). Technology:

$$Y \equiv F\left(n_H, n_L, K\right) = A^{tfp} K^{\alpha} Z\left(n_H, n_L\right)^{1-\alpha},$$

where A^{tfp} is total factor productivity, K is capital, α the capital share and Z is a CES aggregate over the two types of labor

$$Z = \left(a n_H^{\frac{\rho-1}{\rho}} + (1-a) n_L^{\frac{\rho-1}{\rho}}\right)^{\frac{\rho}{\rho-1}}$$

- Here

$$n_g = \sum_i \varepsilon_i n_{i,g},$$

- Labor force participation exogenous process
  - Matches data for natives and immigrants
- Separate labor markets for the two groups, C-D matching function

- Workers differ in terms of productivity, also within groups
- Gradual integration: Productivity of immigrants grow with the number of years in the country (prob π)
    - Stops growing at some point with prob ϕ (can't get better than fluent in the language, etc)
- Values

$$
\begin{aligned}
W_{i,g}^{na} &= (1-\tau)\, w_{i,g}^{na} + \beta p^m R^{m\prime} + \beta\,(1-p^m)\,\{ \\
&\quad (1-\phi)\,(1-\pi)\left[(1-\delta_g)\,W_{i,g}^{na\prime} + \delta_g\, U_{i,g}^{na\prime}\right] \\
&\quad + (1-\phi)\,\pi\left[(1-\delta_g)\,W_{i+1,g}^{na\prime} + \delta_g\, U_{i+1,g}^{na\prime}\right] \\
&\quad + \phi\left[(1-\delta_g)\,W_{i,g}^{e\prime} + \delta_g\, U_{i,g}^{e\prime}\right]\}.
\end{aligned}
$$

- Government
    - Taxes labor income, and
    - Spends on unemployment benefits, social welfare and **pensions**
    - Balanced budget (in baseline)

Key assumptions

1. Same unemployment benefit level for all workers within an education group and varying productivity
   - Effectively implies a minimum wage
   - Yields **structural unemployment** in model
   - Unemployment replacement rates that capture "cap" in benefit system:
     - Top income quartile : 0.425
     - Bottom three income quartiles: 0.649

2. Different productivity distributions for natives and immigrants
   - Use Ek (2019)'s estimate that **mean** productivity of immigrants is 73% of native Swedes
     ⇒ Higher structural unemployment for immigrants
   - Calibrate productivity **dispersion** to fit unemployment rates of groups
   - Gradual integration

- Both assumption key to match slowly decaying unemployment
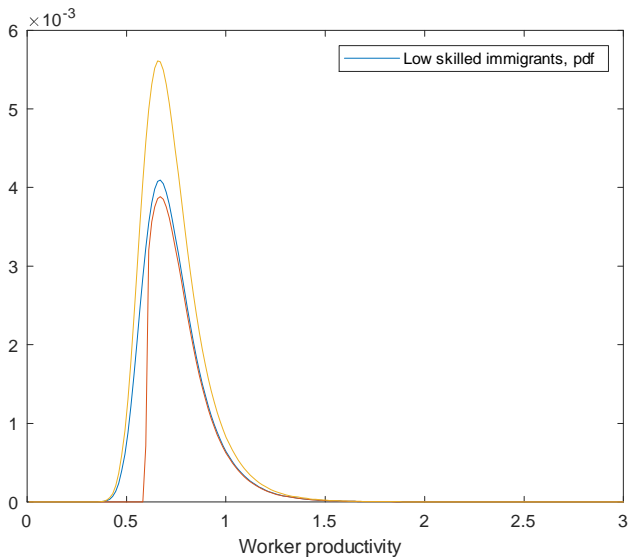
- No detailed description here
- Some parameters set to standard values, e.g., discounting
- Calibrate productivity **dispersion** to fit unemployment rates of groups
- Calibrate productivity **mean** to fit relative productivity
- Calibrate integration parameters to match decaying unemployment among immigrants
- Calibrate benefit parameters to match replacement rates

Model captures unemployment differences across groups

	Unemployment	
	Data	Model
High-skill natives	3.34%	3.36%
Low-skill natives	8.71%	8.74%
High-skill immigrants	15.34%	15.00%
Low-skill immigrants	22.12%	20.98%

...and falling unemployment as immigrants integrate

Unemployment **Labor force participation rate**
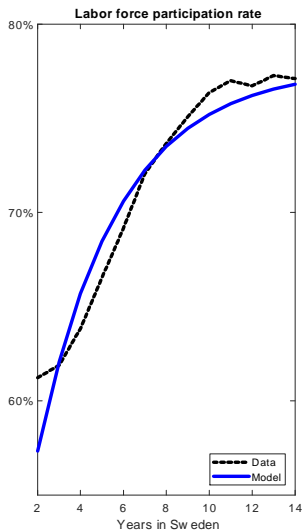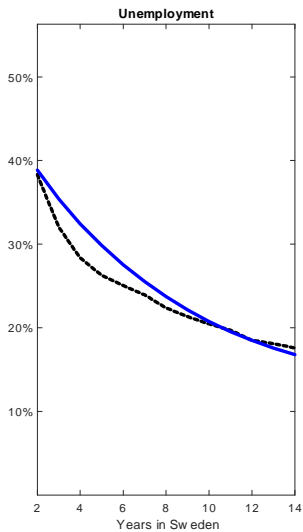
Key moments in steady state

Moment	Model, baseline
Aggregate unemployment	8.71%
Labor income tax rate	37.6%
Average wage for immigrants/natives	77.6%
Net transfers from natives to immigrants	2.1%

...and government expenditures largely (78%) related to non-working age population
⇒ large scope for demographics to affect public finances

- **We consider an increase in immigration corresponding to one percent of the population**
  - Roughly the increase in migration during the refugee crisis in 2015
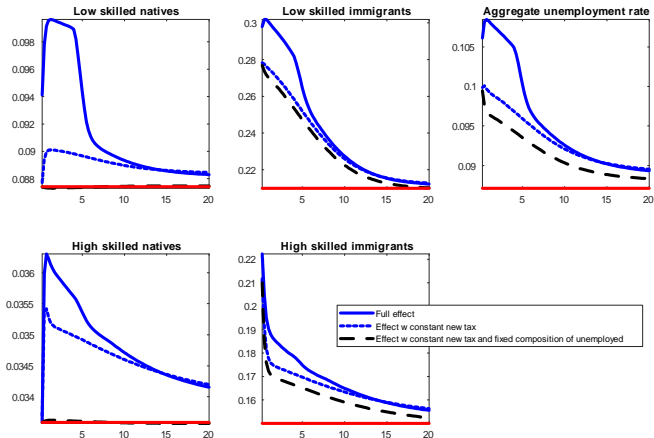 - Modelled as an increased inflow over four quarters

For comparison: **small** steady state effects of immigration

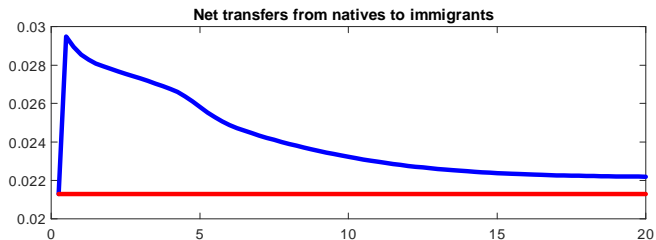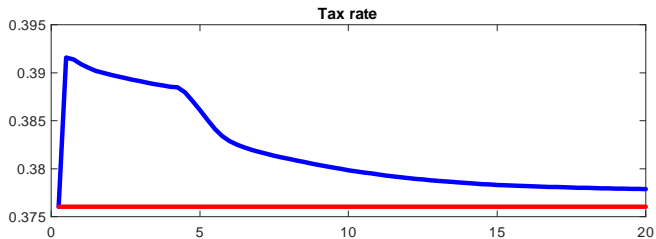|	Change from 1% more refugees
GDP per capita	-0.46%
GDP per working age	-0.60%
Aggregate unemployment	+0.30 pp
Labor income tax rate	+0.34 pp
Net transfers from natives to immigrants	+0.18 pp
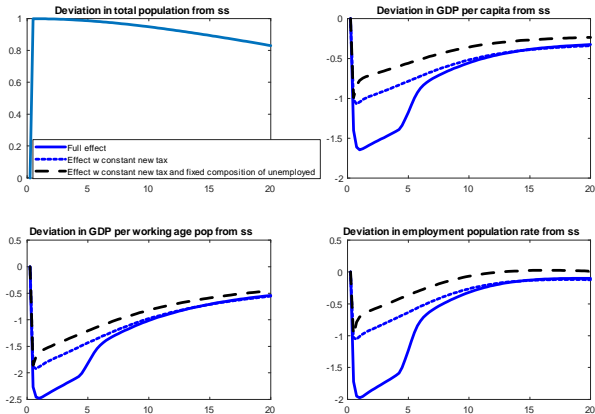
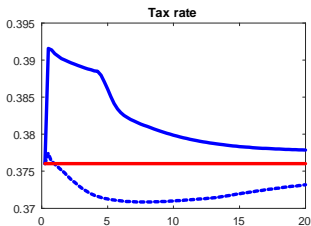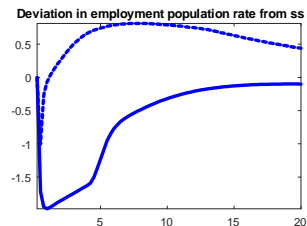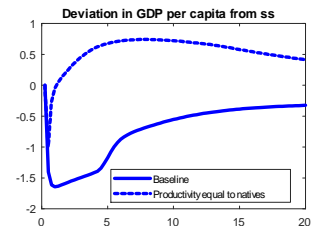# Effects on unemployment

Effects on taxes and transfers

Comparing steady state and dynamic effects of immigration

	Steady state effect	Max dynamic effect
GDP per capita	-0.46%	-1.64%
GDP per working age	-0.60%	-2.48%
Labor income tax rate	+0.30 pp	+1.55 pp
Aggregate unemployment	+0.34 pp	+2.13 pp
Net transfers from natives to immigrants	+0.18 pp	+0.82 pp
Welfare of natives	-0.35%	-0.33%

Work-permit - immigrants with same productivity as natives (demographic dividend)
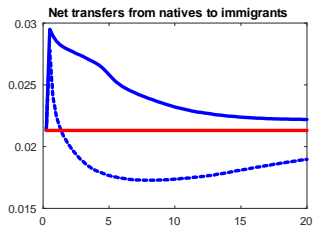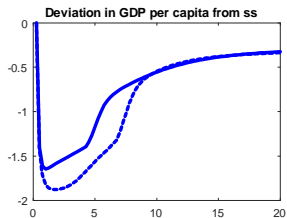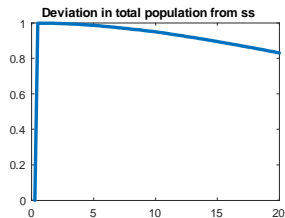
Takeaways from immigration shock results

- Fairly large initial negative effects on employment rate and GDP per capita from non-EU migration
  - Unsurprising given the low initial employment rates in data (and model)
  - Implies drag on Swedish economy
    - GDP per capita: -1.64 %
    - Unemployment: +2.13 pp
    - Taxes: +1.55 pp
    - Wages - small effect for natives
  - But effects on levels decrease over time
- Short-run effects different in *order of magnitude* compared to long-run effect
  - Confirmed that steady state analysis not sufficient
- Tax smoothing mutens effect
- Large positive effects on employment rate and GDP per capita from work-permit migration
- Demographic dividend - composition important

Concluding remarks

- Set up model to capture **dynamic** macroeconomic effects of migration
- Calibrated to Swedish recent migration and integration
    - Captures key dynamic properties of data
- Computed effects of a shock similar to the refugee crisis of 2015
    - Obtained initially negative effects on economy
    - Results robust to varying assumptions
- **All comments very welcome**
- Thank you!

Downgrading

Deviation in total population from ss

Deviation in GDP per capita from ss

Deviation in GDP per working age pop from ss

Deviation in employment population rate from ss

Baseline
Downskilling

Imperfect substitutes

Deviation in total population from ss

Deviation in GDP per capita from ss

Deviation in GDP per working age pop from ss

Deviation in employment population rate from ss

Baseline
Imperfect substitutability