

Population Momentum from Migration

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Agenda

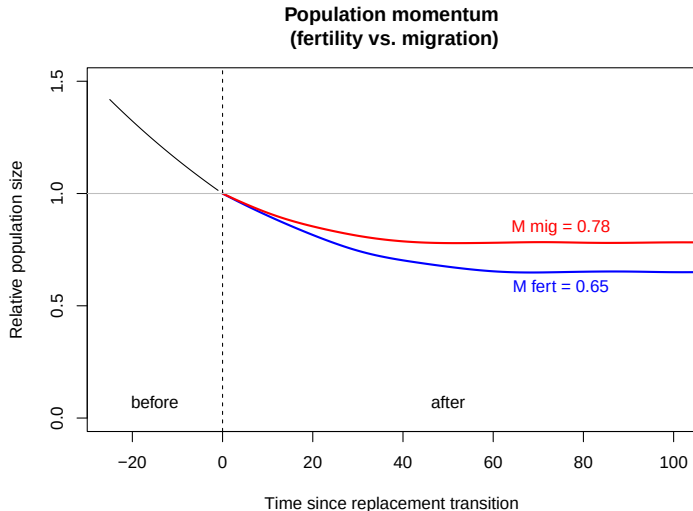
- ▶ The question
- ▶ An Austrian-inspired answer
- ▶ Understanding the answer
- ▶ A model
 - ▶ Birth effect
 - ▶ Pop effect
- ▶ Extensions
- ▶ Discussion

Research Question

- ▶ Pop momentum means decades of continued growth (or decline), even after a sudden change in fertility to replacement.
- ▶ How about an immediate change in migration to replacement?
 - ▶ Pop size?
 - ▶ Evolution of age-structure?
- ▶ New area?

Asymptotic, steady-state well studied (e.g., Espenshade, Schmerttman, Alho), but transitional dynamics not yet investigated

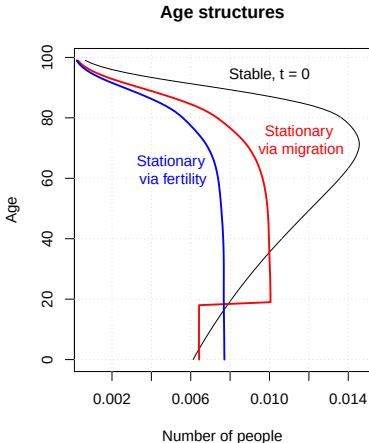
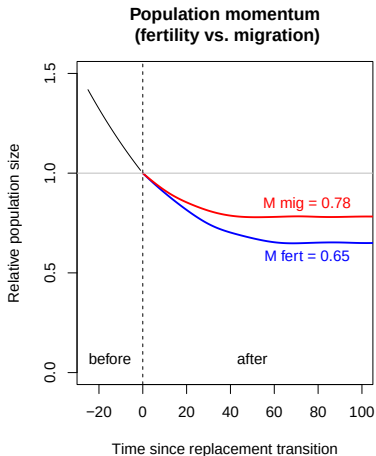
The answer: replacement-migration has less momentum



Austria (2023) fertility, life table, and stable age-structure.
All migrants arrive at age $\alpha = 18$.

Why less momentum for migration?

Fewer births, but a lot more people per birth



A model to explain what's going on

Assumptions (based on Alho)

- ▶ Immigrants arrive at single age α .
- ▶ Immigrant rate proportional to natives “sponsors” themselves aged α
- ▶ Lifetime “production”: NRR babies *plus* c migrants aged α

Migrant momentum scenario (imitating Keyfitz on fertility)

- ▶ Begin with closed, stable population.
- ▶ At time t_0 , migration begins.
- ▶ Level of migration is chosen so that $c = c_0$ makes intrinsic growth rate is 0.
- ▶ After transitional waves, births and pop size become stationary.

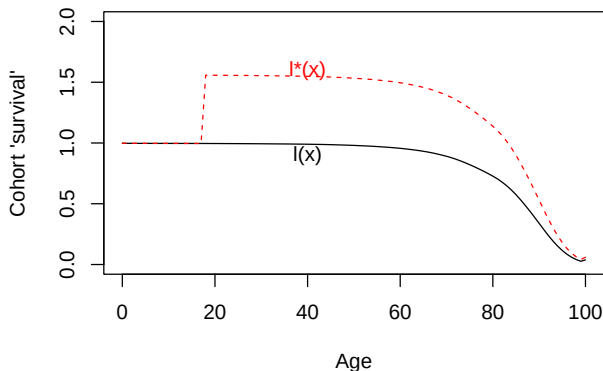
A formal result on births

When immigrants arrive before fertility starts

$$\lim_{t \rightarrow \infty} \frac{B(t)}{B(0)} \approx e^{r\alpha} e^{-r\mu/2}$$

Close to 1.0 if immigration about half of mean age of childbearing.

Intuition on age-structure: migrants inflate survival



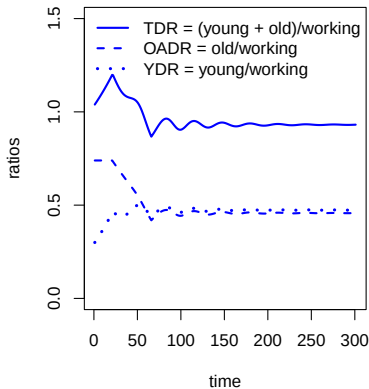
$$\ell^*(a) = \begin{cases} \ell(a), & a < \alpha, \\ \ell(a) [1 + c] = \ell(a)/NRR, & a \geq \alpha. \end{cases}$$

So Momentum Is Smaller

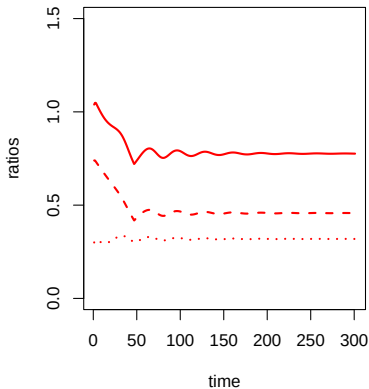
- ▶ Not because of the birth stream.
- ▶ The birth-stream effect alone should actually cause more momentum than fertility.
- ▶ The key mechanism is the age structure: “more people per birth”: $\int \ell^*(a) da \gg \int \ell(a) da$

Transitional Dynamics of Dependency

**Dependency
fertility scenario**



**Dependency
migration scenario**



Summary of results

- ▶ Less momentum for migration-scenario than fertility-scenario.
(In a previously declining pop, stationary pop will be bigger.)
- ▶ Less dependency, too.
(Old-age dependency about the same but young dependency much lower.)

Realism?

- ▶ Adding people at the onset of childbearing may not be a major loss of generality.
- ▶ Not very different from older migrants arriving with already-born children.
- ▶ Dependency ratios improve because youth dependency is low, but needs human capital investment in origin country
- ▶ Politics?

Extensions

- ▶ A range of immigration ages
- ▶ Non-stable start
- ▶ Analysis of migration magnitudes
- ▶ Gradual migration momentum
- ▶ Alternative migration models (additive, algorithmic, ...)

Discussion

- ▶ Much of the literature (e.g., UN “Replacement Migration”) is pessimistic about immigration as a solution to population decline and aging.
- ▶ Our formal analysis suggests otherwise.
- ▶ A country that can incorporate migrants can control its demographic destiny in size and structure.
- ▶ (Encouraging young adults to study and stay in low-fertility countries may not be such a bad idea.)
- ▶ (Analogy: forming a sports team — recruit someone ready to play, or a “baby” you must train first?)