MAX-PLANCK-INSTITUT
FÜR DEMOGRAFISCHE
FORSCHUNG

MAX PLANCK INSTITUTE
FOR DEMOGRAPHIC
RESEARCH

MAX-PLANCK-INSTITUT
FÜR DEMOGRAFISCHE
FORSCHUNG

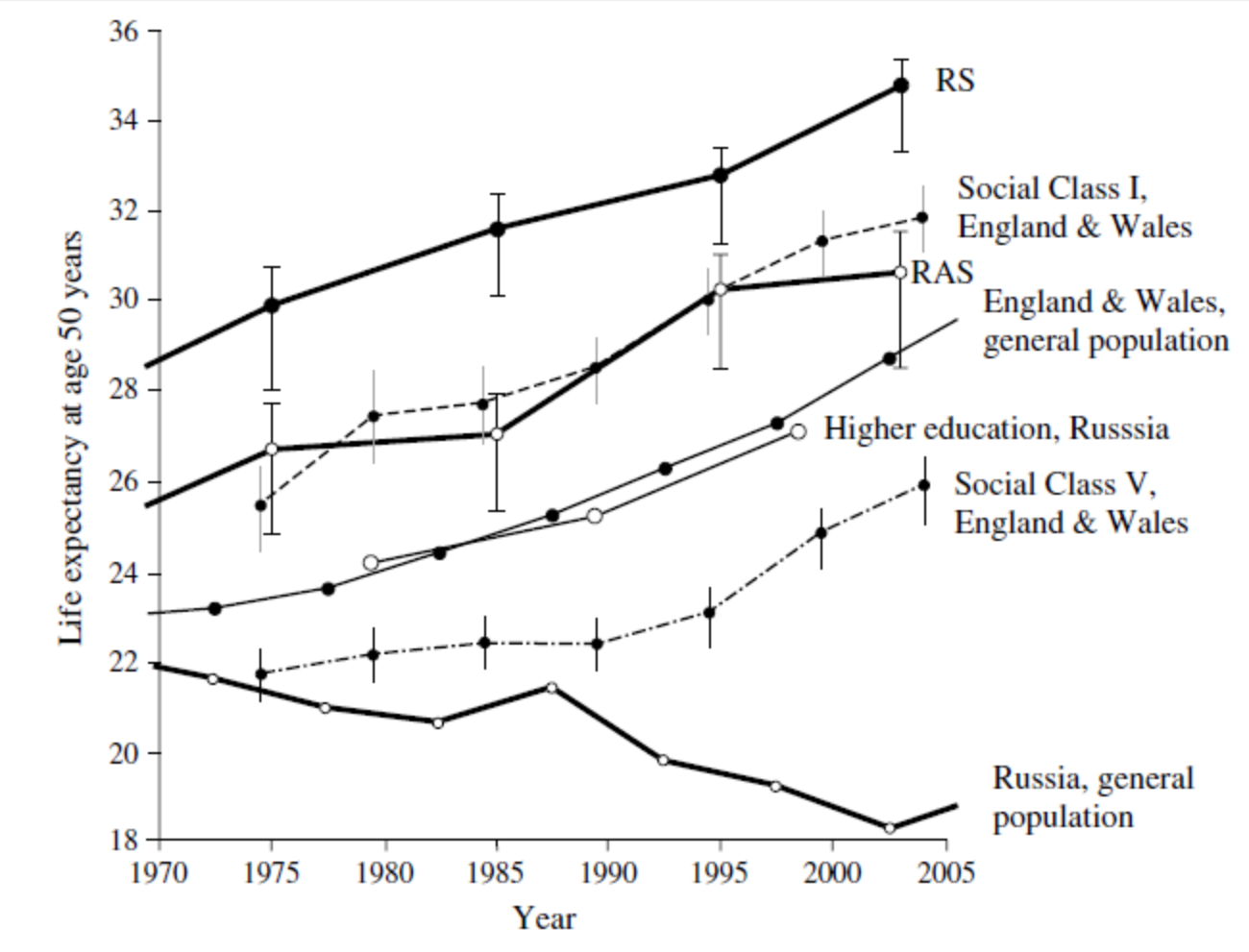
MAX PLANCK INSTITUTE
FOR DEMOGRAPHIC
RESEARCH

Social Connectedness and Social Change

Sebastian Klüsener

joint research with Martin Dribe and Francesco Scalone

Social Status and Spatial Context



RS=Royal Society

RAS= Russian Academy of Science

Andreev et al. (2011)

Why?

What if?

Social Connectedness and Social Change

Well-founded theoretical understanding of how social interaction affects social change

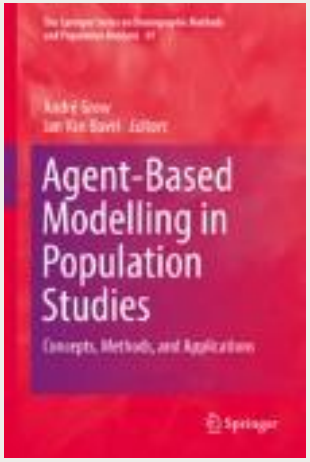
But: Potential role of social interaction in shaping macro-level demographic phenomena still little explored

Social Connectedness and Social Change

Well-founded theoretical understanding of how social interaction affects social change

But: Potential role of social interaction in shaping macro-level demographic phenomena still little explored

→ Agent-based simulations allow to explore this role
Grow and Van Bavel (2017): Agent-Based Modelling in Population Studies. Springer.



Social Connectedness and Social Change

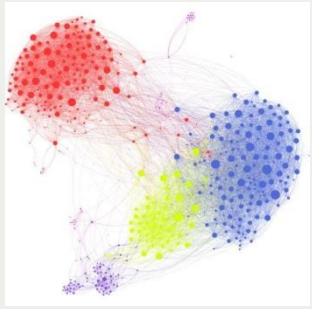
Well-founded theoretical understanding of how social interaction affects social change

But: Potential role of social interaction in shaping macro-level demographic phenomena still little explored

→ Agent-based simulations allow to explore this role
Grow and Van Bavel (2017): Agent-Based Modelling in Population Studies. Springer.

→ Perfect time to do move in this direction

IPUMS INTERNATIONAL



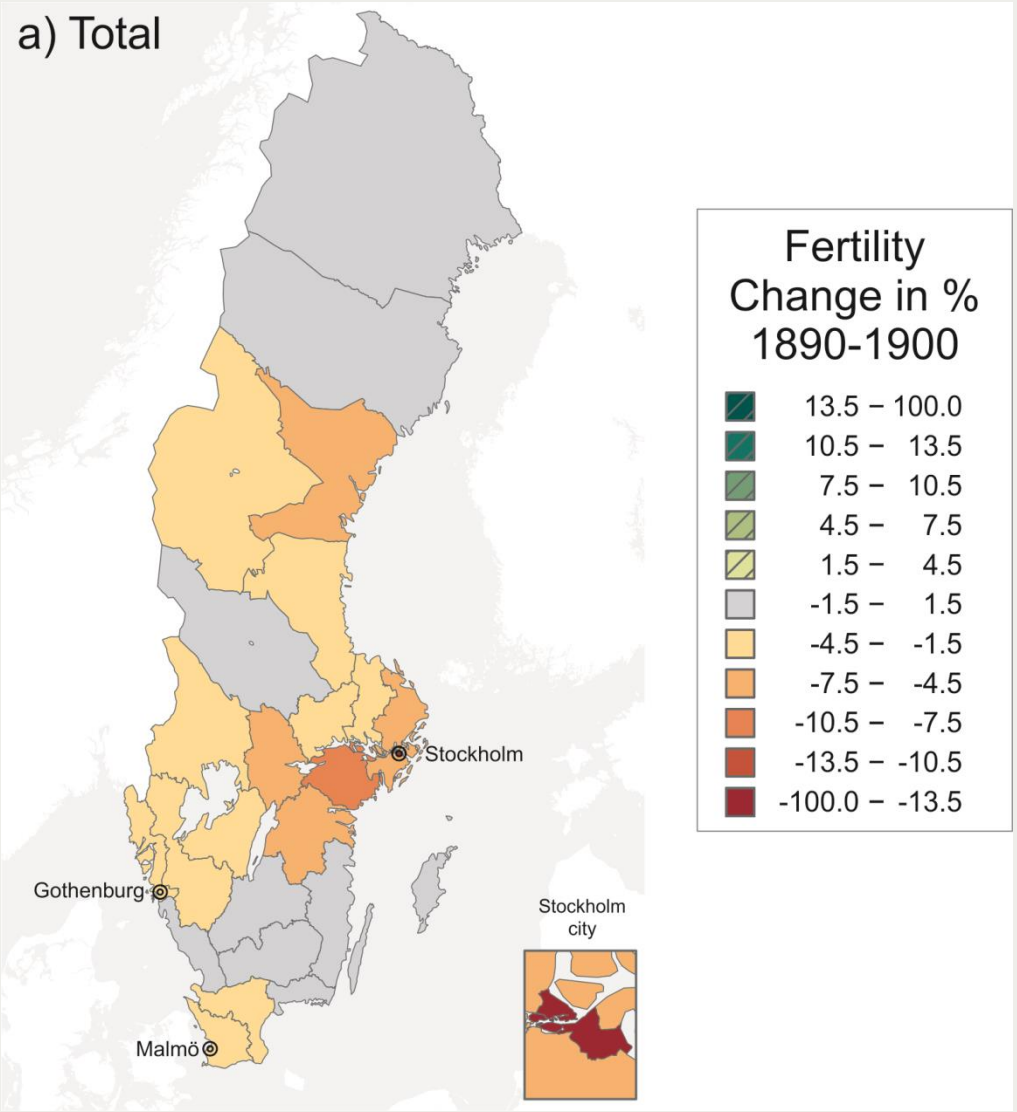
Our Research Question

Which factors **shape** fertility decline patterns in space and time during the demographic transition?

Our Research Question

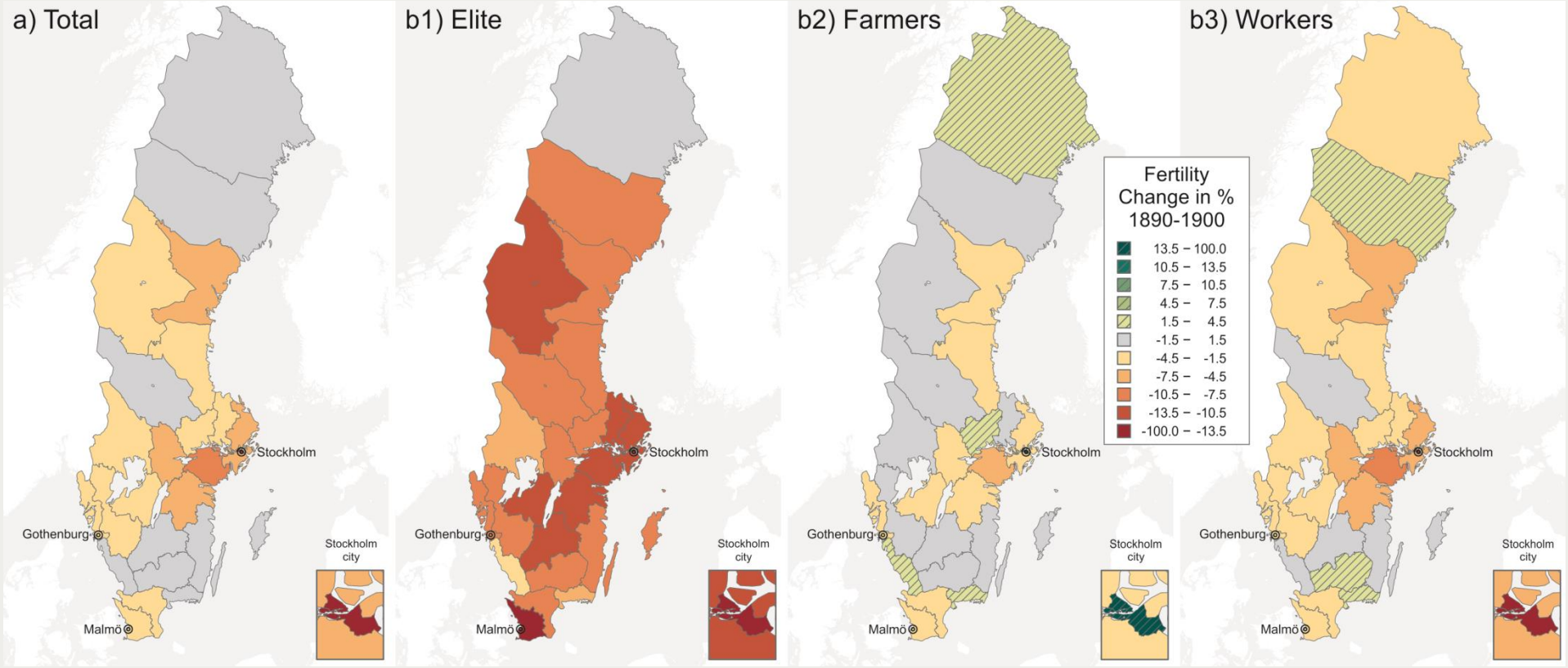
Which factors **shape** fertility decline patterns in space and time during the demographic transition?

Fertility Decline in Sweden
Observed Change in Child-Woman Ratio 1890-1900



Klüsener, Scalone, and Dribe 2017

Fertility Decline in Sweden
Observed CWR-Change by SES 1890-1900



Klüsener, Scalone, and Dribe 2017

Social Connectedness and Social Change

Carlsson (1966):

Fertility decline as part of the demographic transition
- adjustment to socioeconomic change
- diffusion of innovations

Social Connectedness and Social Change

Carlsson (1966):

Fertility decline as part of the demographic transition
- adjustment to socioeconomic change
- diffusion of innovations

→ Both mechanisms require access to information

Social Connectedness and Social Change

Carlsson (1966):

Fertility decline as part of the demographic transition
- adjustment to socioeconomic change
- diffusion of innovations

→ Both mechanisms require access to information

→ This access varies by
- social group (class, ethnicity, religion)
- spatial location ("*Hinterwäldler*")

Social Connectedness and Social Change

Carlsson (1966):

Fertility decline as part of the demographic transition
- adjustment to socioeconomic change
- diffusion of innovations

→ Both mechanisms require access to information

→ This access varies by
- social group (class, ethnicity, religion)
- spatial location ("*Hinterwäldler*")

→ Might cause temporal lags in the adjustment to structural change

Social Connectedness and Social Change

Carlsson (1966):

Fertility decline as part of the demographic transition
- adjustment to socioeconomic change
- diffusion of innovations

→ Both mechanisms require access to information

→ This access varies by
- social group (class, ethnicity, religion)
- spatial location ("*Hinterwäldler*")

→ Might cause temporal lags in the adjustment to structural change

Access to information can also impede social change (Lesthaeghe 1980).

Social Connectedness and Social Change

Torsten Hägerstrand

Time Geography

European Journal of Sociology (1965):

TORSTEN HÄGERSTRAND

A Monte Carlo Approach to Diffusion

Social Connectedness and Social Change

Torsten Hägerstrand

Time Geography

Simon Szreter

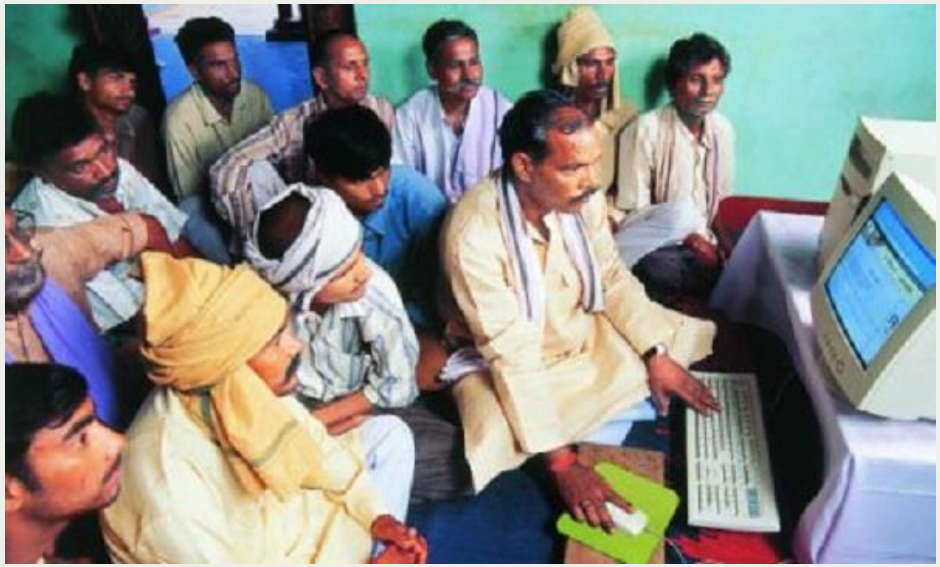
Communication
Communities

Susan Watkins

Social Interaction

Social Status and Communication through Space

Social Status and Communication through Space



Social Processes potentially shaped by Communication Processes

Communication affects:

- shifts in norms and attitudes
- diffusion of best practises/technologies
- awareness about changes in structural conditions/ geographies of opportunities

Social Processes potentially shaped by Communication Processes

Communication affects:

- shifts in norms and attitudes
- diffusion of best practises/technologies
- awareness about changes in structural conditions/ geographies of opportunities

Process for which this might be relevant:

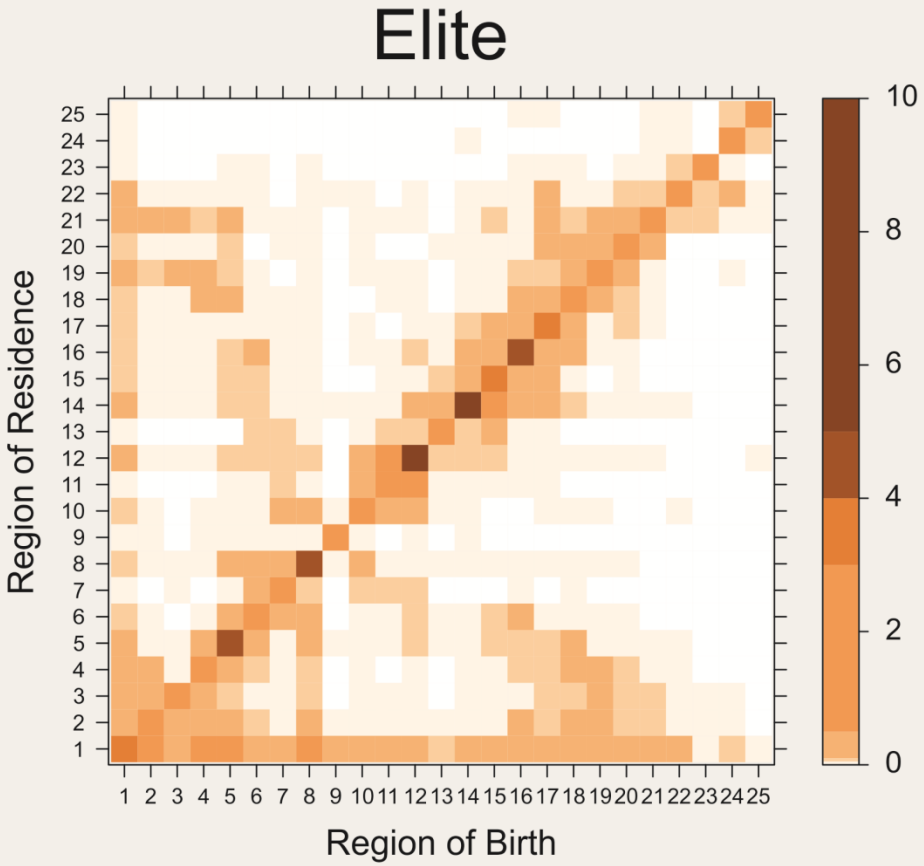
- fertility change
- longevity revolution
- migration patterns and networks
- union formation and dissolution
- gender roles
- policy effects

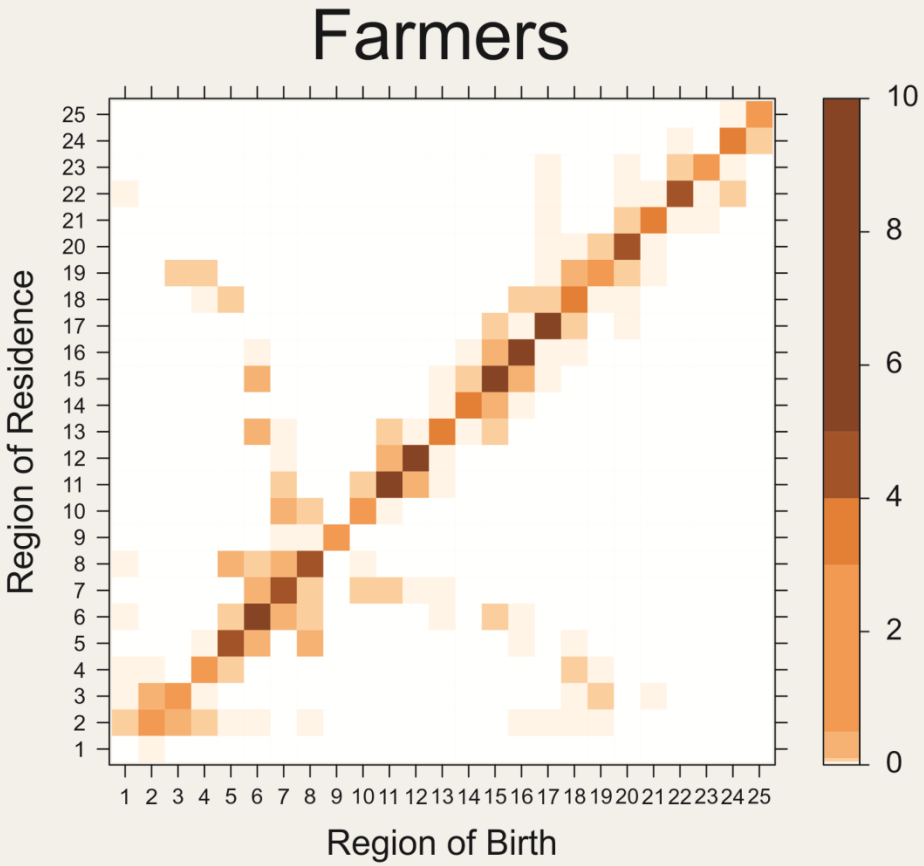
Our Simulation Model

- Simulation of the diffusion of reductions in fertility as a pure information diffusion process (*ceteris paribus*)

- 100%-sample of married women in Sweden 1880
  - 25 regions
  - 3 social classes (HISCLASS)
    - Elite
    - Farmers
    - Workers

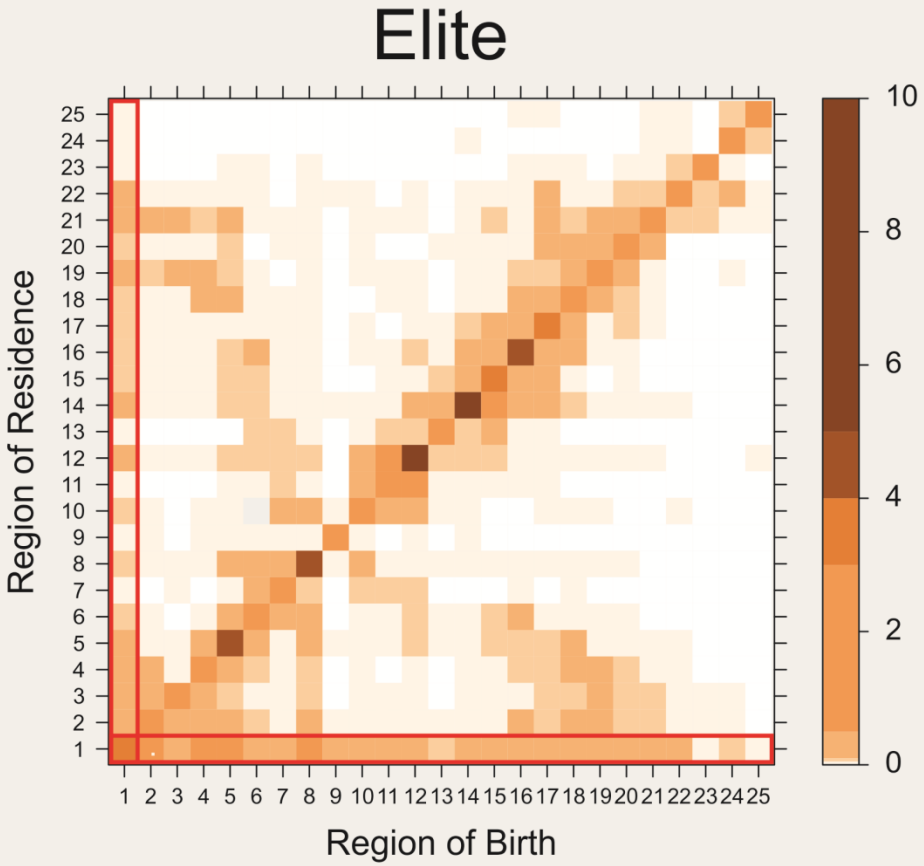
Life-time Migration Links between Swedish Regions Elite vs. Farmers in Census 1880

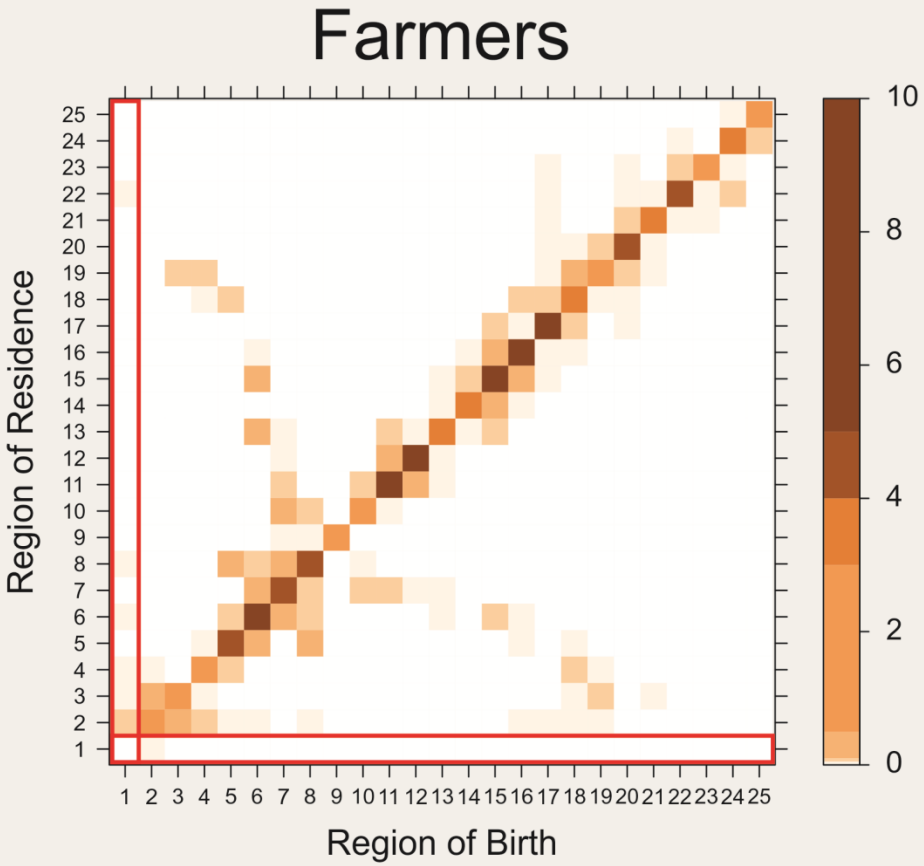




Source: Micro-level census data, SweCens,
The Swedish National Archives, own calculations

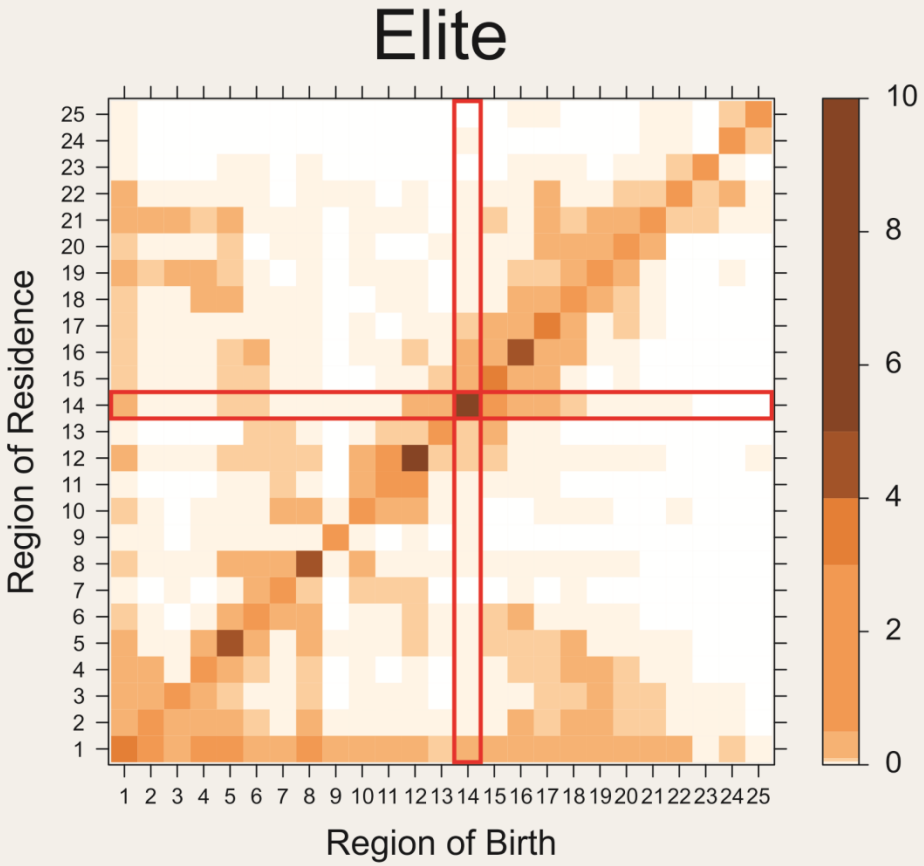
Life-time Migration Links between Swedish Regions
Elite vs. Farmers in Census 1880 – Stockholm city

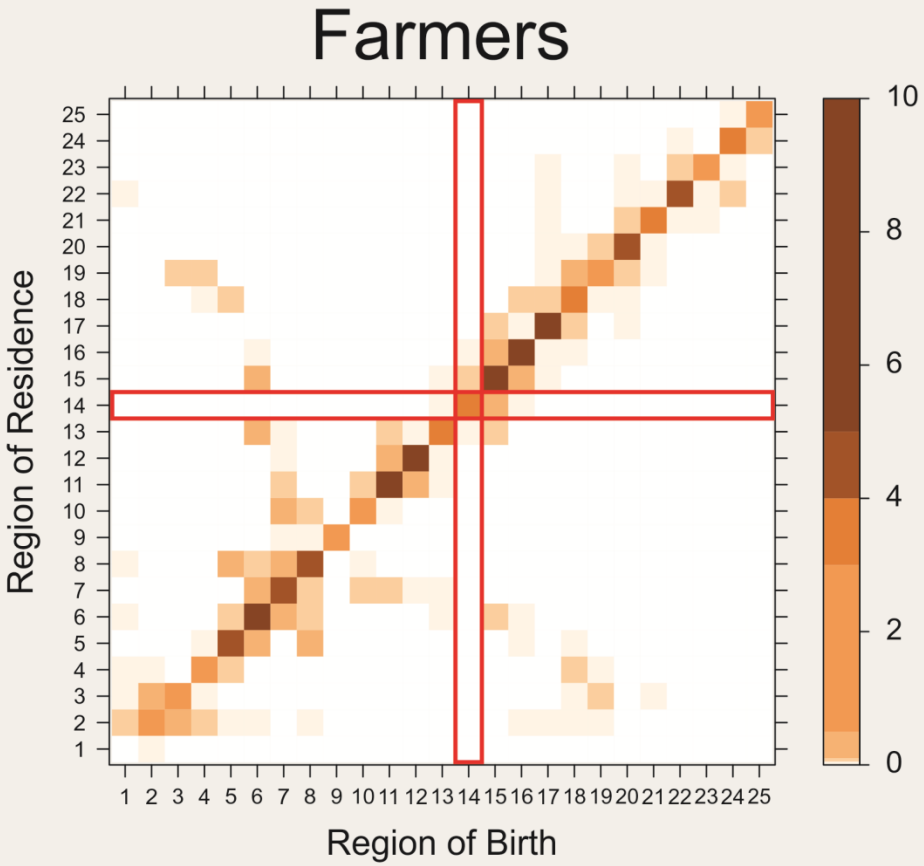




Source: Micro-level census data, SweCens,
The Swedish National Archives, own calculations

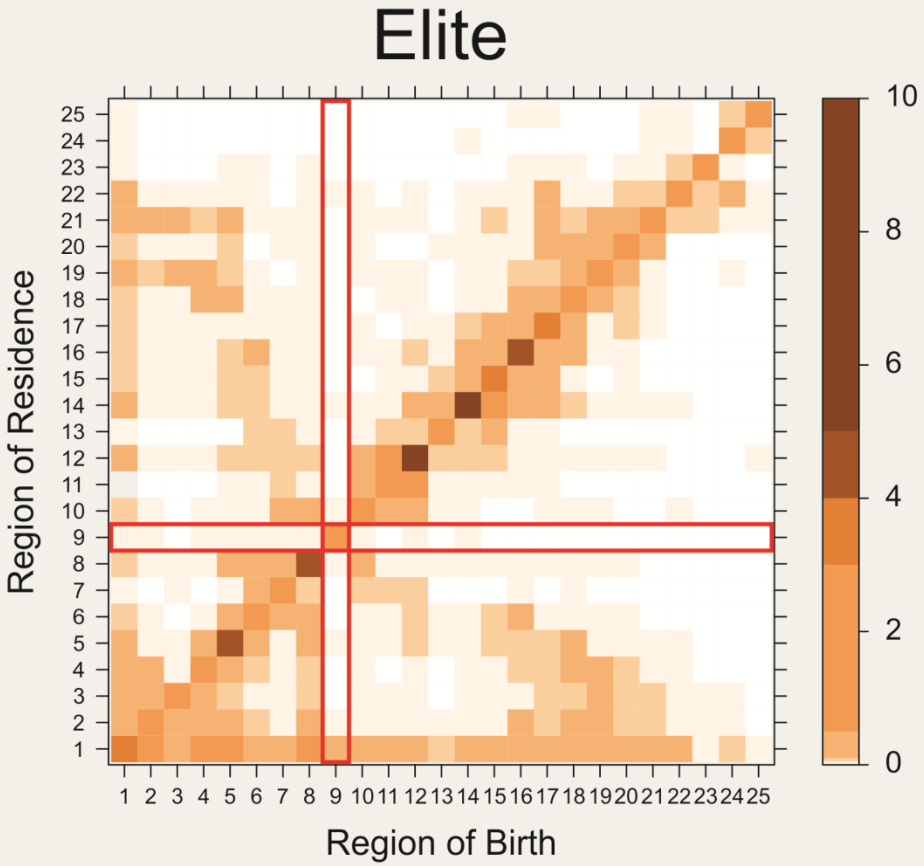
Life-time Migration Links between Swedish Regions
Elite vs. Farmers in Census 1880 – Gothenburg

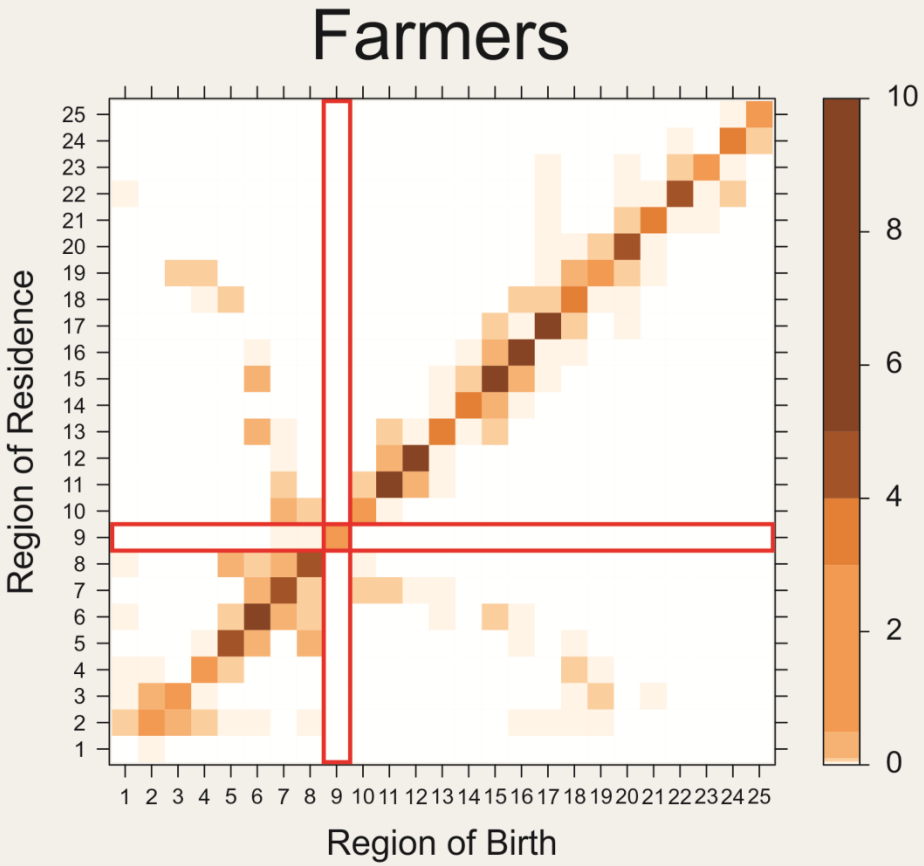




Source: Micro-level census data, SweCens,
The Swedish National Archives, own calculations

Life-time Migration Links between Swedish Regions
Elite vs. Farmers in Census 1880 – Gotland





Source: Micro-level census data, SweCens,
The Swedish National Archives, own calculations

The Simulation Model

- We assume the process to be irreversible (non-adopted → adopted)

- Adopted reductions in fertility dependent on share adopted in "social surrounding"

ws
- in the vanguard group
- in the same social class

(region of residence)

wr
- in the same social class

(region of birth)

pace *x*

The Simulation Model

$$RA_{s,t} = \frac{(SAR_{vs,t} * ws + SAR_{s,t} * (1 - ws)) * wr + SAB_{s,t} * (1 - wr)}{100} * x$$

Example: Deriving adoption risk of a woman at time *t*:

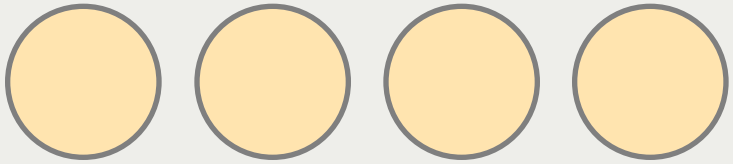
0.9	*0.1* - in the vanguard group	(reg. of residence)	*10%*
	0.9 - in the same social class		*5%*
0.1 - in the same social class		(reg. of birth)	*2%*

Pace *10*

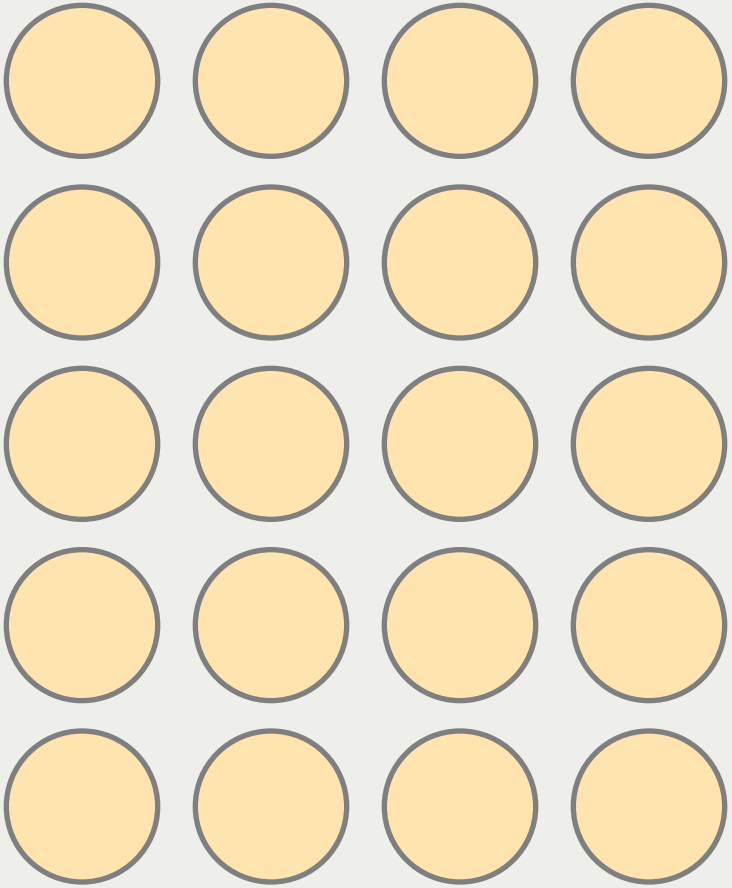
Adoption risk: *0.515%* Random number: 0.00 bis 100.00

The Simulation Model
Randomness and Group Size

Elite (remote region)



Farmers (remote region)

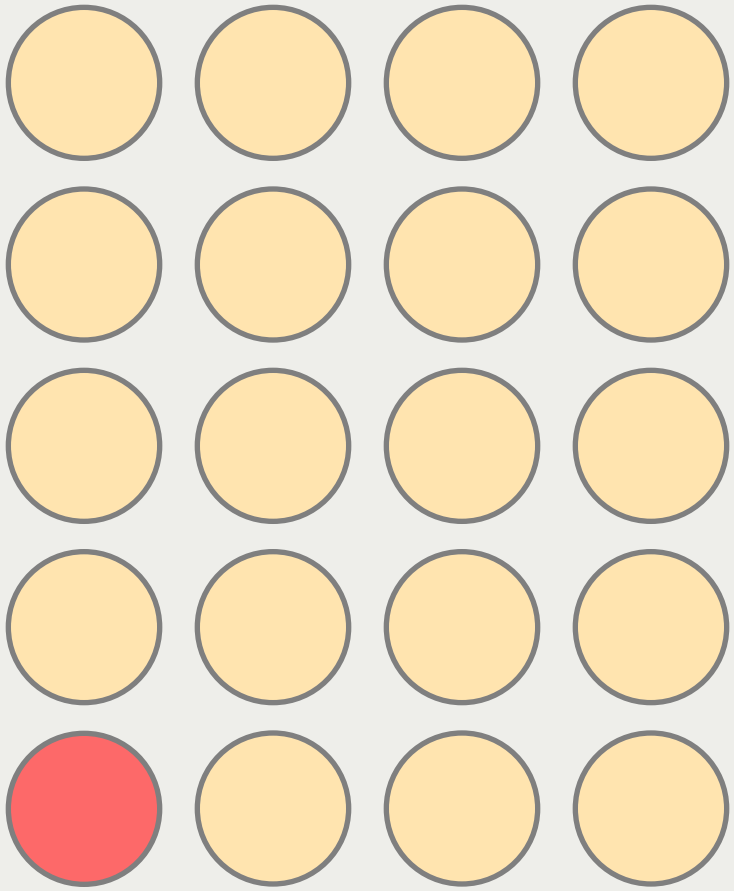


The Simulation Model
Randomness and Group Size

Elite (remote region)

25%

Farmers (remote region)

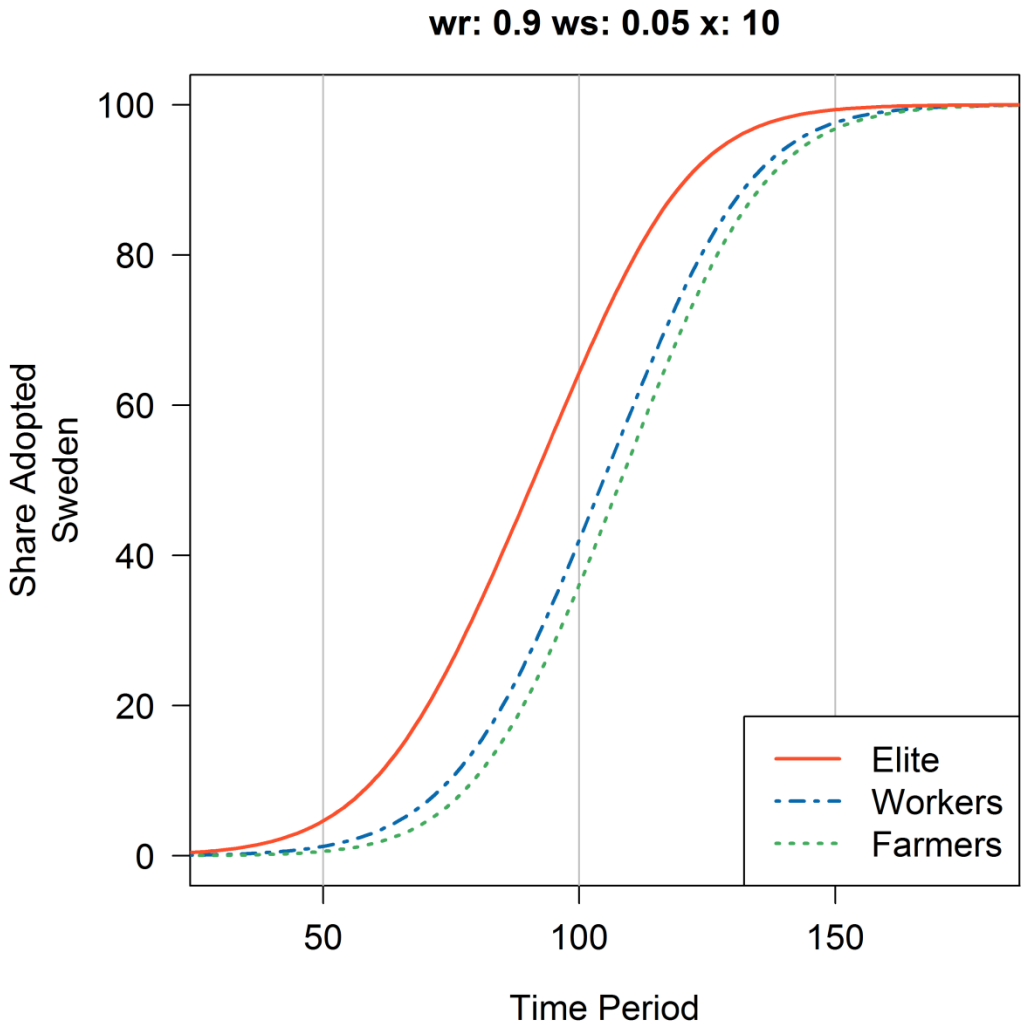


5%

Scenario 1: Diffusion from Vanguard Countries (All Women born in France and Belgium)

32 → 488438

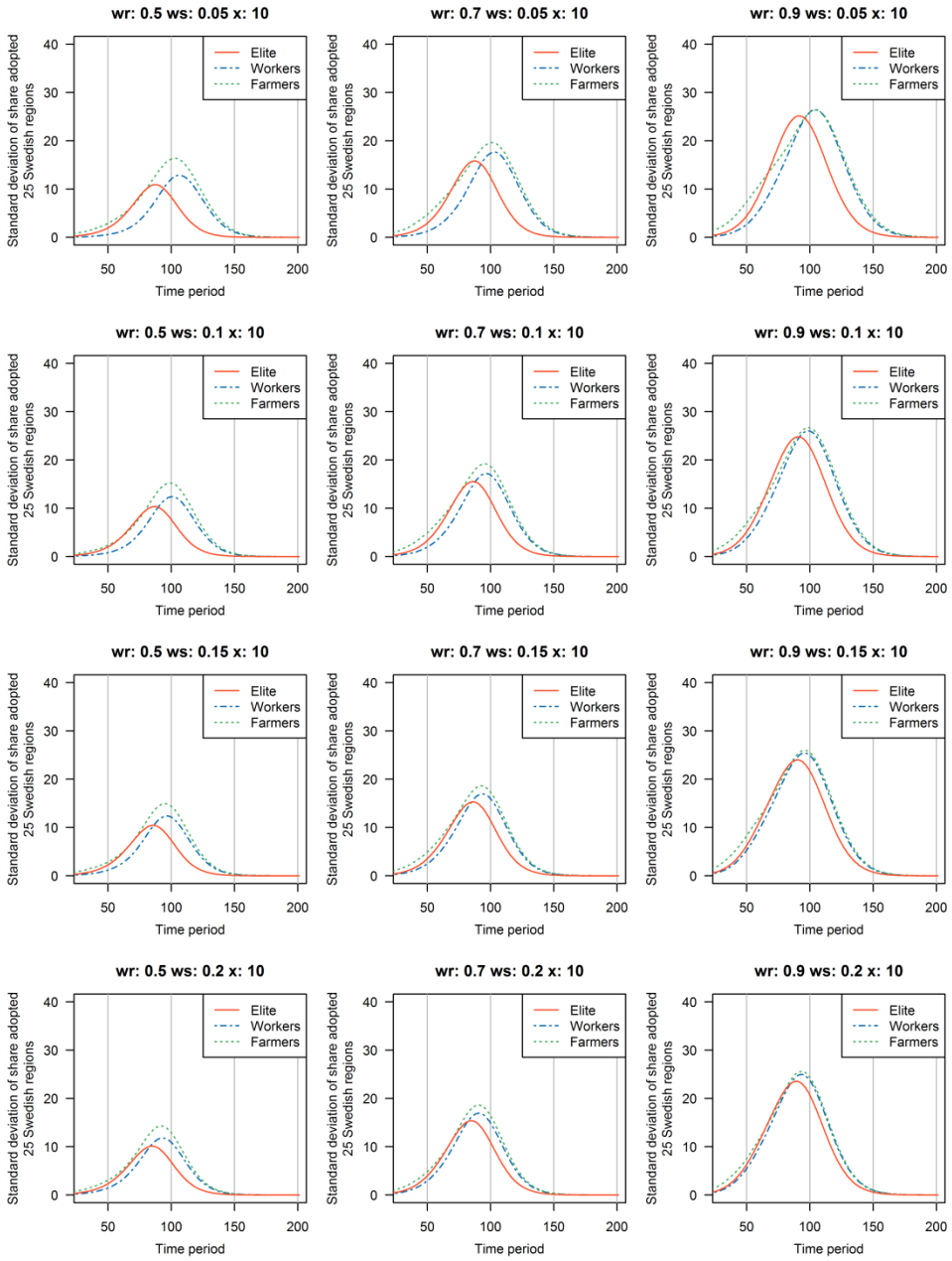
Scenario 1: Diffusion from Vanguard Countries



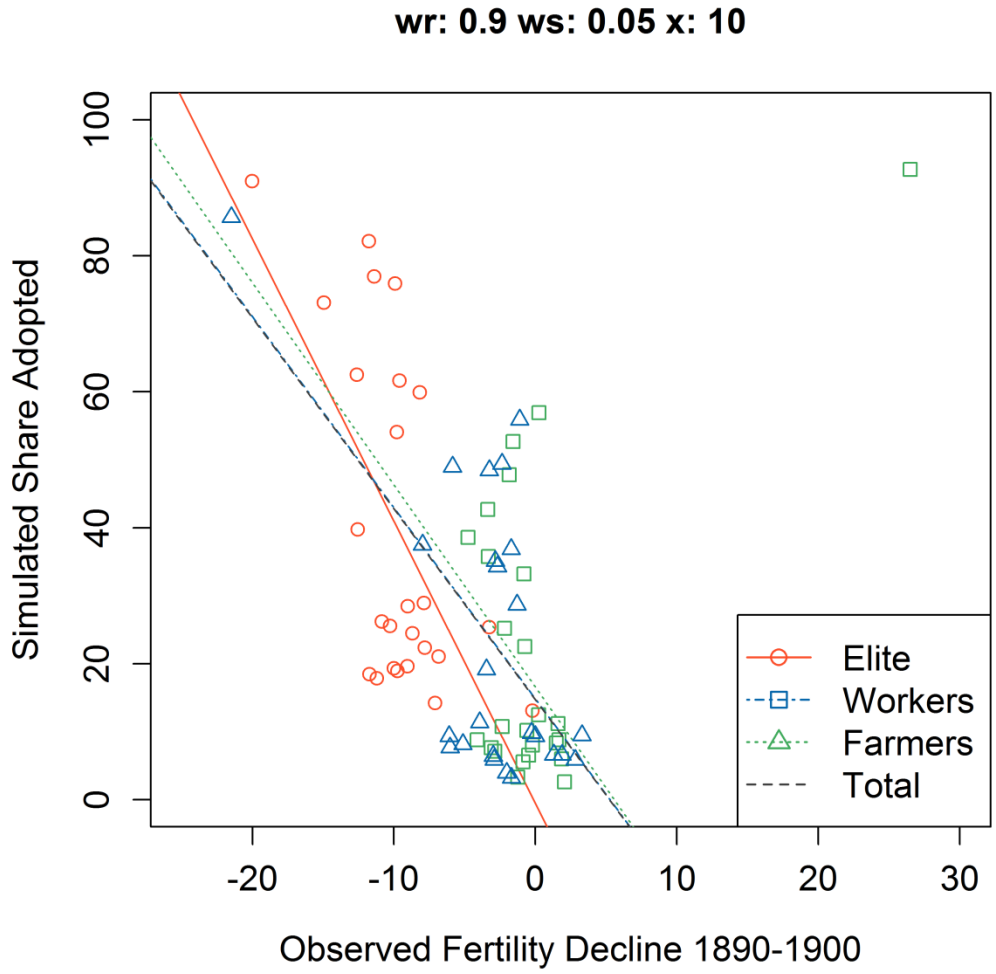
Average of 100 Simulations

Klüsener, Dribe and Scalone, work in progress

Scenario 1: Regional variation



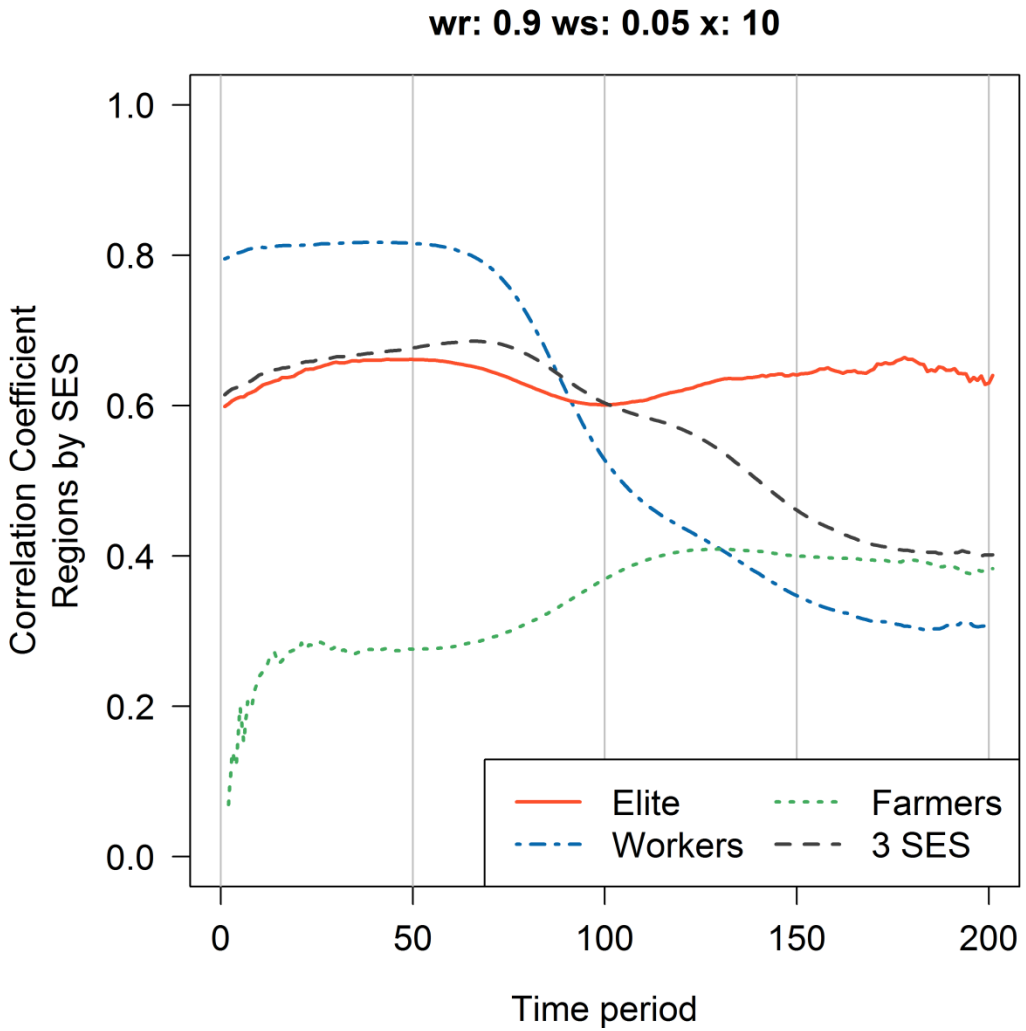
Scenario 1: Diffusion from Vanguard Countries



Average of 100 Simulations

Klüsener, Dribe and Scalone, work in progress

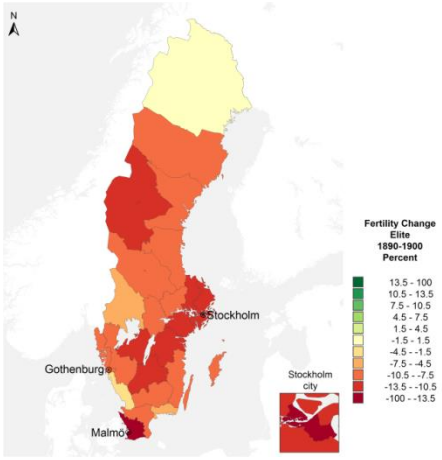
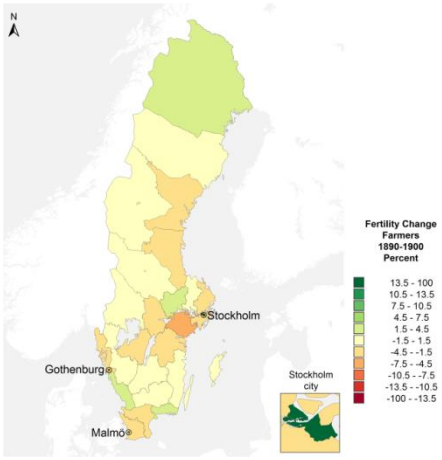
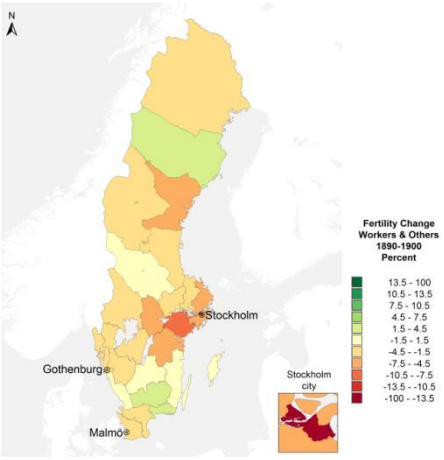
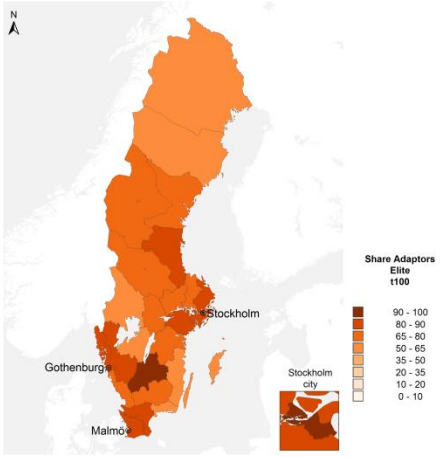
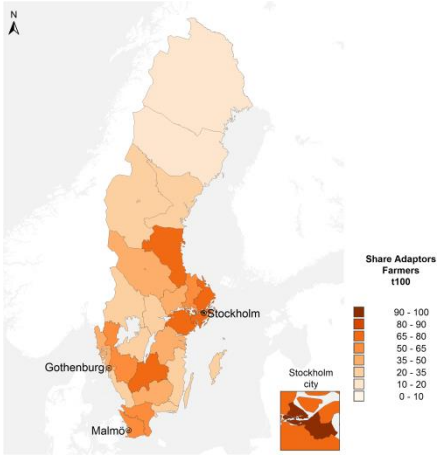
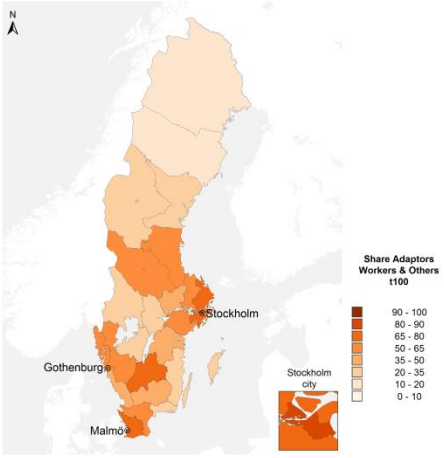
Scenario 1: Diffusion from Vanguard Countries



Average of 100 Simulations

Klüsener, Dribe and Scalone, work in progress

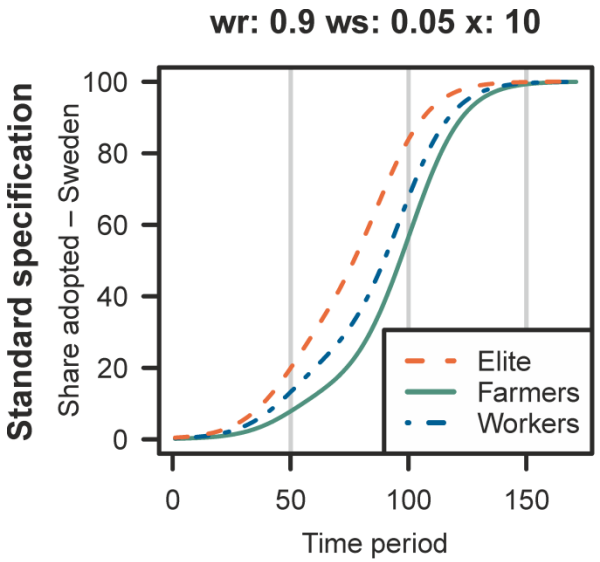
Scenario 1: Diffusion from Vanguard Countries

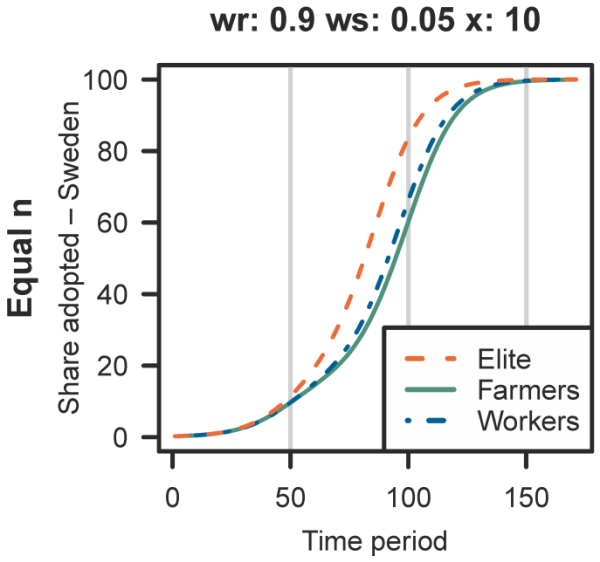
	Elite	Farmers	Workers
Observed			
Modelled			

Klüsener, Dribe and Scalone, work in progress

Exploring the model mechanisms

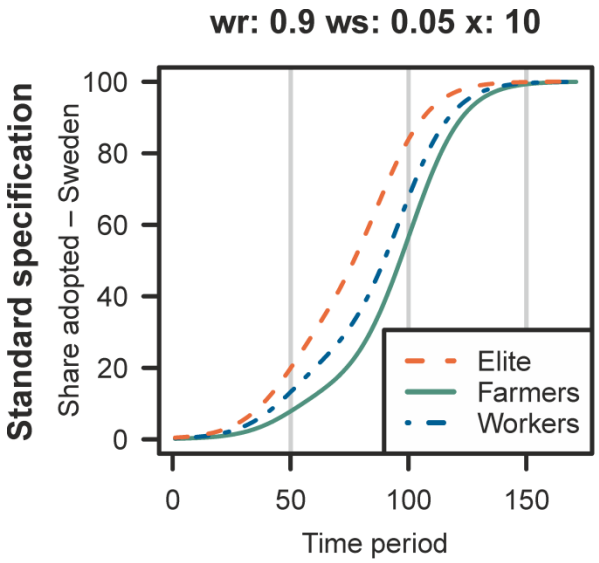
What drives the model outcomes? Diffusion from Big cities Scenario

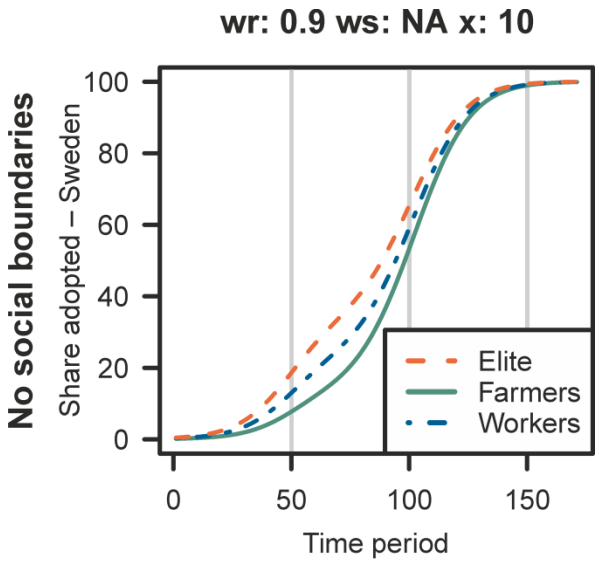


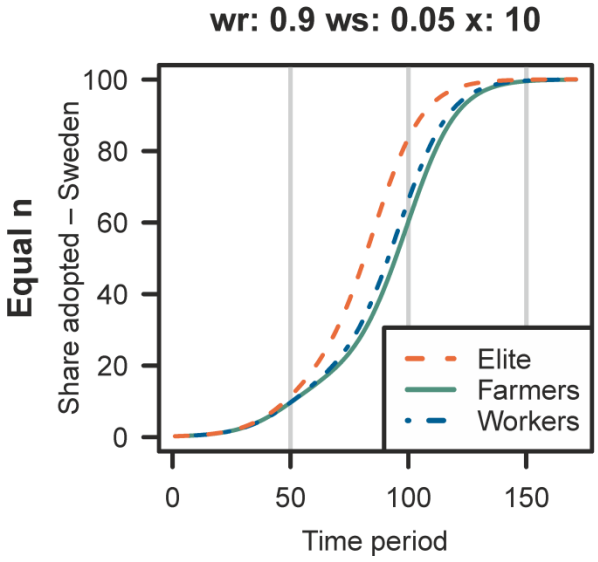


Klüsener, Dribe and Scalone, 2017

What drives the model outcomes? Diffusion from Big cities Scenario

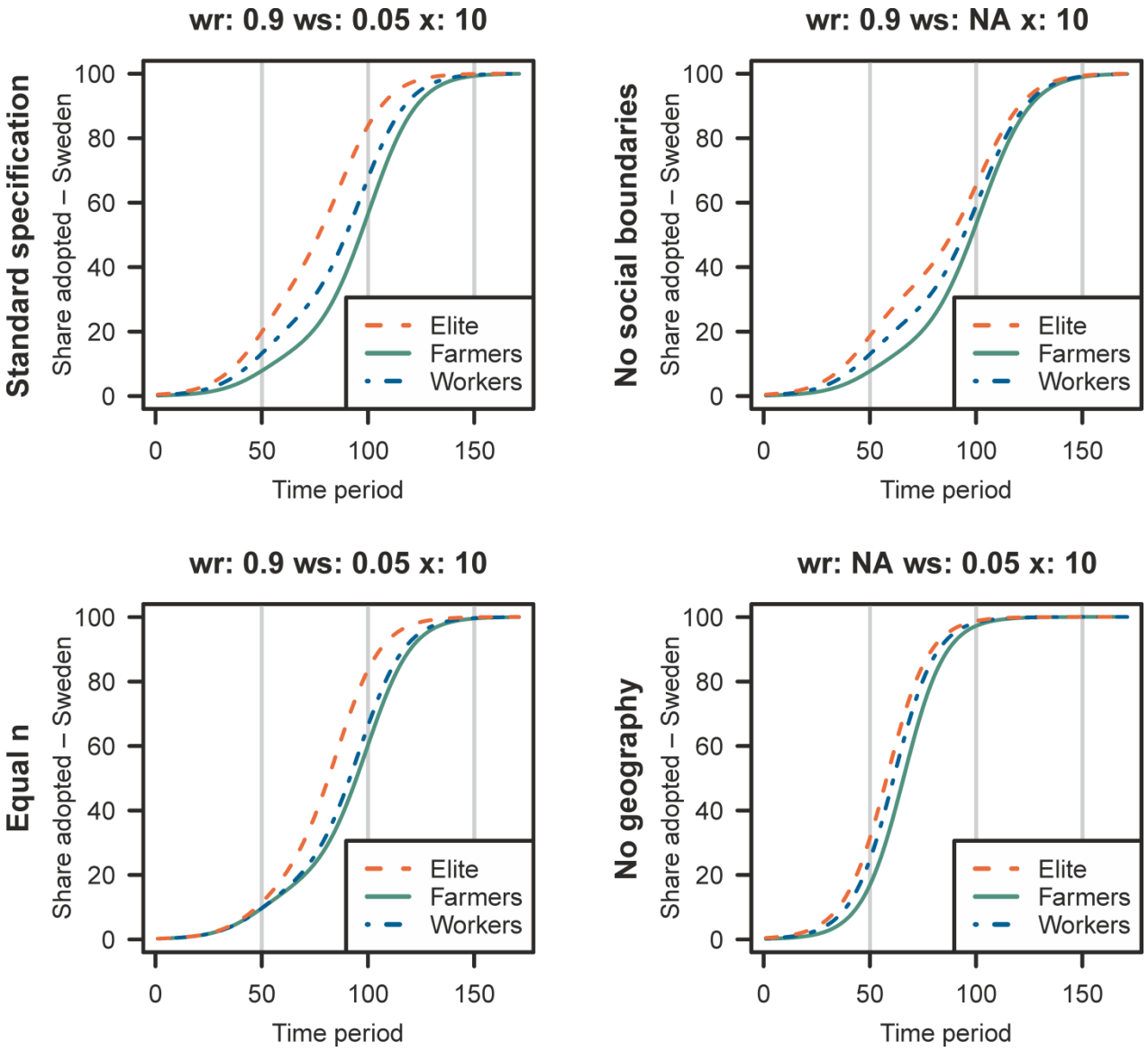






Klüsener, Dribe and Scalone, 2017

What drives the model outcomes? Diffusion from Big cities Scenario



Klüsener, Dribe and Scalone, 2017

Why do these Simulations work quite well?

Migration could act as proxies for other processes

- higher adaptation pressure in places to which many people migrate
- nation building processes
- regions with low levels of in-migration might be more conservative

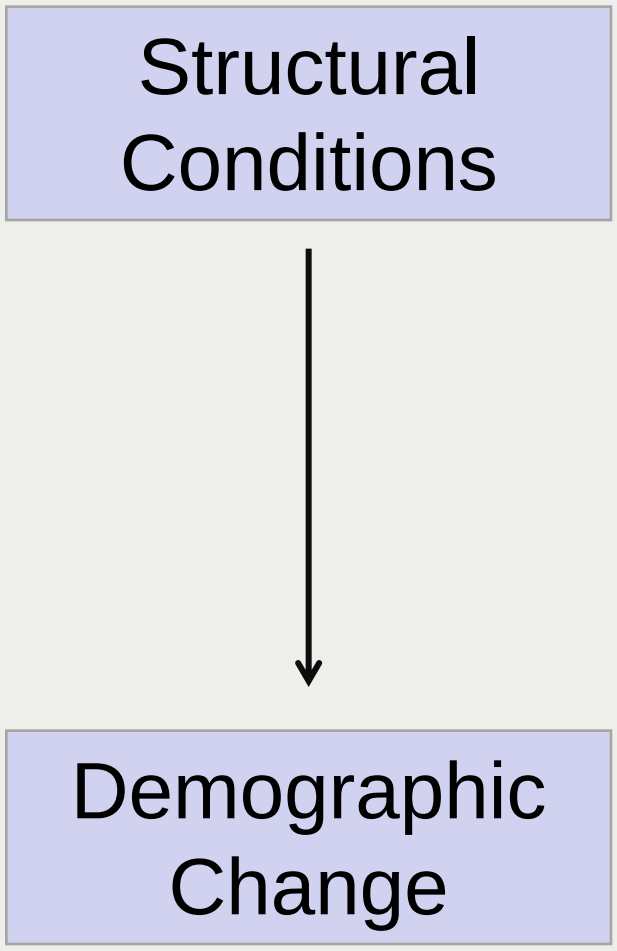
Why do these Simulations work quite well?

Migration could act as proxies for other processes

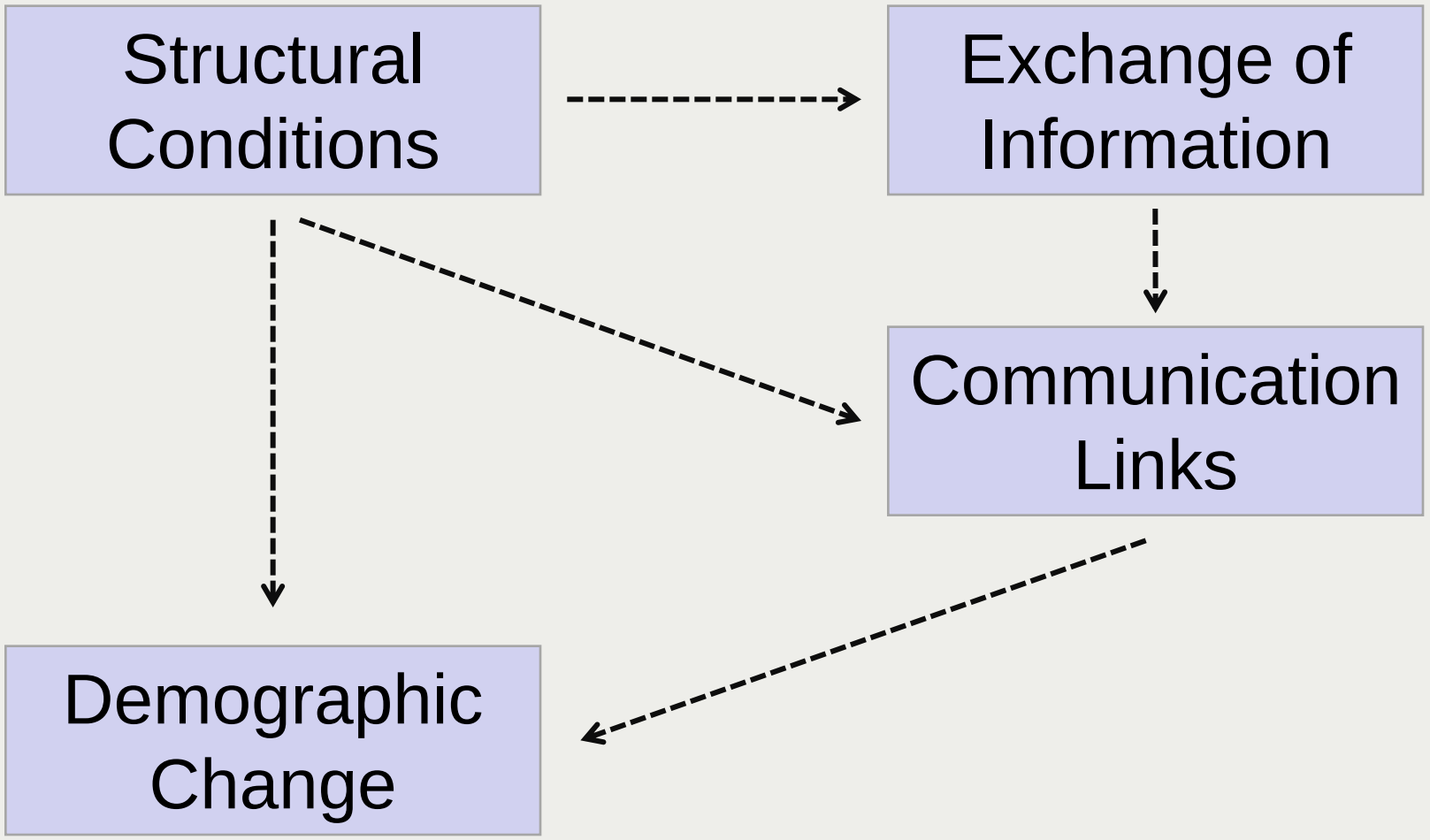
- higher adaptation pressure in places to which many people migrate
- nation building processes
- regions with low levels of in-migration might be more conservative

But: Our ceteris paribus simulations show that these processes do not need to occur in parallel.

Causing vs. Shaping Factors

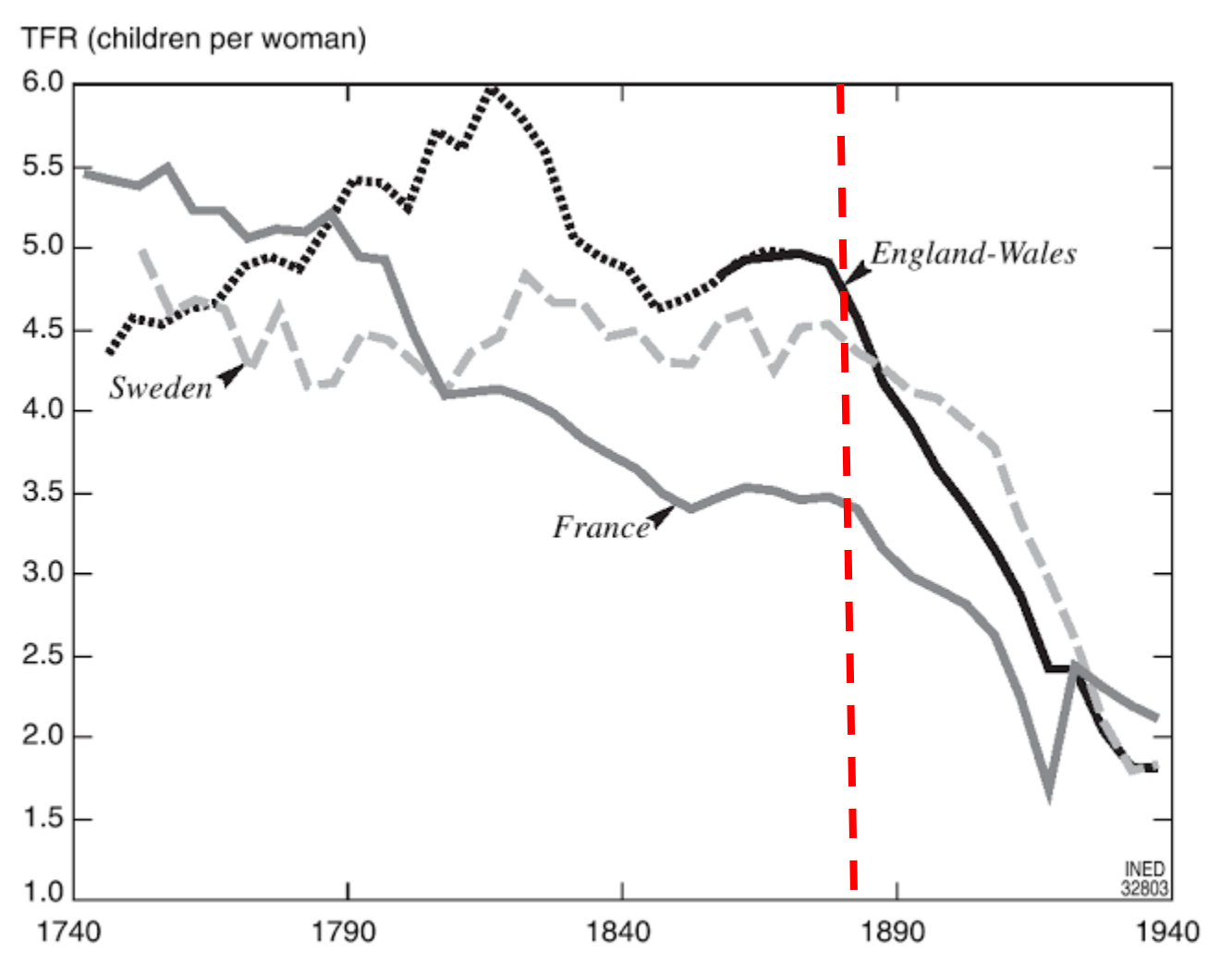


Causing vs. Shaping Factors



Global Perspective

Why was the transition in France initially so slow?



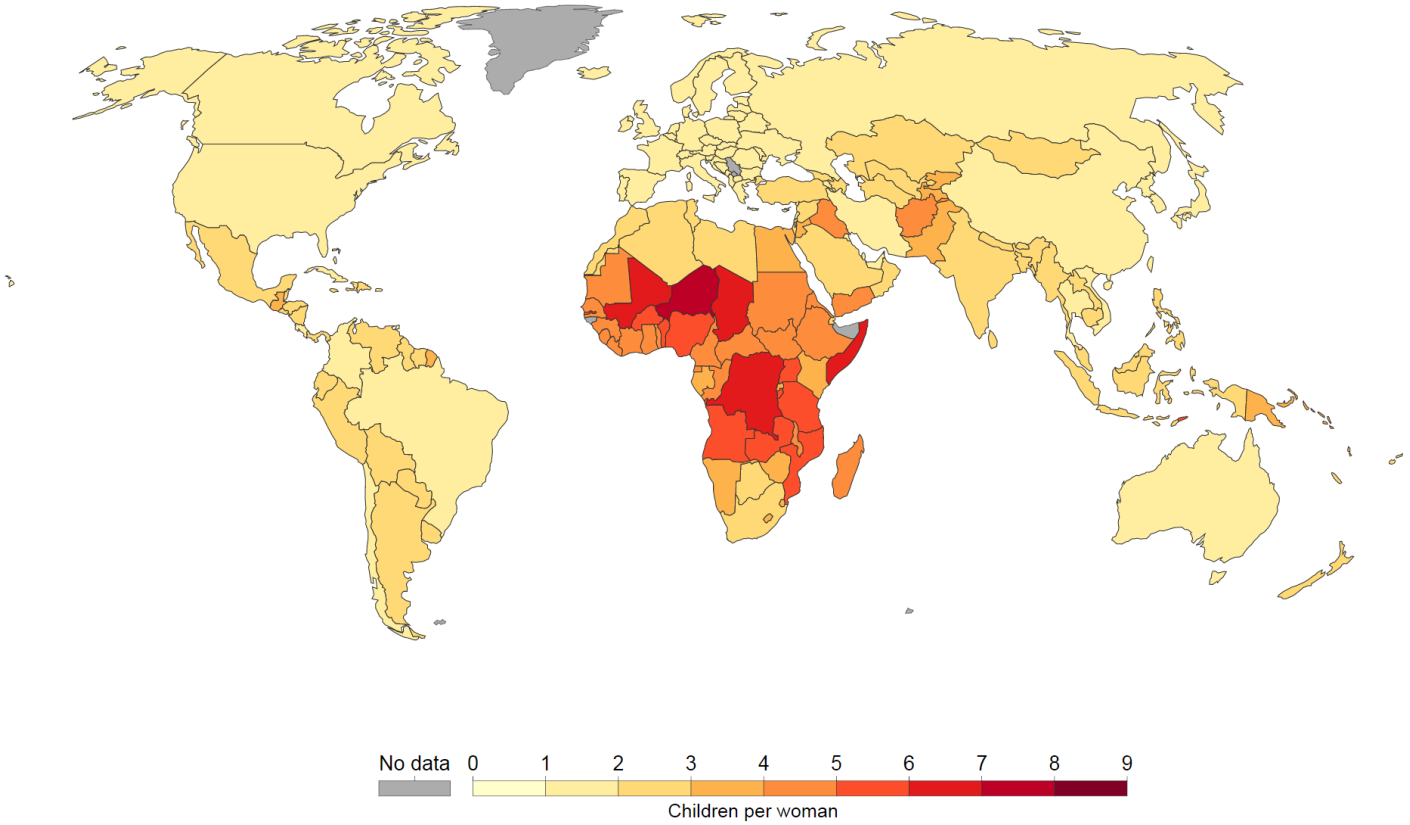
Vallin 2006

Current Situation

Children per woman (Total Fertility Rate), 2015

Total fertility rate (TFR) is the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year.

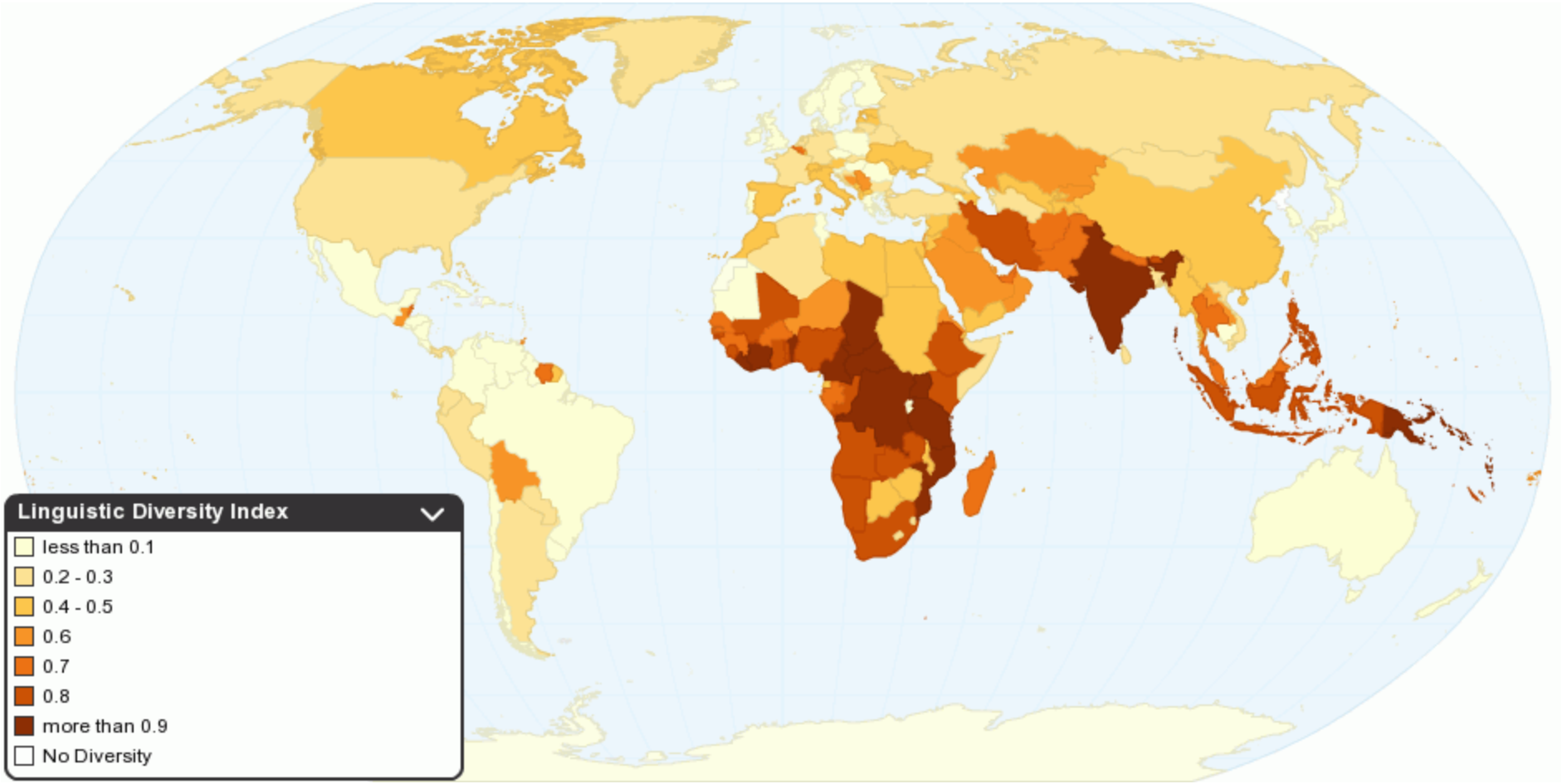
Our World in Data



Source: United Nations – Population Division (2017 Revision)

OurWorldInData.org/fertility/ • CC BY-SA

Beyond spatial and social class distances...



Conclusion

- Communication has potentially substantial power to shape how social change emerges in space and time
- Social network data might allow us to investigate this more closely
- Our approach can also of use in studying other social chance processes: gender division of household labour, childbearing in cohabitation

Reference

Klüsener, S., Scalone, F., & Dribe, M. (2017). Exploring the role of communication in shaping fertility transition patterns in space and time. In Grow A. and Van Bavel, J. (eds.), *Agent-Based Modelling in Population Studies. Concepts, Methods, and Applications*. Springer: Dordrecht, pp. 369-403.

MAX-PLANCK-INSTITUT FÜR DEMOGRAFISCHE FORSCHUNG

MAX PLANCK INSTITUTE FOR DEMOGRAPHIC RESEARCH

Comments or Questions?

www.demogr.mpg.de

Discussion and Conclusion

Is the end of the Regression Age near?

Discussion and Conclusion

Is the end of the Regression Age near?

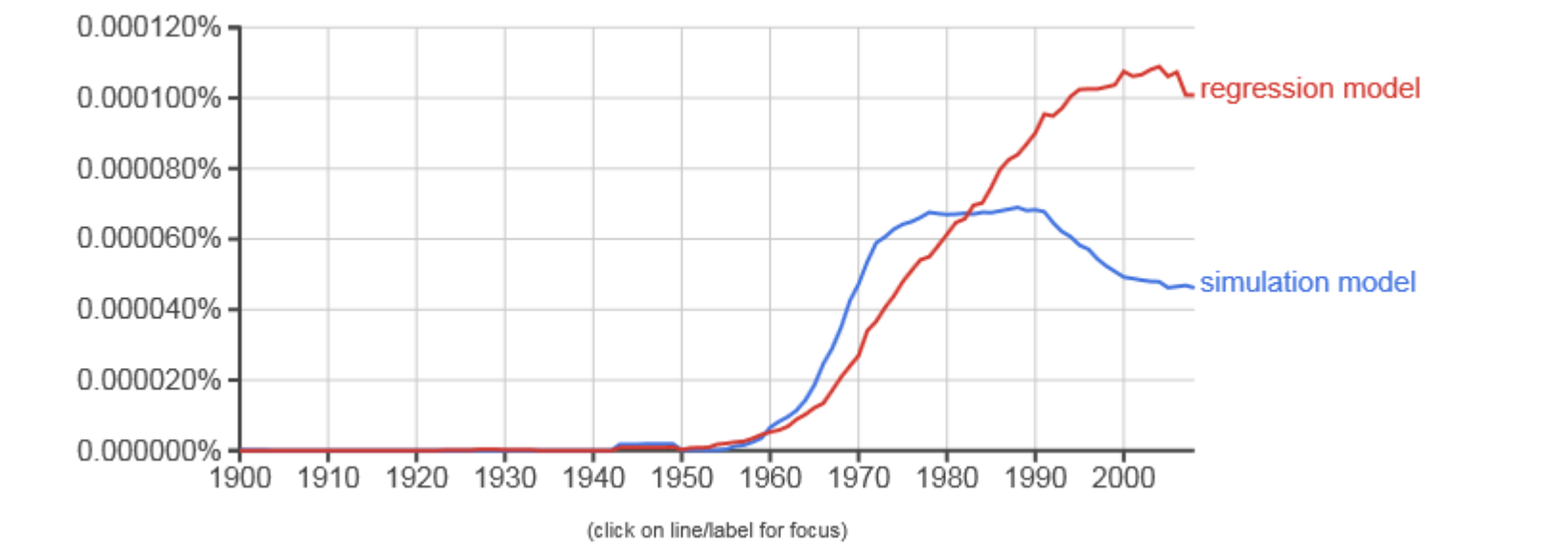
Probably not, but „*what if*“-questions with simulated data/simulations offer huge unexplored potentials:

- The evaluate the potential impact of unobserved factors and mechanisms on outcome patterns

- To demonstrate how little differences in initial conditions can lead to huge differences in outcomes

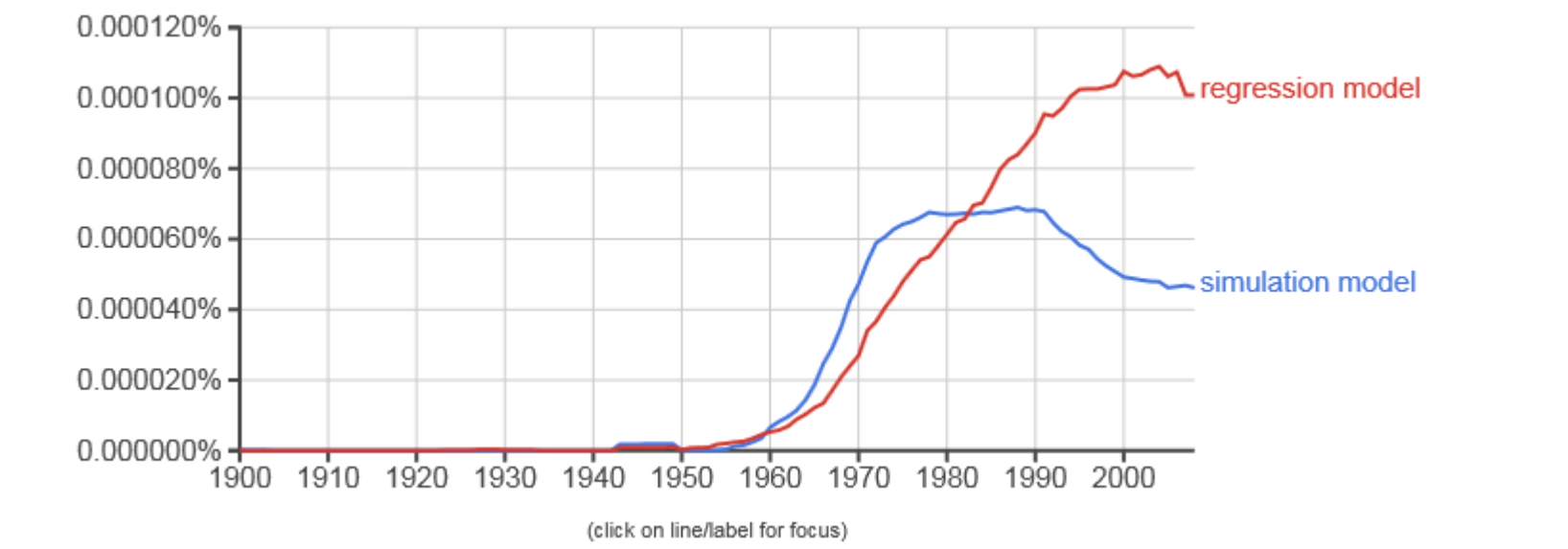
- How changes in macro-conditions are translated in micro-level decision making

A Potential Future Agenda



Google Books Ngram Viewer

A Potential Future Agenda



Google Books Ngram Viewer

Simulation approaches would benefit from a higher standardisation

→ Development of a set of recommended basic simulation model modules