

Interplay economy and technology in cities

Real life examples and use of economic models

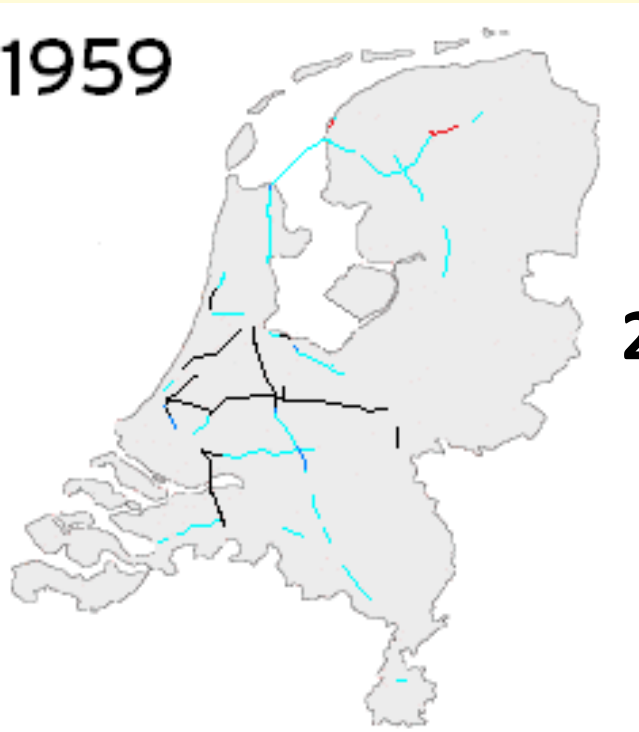
- Economics studies people's behaviour using mathematical models and (big) data
- Technology changes people's behaviour. This can lead to unexpected societal issues
- Economic models can help anticipate on these issues.



Technology affects society through people's behaviour

Highways affected downtowns

1959



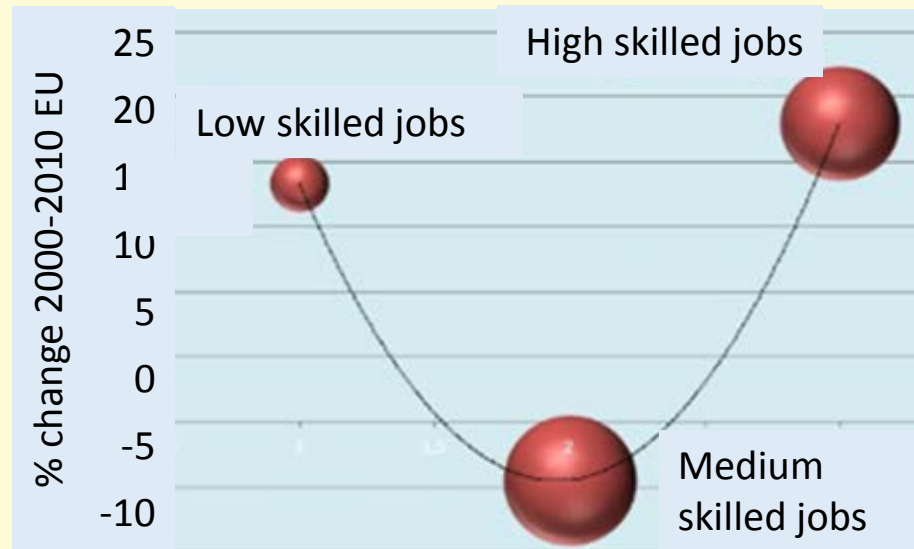
2019



twice as fast travel

5-10% population loss
downtown

Automation hit middle class jobs



Economic models help anticipate societal effects of new technologies

By studying and predicting how people make choices

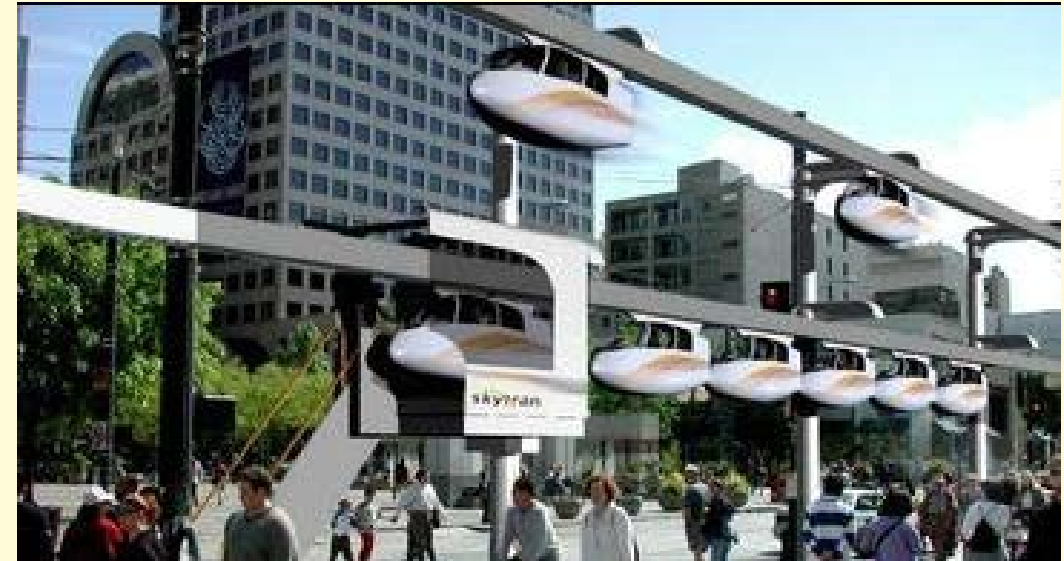
Example automated driving and city growth/decline



Automated private car

- productive time in car, longer trips

→ Cities lose population



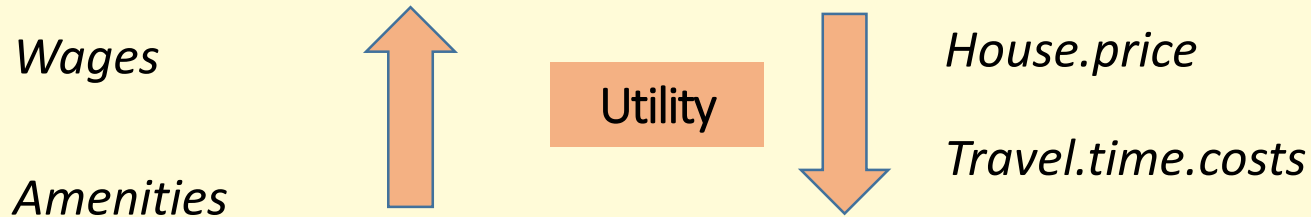
Automated door2door public transit

- fast and cheap in cities not outside

→ Cities attract population

How do people choose where to live? Economic model.

Person i chooses from home locations h to maximize utility



$$\text{Utility} = a * \text{Amenities} - r * \text{House.price} + w * \text{Wage} - \beta * \text{Travel.time.costs} + \text{error}$$

w, r, a are parameters (utility weights), known by the person

Model estimated on big data 7.5 mln people, millions trip records

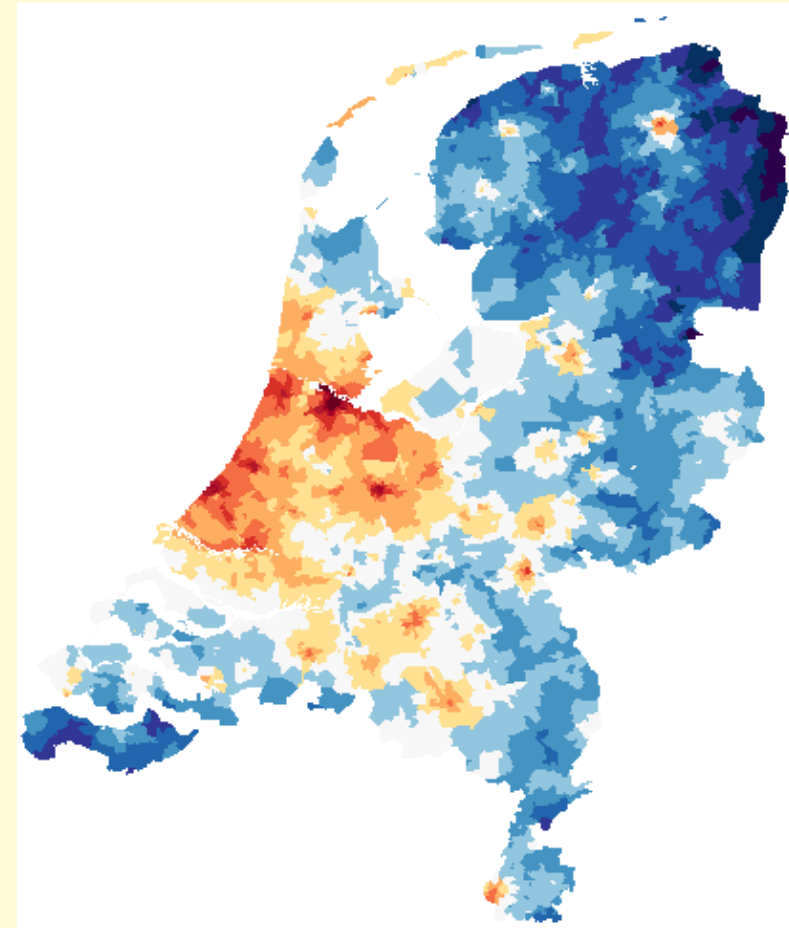
$$\text{Utility} = a * \text{Amenities} - r * \text{House.price} + w * \text{Wage} - \beta * \text{Travel.time.costs} + \text{error}$$

Estimated on observed data 2004-2011

- 7.5 mln employees: home location;
- 60.000 commuters: zip home, zip work, commuting mode;
- Millions records trip attributes
- 3000 zip codes land prices, public goods (green, restaurants, ...)

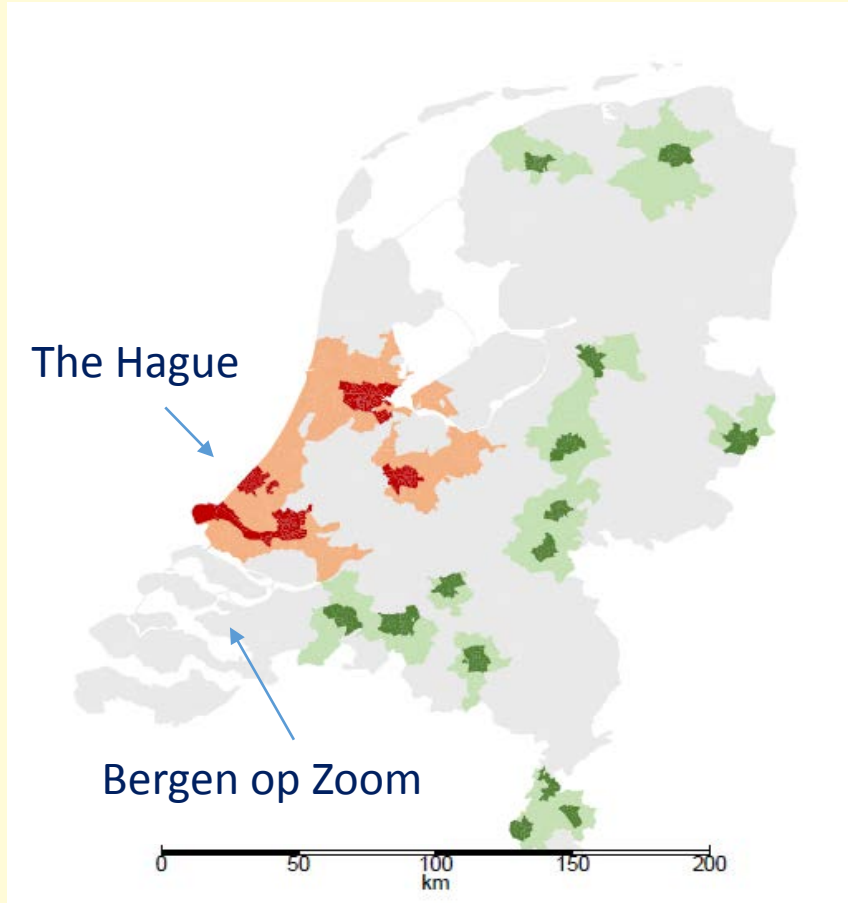
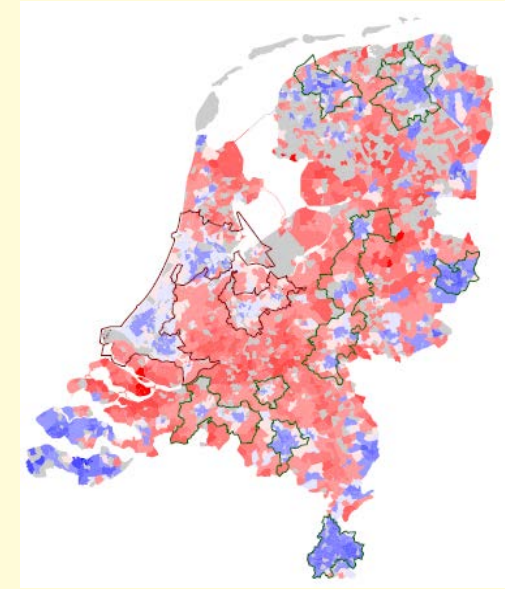


House prices NL



Simulations: spatial effects of automated private car

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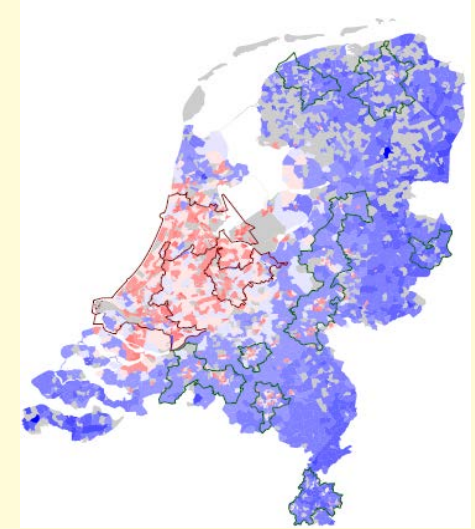
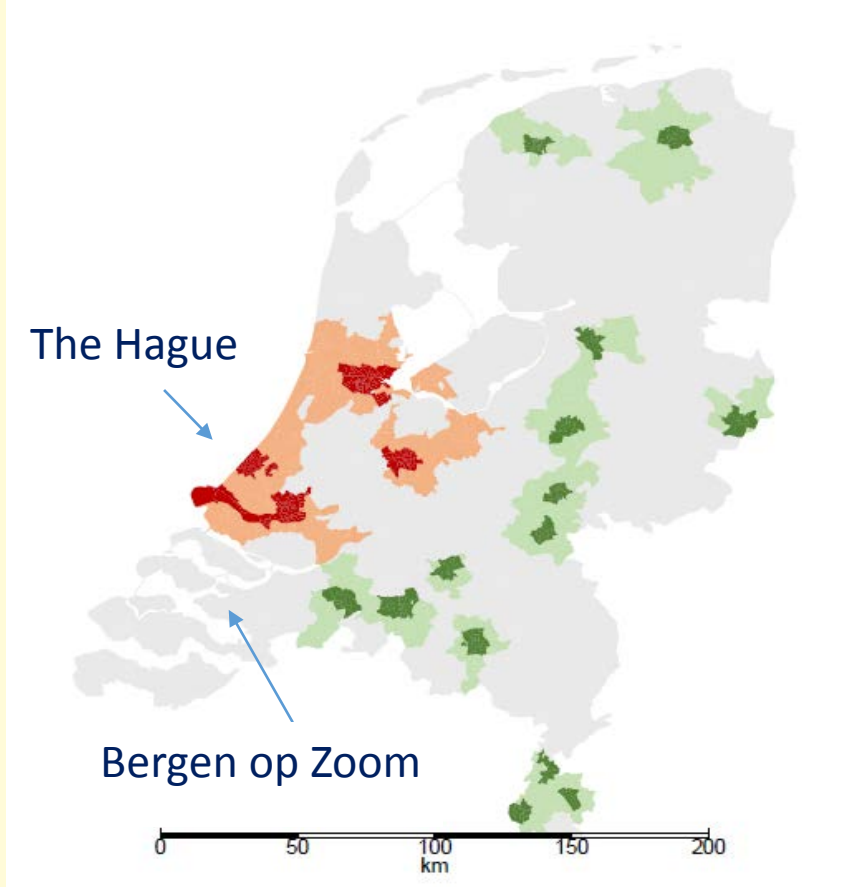


Harry:

lived and worked in The Hague,
moves home to Bergen op Zoom

Simulations: spatial effects of automated public transit

$$\text{Utility} = a * \text{Amenities} - r * \text{House.price} + w * \text{Wage} - \beta * \text{Travel.time.costs} + \text{error}$$

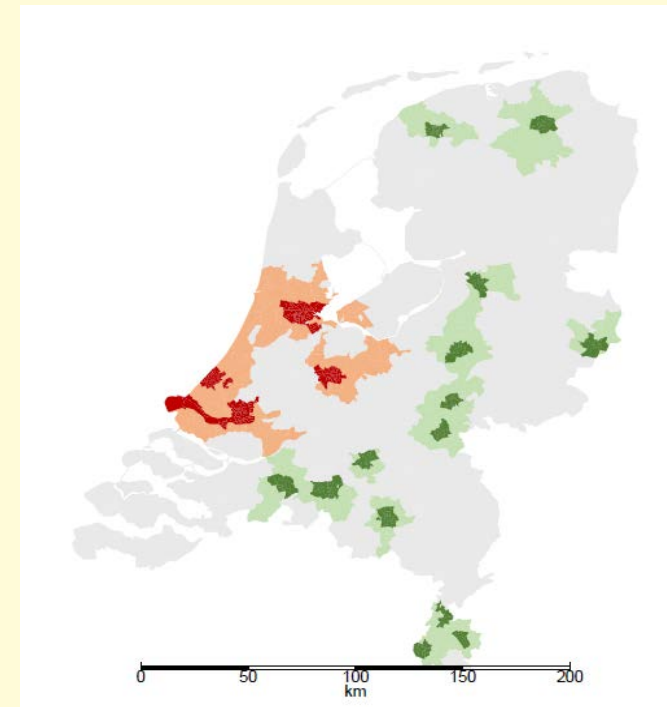
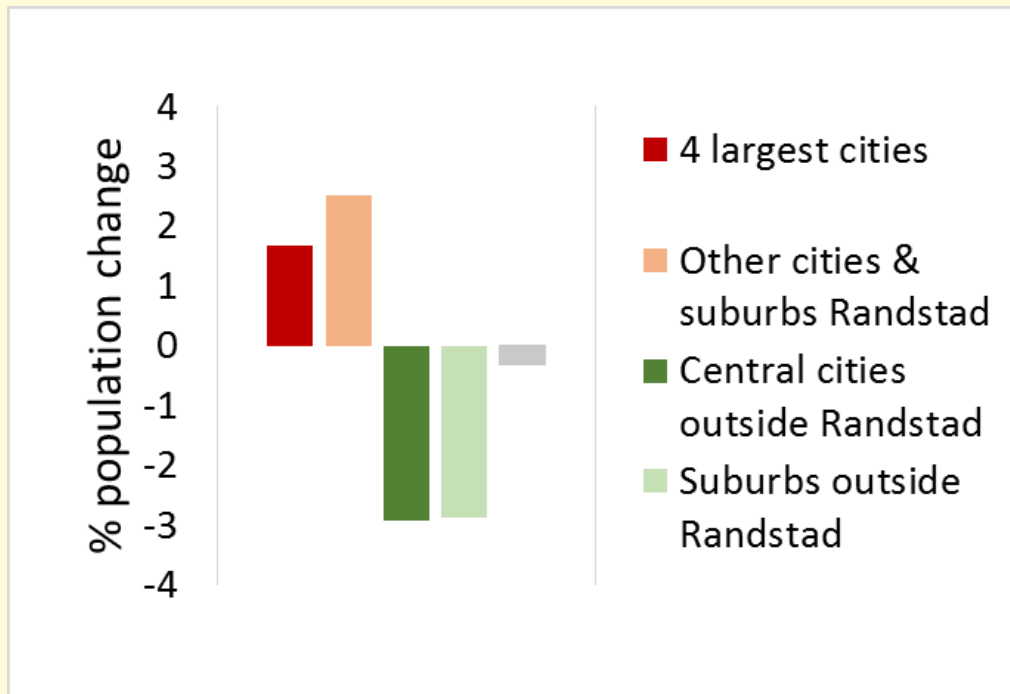


Ginny:

lived and worked in Bergen op Zoom,
moves home to The Hague and job to its suburb Leidschenveen

Automated driving: effect on cities and societal challenges

Highly urbanized region Randstad: cities grow; outside Randstad: cities lose population



Societal challenges

- superstar cities: sky-high prices, for the rich only
- health: automated transit decreases bike use
- etc.



Policy responses

Concluding: How to respond to societal issues caused by AI

accommodate societal issues

OR

steer AI development

Daron Acemoglu 2019

