



# Schumpeterian economics: Retrospect and prospect

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# Schumpeterian economics

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- The core of Schumpeter's huge research programme =  
The (cyclical) process of economic evolution ( $\leftrightarrow$  Hodgson)
- Major concepts
  - The evolutionary process of economic life, routines/managers, innovation/entrepreneurs, selection, capitalist evolution with cycles, creative destruction, evolutionary trends, ...
- Schumpeter's difficulty: Lack of tools for theoretical and econometric analysis
  - So that he could not resolve the *Methodenstreit*
- No Schumpeterian School, but broad inspiration for modern modellers and econometricians
  - Neo- or post-Schumpeterian economics



# Retrospect and prospect

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- Prospect (looking forwards)
  - Develop an agenda for our modern research on economic evolution
- Retrospect (looking backwards)
  - Learn from the immediate past
    - The emergence of evolutionary-economic modelling with formal models, simulation, evometrics, history-friendly models, ...
  - Learn from the distant past
    - Exploit Schumpeter's rich but verbal evolutionary economics with modern tools
    - Use the results to exploit the ideas of others, like Marshall, Menger, Marx, ...

# The history of evolutionary economics

- A long and complex history:
  - 1. **Old evolutionary economics:**  
loose, but wide-spread
  - 2. **The 'dark ages':**  
crowding out by the  
formalist revolution from 1930
  - 3. **New evolutionary economics:**  
clear concepts, models,  
an simulations
  - Schumpeter as the **'missing link'** between the epochs?



Joseph Schumpeter  
(1883-1950)



# Schumpeter's challenge

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- Evolutionary capitalism
  - “The essential point to grasp is that in dealing with capitalism we are dealing with an evolutionary process. It may seem strange that anyone can fail to see so obvious a fact which moreover was long ago emphasized by Karl Marx.” (CSD, p. 82)
- Limits of neoclassical economics
  - “[T]he problem that is usually being visualized [by economists] is how capitalism administers existing structures, whereas the relevant problem is how it creates and destroys them. As long as this is not recognized, the investigator does a meaningless job.” (CSD, p. 82)



## Alan Greenspan on Schumpeter's creative destruction (I)

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"The American economy has been in the forefront of what Joseph Schumpeter Ö called creative destructioní, the continuous scrapping of old technologies to make way for the new.

It presupposes a continuous churning of an economy in which the new displaces the old, a process that brings both progress and stress."

Alan Greenspan, chairman  
of the US Federal Reserve,  
11 December 2003



## Alan Greenspan on Schumpeter's creative destruction (II)

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ì I do not doubt that the vast majority of us would prefer to work in a less stressful, less competitive environment.

Yet, in our roles as consumers, we seem to relentlessly seek the low product prices and high quality that are prominent features of our current frenetic economic structure."

Alan Greenspan, chairman  
of the US Federal Reserve,  
11 December 2003



## Schumpeter's four English books

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- *The Theory of Economic Development*
  - TED, evolutionary theory
- *Business Cycles*
  - BC, evolutionary, statistical and historical
- *Capitalism, Socialism and Democracy*
  - CSD, includes sociology and political science
- *History of Economic Analysis*
  - HEA, history of economics



# Schumpeter's basic vision of economic evolution through creative destruction

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- Initial economic equilibrium:
  - Routine behaviour (“same procedure as last year”)
- “Economic development”
  - Disturbance by a swarm of innovative entrepreneurs and an induced economic upswing
- Establishment of a renewed equilibrium
  - Downswing with creative destruction of old by new routines (economic selection)
- Evolution = Innovation + renewal of routines

# Capitalism according to Weber and Schumpeter



- Max Weber: Protestant ethics is central to capitalism
- Schumpeter: Bank loans to innovators are central to capitalism. Ethics comes later





## Two forms of organisation of innovative activity

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- **Schumpeter Mark I**

- Innovations are carried out by individual entrepreneurs who create new firms

- **Schumpeter Mark II**

- Innovations are permanently performed by many large corporations in their monopolistic competition
- The innovation process is organised by departments of research and marketing
- Government may influence this process





## Schumpeter's core difficulty

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- “[I]n a sense there is nothing in my structures that has not a living piece of reality behind it. This is not an advantage in every respect. It makes, for instance, my theories so refractory to mathematical formulations. They can never be so cut and dried as Keynes’ schema is;
- but there are compensating advantages, and one of them is that so many people have told me, as you have done: ‘Yes, that is so. I know it from my own experience and observation’.”
- (Schumpeter 1943, cit. after Swedberg, p. 230)



# Types of methods and phenomena

	Stationary phenomena	" Evolutionary " phenomena	
		Simple	Mutative
<b>Static analysis</b>	(1)	(2)	(3)
<b>Dynamics</b> <b>Analytic</b> <b>Historic</b>	(4)	(5)	(6)
	(7)	(8)	(9)

Based on *History of Economic Analysis*.



## The solution from modern analysis

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- What evolves in economic evolution?
  - The average characteristics of a population of economic agents!
- How does evolution take place?
  - By selection among agents with different characteristics!
  - By emergence of new characteristics of agents!
- Conclusions?
  - Study statistics, not representative agents!
  - Selection destroys variance, so innovation is crucial for long-term evolution!



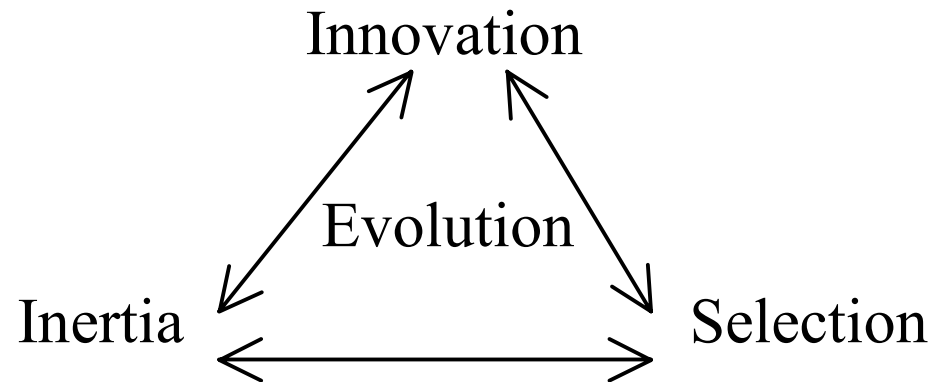
# The elements of evolutionary thinking

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- Bounded rationality and rule-based behaviour
  - **Routines** or procedures are the things that evolve in evolutionary models. They are based on **knowledge**, bounded rationality and organised behaviour
- Population thinking
  - The evolutionary process can only be studied from the viewpoint of a **population of heterogeneous agents**
    - It is not enough to study the process through “representative agents”. Each firm is special
- The basic mechanisms of evolution
  - **Inertia**: preservation and transmission of routines
  - **Innovation**: Creation of new variants of routines
  - **Selection** between different routines
  - **Segregation** between different ‘populations’ of agents (seldomly studied explicitly)

# The process of evolution

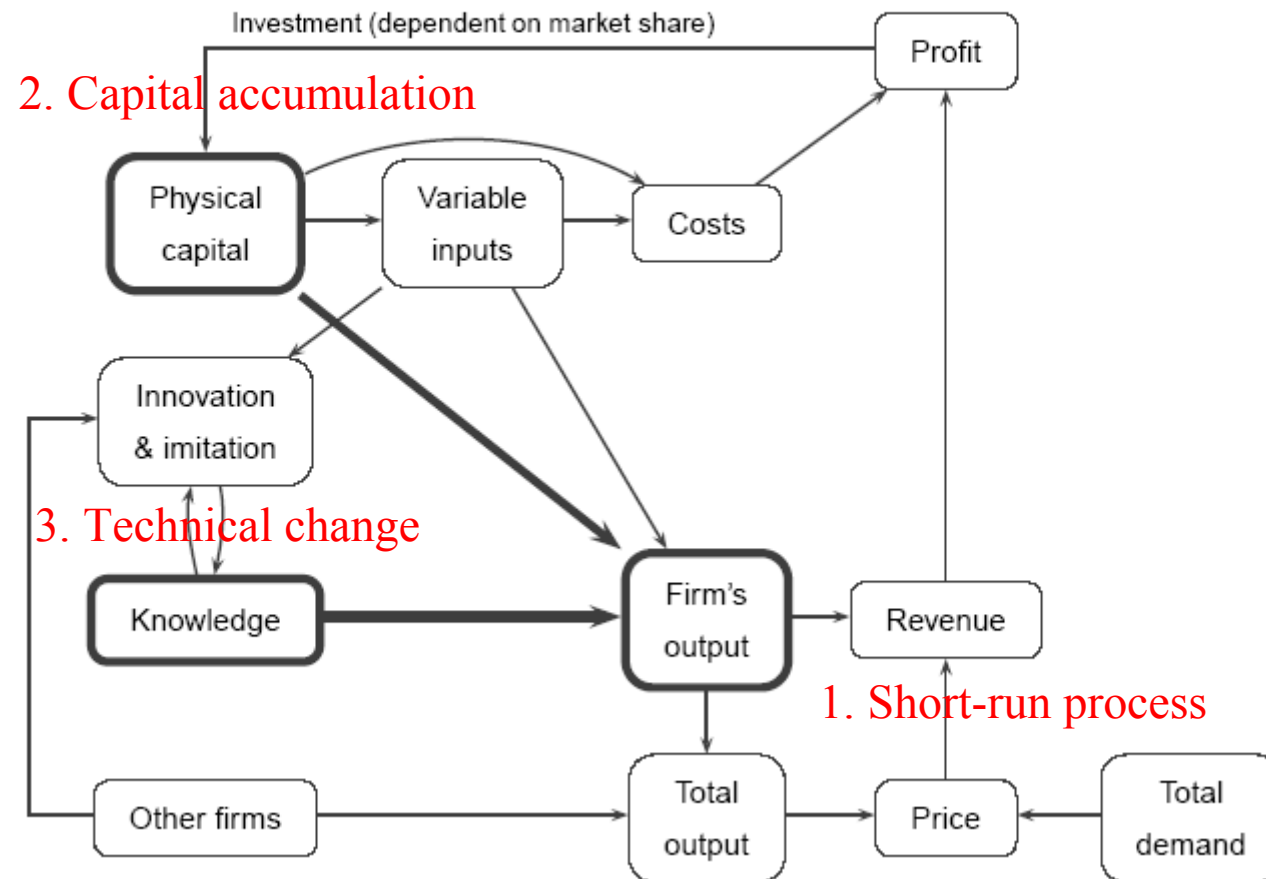
- An evolutionary process takes place if there is a certain **balance between the mechanisms**:
  - If innovation dominates, then the result is '**chaos**'.
  - If inertia and selection dominates, then the result may be '**stasis**'.
  - Only through the selection mechanism may some **optimality** properties arise.





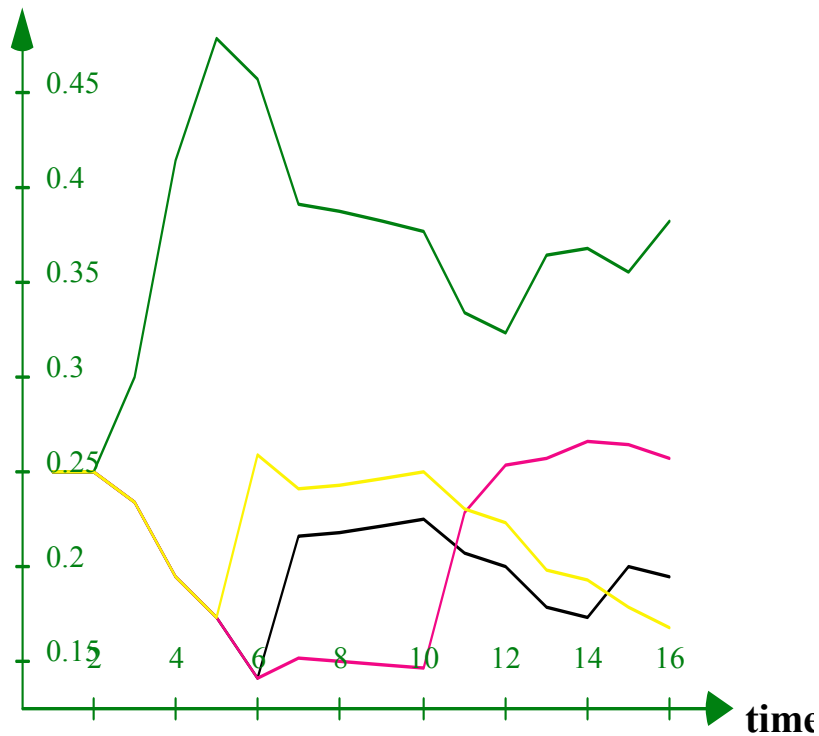
# Modelling the process of evolution

The standard NW model of industrial dynamics

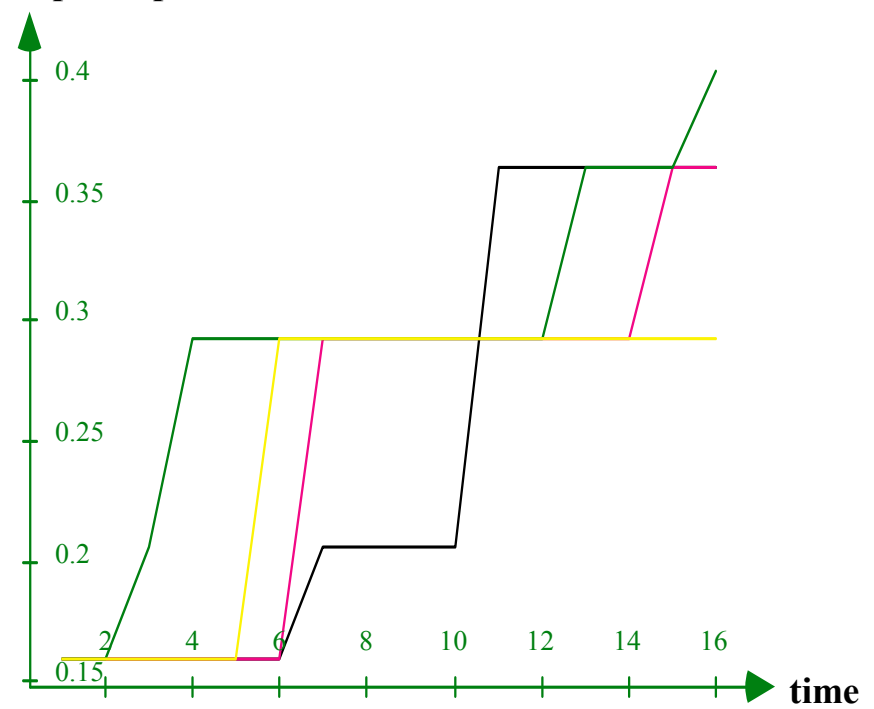


# Simulating the productivity race

market shares  
(total = 1.0)



output/capital ratio





## Analysing evolutionary processes

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- Total evolutionary change =  
Selection effect + Innovation effect
- Selection effect =  
Variance  $\times$  Selection efficiency
- Innovation effect =  
Expected effect of innovation/imitation
- The innovation effect is the creative part
- The selection effect means that the new is promoted while the old is destroyed



## Pure selection as covariance

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- Definition of selection:
  - the exploitation of variance at the first point of time to change the mean characteristic at the second point of time
- Elements of pure selection
  - Pure selection as covariance
  - Efficiency of selection as regression

$$\Delta z = \frac{\text{Cov}(w_i, z_i)}{w} = \frac{\text{Reg}(w_i, z_i) \text{Var}(z_i)}{w}$$



## Innovation as a mean effect

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- Definition of "innovation":
  - the weighted mean of the firm-internal change in productivity

- Measuring pure innovation

$$\Delta z = \frac{\mathbf{E}(w_i \Delta z_i)}{w} = \sum s_i \frac{w_i}{w} \Delta z_i = \sum s'_i \Delta z_i$$

- "Innovation" is defined as any change within the "units of selection"
  - It includes imitation among units
  - It can often be decomposed into within-unit selection and low-level innovation

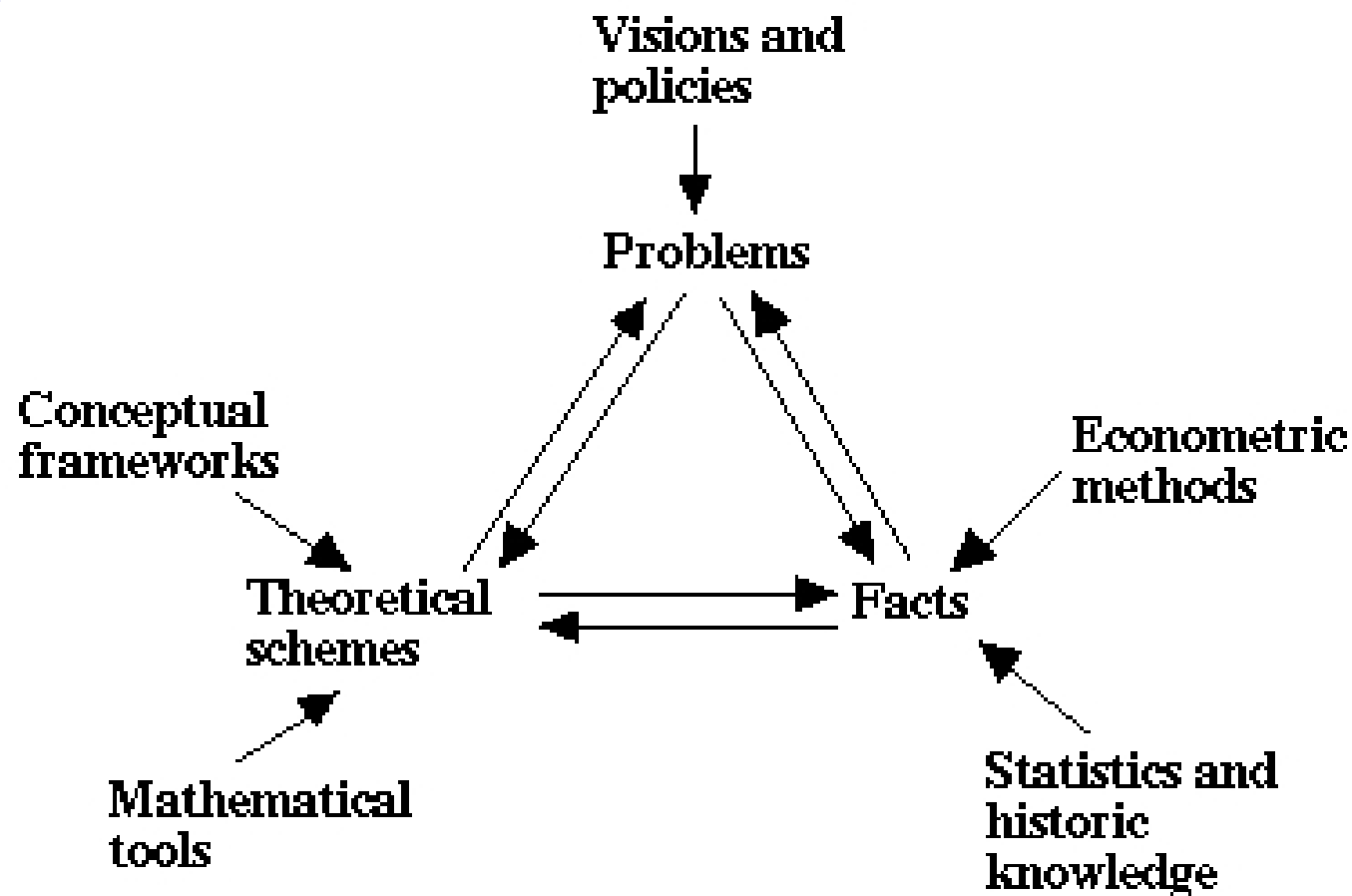


## A Schumpeterian evometrics?

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- Reformulate Schumpeter's theories evometrically
  - The auto-regression of behaviour over time to distinguish between adaptive and creative response
  - The changes in behavioural variance over the cycle
    - Highest at the top of the upswing
  - Use statistical concepts to define Schumpeter's ideas for industrial and locational case studies (including evolutionary transitions)
- Problem
  - To develop evometrics as a toolbox adapted for the study of economic evolution

# Schumpeter's idea of the development of economic science





# Format and purposes of the course

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- Format
  - Mix of (1) short lectures, (2) discussions, (3) contributions from the participants and (4) consultations after the lectures
- Core purposes
  - Introduce modern tools for analysing economic evolution
    - Lit: Andersen's *Evolutionary Economics* + papers
  - Reconsider Schumpeter's contribution to obtain new ideas for modern research
    - Lit. Schumpeter's works, Andersen's manuscript, etc.
  - Help you to develop your research and to come to international conferences
    - My areas are e.g. the International Schumpeter Society, DRUID conferences and DRUID Academy PhD conferences



## Core difficulties

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- The unfinished evolutionary economics
  - Confusingly many approaches and no fixed agenda
  - Solution: Start with simple models, and then extend
- The broad scope
  - Too many research questions
  - Solution: Introduce your own questions in discussions and in short presentations
- Language
  - The difficulties of English language
  - Solution: Ask me to slow down and to explain unclear expressions



# Proposed course schedule - I

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- 1. Introduction
- A. Post-Schumpeterian evolutionary modelling
  - 2. Population thinking and its tools
    - AEE, ch. 2 + postscript + ...
  - 3. The Nelson-Winter modelling tradition
    - AEE, ch. 4 + ...
  - 4. Simulating and extending Nelson-Winter models
    - AEE, ch. 4 + appendix + ch. 3 + ...
  - 5. Toward a post-Schumpeterian evolutionary game theory
    - AEE, ch. 5 + paper



## Proposed course schedule - II

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- B. Schumpeter's theories in retrospect
  - 6. The basic theory of evolution through creative destruction
    - TED + CSD + ...
  - 7. The cyclical process of economic evolution
    - TED + BC + ...
  - 8. Long-term economic and institutional coevolution
    - CSD + ...
  - 9. The methodology of evolutionary analysis
    - HEA + ...
- C. Research horizons
  - 10. Core tasks for evolutionary-economic analysis
    - AEE, ch. 6 + ...