PhD Project on: Evolutionary Systems and the Freedom of the People

- Basic ideas and first applications -

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Overview

1. Theory
2. Methods
3. Application
4. Still to do, questions and problems
Aims of the PhD project

- **Combine Schumpeter and Sen**; set the human capability approach into an evolutionary framework

- Analyze theoretically the **interplay** between the evolution and structure of socioeconomic **systems** and the freedom (social choices) of the **individuals**

- Develop appropriate methodologies to apply the theoretical concept (SNA, ABM, spatial econ.)

- Use them to analyze systems of innovation and freedom in Europe and Latin America
Neoschumpeterian Economics:

- ...deals with dynamic processes causing qualitative transformation of economies driven by the introduction of novelties in their various and multifaceted forms and the related co-evolutionary processes“ (Hanusch and Pyka 2007, Cambr. J. of Econ)

- But: Innovation as goal of development?

Human Development and Capabilities Approach

- The expansion of the freedom of the people (∼ social choices, capabilities) as means and ends of development (e.g. Sen, 1995, 1998, 1999; Nussbaum and Sen, 1993)

- Rather static comparative analysis

- Does not consider systemic and dynamic aspects of development
### Pillars of an integrated framework

| A. **Individuals**: heterogeneity and a bottom-up approach |
| B. **Capabilities** to function; especially learning capabilities |
| C. **Systems**: networks and variety evolution as essential features of systems structure and dynamics; impact on social choices and freedoms of the individuals |
| D. Need for **methodologies**, able to consider both heterogenous agents and systems' structures and evolutions; e.g. ABM |
Networks and capabilities

- The **structure** of a network and the **position** of the individuals influences their capabilities to access information, finance and power (Granovetter, Castells, Barabasi and Albert etc.)

- **Positive**: information and knowledge flow, synergy effects, stability

- **Negative**: inequalities and inefficiencies (e.g. through corruption and lobbying), exclusive (character of) networks

- **Systemic**: Scale free character of networks and preferential attachment; endogenous inequality reproduction (Albert and Barabasi)

- **Ego-networks**: a fertile combination of strong and weak ties may provide the social choice for agency

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(a) Random network
(b) Scale-free network
Economic variety and social choices

- Efficiency and variety growth are complementary drivers and outcomes of economic development
- Variety growth is necessary for long-run economic development

Interplay: variety evolution and social choices:
- Efficiency without variety growth may lead to unemployment (Pasinetti, 1981, 1983) and unfreedom
- Variety growth expands the set of social choices
- Opportunities for new combinations, dusi-activities (Jacobs, 1969)
- Variety evolution and the rising complexity may demand persistently growing capabilities of the agents to be free
How? Methodology

- Qualitative analysis
  - Case studies on evolution of freedom, networks and variety
  - Local systems of innovation and well-beings

- Quantitative (econometric) analysis
  - Social network analysis and spatial econometrics
  - Analysis of social structures & dynamics, spatial effects & distribution

- Simulation models (ABM)
  - In-depth analysis of theoretical causalities and simulation of the interdependencies between the freedom of the people and the systems structure and dynamics
  - Simulation of policy scenarios
First empirical applications

We started to analyze socioeconomic patterns and individual freedoms in Latin America,

however, the approach may be valid for the analysis of any developing, emerging or advanced country

Case and empirical studies:

- Freedom, economic structure and knowledge in Latin America (factor and cluster analysis)
- Social capital and innovation in the agricultural poor (information networks, social network analysis, Peru)
- Entrepreneurship and freedom in the Brazilian Northeast (qualitative analysis, semi-structured interviews)
Systems of innovation and development in Latin America

- Adapt the NIS approach and taxonomies to the specific conditions in Latin America countries
- Reveal characteristic patterns and structural bottlenecks in the future orientation of Latin American economies (cluster analysis)
- Need to consider structural imbalances, lack of the capabilities and opportunities for fertile learning processes (especially dusi)
- (i) freedom (ii) knowledge and a (iii) future-oriented economic structures as mutual interconnected and reinforcing objective classes of development. (factor analysis)
- While in some countries knowledge is the main bottleneck for future-oriented development, other countries suffer also from inefficient economic structures or the exclusion of large parts of the population from economic life.
Relative strengths and weaknesses

- Cluster profiles (mean of standarized distances, -1, 1)
- Freedom = HDI, poverty, unemploment, institutions etc.
- Knowledge = innovation systems taxonomy
- Economy = efficiency, sectoral setup, internationalisation

<table>
<thead>
<tr>
<th>Cluster Profiles</th>
<th>Freedom</th>
<th>Knowledge</th>
<th>Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Rica</td>
<td>0,58</td>
<td>0,81</td>
<td>0,68</td>
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<tr>
<td>Uruguay</td>
<td>0,74</td>
<td>0,54</td>
<td>-0,12</td>
</tr>
<tr>
<td>Argentina, Brazil</td>
<td>0,14</td>
<td>0,81</td>
<td>0,18</td>
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<tr>
<td>Mexico, Panama, Trinidad&amp;Tob</td>
<td>0,36</td>
<td>0,18</td>
<td>0,69</td>
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<tr>
<td>Colombia, El Salvador</td>
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<td>-0,29</td>
<td>0,03</td>
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<tr>
<td>Peru, Venezuela</td>
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<td>-0,11</td>
<td>-0,37</td>
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<tr>
<td>Dom. Republic, Ecuador</td>
<td>-0,46</td>
<td>-0,61</td>
<td>-0,21</td>
</tr>
<tr>
<td>Bolivia, Guatemala, Honduras, Nicaragua, Paraguay</td>
<td>-0,69</td>
<td>-0,75</td>
<td>-0,64</td>
</tr>
</tbody>
</table>
Freedom and microentrepreneurship in the Sertão Paraibano, Northeast Brazil

Study design:
- Semi-structured interviews with 127 local agents (entrepreneurs, microfinance, local administration)
- questions on freedom, ventures, socioecon structures & dynamics

System perspective:
- Strong ties strong, weak ties weak, triple helix weak
- Unsaturated markets; rather competition than coop. externalities
- Positive institutional dynamics (leading to higher individual freedoms, civil rights, access to finance; competition and trust)
- Growing economic efficiency and variety (related and unrelated)

Individuals:
- Microentrepreneurs as regional efficiency enhancer and local innovators, positive demonstration effects
- Given the individuals the basic capabilities (education, health, income, access to finance) they help themselves and importantly contribute to the local economic development
Measuring social capital and inno in the agricultural poor

Why?
- almost 3 billion people in the world live in smallholder households
- Lack of robust quantitative methods to measure innovation in the agricultural poor allowing for comparison

Study:
- Spatial easy to be bounded local farmer communities in Peru
- Total sampling methods, application of SNA

Main results:
- Decisive structures can be revealed which would be overseen by traditional methodologies (in our case, dominance of one external actor which makes most correlation tests senseless)
- Useful for dev project evaluation?; impede the destruction of endogenous grown social structures and cooperation pattern
- Unclear causal relations between networks and innovation and which network indicators (centralities, composition) are appropriate
Still do do: Develop a simple ABM on freedom, variety and networks

Agent Based Modelling allows to:

- analyze micro-meso-macro feedback-loops
- consider heterogenous capabilities and opportunities of the individuals
- Consider interaction, learning processes, path dependencies and structural dynamics
- Simulate the reproduction of inequalities in complex systems
- Simulation of policy scenarios

Possible building blocks?:

- Sectoral dynamics (Saviotti and Pyka, 2004,2008)
- Technology and inequality (Cantner et al. 2001)
- …
Questions for modelling and further theoretical progress

- Who interacts why and when with whom?
- What happens through the interaction?
- What are the capabilities of the individuals/agents and how are they affected by the interactions?
- What are the possible choices and preferences of the individuals and how are they affected by novelties?
- How are the firms and the sectoral development affected by the capabilities, social choices and preferences of the individuals?
- What capabilities (of individuals and firms) are necessary prerequisites for the possible creation of novelty?
- What external influence factors do we have?
- Get the essential causal relations clear: individuals (capabilities, social choices) – firms (capabilities to produce) – learning processes - innovation and sectoral development.
- What is essential, what can we drop?
- How can we model it?
Thank you for your attention. Any idea, critique and doubt is very welcome.

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Literature recommendation


__________________________ (2007, eds.): The Elgar Companion to Neo-Schumpeterian Economics, Cheltenham; UK: Edward Elgar


**Saviotti, P. (1996):** Technological Evolution, Variety and the Economy, Edward Elgar Publisher, Cheltenham, UK