

Combining political and economic models: An evolutionary Computable General Political Economy Equilibrium Model (CGPE)

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CGPE - A model for policy evaluation

Task: Understand why suboptimal policies are chosen/persist

Aim: Identify political knowledge and incentive gaps and propose strategies that reduce existing gaps

Method: The Computable General Political
Economy Equilibrium Model (CGPE)

Advantage: Modeling of political decision-making and policy learning processes with endogenous policy preferences and beliefs

Background information

- ▶ Idea to combine political and economic models is not new but no one has derived a CGPE for empirical application yet (see Binswanger and Deiniger (1997)).
- ▶ Idea has already been applied to analyze agricultural policy-making in the EU (see work published by Henning, Pappi and Struve).
- ▶ Workshop on evaluating and modelling CAADP-policies in 2011 organized by IFPRI, University of Kiel and PEGnet.

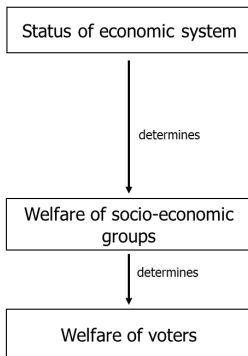
Outline of presentation

1. Model layout
2. Empirical application
3. Expected research outputs
4. Final remarks

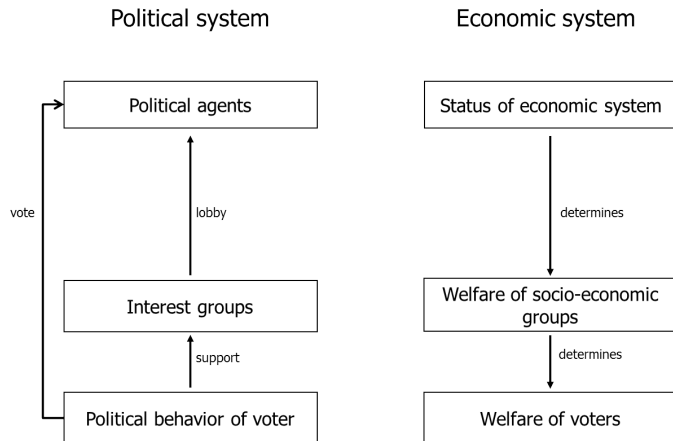
Model layout: The static CGPE

**Computable general
equilibrium model (CGE)**

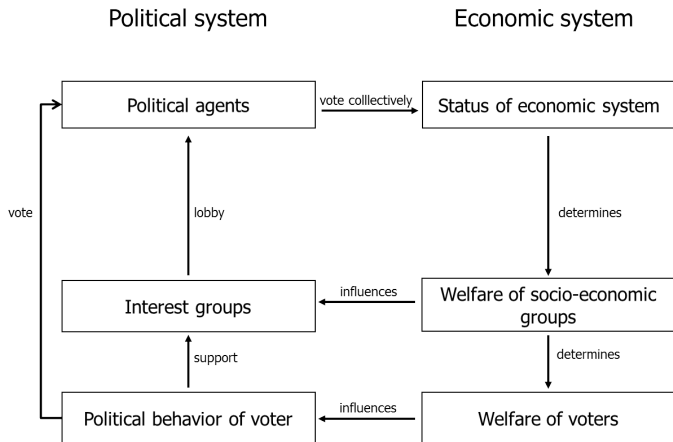
Economic system



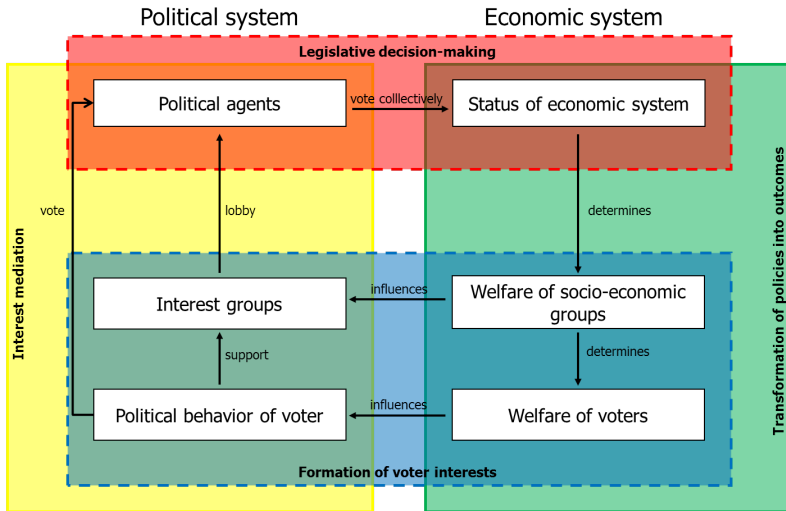
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Legislative bargaining module: General overview

- ▶ Final policy choice (γ^*) determined by
 - ▶ Rules of political games (φ)
 - ▶ Political agents' policy positions ($U_g(\gamma)$)
- ▶ Models the final policy decision as the result of a political bargaining process using:

$$\gamma^* = \Gamma(U_g(\gamma), \varphi).$$

- ▶ Cooperative mean-voter rule developed by Henning and Pappi

Legislative bargaining module: Policy preferences

- ▶ Political support maximization

$$U_g(\gamma) = \text{Max} \{S_g(z) \mid T(z, \gamma) \equiv 0\}$$

- ▶ Voter behaviour, i.e. $S_g(z)$

Deriving policy positions of political actors: Voter response module

- ▶ Understanding the determinants of the voting decision
- ▶ Voter behavior:
 - ▶ Ideological (e.g.-ethnicity based voting),
 - ▶ Retrospective and
 - ▶ Policy-oriented.
- ▶ Result: Political support function which is similar to a social welfare function

Data on voter behavior

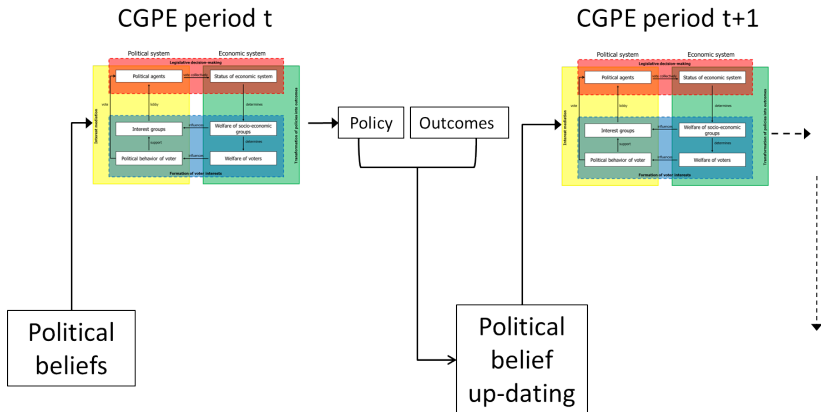
C17. When you consider voting for a certain candidate, which of the following things are important for your choice. *(Do not read out the don't know option)*

	Very unimportant	Unimportant	Important	Very important	Don't know
Character	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Outer Appearance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ethnic origin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional origin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Political knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Party affiliation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Past political performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Election campaign	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (_____)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Deriving policy positions of political actors: Belief formation module

- ▶ No perfect information/knowledge about the political technology $T(z, \gamma)$
- ▶ Belief formation about the political technology $T(z, \gamma)$
- ▶ See, for example, Jonathan's analysis of the Self-/Other-Perception of different coalitions.

The evolutionary CGPE



Belief up-dating and policy learning module I

I. Communication learning in networks

- ▶ Each actor forms his policy beliefs via taking weighted averages of his neighbour's and his own beliefs.
(see Friedkin and Johnson (1991))

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Data on communication networks

Question 5. Expert information

Stakeholder organizations, research institutes or political actors can frequently provide expert information to other organizations, especially when consequences of complex policies have to be evaluated. Such kind of expert information comprises the knowledge of the effects of different policy instruments on the welfare of different social groups. Therefore expert information is very important for political organizations as well as for other interest groups when designing and influencing agricultural policy programmes.

Question 5.01 Expert information: Sender

Using the list of organizations again, please check all organizations to which your organization provides expert information on agricultural policies.

Question 5.02 Expert information: Receiver

Using the list of organizations again, please check all organizations from which your organization receives expert information on agricultural policies.

Question 5.03 Value of provided information

Please check further those organizations from which your organization receives extremely valuable information.

Belief up-dating and policy learning module II

II. Observational learning using mental models

- ▶ Observe policy and policy outcome
- ▶ Take the difference between what you observe and what you expected given the specific policy choice
- ▶ Form a new belief about the relation between a specific policy and an outcome
- ▶ Change or stay with your policy position

Belief up-dating and policy learning module III

III. Reinforcement learning via gratification

- ▶ Idea: Voters reward agents with reelection if their welfare under the implemented policies fits their expectation.
- ▶ Political actors are interested in being reelected.
- ▶ Thus, a change in political support leads to a change in policy positions of political actors.

- ▶ See for example the NAADS-reform in Uganda

Linking policy choices with the CGE

Standard approach

Transform policy into a CGE-model parameter
(e.g. trade policy \rightarrow tariff)

Problem: How can we translate an infrastructure programme into model parameters?

Policy impact function

Parameter of interest: Technological progress

Approach: Estimate the impact of a specific budget distribution on technological progress in a specific sector using expert information (see e.g. Fan and Zhang (2004))

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Data: Economic system

CGE

- ▶ Country statistics on economic indicators

Policy impact function

- ▶ Entropy estimation combining data and expert information

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Data: Political system

Rules of political games

- ▶ Constitutional analysis
- ▶ Insights on the policy process from qualitative studies
e.g. Big Man presidentialism

Policy positions

- ▶ Political support function: Voter survey + Policy network study
- ▶ Policy beliefs: Policy network study
- ▶ Communication learning: Policy network study

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Policy network study: General facts

Main goal: Collect quantitative survey data on policy positions, interests and networks

Method: Face-to-face interviews with relevant actors using standardized questionnaires

Data:

1. Structural variables: measure ties of a specific kind between a pair of actors, i.e. communication
2. Composition variables: measure actors' attributes, i.e. policy preferences

Question: Preference regarding policy outcomes

Question 2.09 Poverty reduction								
<p>Poverty estimates reveal a significant improvement with headcount poverty declining, from 38% in 2002 to 31% in 2005 and 23% in 2010 (Economic Policy Research Centre, Kampala). Research by Benin (2007) has demonstrated that if agriculture in Uganda grew at 6% per annum, the national poverty headcount level would fall from 31.1% in 2005 to below 17.9% by 2015. This would be well below the 28% Millennium Development Goal target (DSIP, p4).</p>								
<p><i>Thinking about Uganda's future after 2012, at which poverty level should government focus, when spending budget on poverty reduction programmes?</i></p>								
<p>23% of population living below the national poverty line</p>	1	2	3	4	5	6	7	<p>5% population living below the national poverty line</p>

Political diagnosis: Identifying political performance gaps

I. Performance gap due to incomplete knowledge

- ▶ Calculate the policy choice γ^{know} by maximizing agents' political support functions assuming that they know about the "best-estimate" of the political technology
- ▶ $Gap_{know} = \gamma^{know} - \gamma$
- ▶ Example: The two coalitions and their Self-/Other-Perception

Political diagnosis: Identifying political performance gaps

II. Performance gap due to biased incentives

- ▶ Calculate the policy choice γ^{inc}
by maximizing unbiased political support functions
subject to actor-specific beliefs about the political technology
- ▶ $Gap_{inc} = \gamma^{inc} - \gamma$
- ▶ Example: Non-policy oriented voting

Political diagnosis: Identifying determinants of performance gaps

Simulate policy outcomes and corresponding political performance....

- ▶ varying legislative rules
→ Impact of formal legislative rules
- ▶ assuming the implementation of effective monitoring and evaluation-systems
→ Impact of innovative policy evaluation and monitoring systems

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Political therapy: Deriving strategies that reduce observed gaps

Reducing knowledge gaps by ...

- ▶ designing evidence-based political processes.
- ▶ designing participatory policy processes exploiting wisdom of the crowd effects.

Reducing incentive gaps by ...

- ▶ identifying political mass communication strategies leading to less biased policy beliefs of voters.
- ▶ designing participatory policy processes reducing government capture.

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Major contributions of the CGPE

- ▶ Inform on-going debate about contested policy issues with results from more "realistic" equilibrium models.
- ▶ Get an understanding of drivers of inefficient policy processes by determining political knowledge and incentive gaps.
- ▶ Suggest solutions to inefficient policy processes using results from simulation studies based on CGPE.
- ▶ Provide a computer-based toolkit based on the CGPE which allows national stakeholders to simulate the impacts of their policy choices.

Thank you very much for your attention!