Micro-Macro Workshop

Linkage Options

in Micro-Macro Models

An Overview

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Overview

Setting our respective modelling approach in perspective

- Micro-macro approaches in other fields of research:
  - What can we learn from them?
  - Are there analogous problems?
- Other linkage options
  - What would we lose?
  - Do we really need as complicated a model as we have?

Micro-Macro modelling in different fields

- Development economics / poverty analysis:
  - Macro: sectoral trade patterns.
  - Micro: individual, heterogeneous households.
  - Policy shock: trade liberalisation.
  - Main interest: distributional effects.
  - Typical field of one-way linkage: first CGE model to determine effects on (factor) prices, second MS analysis to trace out consequences for individual households.
  - Is there relevant feed-back?

Micro-Macro modelling in different fields

- Energy economics / climate policy
  - Macro: Demand for energy goods.
  - Micro: Energy production / transformation technologies.
  - Macro policy: emission trading scheme.
  - Micro policy: promotion of particular technologies.
  - Main interest: Total costs of policy design options.
  - Traditional opposition of TD (CGE) and BU (energy system) models.
  - Which simplifications are legitimate in a linkage?

Micro-Macro modelling in different fields

- Labour supply analysis
  - Micro: Labour supply effects differentiated by individual household characteristics.
  - Macro: Wage formation, involuntary unemployment.
  - Micro policy: differentiated tax and transfer changes.
  - Micro interest: Improved labour market situation for particular disadvantaged groups?
  - Macro interest: Economic performance, public budget.
  - Traditional field of behavioural MS models.
  - Is macro feedback so important that linkage is warranted?

Micro-Macro modelling in different fields

- Population ageing / pension reform issues
  - Micro: heterogeneous individuals (in which respect? savings behaviour? Incidence of inheritence?).
  - Macro: Capital formation, budget constraint of the pension system.
  - Micro policy: pension reform that takes account of individual characteristics.
  - Macro shock: Ageing of the population.
  - Fougère/Mercenier/Magnani: integrated model.
  - Rausch/Rutherford: iterative approach.

Variants of Micro-Macro Modelling

- Stand-alone micro model.
  - Behavioural MS in labour supply analysis.
  - Energy system model in energy economics.
- Stand-alone macro model.
  - Dynamic (OLG) CGE for pension reform analysis.
  - (Recursively) Dynamic CGE for climate policy analysis.

Variants of Micro-Macro Modelling

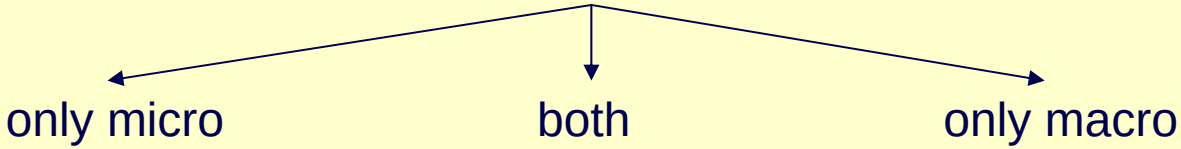
- Micro model with simple macro extensions.
  - Behavioural MS with additional labour demand equation.
  - Energy system model with additional energy demand equations.
- Macro model with simple micro extensions.
  - CGE for labour market analysis with split into different household and/or skill types.
  - CGE for climate policy analysis with a number of electricity generation technologies.

Variants of Micro-Macro Modelling

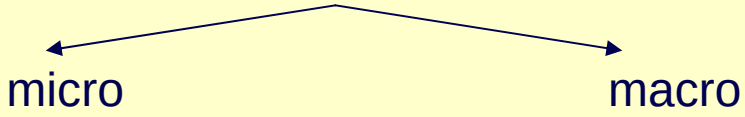
- One-way top-down linkage.
  - CGE for macro-price effects, fed into micro model for distributional effects (trade analysis) or further technological split-up (energy system)
- One-way bottom-up linkage.
  - MS for micro-effects (labour supply, energy technology choice), then aggregating and transferring as an exogeneous parameter into a CGE model. → Immediately raises consistency issues.
- Fully integrated bottom-up/top-down model.

Choice criteria for modelling approach

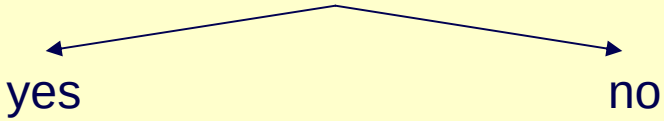
- Which variables are you interested in?



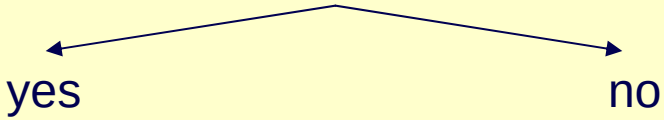
- Where is the initial shock?



- Is there quantitatively relevant feedback?



- Is the feedback (if any) complicated?



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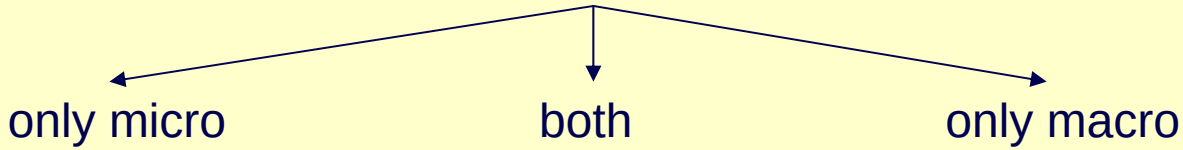
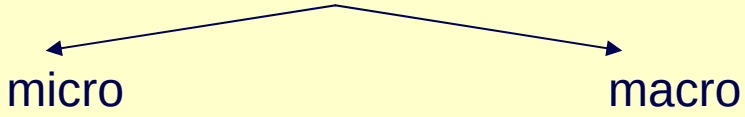


- Distribution analysis in development economics: mostly micro.
- Energy economics / climate policy analysis: mostly macro.
- Labour supply analysis: mostly micro.
- Population ageing: micro and macro.

Choice criteria for modelling approach

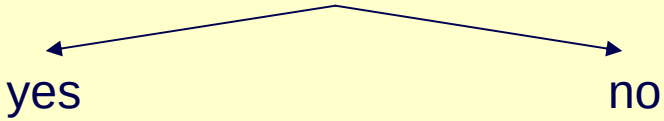
- Where is the initial shock?



- Distribution analysis in development economics: macro (trade policy).
- Energy economics / climate policy analysis: macro (generic policy) or micro (specific policy).
- Labour supply analysis: micro.
- Population ageing: macro.

Choice criteria for modelling approach

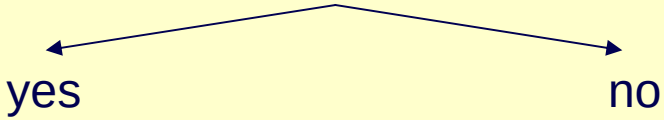
- Is there quantitatively relevant feedback?



- Distribution analysis in development economics: maybe not.
- Energy economics / climate policy analysis: disputed (fable of the elephant and the rabbit).
- Labour supply analysis: depends on the labour market institutions.
- Population ageing: unclear.

Choice criteria for modelling approach

- Is the feedback (if any) complicated?



- Energy economics / climate policy analysis:
  macro to micro: cross-price effects?
  micro to macro: complementarities and bounds.

- Labour supply analysis:
  macro to micro: cross-price effects? labour market institutions?
  micro to macro: interaction within couples.

Arguments for a full micro-macro linkage

When can a full micro-macro linkage be justified?

- We are interested in both micro and macro variables.
- Or: one set of variables is essential in the derivation of the other.
- We cannot restrict the analysis to the level where the initial shock occurs.
- There is quantitatively relevant feedback.
- The feedback mechanisms are complicated and cannot be captured by a small number of equations.

→ Which of the models pass this test?