A comparative analysis of modelling approaches to assess transition impacts
First insights from the NEMESIS models

B. Boitier (SEURECO)

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The NEMESIS model: main features

- A macroeconomic model for EU27 + UK + NO + IS (+ CH) developed and managed by SEURECO.
- A neo-Keynesian theoretical background.
- A detailed coverage: 31 countries, 30 economic activities, 27 consumption purposes, 5 production factors: capital, labour (low- and high-qualified), energy consumption and other intermediate goods.
- An energy and climate module covering 19 energy products and 7 GHG (only CO2 covered in this exercise) and with a specific modelling of the power generation considering 15 different technologies.
- (An endogeneous growth module based on investments in innovative assets: R&D, training, software and ICTs, and knowledge spillovers - Not used in this exercise)
The NEMESIS model: track record

A long experience in **policy impact assessments**:

- **Taxation**: studies for the Haut Conseil du financement de la protection sociale (HCFi-PS, 2014[1]), as well as for the Direction Générale des Entreprises (ex DGCIS), and more recently for European Commission DG TAXUD and regular works for think tanks.

- **Environment**:
  - with the energy-climate module: EU research project AMPERE (Capros et al., 2014[2]) or PARIS REINFORCE, on going (Nikas et al., 2021[3]), models’ intercomparison (Boitier et al., 2015[3]), carbon footprint and CBAM (Muller et al., 2020a[5]; 2020b[6]) or the value of the climat action (Quinet et al., 2019[7]);
  - linked with detailed energy-system model(s): several studies for the DGEC with the POLES model (MEDDE, 2015[8]), European Commission DG ENV on RES employment impacts in EU (Duscha et al., 2016[9]) or H2020 research project SET-Nav (Crespo del Granado et al., 2019[10]).

Use IAMs/NIGEM outputs from NGFS scenarios:

- **4 scenarios**: “Baseline”, “NZE 2050”, “Delayed”, “Divergent”
- **5 drivers**:
  - *Population and labour productivity* for the “Baseline” scenario (not for other scenarios)
  - A *carbon price* introduced as the unique climate policy instrument in the model (no cap and trade, EU-ETS, ESR, national carbon tax, etc, ...)
  - International *fossil fuels prices* (not included yet in standard case)
  - Change in *demand addressed from the RoW*
  - Change in *prices in the RoW*

- Recycling of carbon revenues to households (lump sum)
CO₂ emissions in France (Mt/y.)

CO₂ emissions from fossil fuel combustion and industrial processes in France. Source: historical values from EEA (2021[15]) and projections from NEMESIS model.

Draft results - do not quote
CO₂ emissions by sector in the “NZE 2050” scenario in EU27 (Mt/y.)

CO₂ emissions from fossil fuel combustion and industrial processes by sector in EU27.
Source: NEMESIS model.

Draft results - do not quote
Real GDP deviation in the "NZE - 2050" scenario in % with respect to scenario "Baseline". Source: NEMESIS model.

Draft results - do not quote

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Modelling of transition impacts - NEMESIS
Contribution of GDP components to GDP deviation in the “NZE - 2050” scenario in GDP ppt with respect to scenario “Baseline” in France.
Source: NEMESIS model.
Draft results - do not quote
Contribution of GDP components to GDP deviation with respect to scenario “Baseline” in France in 2030 and 2050 according to “NZE-2050” divers inclusion or not.

Source: NEMESIS model.

Draft results - do not quote
Employment deviation by sector in “NZE 2050” in 2050 in France

Employment deviation by sector in France in the “NZE 2050” scenario (% and thousand with respect to “Baseline” scenario)

Source: NEMESIS model.

Draft results - do not quote
Value-added deviation by sector in “NZE 2050” in 2050 in France

Value-added deviation by sector in France in the “NZE 2050” scenario (% with respect to “Baseline” scenario)
Source: NEMESIS model.

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Discussions: How to model an “adverse” climate transition?

- Raise capital cost of climate mitigation related investments
- Reinforce mis-matching in the labour market
References


References II


