

P 4.3 MIADAC

Modelling Climate Change Policies: Mitigation, Adaptation, and Acceptance

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1. Three research questions of the project

- What will be the implications and the evolution of the international climate policy regime that will be enacted after 2012?
- What is the interaction between international trade law and international climate policies?
- What will be the costs and benefits related to climate change for Switzerland and what is the role of adaptation in national climate policies and their acceptance?

2. Research Summary

Task 1: Analyze the evolution of international climate policy

Independently of the shape of the agreement that might be reached in Copenhagen for the commitment period after 2012, there is scope to investigate the mechanisms that will be enacted under the renewed climate regime. Thus, we will continue our work of phase 2 on testing different architectures of international climate agreements in order to identify their environmental and economic consequences at the Swiss, European and global levels. In particular we will:

- Analyze the evolution of international climate policy.
- Evaluate the role of technology transfer and developing country participation for agreements in the long run.
- Evaluate the possible strategic reaction of major countries to future climate policy, such as their use of market power in emission trading markets.
- Analyze the political economy side of national and international climate policy in a public choice framework, with a special focus on voters and the influence of interest groups.

Task 2: Assess the interaction of international trade and climate policy

International trade law interacts with climate policies when countries implement countervailing measures such as tariffs and border-tax adjustments in order to offset international differences in climate-related regulations, technical standards, taxes and process and production methods. These issues are analyzed by project CITEL. We will support their research by assessing the economic (i.e. impact on welfare and terms of trade) and environmental (GHG emissions reduction) effects of such trade instruments. We will use our coupled top-down/ bottom-up model developed in phase 2.

In particular, we will examine the consequences in terms of carbon leakage of a unilateral policy by the EU such as a carbon tax and seek the compensatory tariff that would allow going back to the initial situation. We will also simulate possible reactions of the countries targeted by the compensatory tariff (trade war).

Task 3: Assess the economic impacts of climate change and adaptation measures in Switzerland

We will extend our phase 2 work on adaptation measures (Gonseth, 2008) and refine existing estimates of impact costs for the Swiss economy (Ecoplan - Sigmoplan, 2007) in order to achieve more comprehensive estimates of future costs and benefits of climate change for the most vulnerable economic sectors in Switzerland.

- Aggregate and extrapolate our phase 2 survey of estimates of physical impacts of climate change (Matasci, 2008) and suitable related estimates to obtain indicators that are meaningful for an economic analysis on a regional or national scale.

- Provide an economic valuation of impacts of climate change.
- Identify what is needed to overcome the barriers to bring adaptation issues to the front of political discussions.
- Characterize priorities in policy terms for adaptation in areas such as risk awareness, conflict of interests, entangled responsibilities, financing restrictions, myopic views, and lack of information.

3. Data and methods

Task 1: Analyze the evolution of international climate policy

We will use the CGE model of the world economy (GEMINI –E3) developed in Phase 1 and updated in phase 2 to analyze the economic and environmental impacts of long-term climate treaties. Our model allows simulating the strategic interaction of countries and the implications of technological cooperation. This task will be complemented by extending the results of our EU FP6 project TOCSIN, which also deals with these issues. Furthermore, we will use public choice and game theoretical methods (Grossman and Helpman, 2001; Altamirano Cabrera, 2007) to investigate the political-economy side of the negotiations and its impact on the resulting climate regime.

Main sources of data: i) international data from the GTAP database (Univ. of Purdue), the US Department of Energy, and the International Energy Agency (IEA/OECD); ii) Swiss data from the OFEV/BAFU and from the Swiss Federal Statistical Office

Task 2: Assess the interaction of international trade and climate policy

We will extend the use of our coupled model to include the assessment of the interaction of climate policies and international trade law. This will be supported with the interpretation of public international trade law on subjects such as border tax adjustments, compensatory tariffs, technical standards and taxes on climate-related process and production methods.

Main sources of data: Swiss Federal Statistical Office, GTAP, World Trade Institute, World Trade Organization.

Task 3: Assess economic impacts of climate change and adaptation measures in Switzerland

We take as a starting point our phase 2 survey of estimates of physical impacts of climate change (Matasci, 2008). We will assess key sectors most vulnerable to climate change such as agriculture, tourism, energy production and distribution, as well as the potentially most damaging extreme weather events, e.g. heat waves, droughts and floods. For the identified sectors and events we will use data gap analysis, evaluate the feasibility of extrapolation with significant informative values, and advanced aggregation and extrapolation methods. Finally, for each impact category we will select and apply appropriate valuation techniques (Freeman, 2003) depending on theoretical adequacy and data availability.

Main sources of data: existing forecasts of consequences from climate change (e.g. from other WPs), studies from the PNR 31, WSL, OcCC/Proclim (2007) report, Ecoplan/Sigmaplan (2007) study, OFEV/BAFU.

4. Milestones and deliverables

After 18 months:

Milestones

- Proposals for long-term ('post-Copenhagen') international climate policy with particular attention to permit trading, technology transfer and developing country participation.
- Identification and assessment of the major conflict and convergence points of international trade law and climate policies
- Identification and economic estimation of climate change impacts in Switzerland.
- Analysis of the effectiveness of national adaptation strategies in terms of effectiveness (i.e. reduction of climate change damages) and political acceptability.

Deliverables

- Updated global bottom-up/top-down model.
- Policy recommendations and conclusions for future climate treaties.
- Game theoretical model of political economy aspects on climate change policy.
- First estimates of the economic and environmental impacts of border tax adjustment measures for regulations, technical standards and taxes on climate-related process and production methods
- Preliminary economic estimates of climate change impacts in Switzerland.

After 36 months:

Milestones

- Final economic estimates of climate change impacts in Switzerland.
- Final estimates of the economic and environmental impacts of border tax adjustment measures designed to compensate for international differences in regulations, technical standards and taxes on climate-related process and production methods
- Main implications for acceptability of national policies and long-term treaties on adaptation.

Deliverables

- Policy implications for the interaction of international trade law and climate policies.
- Final estimates of adaptation costs and consequences.
- Recommendations for policy priorities and acceptable national climate policies with adaptation.

5. Contribution to the WP4 and collaboration with other NCCR projects and 3rd parties

We envisage strong cooperation with projects 2.1 and 2.3 for updated information on climate change scenarios; with projects 3.1 and 3.2 for information about ecosystem impacts and adaptation; and with projects 4.1 and 4.2 for issues of trade, international law and technology transfer. Outside the project, we envisage cooperation with other European Universities to identify management options for adaptation. Finally, we will continue our collaboration with ORDECSYS to keep developing the GEMINI model and its extensions.

References

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