DGE–CRED Practical Session 3: Implementation of damages on the agriculture sector

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On behalf of:
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
of the Federal Republic of Germany

Task 1: Calibration workbook and the Baseline scenario.

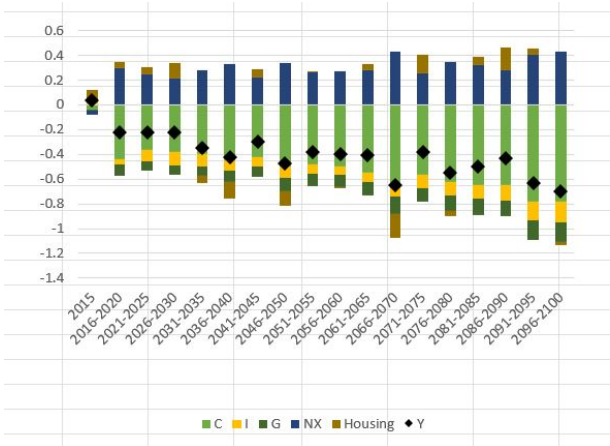
- Use the CreateRawExcelInputFileRobust.m in the function folder.
- Sectors are: Rice, Agriculture, forestry and fishing; Industry; Services
- Subsectors are: Rice; Agriculture, forestry and fishing excluding rice; Industry; Services
- Region: Vietnam without MRD; MRD
- Climate variables regional: surface temperature (tas)
- Climate variables national: sea level (SL)
- Use the Calibration.xlsx file and copy the Sheet Data and the Baseline sheet into the ModelSimulationandCalibration4Sectorsand2Region.xlsx.
- Run the Baseline scenario.

Task 2: Create SSP 119, 245 and 585 scenarios.

- Use the ClimateScenariosSSPRegions2MRI.m in the function folder.
- Create a sheet for SSP119, SSP245 and SSP585.
- Copy the climate data for temperature and sea level into the sheet.
- Define damages for rice in the Mekong River Delta and in Vietnam without MRD.
  - In Vietnam, without the Mekong River Delta, the effect of a 1°C increase in temperature reduces crop yields (exo_D_1_1) by 3 percent.
  - For the Mekong River Delta, please use the paths provided in the ClimateScenariosSSPRegions2MRI.xlsx file.

Task 3: GDP components.

- Damages to the rice sector alone reduce GDP in Vietnam by almost one percent until the end of the century.



Task 4: Create a graph to illustrate the impact of damages to the rice sector on regional value-added, employment, and capital stock.

- Use the Figures.xlsx file in the Data folder.
- Create a graph depicting the deviation between the SSP 585 and Baseline path for Y_1_1, Y_1_2.
- Create a graph depicting the deviation between the SSP 585 and Baseline path for N_1_1, N_1_2.
- Create a graph depicting the deviation between the SSP 585 and Baseline path for K_1_1, K_1_2.
- What do you observe?

Task 5: Adaptation to climate change in the rice sector (labour tax).

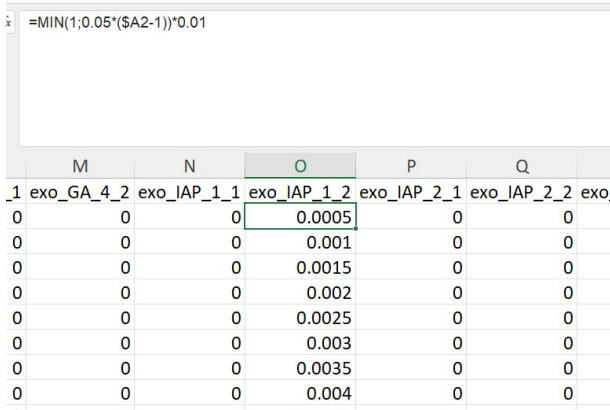
- Assume that the government wants to compensate rice farms in the Mekong River Delta for the loss in crop yields by lowering taxes on labour expenses paid by firms (exo_tauNF_1_2) by 10 percent.
- Create a scenario SSP585_AdaptTaxLab and add a column with the name exo_tauNF_1_2.
- Reduce the tax rate paid by farmers in the Mekong River Delta by 10 percent.
- Is this adaptation measure effective?

Task 6: Adaptation to climate change in the rice sector (capital tax).

- Assume that the government wants to compensate rice farms in the Mekong River Delta for the loss in crop yields by lowering taxes on capital expenses paid by firms (exo_tauKF_1_2) by 10 percent.
- Create a scenario SSP585_AdaptTaxCap and add a column with the name exo_tauKF_1_2.
- Reduce the tax rate paid by farmers in the Mekong River Delta by 10 percent.
- Is this adaptation measure effective?

Task 7: Create SSP585_AdaptPrivate.

- Change the values for exo_IAP_1_2 to reflect the necessary time to change from one crop to another.
- The MIN function makes sure that private adaptation expenditures do not exceed 1 percent of current GDP.



	M	N	O	P	Q	
_1	exo_GA_4_2	exo_IAP_1_1	exo_IAP_1_2	exo_IAP_2_1	exo_IAP_2_2	exo_
0	0	0	0.0005	0	0	
0	0	0	0.001	0	0	
0	0	0	0.0015	0	0	
0	0	0	0.002	0	0	
0	0	0	0.0025	0	0	
0	0	0	0.003	0	0	
0	0	0	0.0035	0	0	
0	0	0	0.004	0	0	

Task 8: Public adaptation to climate change in the rice sector (new crop variant).

- Assume the same adaptation measure as in Task 7.
- This time adaptation measures are financed by public government expenditures exo_GA_1_2
- What differences do you observe compared to Task 7?

Task 9: What adaptation measure is the best to reduce the loss in consumption?

- What adaptation measure can reduce the consumption loss the most?
- Is it ok to compare only the differential in consumption levels?