The GRACE model used for estimation of increased wheat price spikes and larger economic inequality with 2oC global warming

By Taoyuan Wei, CICERO Center for International Climate Research (taoyuan.wei@cicero.oslo.no), 30 June 2022

The computable general equilibrium (CGE) model GRACE was updated from an original version developed by Aaheim and Rive (2005). This document includes all the programming codes of the version of GRACE used by this study. The codes can be run with GAMS/MCP and GAMS/MPSGE (Rutherford 1998). The model calibrates the base year economy (2011) with Global Trade Analysis Project (GTAP) v9 database (Badri et al. 2015), where the input data of changes in wheat yield in a scenario are directly taken from the results from the wheat crop model ([APSIM-Wheat14 v7.10](https://www.apsim.info/documentation/model-documentation/crop-module-documentation/wheat/)). The original and aggregated GTAP v9 database are excluded from this document due to license restriction. The original GTAP database is available from the GTAP website (<https://www.gtap.agecon.purdue.edu/>) and the aggregated database can be obtained by the aggregation codes in the folder “GTAP9GAMS” that is a simplified modification of the GTAP9GAMS codes written by Rutherford (2005). For aggregation, the original GTAP data in the .GDX format should be placed at a subfolder “data”in the folder “GTAP9GAMS”. The aggregated data will also be stored in the subfolder.

Starting with the aggragated database, which is called foodpris51.gdx in the document, we construct the GRACE model in the folder “grace.” In the GAMS software ([www.gams.com](http://www.gams.com)), we run the model by executing the file “core.gms.” Please follow the steps below.

1. Run the “single run” alone to obtain base-year initial BAU equilibrium.
2. Switch off the “single run” codes and run the “multiple run” codes to obtain simulation results for each climate change scenario.
3. The simulate results for each climate change scenario will be further treated to obtain necessary variables for report in this study by running the codes in the file “resdata.gms”
4. The reported data by running the codes in the file “resdata.gms” will be copied to the excel files in the main folder for further treatment.
5. More explanation notes can be found in the corresponding files.

For each run of the file “core.gms”, it may need around 20 hours and please be patient.

Any questions and comments can be delivered to Taoyuan Wei by email address: taoyuan.wei@cicero.oslo.no

# References.

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Badri, N., A. Aguiar and R. McDougall, Eds. (2015). Global Trade, Assistance, and Production: The GTAP 9 Data Base, Center for Global Trade Analysis, Purdue University, <http://www.gtap.agecon.purdue.edu/databases/v9/v9_doco.asp>.

Rutherford, T. F. (1998). Economic Equilibrium Modeling with GAMS: An Introduction to GAMS/MCP and GAMS/MPSGE. Washington, D.C., GAMS Development Corp.

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