Integrated Economic-Environmental Modeling for Evidence-Based Public Policy and Investment Design

IEEM Chile: The Pre-Programmed Reference Scenario 2016-2050 (Setup Scenario)

Martín Cicowiez
(CEDLAS-UNLP y RMGEO)
Onil Banerjee
(RMGEO)

Banco Central de Chile
Santiago de Chile, Mayo, 2-5, 2023

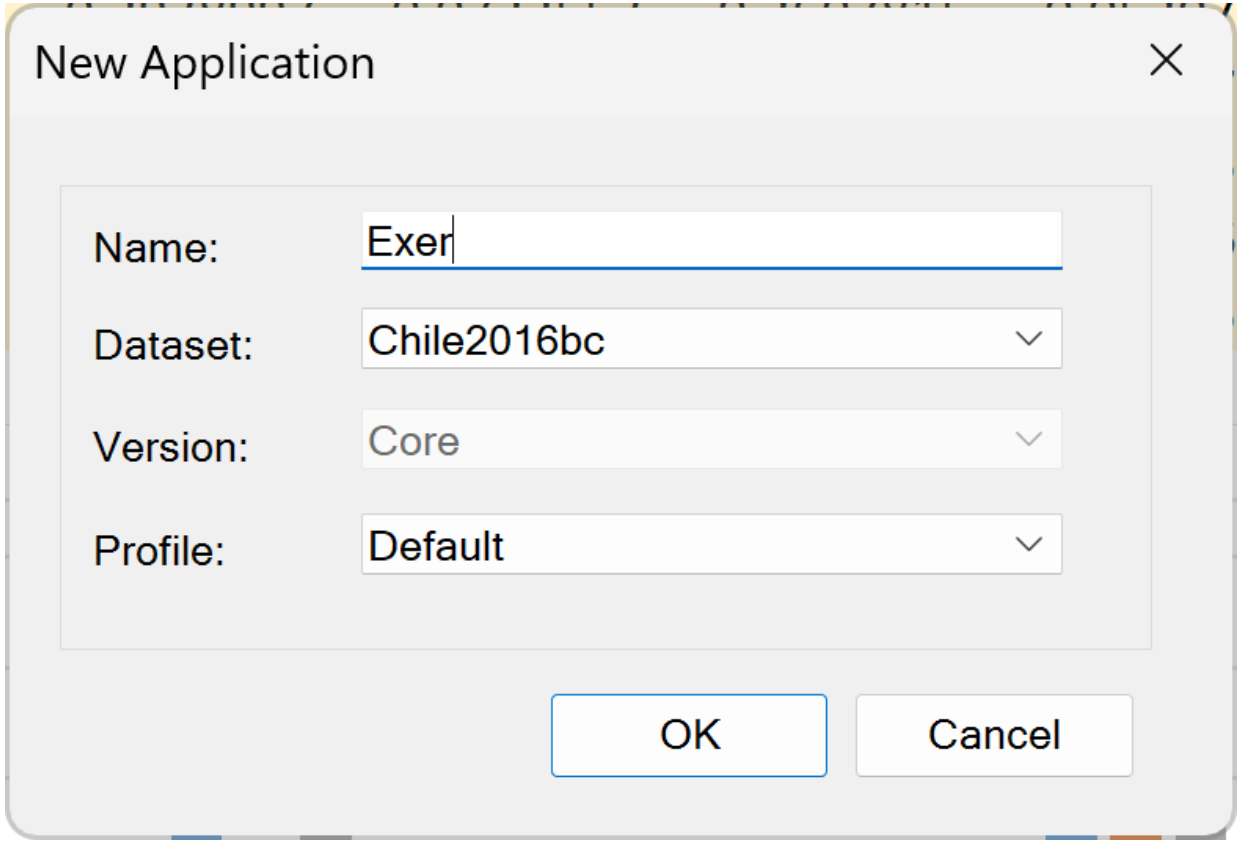
Contents

- Creation of New Excel File with ISIM Application
- Sets in IEEM / ISIM
- Key Default Assumptions
- Pre-programmed Reference Scenario Run; Results
- Changes in Assumptions for the Pre-Programmed Reference Scenario (**Setup**)

New Excel File with ISIM Application

- To create a new Excel file with ISIM application,
  - open Excel
  - click on the ISIM tab
  - click on **New** | **In New Workbook** in the Application group; then
    - **Name** = Exer
    - **Dataset** = Chile2016bc
    - **Version** = Core

New Excel File with ISIM Application – cont.



Sets in IEEM / ISIM

- The following sets are used in IEEM to define simulations
  - sim = simulations
  - a = activities
  - c = commodities (goods/services)
  - f = factors
  - ins = institutions
  - insd = domestic institutions
  - h = institutions, households
  - ac = global set

Elements of IEEM Chile 2016 – Government Receipts

- trgovngov = trnsfr from domestic inst to government
- trgovrow = trnsfr from RoW to government
- netforfingov = net foreign financing to government
- netdomfin = net domestic financing to government
- ‘tax-act’ = tax activities
- ‘tax-imp’ = tax imports (tariffs)
- ‘tax-com’ = tax commodities
- ‘tax-dir’ = tax direct (incomes)

Elements of IEEM Chile 2016 – Government Spending Items

- trngovgov = trnsfr from gov to domestic inst
- trrowgov = trsnfr from gov to RoW
- congov = gov consumption
- ‘f-capg’ = gov investment

Elements of IEEM Chile 2016 – Non-Government Payments

- trngovrow = trnsfr from RoW to domestic non-gov inst
- trrowngov = trnfr from domestic non-gov inst to RoW
- savngov = savings insdng
- trfacrow = trnsfr from RoW to domestic factors
- trrowfac = trnsfr from domestic factors to RoW
- netforfinngov = net foreign financing to insdng
- fdi = foreign direct investment
- ‘f-cap’ = private investment

Pre-Programmed Reference Scenario

- It is a scenario that reflects a "business-as-usual" situation, from the base year to a future year
  - in our case, from 2016 to 2050
- The results of the non-base scenarios are interpreted by comparison with the base scenario, usually equal to the pre-programmed reference scenario.

Default assumptions for Chile

- In the case of Chile, the pre-programmed baseline scenario is generated by making the following assumptions
  - can be modified by options in **Setup**
- The annual GDP growth rate is the average for 2017-2050 = 2.3%. The information was obtained from IMF WEO April 2023.

Default assumptions for Chile – cont.

- Government Receipts – Rules; govrecrule0 + govclos0
  - trgovngov = exog %GDP
  - trgovrow = exog %GDP
  - netforfingov = exog %GDP
  - netdomfin = exog %GDP
  - ‘tax-act’ = exog tax rates
  - ‘tax-imp’ = exog tax rates
  - ‘tax-com’ = exog tax rates
  - ‘tax-dir’ = exog tax rates -- endog (ver govclos0)

Default assumptions for Chile – cont.

- Government Spending Items – Rules; govspndrule0
  - trngovgov = exog %GDP
  - trrowgov = exog %GDP
  - congov = exog %GDP
  - ‘f-capg’ = exog %GDP

Default assumptions for Chile – cont.

- Non-Government Payments – Rules; ngovpayrule0
  - trngovrow = exog GDP%
  - trrowngov = exog GDP%
  - savngov = exog GDP%
  - trfacrow = exog GDP%
  - trrowfac = exog GDP%
  - netforfinngov = exog GDP%
  - fdi = exog GDP%
  - ‘f-cap’ = exog GDP%

Default assumptions for Chile – cont.

- Macro Closure Government
  - all non-tax expenditures and revenues exog %GDP; tax revenues except direct (income) tax exog rate; direct tax rate endog
- Macro Closure Savings-Investment
  - investment exog %GDP with savings rate insdng as variable balancing savings and investment
- Macro Closure External Sector (BoP)
  - external financing exog %GDP with real exchange rate as balancing variable for foreign exchange inflows and outflows

Default assumptions for Chile – cont.

- Factor Markets
  - f-lab = unemploy with wage curve
  - f-cap = fixed employ; once installed, sector-specific
  - f-land-crops = fixed employ; sector-specific, exog supply and function of deforestation
  - f-land-livestock = fixed employ; sector-specific, exog supply
  - f-land-for = fixed employ; sector-specific, exog supply
  - f-fish = fixed employ; sector-specific, exog supply
  - f-nrpetgas = fixed employ; sector-specific, exog supply
  - f-nrcopper = fixed employ; sector-specific, exog supply
  - f-nrothmin = fixed employ; sector-specific, exog supply

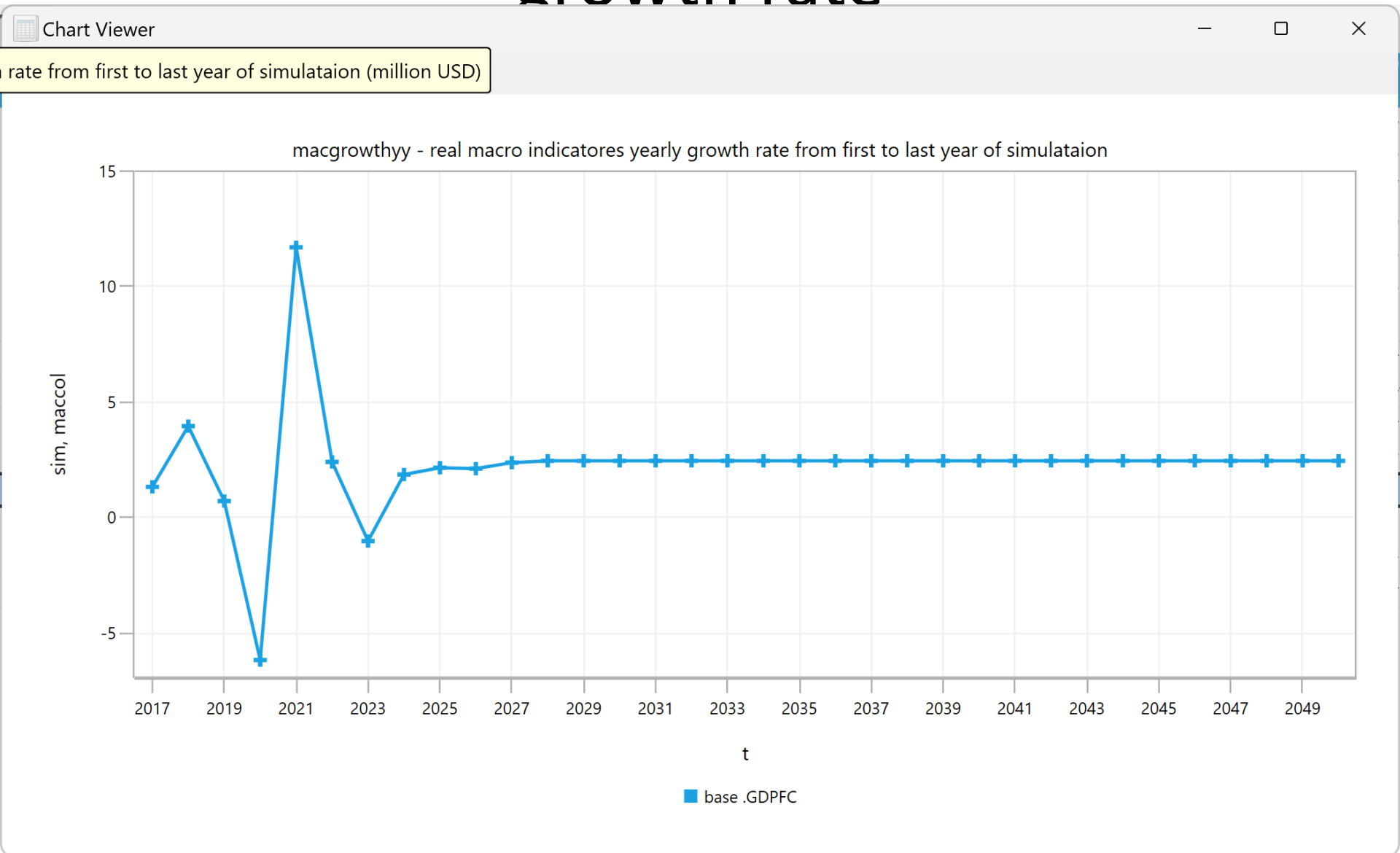
Running the Pre-programmed Reference Scenario

- To run the pre-programmed reference scenario without changes, click on **Run Setup** in the **Setup** group.
- Automatically, several reports are generated for the base scenario, which at this point is identical to the pre-programmed reference scenario or Setup
  - i.e., unless changes are made, the reference scenario becomes the baseline scenario.

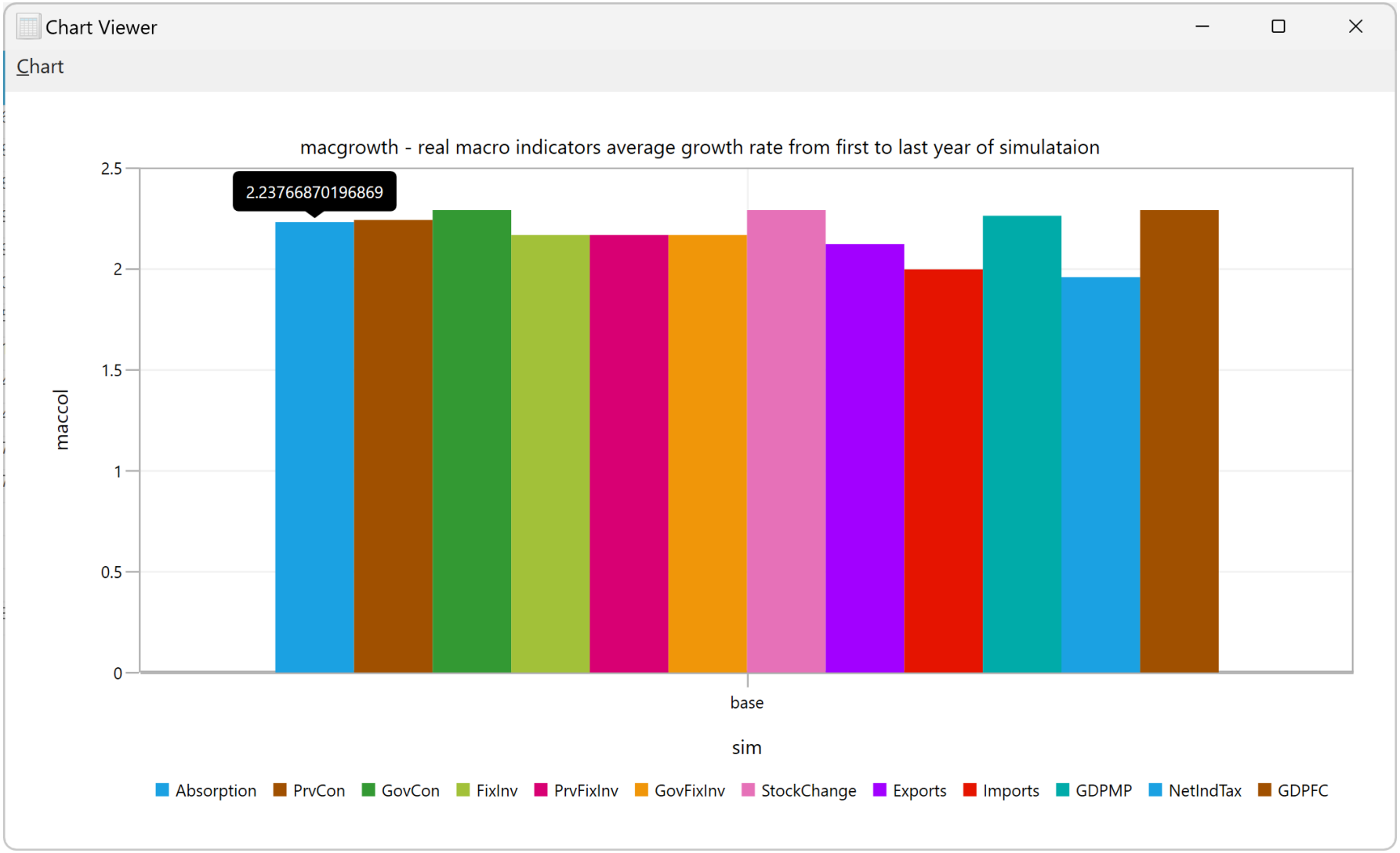
Pre-programmed Reference Scenario Results

- To navigate through an Excel file with ISIM application, you can use **Navigation Tree**
  - To make it visible, click on the corresponding button in the **View** group.
- To view the reports, go to **View** | **Reports**
  - Raw Results GDX
  - Base Year Data
  - Macro Results
  - Meso Results
  - Poverty and Inequality Results

Results for the Base; GDP FC; % annual growth rate



Results for the Base; % average annual growth rate 2023-2050



Files and Report Parameters

- The **Raw Results** GDX file reports all variables and parameters of the model
  - all endogenous variables (variable name + X)
  - the percentage change from the baseline scenario for all endogenous variables (variable name + XP)
  - the average annual growth rate for all endogenous variables in the model (variable name + XPP)
  - the average annual growth rate for tminrep-tmaxrep for all endogenous variables in the model (variable name + XPPREP)
  - the year-on-year growth rate for all endogenous variables in the model (variable name + XPY)
  - the parameters used to define the counterfactual scenarios (parameter name + x)

Change of Assumptions Pre-Programmed Reference Scenario

- As an example, the assumptions for the following are changed
  - GDP growth rate
  - expenditure elasticities (income)
  - government closure
  - rules for government spending

Important!

- In IEEM-GAMS, the macro closure and the rules selected for the pre-programmed reference scenario (Setup) constitute the default choices for the other simulations.
- In IEEM-ISIM, all simulations impose, by default, choice 1 for govrecrulesim, govspndrulesim and ngovpayrulesim.
- However, these default choices can be overwritten when defining the other simulations.