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Session 4

Presentation and use of the CGE through the UNESCWA  
interface

# 1.1 CGE Model Sections

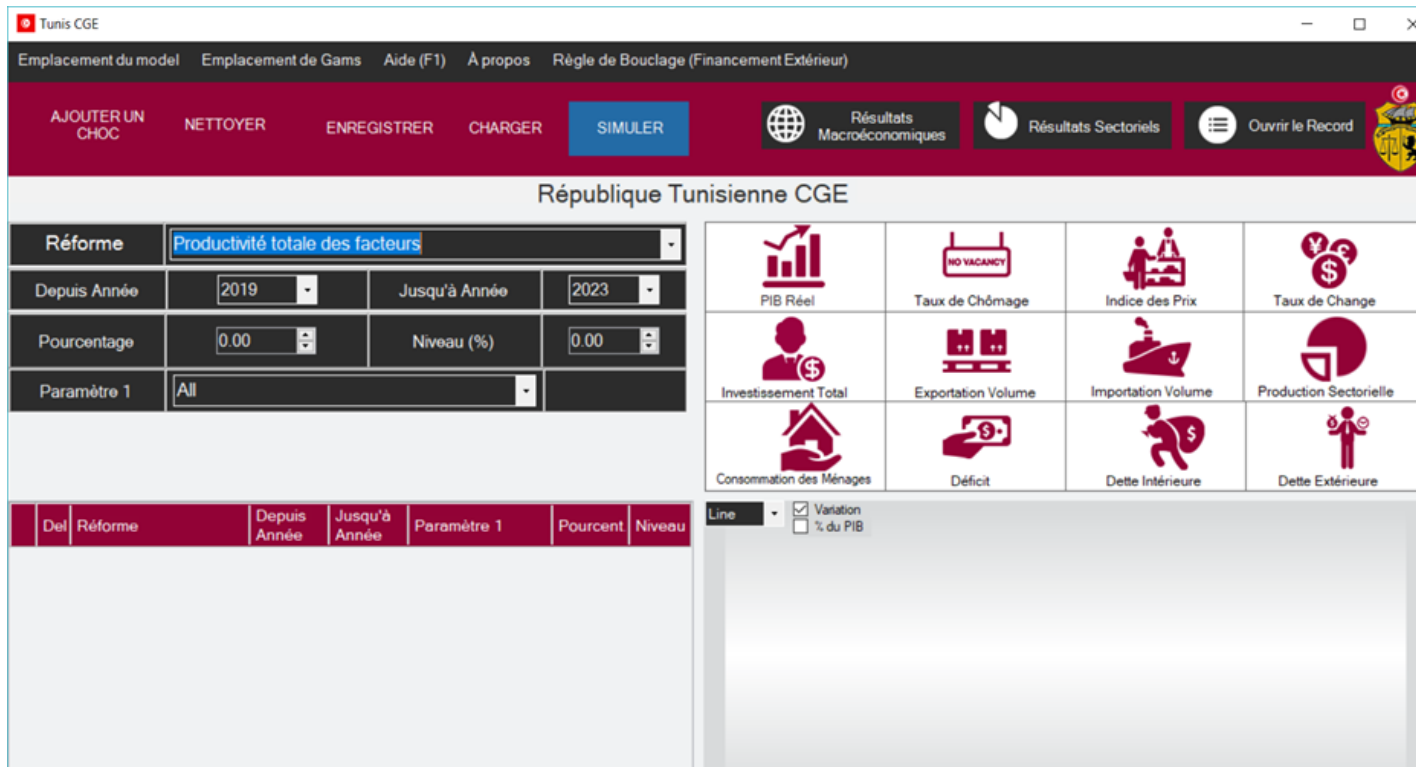


Figure 1 - CGE Model Design

The CGE Model is split into **six main sections**:

- Upper menu
- Grid and results' buttons
- Parameters
- Grid/list of shocks
- SDG's & Goals' indicators
- Graph sections

## 1.1.1 Upper Menu Section

In this section, there is the menu of the CGE Model that contains 5 menu items:

- 1. Emplacement du model:** a menu item that has 2 sub-menu items (Afficher le lieu actuel and Changer le lieu) as shown in (Figure 2 - CGE Model Menu (1)) the former is used to show the current working path where the CGE folder exists, and the latter is used to set the working path by selecting the target CGE folder

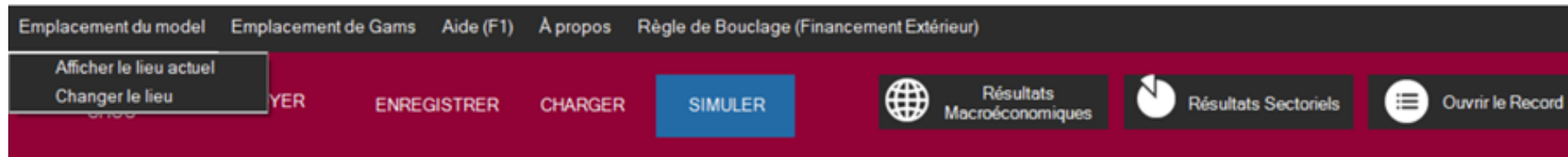


Figure 2 - CGE Model Menu (1)

- 2. Emplacement de Gams:** a menu item that has 2 sub-menu items (Afficher le lieu actuel and Changer le lieu) as shown in (Figure 3 - CGE Model Menu (2)) the former is used to show the current gams application (gams.exe) path where the gams application is installed and where its executable file resides, and the latter is used to set the gams path by selecting the corresponding “gams.exe” file which will be used to run the simulations
- 3. Aide (F1):** this menu item is used to show the Help section (or user manual) that helps the user getting familiar with the CGE model interface

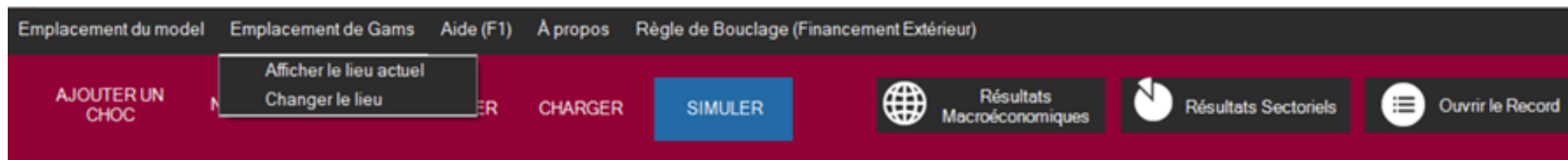


Figure 3 - CGE Model Menu (2)

4. **Règle de Bouclage** (Financement Extérieure): this menu item is used to set the Closure Rule of the simulation. It has 7 options, default one is Finance étrangère as shown in (Figure 4 - CGE Model Menu Closure Rule (3))



Figure 4 - CGE Model Menu (3)

## 1.1.2 Shocks' Grid Buttons and Results' Buttons Section



Figure 5 – Grid's action buttons

- 1. Grid's Buttons:** 5 buttons resemble the action items used in editing the shock's grid as shown in (Figure 5 - Grid's Action Buttons):
  - Ajouter un Choc: this button is used to add a new shock to the grid based on the selected parameters
  - Nettoyer: this button is used to clear all the shocks added to the grid in one shot
  - Enregistrer: this button is used to save the added shocks to a text file (.txt) after specifying the name of the file
  - Charger: this button is used to load shocks from a saved .txt file into the grid, which is the output of the Save button
  - Simuler: this button is used to Run the simulation after adding the values of shocks and parameters



Figure 6 – Results Action Buttons

**2. Results Buttons:** 3 buttons are used to show the simulation's results as per (Figure 6 - Results Action Buttons)

Results\_132181191800424059 - Excel

File Home Insert Page Layout Formulas Data Review View Developer Tell me RBDEB(Osm... Share

A6 Macroeconomic Results

**TUNIS - CGE - Macro Economic Results**

Macroeconomic Results						
Variable	2019	2020	2021	2022	2023	Difference
Real GDP	0.07	0.06	0.05	0.04	0.02	0.05
Unemployment rate (in percent)	0.1	0.11	0.12	0.13	0.14	0.14
CPI	-0.1	-0.09	-0.09	-0.09	-0.08	-0.08
DPI	0	0	0	0	0	0
Exchange rate	0	0	0	0	0	0
Local Consumption	0.09	0.06	0.05	0.04	0.01	0.05
Total Investment	-0.01	-0.02	-0.01	-0.02	-0.04	-0.02
Private Investment	-0.02	-0.03	-0.01	-0.02	-0.05	-0.03
Trade						
Total Exports	0.27	0.25	0.22	0.18	0.14	0.21
Total Imports	0.23	0.2	0.17	0.13	0.09	0.16
Public finance						
Public Expenditure						
Total Expenditure	-0.19	-0.23	-0.2	-0.21	-0.22	-0.21
Wage Bill	0	0	0	0	0	0
Good and Service	0	0	0	0	0	0
Public Investment	-0.19	-0.23	-0.21	-0.22	-0.23	-0.22
Domestic Interest	0	0	0	0	0	0

Results

Ready 85%

Figure 7 – Macro-economic Results

a. **Résultats Macroéconomiques:** this button is used to show the macro-economic results of the simulation. When clicking on this button, an excel file will open showing all the needed macro-economic results (Figure 7 - Macro-economic Results)



TUNIS - CGE - Sectoral Results						
PROD						
Sector	2019	2020	2021	2022	2023	Cumulative
Agriculture et Peche	0.08	0.08	0.08	0.08	0.08	0.08
Industries agro-alimentaires	2.03	1.93	1.83	1.73	1.64	1.83
Industrie du Tabac	-0.41	-0.43	-0.42	-0.41	-0.41	-0.41
Textiles Habillement et cuirs	-0.26	-0.23	-0.32	-0.43	-0.57	-0.35
Industries Diverses	-0.03	-0.03	-0.03	-0.03	-0.04	-0.03
Raffinage du Petrole	-0.2	-0.17	-0.18	-0.17	-0.17	-0.18
Industries Chimiques	0.01	0	-0.01	-0.02	-0.05	-0.02
Materiaux de construction ceramique et verre	-0.01	-0.02	-0.02	-0.02	-0.03	-0.02
Industries mecaniques et electriques	-0.08	-0.08	-0.09	-0.11	-0.13	-0.1
Extraction petrole et gaz naturel	-0.02	-0.03	-0.05	-0.06	-0.09	-0.05
Mines	-0.02	-0.03	-0.04	-0.05	-0.08	-0.04
Electricite et gaz	0.07	0.05	0.04	0.03	0.02	0.05
Eau	0.02	0	-0.01	-0.02	-0.04	-0.01
Batiment et genie civil	-0.04	-0.05	-0.03	-0.04	-0.06	-0.05
Entretien et reparation	0	-0.01	-0.02	-0.04	-0.07	-0.03
Commerce	0.09	0.08	0.08	0.06	0.05	0.07
Services d hotelerie et de restauration	0.05	0.04	0.04	0.04	0.03	0.04
Transports terrestres	0.03	0.02	0.02	0.01	-0.01	0.01
Transports maritimes	-0.01	-0.01	-0.01	0	0	0
Transports aériens	0.02	0.02	0.02	0.02	0.02	0.02

b. **Resultats Sectoriels:** this button is used to show the sectorial results of the simulation. When clicking on this button, a “sectoral.csv” file opens in excel showing all the needed sectorial results of the simulation (Figure 8 - Sectorial Results).

Figure 8 – Sectorial Results

```
sim.lst - Notepad
File Edit Format View Help
GAMS Rev 143 Intel/MS Windows
General Algebraic Modeling System
Compilation

1
INCLUDE C:\Users\osmat\Desktop\Layale\Chemonics\CGE\AMIR.gms
7 parameter t1 /1/
8 ref /1/
9 EXP_endog /1/
10 direction /0/
11 ref0 /1/;
12
13 *-----
14 *1. sets -----
15 *-----
16
17 SETS
18 t time /2015*2023/ ;
INCLUDE C:\Users\osmat\Desktop\Layale\Chemonics\CGE\sets.gms
20 SETS
21 AC global set for model accounts - aggregated microsams accounts
22 ACNT(AC) all elements in AC except TOTAL
23 AAG(AC) aggregate activity accounts
24 R(AC) trading regions
25 A(AC) activities
26 ACES(A) activities with CES fn at top of technology nest
27 C(AC) commodities
28 CD(C) commodities with domestic sales of output
29 CDN(C) commodities without domestic sales of output
30 CE(C) exported commodities
31 CER(C,R) imported commodities by region
32 CEN(C) non-export commodities
33 CM(C) imported commodities
```

Figure 9 – Log File Sample

c. **Ouvrir le Record:** this button is used to open the log file of the simulation. This log file is needed to get all the details of the simulation especially whenever an execution error occurs; this file is used to know what the error is and to fix it (Figure 9 - Log File Sample)

## 1.1.3 Parameters to Shock Section

Réforme	Productivité totale des facteurs		
Depuis Année	2019	Jusqu'à Année	2023
Pourcentage	5.00	Niveau (%)	0.98
Paramètre 1	All		

Figure 10 – Parameters to Shock

*This section is used to specify the parameters that the user wants to add to the simulation before running it as shown above in Figure 10 - Parameters to Shock. There are 6 parameter types that can be selected; some of them are linked to one another and filtered accordingly (Figure 10 - Parameters to Shock)*

- 1. Réforme:** this is the main parameter type. It is a dropdown list with the following possible 14 options: Productivité totale des facteurs, Dépenses Courantes du Gouvernement, Investissement Publique, Droits de Douane, Taxe sur les Entreprises, Taxe sur les Revenu des Ménages, Transfert Direct aux Ménages, Population Active, Taxe sur la Valeure Ajoutée, Autre Taxe Indirects, Subventions aux Produits Énergétiques pour les Ménage, Subventions aux Produits Énergétiques pour les Entreprises, Taux de Change and Prix Mondial
- 2. Depuis/Jusqu'à Année:** this is the second parameter where the user can specify the “From Year” and “To Year” values. The possible years’ range is 2019 to 2023.

Réforme	Productivité totale des facteurs		
Depuis Année	2019	Jusqu'à Année	2023
Pourcentage	5.00	Niveau (%)	0.98
Paramètre 1	All		

Figure 10 – Parameters to Shock

3. **Pourcentage:** this is the percentage which will be added to the shock's formula per selected policy. Let us assume the policy added is "Dépenses Courantes du Gouvernement" with a percentage of 5% and an offset of 0.01, the generated formula will contain the added percentage ( $1+0.05 = 1.05$ ) multiplied by the policy (G) function of the selected argument (note that each argument has a text and a hidden value which is used when generating the equation, in this case it is clothing leather products footwear = 'c\_tcclf') and time t, and to which we add the offset (0.01):  

$$1.05 * G\_ref('c\_tcclf', t) + (0.01)$$
4. **Niveau:** this is the offset % that will be added to the shock's formula. Elaborated with the percentage parameter. Please note that the offset should be in the 0.0x figure.
5. **Paramètre 1:** this parameter is linked to the selected Policy and varies in value according to the selected Policy and can have one of the following 25 options: Agriculture et Pêche, Industrie Agro-alimentaires, Industrie du Tabac, Textiles Habillement et Cuirs, Industries Diverses, Raffinage du Pétrole, Industries Chimiques, Matériaux de Construction Céramique et Verre, Industries Mécaniques et Électriques, Extraction Pétrole et gaz Naturel, Mines, Electricité et gaz, Eau, Bâtiment et Génie Civil, Entretien et Réparation, Commerce, Services d'hôtellerie et de Restauration, Transports Terrestres, Transports Maritimes, Transports Aériens, Services Auxiliaires des Transports, Poste et Télécommunication, Services Financiers, Autres Services Marchands and Administration Publique

## 1.1.4 Shocks' Grid Section

Del	Réforme	Depuis Année	Jusqu'à Année	Paramètre 1	Pourcent	Niveau
	Dépenses Courantes du Gouvernement	2019	2023		4	0.00
	Prix Mondial	2019	2023	All	4	0.98
	Transfert Direct aux Ménages	2019	2023	Quintile 10	9	-0.05

Figure 11 – Shock's Grid

*This is the second main section of the CGE Model; it is the grid that shows the added shocks along with their parameters. This grid has 7 columns as shown in (Figure 11 - Shock's Grid) to the left: Del, Réforme, Depuis Année, Jusqu'à Année, Paramètre 1, Pourcentage and Niveau*

- The user can delete any row in the grid by clicking on the delete bin image in the corresponding Del column or by just selecting the row and pressing the Delete button on the keyboard. The user can also delete the row using the context menu, through a mouse right click on the target row and selecting the “Delete Row” menu option
- The user can change the width of any column with the mouse by holding the right corner of the column and moving the mouse right-left in order to increase-decrease the width
- The user can also edit the Depuis Année, Jusqu'à Année, Pourcentage and Niveau values from within the grid directly: Double click on the cell in order to enter the Edit mode then press E
- nter when done editing

## 1.1.5 Indicators Section

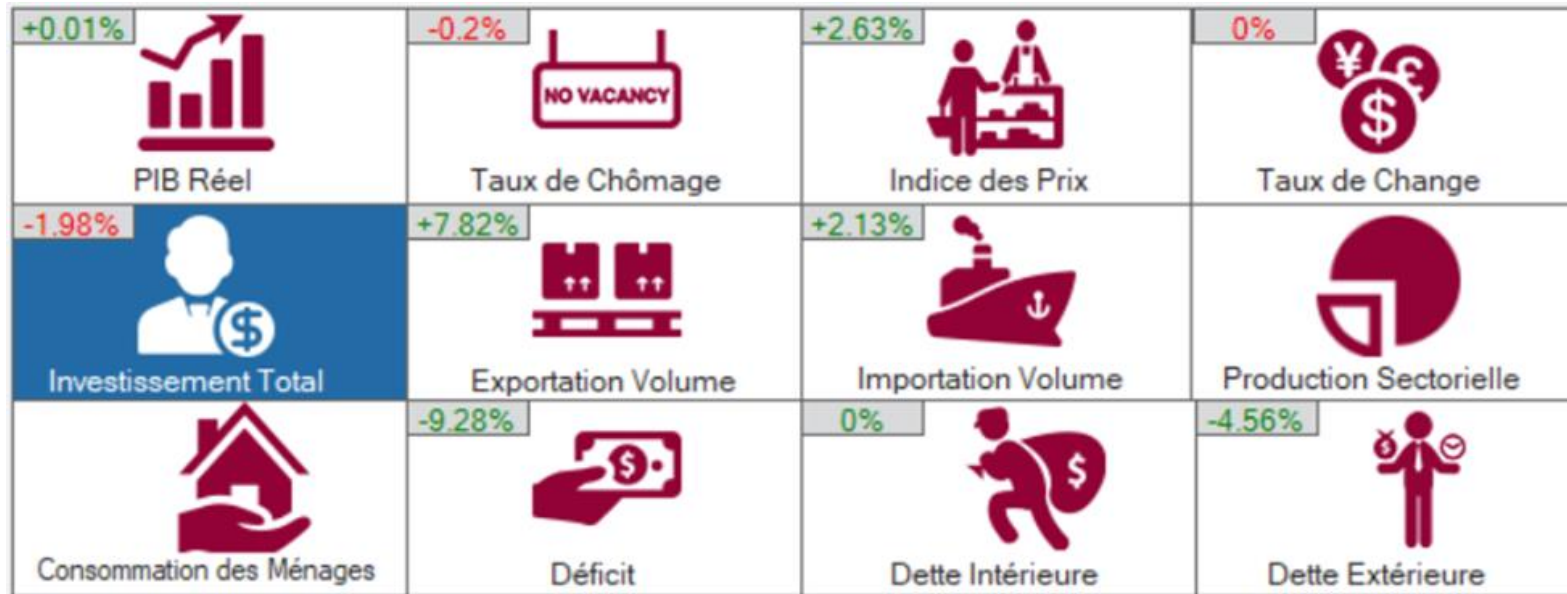


Figure 12 – Economic indicators

*In this section, the CGE Model interface shows the **12 economic indicators**, represented by their corresponding icon, along with their respective percentage result when the simulation ends (on the top left corner of each indicator) as shown in (Figure 12 - Economic Indicators) above.*

- The icons are interactive; the user can click on each icon in order to draw its corresponding chart placed underneath the indicator's section
- The icons take the blue color on mouse hover
- When the simulation is successfully completed, the Real GDP indicator line chart is displayed by default as per (Figure 13 - PIB Réel) below with "Variation" option on the top left corner of the graph is checked. Alternatively, same chart may be viewed as "PIB Réel - Baseline vs Simulation" simply by clicking the checkbox labeled "% du PIB" on the top left corner of the graph



## 1.1.6 Graphical Representation Section



Figure 13 – PIB Réel

In this section, the CGE Model displays the results in a line chart for the “PIB Réel” economic Indicator

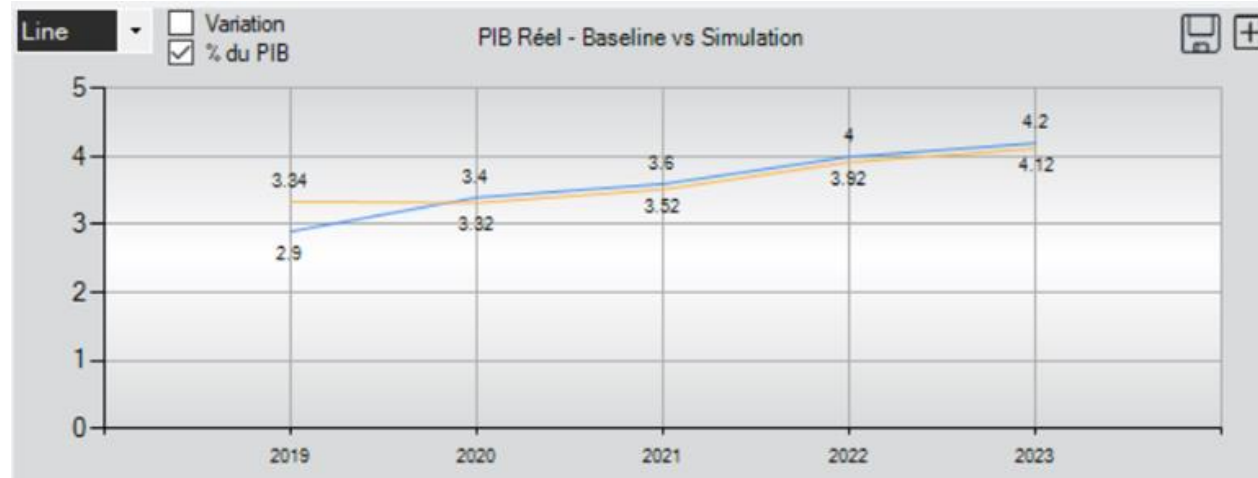


Figure 14 – PIB Réel Baseline vs. Simulation

As mentioned earlier, when the simulation is successfully completed, the first indicator which is the PIB Réel is displayed in the chart area as shown in (Figure 13 - PIB Réel) with the “Variation” option checked. Every point represents the percentage value of the indicator (in this case PIB Réel) in the corresponding year.

If the “% du PIB” option is checked instead the graph will be updated comparing the baseline versus simulation values as illustrated in (Figure 14 - PIB Réel Baseline vs. simulation)



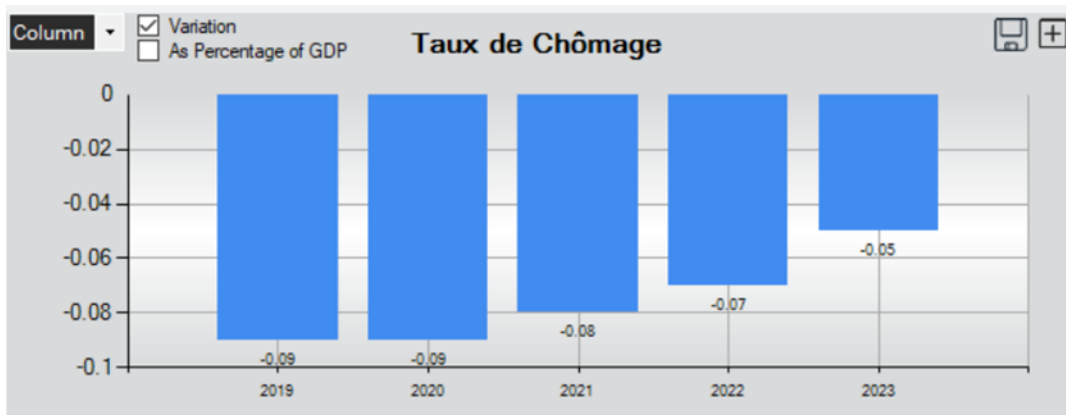


Figure 15 – Taux des Chomage Column Chart

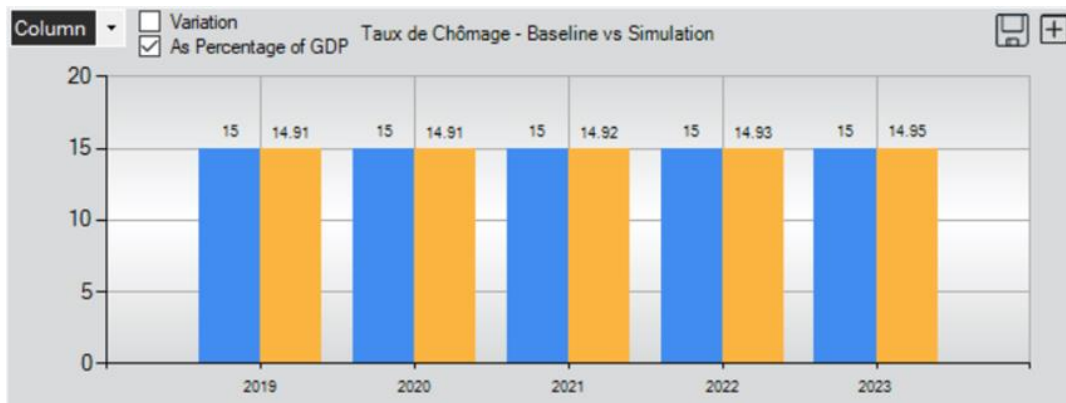


Figure 14 – Taux des Chômage - Baseline vs. Simulation Column Chart

This also applies to all other indicators. The results being drawn in the line charts are taken from the macro-economic results of the simulation. Furthermore, the “Save” or “Plus” buttons on the top right corner of the graph can be used to either enlarge the view for better visibility or save it as an image for later use.

Also the chart type can be changed simply by choosing the requested chart type from the list accessible on the top left corner of the graph include: Line, Spline, Column or Area chart types (Figures 15 to 18)

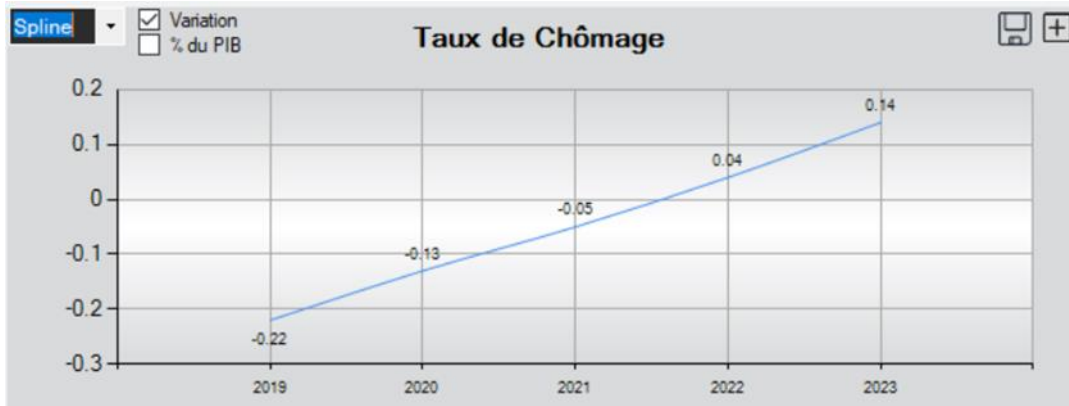


Figure 17 – Taux des Chomage Spline Chart

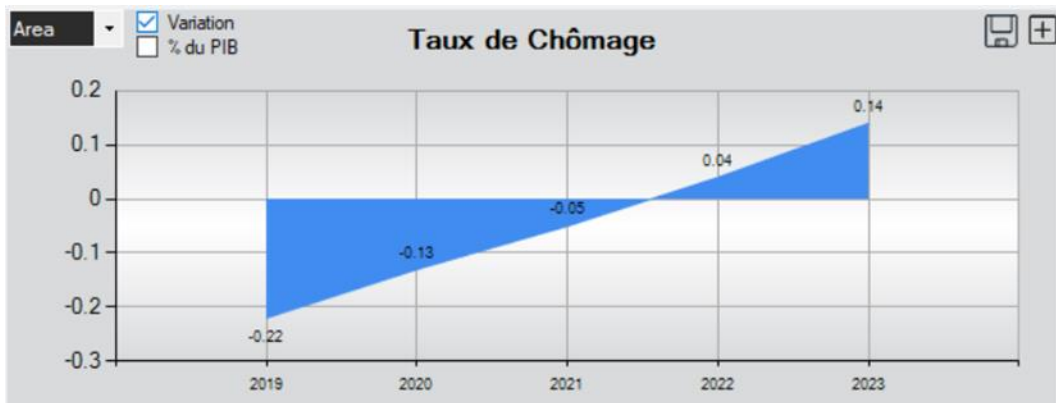


Figure 15 – Taux des Chomage Area Chart

## 2. Simulation Workflow Sample

First of all, the user has to run the CGE Model application by double clicking on the executable file (let us call it TunisCGEModel.exe). When running the application, the interface opens readily for the user to enter the parameter, specify his/her simulation parameters and input. The user can Run the simulation and wait for it to converge and then check the outputs of the simulation.

## 2.1 Application Process Flow chart

