ISIM-MAMS v2: AN INTERFACE FOR MAMS[*]
USER GUIDE[+]

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[*] MAMS = MAquette for MDG Simulations; MDG = Millennium Development Goals.

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Introduction

The purpose of developing an interface for MAMS is to make MAMS user-friendly.[1] The combined program, consisting of the underlying MAMS program and the MAMS interface is referred to as ISIM-MAMS; in this document, the workings of ISIM-MAMS version 2 is described. ISIM-MAMS allows the user to define and run MAMS simulations interactively in the Excel **2007/2010/2013/2016** environment, without directly running GAMS – the software in which MAMS is coded. No previous knowledge of the GAMS language or programming skill is necessary to use the program. In order to run ISIM-MAMS v2, the user needs to have installed Excel 2007 or newer and GAMS (distribution **24.3** or newer with the PATH and CONOPT solvers). The simulation results are also provided in an Excel file.

The MAMS Interface is being developed as an add-in for Excel 2007/2010/2013/2016. When doing simulations using ISIM-MAMS, the user has to (1) open Excel, (2) open an existing application or create a new application (both of which would be associated with a

[1] A complete description of MAMS can be found in Lofgren et al. (2012).

specific country dataset)[2], (3) select the (new) ISIM-MAMS tab (which opens a ribbon with MAMS-specific buttons), (4) define and/or run one or more scenarios (a base scenario and one or more policy scenarios; some of these may be pre-defined), and (5) access the results inside the same Excel file, available as tables and graphs. To run MAMS, the user simply has to click on the "Run" button on the MAMS Interface ribbon.

The MAMS Interface is connected to a database that stores set elements (commodities, activities, factors, etc.) and other data elements (default elasticities and closure & rules), that are specific to the country dataset and that may be needed to define scenarios. The rest of the relevant country dataset(s) (other than the application database) is stored in the MAMS-in-GAMS folder, mostly in Excel files. Among other things, it should be noted that the MAMS Interface is run simply by opening an Excel file and clicking on the ISIM-MAMS tab.

In sections 1-13 we describe the workings of the second version of ISIM-MAMS software.[3] In the last section, we explain how to define four different MAMS simulations using ISIM-MAMS with a demonstration dataset.

1. Software Requirements

In order to use ISIM-MAMS v2, the user needs a PC running Windows with Excel 2007/2010/2013/2016, and GAMS distribution 24.2.2 or newer with the PATH and CONOPT solvers installed -- along with a valid license file.

2. Installation

The MAMS Interface is being developed as an add-in for Excel 2007/2010/2013/2016. The ISIM-MAMS software is distributed as a zip file that contains a setup file. To install the software, unzip the file ISIM-MAMS-Setup.zip in a folder located in the C: hard drive and

[2] ISIM-MAMS applications are stored in Excel files.

[3] To save space, in what follows we refer to ISIM-MAMS instead of ISIM-MAMS v2.

run the file setup.exe; an ISIM-MAMS tab will be added to Excel.[4] Currently, there are two versions of ISIM-MAMS, 32 and 64 bits. The user has to install the one that is in accordance with his/her version of Excel 2010/2013/2016[5]; users of Excel 2007 should install the 32 bits version of ISIM-MAMS.

In case needed, the installation process will connect to the Internet to download the "Visual Studio Tools for the Office System 3.0 Runtime", an Office component that is needed to execute Office add-ins or customizations. The user will be asked to restart Excel once ISIM-MAMS in installed.

In case the installation process detects the presence of an older version of ISIM-MAMS, the installer will stop and will ask the user to uninstall the previous version before proceeding.[6]

During the installation process, the user will be asked to trust the source of the ISIM-MAMS Microsoft Office Customization; to do so, click on the Install button (see Figure 2.1).

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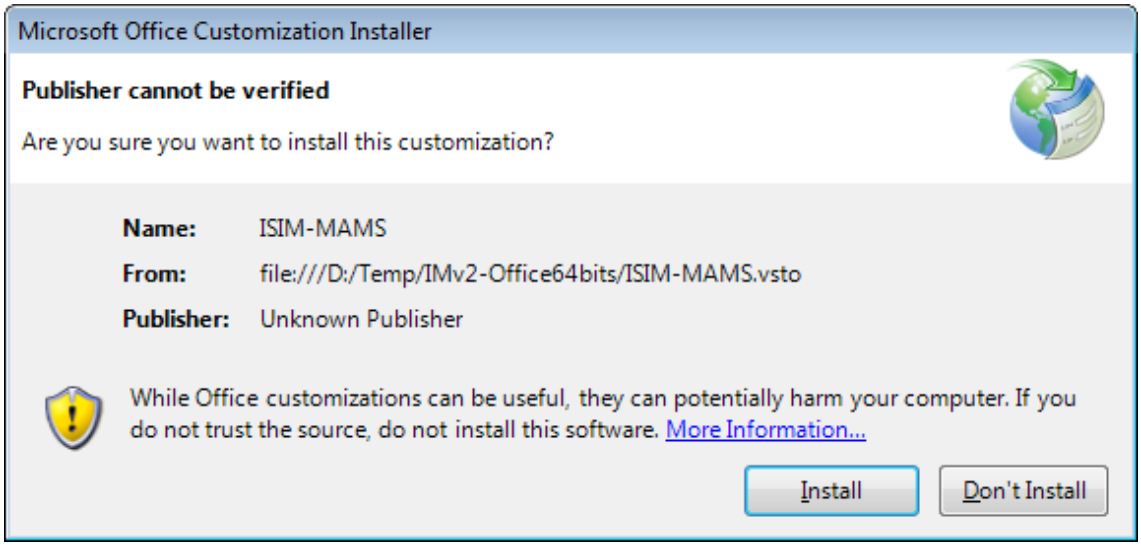
[4] Note that the name of the folder in which the ISIM-MAMS installation file is unziped should not contain non-English letters.

[5] To learn which version of Excel 2010 is installed, open Excel 2010 and go to File | Help. The information can be found on the right-hand side of the screen below the "About Microsoft Excel" title.

[6] To uninstall ISIM-MAMS, go to Settings | Control Panel | Programs and Features and double click on ISIM-MAMS.

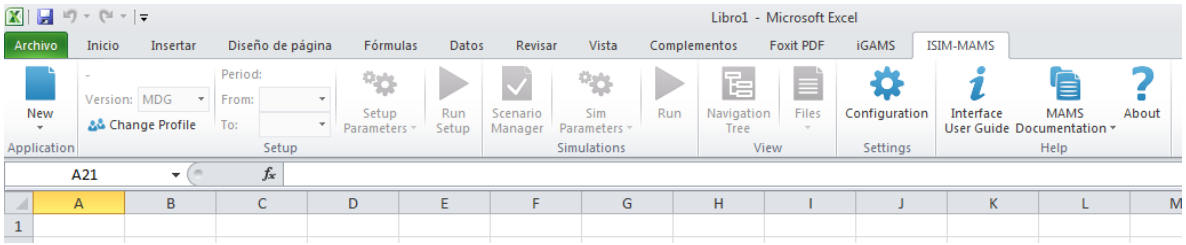
Figure 2.1: Installing ISIM-MAMS



3. Running ISIM-MAMS

To run ISIM-MAMS, (1) open Excel, and (2) select the (new) ISIM-MAMS tab (which opens a ribbon with MAMS-specific buttons) (see Figure 3.2).

Figure 3.2: The ISIM-MAMS Ribbon



4. Getting Help on ISIM-MAMS

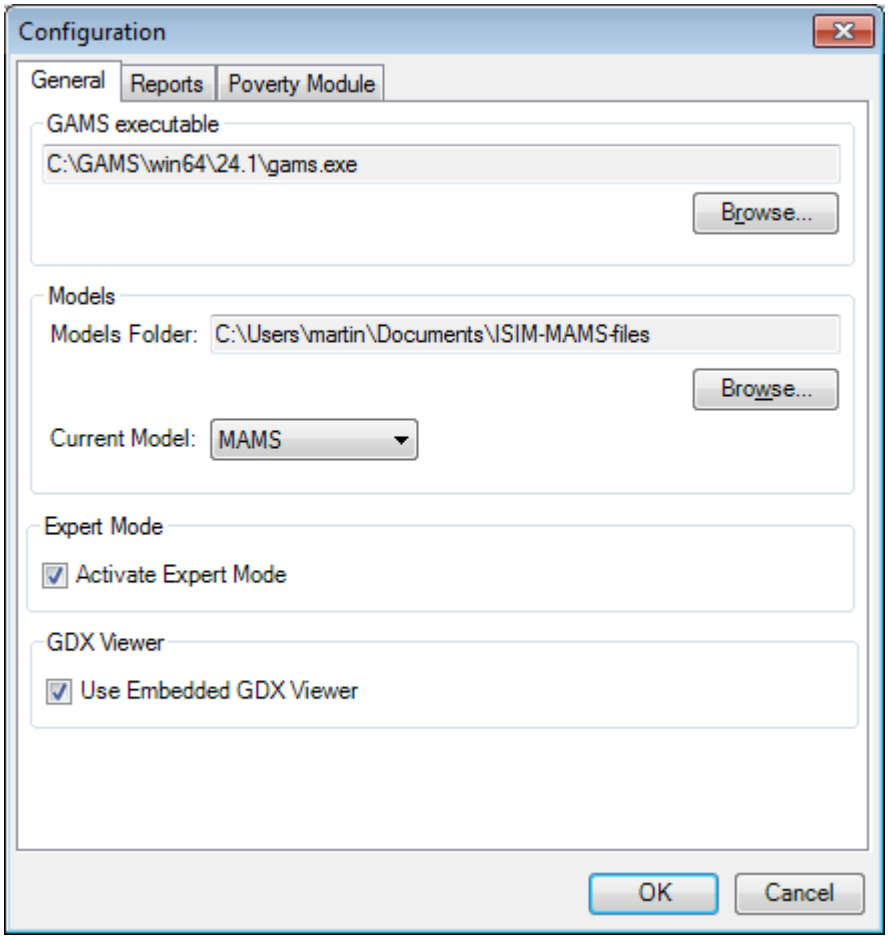
To access the ISIM-MAMS User Guide (i.e., this document) from within Excel, click on the "Interface User Guide" icon in the ISIM-MAMS ribbon. The ISIM-MAMS User Guide will open in the default PDF files viewer.

In addition, the user can access relevant parts of the MAMS User Guide (see Lofgren, 2010) as contextual help (see examples below). The MAMS Description and Mathematical Statement (see Lofgren et al. (2012)) can be accessed - in PDF format – by clicking on the "MAMS Documentation" icon and selecting the second option.

5. Configuration

The MAMS Interface will install the MAMS files (including selected datasets) in the user's documents folder; e.g., "C:\Users\martin\Documents\ISIM-MAMS-files". The setup of the interface provides defaults for the selection of the GAMS and MAMS directories; the user may overwrite these by clicking on the "Configuration" button in the "Settings" ribbon group (e.g., if GAMS is installed in another directory and/or if the user prefers to work in other directories) (see Figure 5.1).

Figure 5.1: Folders Configuration



The "Configuration" button in the "Settings" ribbon group also allows the user to configure ISIM-MAMS Reports, Poverty Module, and Appearance, which are described below. Additionally, the "General" tab in "Configuration" allows the user to reset the MAMS model files (button Reset Model Files) and/or example datasets that are installed with ISIM-MAMS (button "Reset Datasets"), activate the Expert Mode, and select the GDX Files Viewer (see below).

6. Create a New ISIM-MAMS Application

To create a new ISIM-MAMS application, open a new or an existing Excel file, and press the "New" button in the ISIM-MAMS ribbon (see Figure 3.2)[7]; select a name for the new application, a country dataset, a MAMS version (MDG or Core/non-MDG)[8], a Profile (i.e., a Profile determines the set of MAMS parameters that can be edited through ISIM-MAMS), and press OK.[9] By default, the following new sheets will be added to the Excel file: closure0-and-rules0 (i.e., closure and rules for the reference scenario), gdpgrw (i.e., GDP growth rate for the reference scenario), elasticities, poverty-module, external-shocks, pop-shocks, tfp-shocks, trnsfr-shocks, mdg-targeting, closure-and-rules (i.e., closure and rules for the non-reference scenarios), dictionary, and errors-summary; this Excel file is the application database – it contains all the application-specific information. The user can save this Excel file using the Excel usual procedure. Note that an ISIM-MAMS application is always associated with a country-specific dataset.

In Figure 6.1 we show how to create an MDG ISIM-MAMS application named "example" based on the "Demo" dataset and the default Profile. The MAMS Interface will load into Excel the data needed to define scenarios for the selected application, including the elements in the sets that are used to define shocks (e.g., the elements in the set of exported commodities to define world export prices or the elements in institution sets to define inter-institutional transfers).

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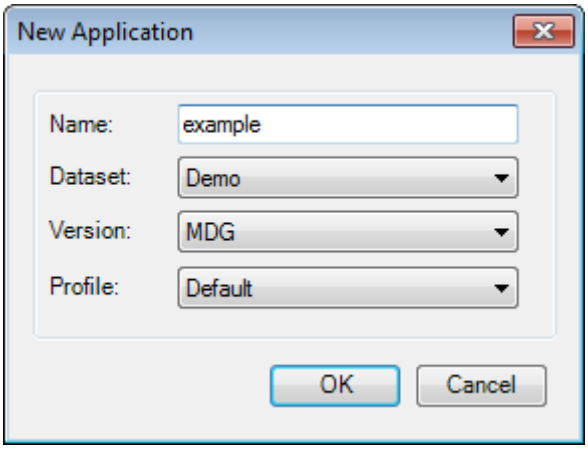
[7] The options "In New Workbook" and "In Current Workbook" produce the same outcome when clicked from a blank Excel file open.

[8] Two versions of MAMS exist: Core (a standard, dynamic-recursive CGE model), and MDG (an extended dynamic-recursive CGE model designed for MDG and human development analysis). See Lofgren (2010) for details.

[9] The current version of ISIM-MAMS includes four country datasets, Demo, Argentina, Kenya, and Uganda; all these datasets can be used with the Core and MDG versions of MAMS.

Figure 6.1: New Application Dialog Box



The MAMS interface permits changes in and creation of application databases; at least during this stage, it does not permit changes in country datasets; the user can change selected elements of these datasets, elasticities and closure & rules. However, advanced users can modify the contents of these datasets and other aspects of the MAMS program by editing relevant files in the MAMS folder, using Excel and a text editor.

7. Restart an ISIM-MAMS Application

To restart an existing ISIM-MAMS application, open the corresponding ISIM-MAMS application Excel file. The Excel file should contain any previously defined scenarios, elasticities and closures for the application in question. The MAMS Interface will load into Excel the data needed to define (new) scenarios for the selected application. An ISIM-MAMS application file can have xls or xlsx extension.

Notice that ISIM-MAMS checks that the application Excel file is compatible with the ISIM-MAMS version installed in the user's machine. In case the application Excel file was created with a non-compatible version, the Excel file will be opened but not linked to ISIM-MAMS.

8. ISIM-MAMS Navigation

To navigate across the Excel file, the user can use the available buttons in the ISIM-MAMS ribbon. For example, to change the growth rate of the reference scenario, the user can click on the "Setup Parameters" buttons in the "Setup" ribbon group and then select the

“Growth” | “GDP Growth” option (see Figure 8.1a). The, the user will be directed to the relevant part of the ISIM-MAMS application file (see Figure 8.1b).

Figure 8.1.a: Navigating an ISIM-MAMS Application Excel File

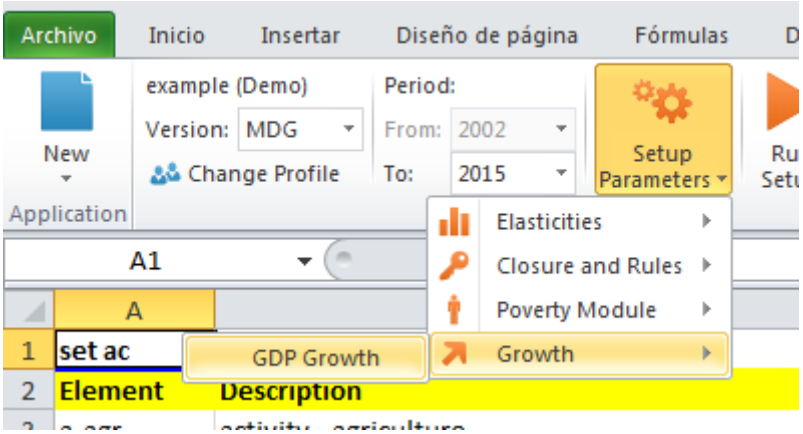
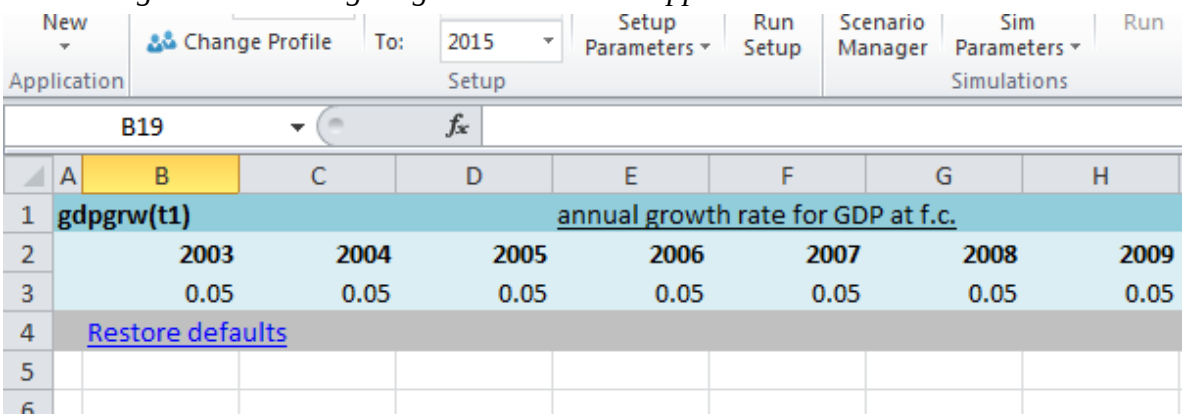
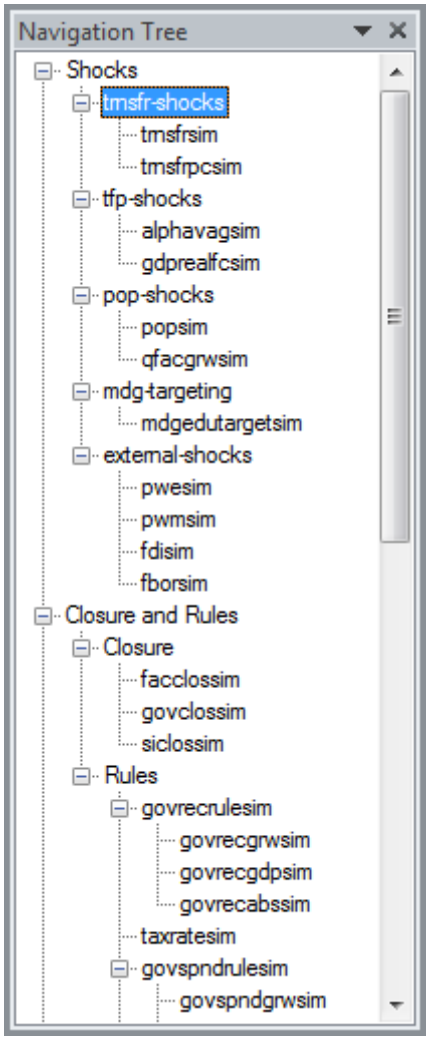


Figure 8.1.b: Navigating an ISIM-MAMS Application Excel File – cont.



As an alternative, to navigate across the Excel file, it is possible to use the Navigation Tree. In order to access the Navigation Tree, click on the corresponding icon on the “View” ribbon group (see Figure 8.2). A new window will pop up on the left-hand side of the screen; the Navigation Tree can be resized, moved, and closed. To navigate through the Excel file, the user can click on the element of interest.

Figure 8.2: Navigation Tree



9. Model Setup

The first step in performing counterfactual simulations with MAMS is the construction of a (dynamic) baseline scenario. To do this, ISIM-MAMS includes, for each country dataset, a default baseline scenario or "pre-programmed reference scenario". However, as explained below, the user can change key parameters of the default baseline scenario. Specifically, and using the Default Profile, the user can change the defaults of the pre-programmed reference scenario for elasticity values, closure and rules, and the GDP growth rate; for example, to change the elasticities of substitution between primary factors of production (1) click on "Setup Parameters" in the "Setup" ribbon group, and (2) select "Elasticities" | "Factor Substitution" in order to be directed to the sheet(named "elasticities". Then, the user can (a) change the elasticities values, or (b) restore de default values by clicking on "Restore defaults" (see Figure 9.1). A similar procedure can be used to modify the trade-

related elasticities, expenditure elasticities, reservation wage elasticities, and total factor productivity elasticities.

To access an explanation for a given ISIM-MAMS elasticity, click on the short description located at column D; the Help Viewer will appear showing a specific section of the MAMS User Guide (see Figure 9.2).

Figure 9.1.a: Changing the Elasticity of Substitution between Factors of Production

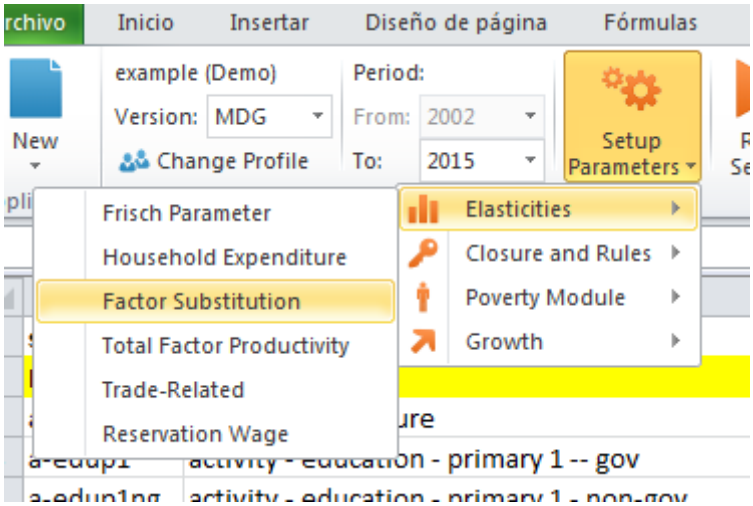


Figure 9.1.b: Changing the Elasticity of Substitution between Factors of Production – cont.

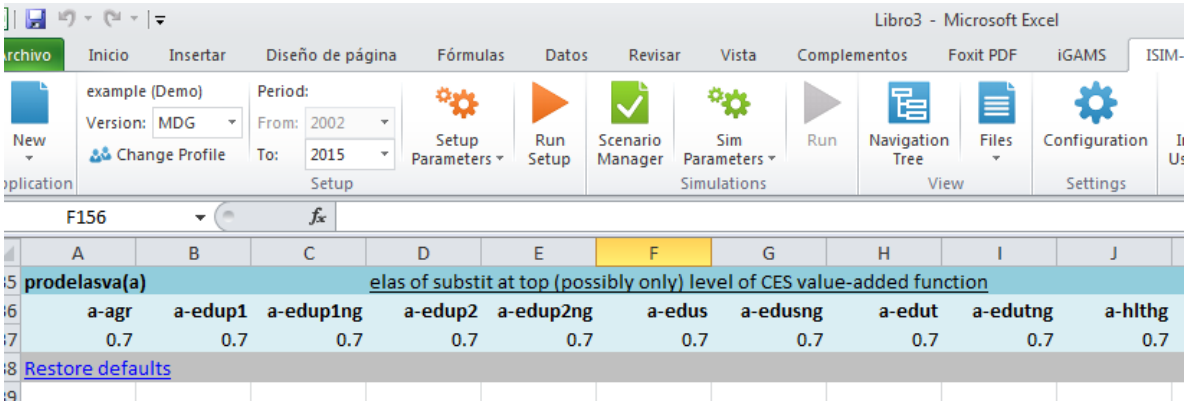
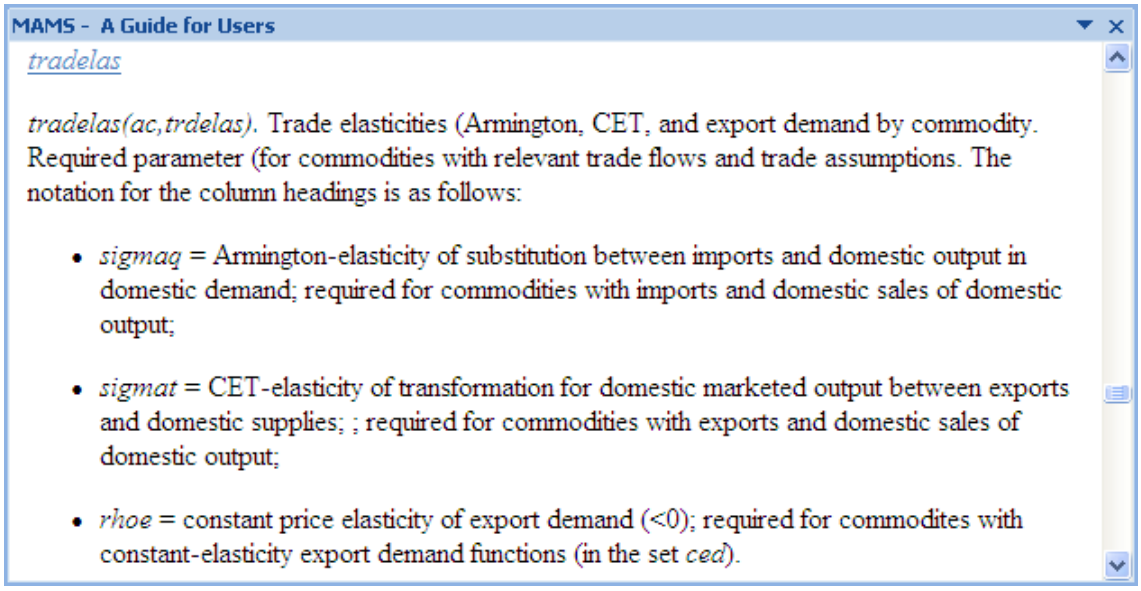


Figure 9.2: Help on Trade-Related Elasticities



To change the closure for the pre-programmed reference scenario, click on the "Setup Parameters" icon, select "Closure and Rules", and then select one element to change; the user will be directed to the relevant section in the "closure0-and-rules0" sheet; then, the user can make changes to the following pre-programmed reference scenario closure and rules-related parameters:

- **Closure0** (for model setup)
  - Factor Markets: factor market closure [facclos0(f,t1)]
  - Government: government closure [govclos0(t1)]
  - Savings-Investment: savings-investment closure [siclos0(t1)]
- **Rules0** (for model setup)
  - Government Spending: rule for government spending on several items [govspndrule0(ac,t1)]
    - Growth in Government Spending: growth rate for various government spending items [govspndgrw0(ac,t1)]
    - GDP Share for Government Spending: GDP share for various government spending items [govspndgdp0(ac,t1)]
    - Absorption Share for Government Spending: absorption share for various government spending items [govspndabs0(ac,t1)]

- Government Receipts: rule for various government receipts [govrecrule0(ac,t1)]
    - Growth in Government Receipts: growth rate for various government receipts [govrecgrw0(ac,t1)]
    - GDP Share for Government Receipts: GDP share for various government receipts [govrecgdp0(ac,t1)]
    - Absorption Share for Government Receipts: absorption share for various government receipts [govrecabs0(ac,t1)]
    - Tax Rates: tax rates imposed on various transactions [taxrate0(tax,acp,t1)]
- Non-Government Payments: rule for various non-government payments [ngovpayrule0(ac,t1)]
    - Growth in Non-Government Payment: growth rate for various non-government payments [ngovpaygrw0(ac,acp,acpp,t1)]
    - GDP Share for Non-Government Payment: GDP share for various non-government payments [ngovpaygdp0(ac,t1)]
    - Absorption Share for non-Government Payment: absorption share for various non-government payments [ngovpayabs0(ac,t1)]
- Institutions with Flexible Direct Tax Rates: 0-1 parameter for potential flexing of direct tax rates [tins010(ins)]
- Institutions with Flexible Saving Rates: 0-1 parameter for potential flexing of institutional savings rates [mps010(ins)]

As an example, we show how to select foreign borrowing as the mechanism for clearing the government budget for the pre-programmed reference scenario during the whole simulation period (see Figure 9.3).The valid numerical values and their significance (the clearing variable that each one indicates) can be consulted in the MAMS User Guide by clicking on the closure parameter description (see Figure 9.4).

Figure 9.3.a: Selecting the Pre-Programmed Reference Scenario Government Closure Rule

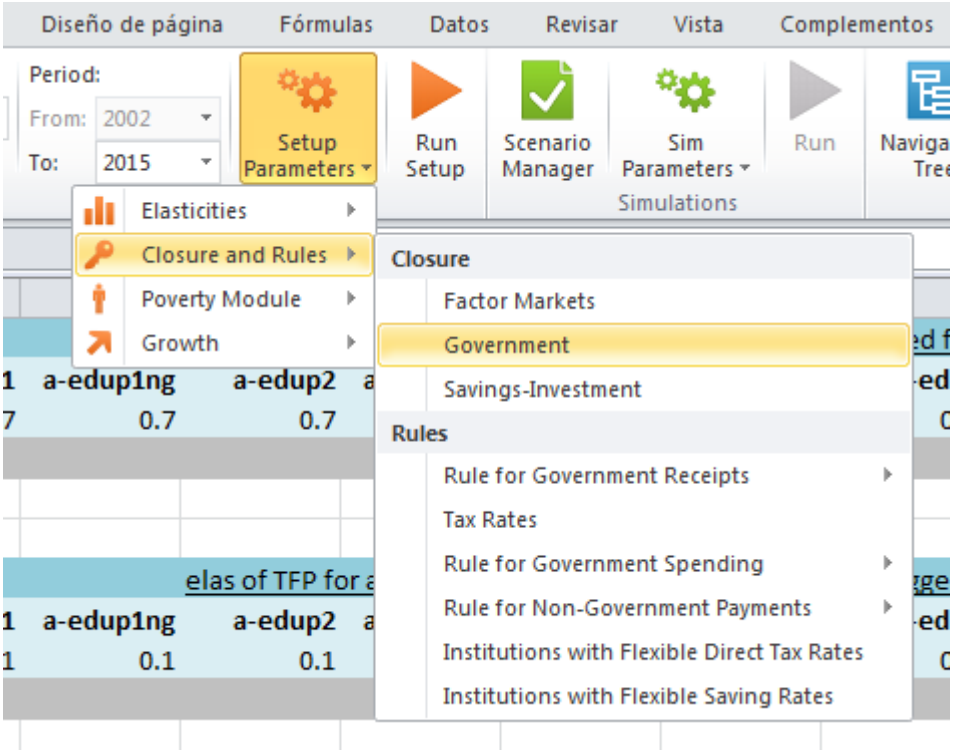


Figure 9.3.b: Selecting the Pre-Programmed Reference Scenario Government Closure Rule – cont.

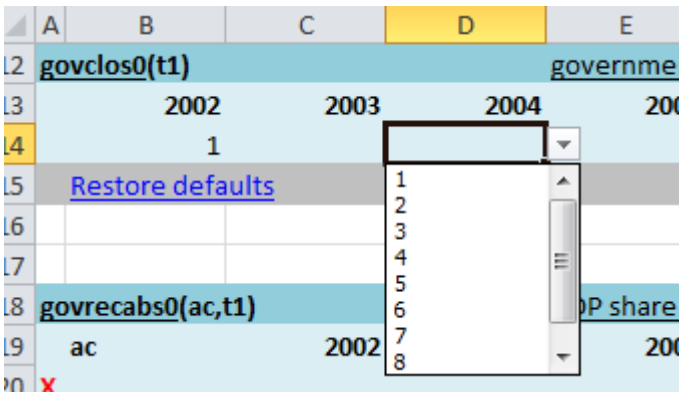


Figure 9.4: Help on the Alternative Rules for Clearing the Government Budget

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govclos0

govclos0(t1): government closure (rule for clearing the government budget). Required parameter. This parameter selects the mechanism for clearing the government budget in *mod.gms*. It also provides the default for subsequent simulations (solved in *sim.gms*) – the default may be overwritten for all or some of the simulations where these are defined (in *app-core-sim.xls* or *app-mdg-sim.xls*, depending on which model version you use). The valid numerical values and their significance (the clearing variable that each one indicates) are stated in the following table.

Table 4. Rules for clearing the government budget

Rule No.	Variable clearing the budget
1	all domestic tax rates (direct and indirect): uniform scaling
2	direct tax rates: uniform point change for selected households
3	direct tax rates: uniform scaling for selected households
4	transfers to government from the rest of the world (grant aid)
5	foreign borrowing:

The closure and rules parameters are disaggregated by time; if the user specifies values only for the base year, then these values will be used for all years; if the user specifies values for any additional (non-base) year, then he/she has to specify values for all years for that simulation – if not, ISIM-MAMS will generate an error message.

The pre-programmed reference scenario closure and rules provides the defaults for subsequent simulations – the defaults may be overwritten for all or some of the simulations where these are defined (see below).

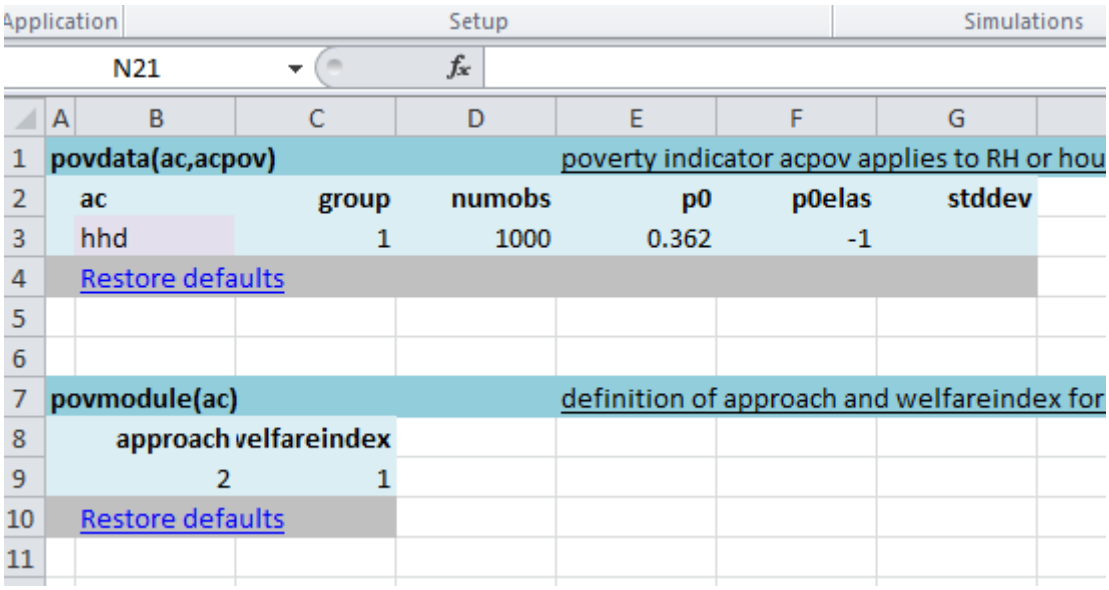
To change GDP (at factor cost) growth rate during the pre-programmed reference scenario, click on the "Setup Parameters" icon and select the "GDP" | "GDP Growth" option; the user will be directed to the sheet named "gdpgrw". The user can adjust the default values as required.

Notice that, depending on the Profile that is being used, the user can change the other information in the country dataset that is used to calibrate the model to the base year.[10] In any case, when defining the base scenario (and after having inspected its results for the period of interest), the user would be able to deviate from the pre-programmed reference scenario for non-base years. (Technically, this is no different from the specification of other scenarios.)

[10] This feature has been added in ISIM-MAMS v2.

Finally, as part of the model setup, the user can click on the “Setup Parameters” button in the “Setup” ribbon group and select “Poverty Module” | povdata/povmodule to change the default poverty calculation options and data for the selected dataset (see Figure 9.5). Specifically, the parameters in the “poverty-module” sheet allow the use to change: (1) the approach to compute poverty, (2) the welfare index (income/consumption), (3) the initial poverty rate, and (4) the growth elasticity of poverty; see Lofgren (2010) for details.

Figure 9.5: Poverty Module



Running the Pre-Programmed Reference Scenario

To complete the model setup, press the “Run Setup” button to run the pre-programmed reference scenario of the selected dataset – unless other changes are added to this scenario, it becomes the base.

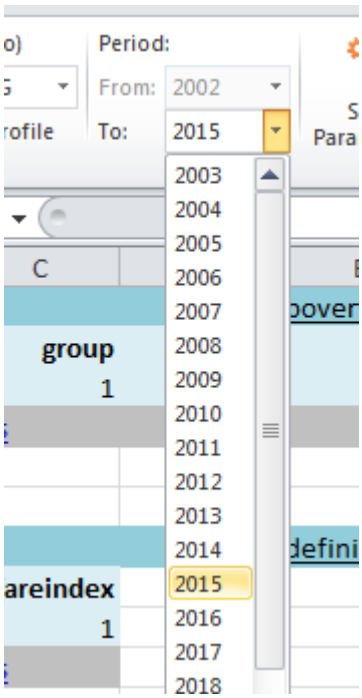
Currently, the user can access the results of the pre-programmed reference scenario trough the GDX report file (i.e., file rep1-disp-gdx.gdx) or the GAMS listing file by clicking on the “Files” icon in “View” ribbon group. Additionally, he/she can look at the baseline results when running the selected counterfactual scenarios, provided that the base scenario does not deviate from the pre-programmed reference scenario (see below).

Simulation Period

To adjust the simulation period, select a different final year using the drop-down menu in

the “Period” section of the “Setup” ribbon group (see Figure 9.6).[11] In case the simulation period is expanded, new time columns will be added to the shock and closure parameters. In case the simulation period is reduced, the non-relevant time periods in the shock and closure parameters will turn to disabled, indicating that those time periods will not be part of the counterfactual scenarios. Notice that the user needs to re-run the pre-preprogrammed reference scenario after the simulation period is changed.

Figure 9.6: Selecting the Simulation Period



10. Defining Simulation Scenarios

The user can define scenarios by introducing policy changes and exogenous shocks, including changes in world prices of exports and imports, foreign aid, taxation, public spending levels and its allocation; all the defined counterfactual scenarios are saved in the ISIM-MAMS application-specific Excel file. The interface validates the input from the user in order to reduce the likelihood that simulations will fail to run without error.

[11] In terms of the MAMS code, we reset the sets t, t2 and tsol when the simulation period is changed. Consequently, the user needs to re-run the pre-preprogrammed reference scenario after the simulation period is changed.

The Scenario Manager

The ISIM-MAMS Scenario Manager is made visible by clicking on the "Scenario Manager" icon (see Figure 10.1). To add a new simulation, click on the "New simulation" button. To delete an existing simulation, select the simulation to delete and click on the "Delete simulation" button; all the shocks associated with the selected simulation will be deleted, after the user's confirmation. The user should check the simulations to run; there is no need to run all the defined scenarios. In the example, the pwe-2 simulation will be run, while the pwm-2 will not.

Notice that the user can select the mode that will be used to solve each simulation, single-pass or multi-pass. As explained in Lofgren (2010), single-pass is faster but multi-pass is more robust. As a first step in developing a new simulation, we recommend selecting multi-pass (i.e., the default).

The user can right click on a simulation in the Scenario Manager in order to edit its name, edit its description, make a copy of the selected simulation (i.e., option "Clone"), and solution method (multi-pass or single-pass) (see Figure 10.2).

Figure 10.1: The Scenario Manager

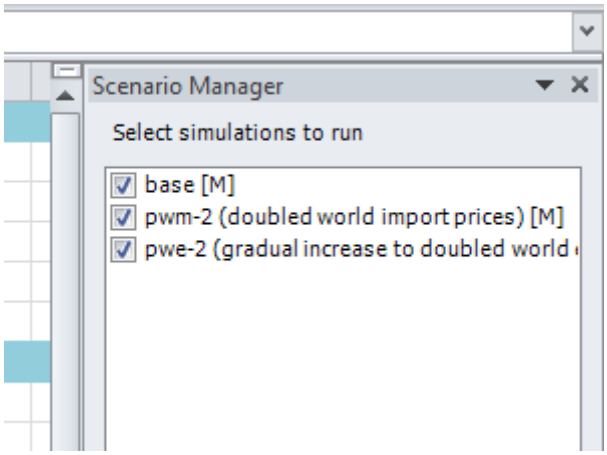
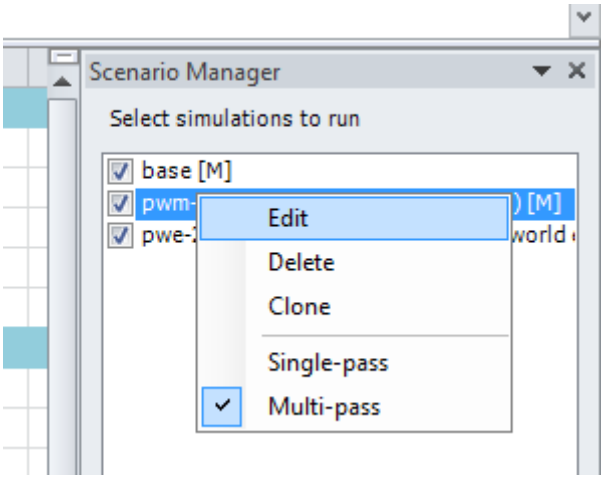


Figure 10.2: Context-Menu in the Scenario Manager



Adding Shocks

The shocks that the user can simulate with both version of MAMS (i.e., Core and MDG) are grouped in four categories:

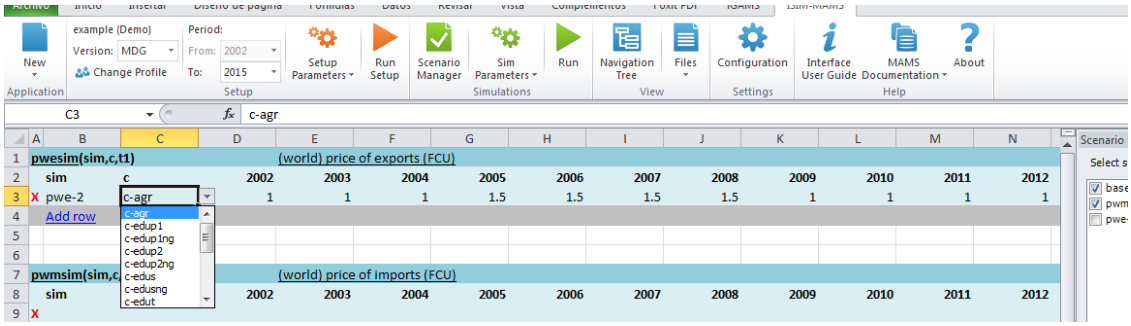
- external shocks (see the "external-shocks" sheet): changes in (1) the world price of exports and imports; (2) foreign direct investment; and (3) foreign borrowing
- total factor productivity shocks (see "tfp-shocks" sheet): changes in (1) total factor productivity, by activity and time period; and (2) real GDP at factor cost
- demographic shocks (see "pop-shocks" sheet): changes in (1) population size, by representative household or other population segment; and (2) in the MDG (Core) version, changes in the growth rate of non-labor (all) factors
- transfers shocks (see "trnsfr-shocks" sheet): changes in (1) transfers to non-household institutions or factors; and (2) per-capita transfers to households
- closure and rules (see "closure-and-rules" sheet): changes in closure and rules, by simulation and time period – similar to the setting of closure and rules for the pre-programmed reference scenario. Among other things, the rules section allows defining scenarios with changes in (1) government spending and receipts, and (2) transfers between institutions

Additionally, the MDG version of MAMS allows simulating the achievement of one or more MDG targets (see sheet "mdg-targeting").

As an example, we show how to define a 50% increase in the world price of agricultural exports during 2005-2008 using an application based on the “Demo” dataset; the other shocks for the Core version of MAMS can be similarly defined. The user can take the following three steps:

First, select the external-shocks sheet (see Figure 10.3). To get help on a shock, click on the shock description located at column E.

Figure 10.3: Defining a Shock to the World Price of Exports



Second, use the first row under the headings in the pwesim(sim,c,t1) section to define a shock to the world price of exports. The user can use the drop-down menus to select the simulation name (sim dimension) and the commodity to which the shock to the world export price applies (c dimension). The elements shown in the simulation set are those defined using the Scenario Manager. The elements of the set c are stored in the ISIM-MAMS database and are specific to each country dataset. The elements in the time dimension depend on the period selected for the current ISIM-MAMS application.

Third, introduce the shock values under the time headings. In the example, we introduce a 50% increase in the world price of agricultural products during the period 2005-2008 (see Figure 10.3). The user should follow some rules to define world price shocks:

1. if no data is provided for a given commodity c, then the real FCU price is assumed equal the price in the pre-programmed reference scenario,

2. if pwesim is provided for some commodity and year t, then the value of the world price of exports in period t is computed as the product of the world export price of exports in the base-year and the ratio between the value for pwesim in t and the base-year; that is, the user cannot change the world price of exports for the base-year; for other years, the world price of exports will be scaled up or down depending on whether pwesim in that

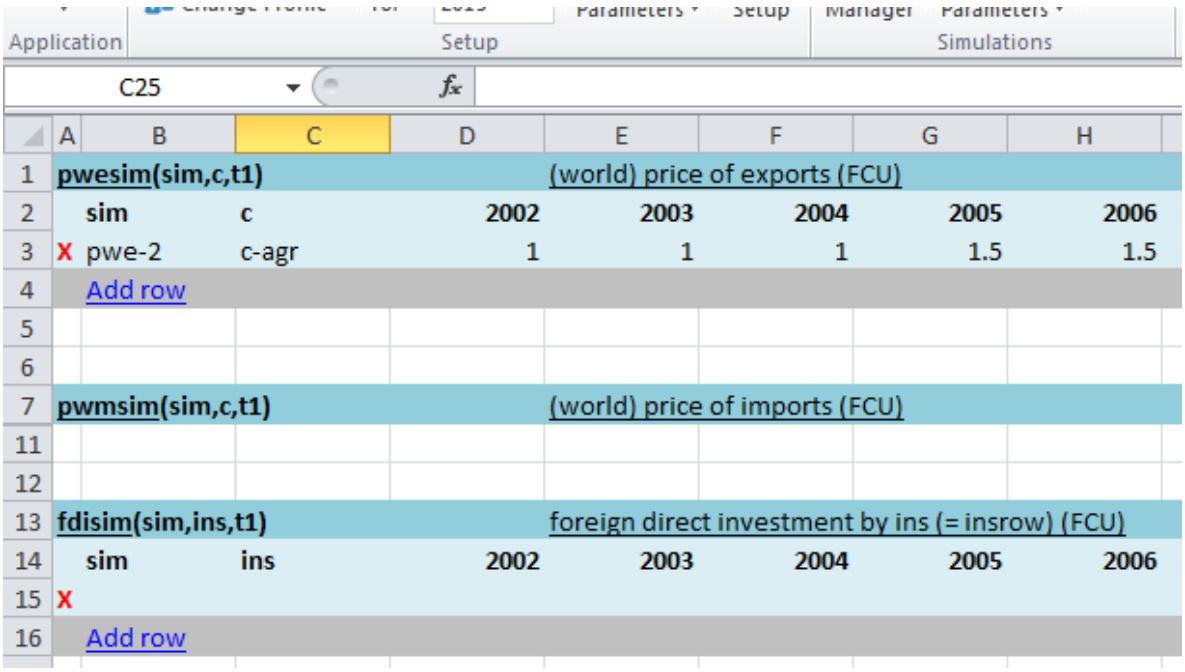
year is larger or smaller than the base-year value, and

3. if pwesim is provided for some commodity and year t, then it is necessary to provide values for all solution years (i.e., elements in the time set or dimension).

The same mechanism applies to the definition of pwmsim and other elements in ISIM-MAMS (see Lofgren, 2010).

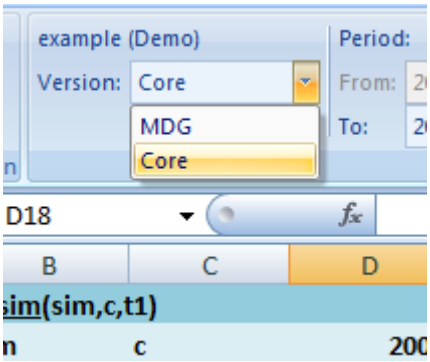
To add a new row to a given shock parameter, click on "Add row". To delete a row, click on the red cross "**X**" located in column A. To hide/unhide shocks, click on the shock name, pwesim in the example (see Figure 10.4).

Figure 10.4: Hide/Unhide Shocks



The user can change the MAMS version that corresponds to the application that is being developed, from a Core (i.e., non-MDG) application to an MDG application, and the other way around (see Figure 10.5).

Figure 10.5: Selecting the MAMS Version



Additionally, the user can select the closure rule for each defined simulation; the default closure rule for a counterfactual scenario is that of the pre-programmed reference scenario.

11. Running Simulations

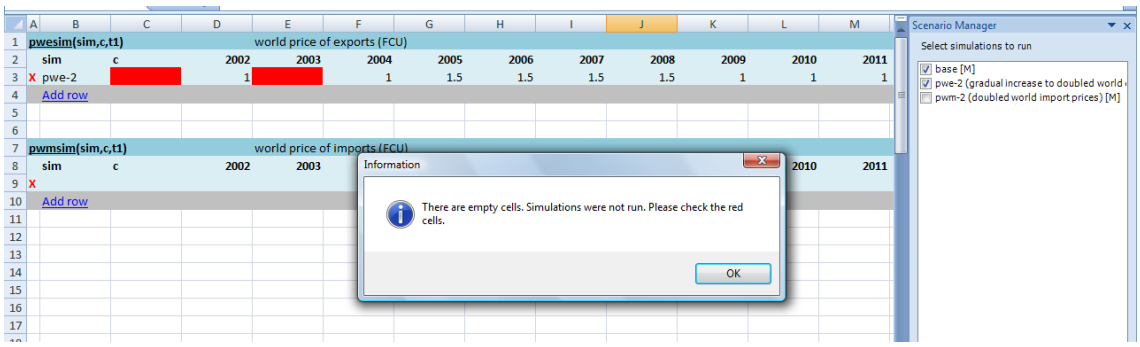
The user can run the defined and selected simulations (calling GAMS) from the MAMS Interface ribbon; afterwards, the user can access the GAMS output files from inside the interface; this is of particular use if GAMS terminates with an error.

To run the defined and selected simulations, click on the "Run" icon located in the "Simulations" ribbon group; a window will pop up showing GAMS progress in solving the model.[12] Besides, a small window will indicate the progress of the current MAMS run. In case MAMS is successfully solved, ISIM-MAMS will add or update the following report sheets: repmacro-contents, repmeso-contents, repmacro, repmeso, and dashboard.

Notice that, when the user clicks on "Run", ISIM-MAMS validates the definition of shocks, elasticities, and closure and rules. In case errors are found, the user will have to check the cells that turned to red, located in the sheets whose label also turned to red (see Figure 11.1). Besides, the errors-summary sheet will show a list of the validation errors generated.

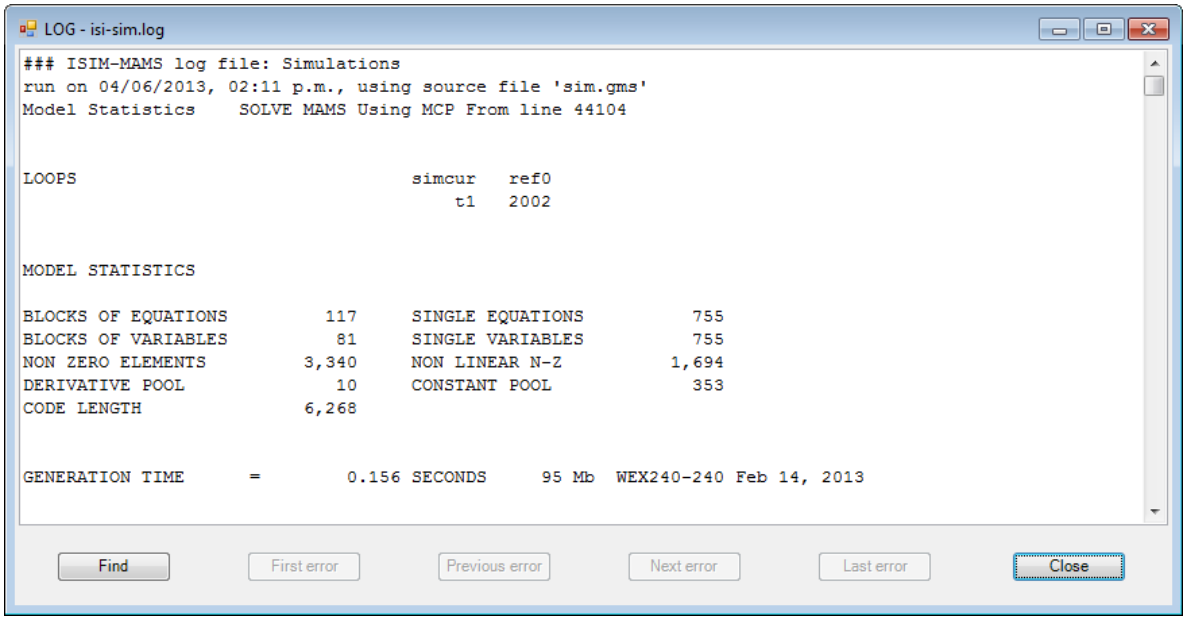
[12] The user can select to hide the said window using the "Appearance" tab in "Configuration".

Figure 11.1: Validation Errors in ISIM-MAMS



In case the solution of MAMS ends with an error, the user is offered the chance to inspect the ISIM-MAMS log file or the GAMS listing file (see Figure 11.2). The log and listing file viewer allows the user to navigate between GAMS errors, by clicking on the "Next error", "Previous error", "First error", and "Last error" buttons.[13]

Figure 11.2: The LOG/LST File Viewer



Viewing MAMS Results

The MAMS results from the last successful run can be accessed from inside the MAMS Interface; in addition to providing simulated variable results as levels, growth rates, and GDP shares, the interface generates pre-defined tables (see Figure 11.3).

---

[13] The log file shows selected sections of the GAMS listing file.

Figure 11.3: Macro Reports in ISIM-MAMS

2	Macro Report Contents			
3	**Table. Real macro indicators by simulation (% annual growth from first to final report year)**			
4			**Final year**	
5	**Indicator**	**2002**	**base**	**pwe-2**
6	**Absorption**	61.23	4.60	4.80
7	**Consumption - private**	42.22	4.03	4.25
8	**Consumption - government**	9.10	4.74	4.91
9	**Fixed investment - private**	7.83	4.84	5.05
10	**Fixed investment - government**	2.11	11.10	11.22
11	**Stock change**	-0.03	0.00	0.00
12	**Exports**	8.40	5.85	6.08
13	**Imports**	17.74	4.22	4.40
14	**GDP at factor cost**	47.31	4.99	5.21
15	**Total factor employment (index)**	0.00	3.50	3.59
16	**Total factor productivity (index)**	0.00	1.49	1.62
17	**Real exchange rate (index)**	0.00	0.18	0.19
18	**Headcount poverty rate (%)**		0.00	0.00
19	*1. Unless otherwise noted, column for initial year shows data in LCU.*			
20	*2. For the poverty rate, the base-year and simulation columns show base-year rate and simulation-sp*			
21				

ISIM-MAMS provides the following formatted report tables:

MACRO Report Contents	
table name	**name**
Table. Real macro indicators by simulation (% annual growth from first to final report year)	macgrowth
Table. Real macro indicators by simulation and year (% growth from previous year)	macgrowthyy
Table. Macro indicators in first report year and by simulation in final report year (% of nominal GDP)	macgdp
Table. Macro indicators by simulation and year (% of nominal GDP)	macgdpyy
Table. Government receipts and spending in first report year and by simulation in final report year (% of nom	govgdp
Table. Government receipts and spending by simulation and year (% of nominal GDP)	govgdpyy
Table. Balance of payments in first report year and by simulation in final report year (% of nominal GDP)	rowgdp
Table. Balance of payments by simulation and year (% of nominal GDP)	rowgdpyy
Table. Macro indicators by simulation and year (nominal LCU)	macnomyy
Table. Government receipts and spending by simulation and year (nominal LCU)	govnomyy
Table. Balance of payments by simulation and year (nominal LCU)	rownomyy
Table. Balance of payments by simulation and year (base-year US$)	rowdolyy
Table. Foreign aid by simulation and year (US$)	foraidyy
Table. Foreign aid per capita by simulation and year (US$)	foraidpcyy

MESO Report Contents	
table name	**name**
Table. MDG indicators -- summary (values in 1990, first report year, 2015 [goal], and final report year)	mdgindic2
Table. MDG indicators by simulation and year	mdgindic2yy
Table. Gross enrollment and completion rates by cycle in first report year and by simulation in final report ye	educindic2
Table. Gross enrollment and completion rates by cycle, simulation, and year (%)	educindic2yy
Table. Real government consumption -- annual growth from base year to final year (%)	qggrowth
Table. Real government consumption -- y-y growth (%)	qggrowthyy
Table. Detailed government budget in first report year and by simulation in final report year (% of GDP)	govgdpdet
Table. Detailed government budget by simulation and year (% of GDP)	govgdpdetyy
Table. Real household consumption by commodity -- annual growth from base year to final year (%)	qhcgrowth
Table. Real household consumption by commodity -- y-y growth (%)	qhcgrowthyy
Table. Real per-capita consumption by household -- annual growth from base year to final year (%)	qhpchgrowth
Table. Real per-capita consumption by household -- y-y growth (%)	qhpchgrowthyy
Table. Real consumption by household -- annual growth from base year to final year (%)	qhhgrowth
Table. Real consumption by household -- y-y growth (%)	qhhgrowthyy
Table. Total real per-capita consumption by household (LCU)	qhpcyy
Table. Real investment by capital stock -- annual growth from base year to final year (%)	dkgrowth
Table. Real investment by capital stock -- y-y growth (%)	dkgrowthyy
Table. Real exports -- annual growth from base year to final year (%)	qegrowth
Table. Real exports -- y-y growth (%)	qegrowthyy
Table. Real imports -- annual growth from base year to final year (%)	qmgrowth
Table. Real imports -- y-y growth (%)	qmgrowthyy
Table. Real GDP at factor cost -- annual growth from base year to final year (%)	gdpfcgrowth
Table. Real GDP at factor cost -- y-y growth (%)	gdpfcgrowthyy
Table. GDP at factor cost by activity -- shares in base year and final year (%)	gdpfcshare
Table. GDP at factor cost by activity -- shares by year (%)	gdpfcshareyy
Table. Decomposition of growth in GDP at factor cost by activity and simulation from first to final report year	gdpgrowthdecomp
Table. Decomposition of growth in GDP at factor cost by activity, simulation, and year (%)	gdpgrowthdecompyy
Table. Educational composition of the labor force -- shares in base year and final year (%)	qflabshare
Table. Educational composition of the labor force -- shares by year (%)	qflabshareyy
Table. Real wages by factor -- annual growth from base year to final year (%)	wagegrowth
Table. Real wages by factor -- y-y growth (%)	wagegrowthyy
Table. Employment by factor -- annual growth from base year to final year (%)	emplgrowth
Table. Employment by factor -- y-y growth (%)	emplgrowthyy
Table. Employment by factor and activity -- base level and annual growth from base year to final year (%)	emplgrowth2
Table. Employment by factor and activity -- growth by simulation and year (%)	emplgrowth2yy
Table. Unemployment rate by labor type in base year and final year by simulation (%)	unemprate
Table. Unemployment rate by labor type, simulation, and year (%)	unemprateyy
Table. Factor stocks -- annual growth by simulation from first to final report year (%)	qfacgrowth
Table. Factor stocks -- growth by simulation and year (%)	qfacgrowthyy
Table. Enrollment (number of students) by cycle and total -- annual growth from base year to final year (%)	qenrgrowth
Table. Enrollment (number of students) by cycle and total -- y-y growth (%)	qenrgrowthyy
Table. Government capital stocks by function and total -- annual growth from base year to final year (%)	qgovcapgrowth
Table. Government capital stocks by function and total -- y-y growth (%)	qgovcapgrowthyy
Table. EV (Equivalent Variation) per capita for final year (% of consumption spending per capita in base year)	evpccons
Table. EV (Equivalent Variation) per capita (% of base year consumption spending per capita) by simulation a	evpcconsyy
Table. EV (Equivalent Variation) per capita for last report year (% of consumption spending per capita in first	evpccons2
Table. EV (Equivalent Variation) per capita (% of base year consumption spending per capita) by simulation a	evpccons2yy
Table. Foster-Greer-Thorbecke (FGT) poverty indicators in first report year and by simulation in final report y	fgtpov
Table. Foster-Greer-Thorbecke (FGT) poverty indicators by simulation and year	fgtpovyy
Table. Inequality indicators in first report year and by simulation in final report year	ineq
Table. Inequality indicators by simulation and year	ineqyy

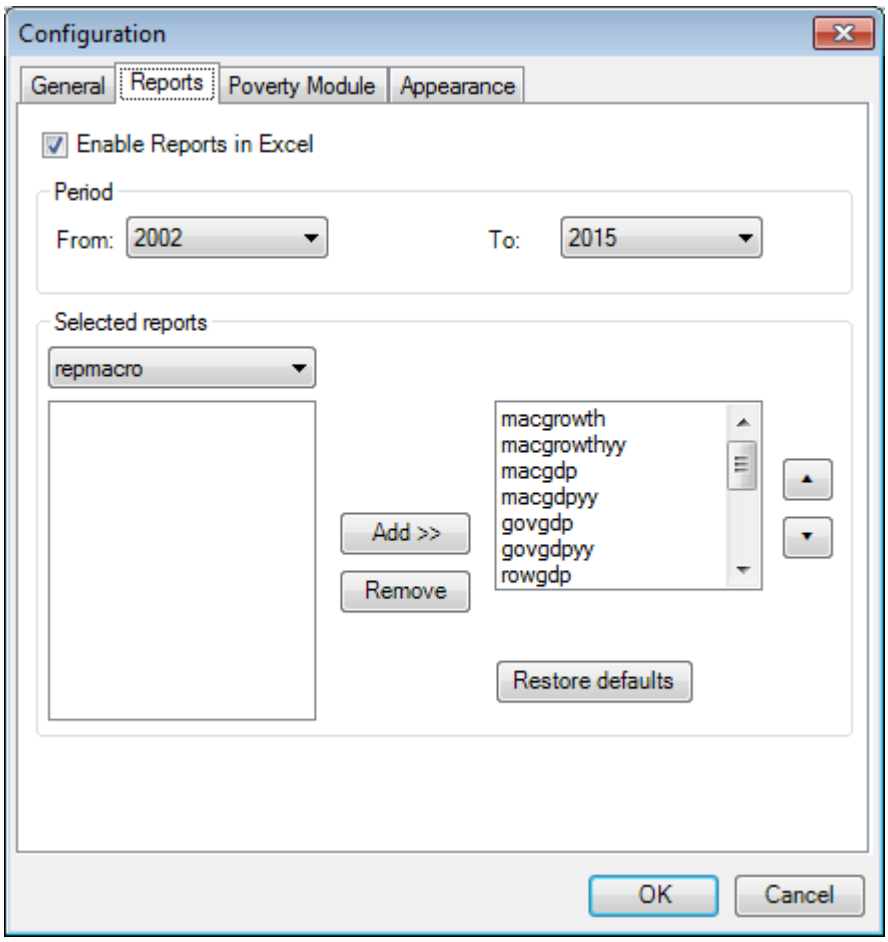
The user can also access all MAMS results by clicking on "Files" and selecting "rep1-disp-gdx.gdx"; the ISIM-MAMS GDX Viewer will open showing the GDX report file.[14]

[14] As an alternative, the user can select the GAMSIDE as the default viewer for GDX files.

Configuring ISIM-MAMS Reports

ISIM-MAMS allows the user to configure the reports. To access the reports configuration, click on "Configuration" and select the "Reports" tab (see Figure 11.5). The user can: (a) select the first and last years to show in the reports, (b) select the set of pre-programmed tables that will be showed in the macro and meso reports, and (c) select the order in which the result tables will appear. In addition, the user can select not to generate reports in Excel.[15] A description of each pre-programmed table appears when the mouse hovers over its name. The configuration of reports is specific to each ISIM-MAMS application; when a new application is created, the default options will be applied (i.e., all pre-programmed tables are shown for all simulations and time periods).

Figure 11.5: Configuration of Reports

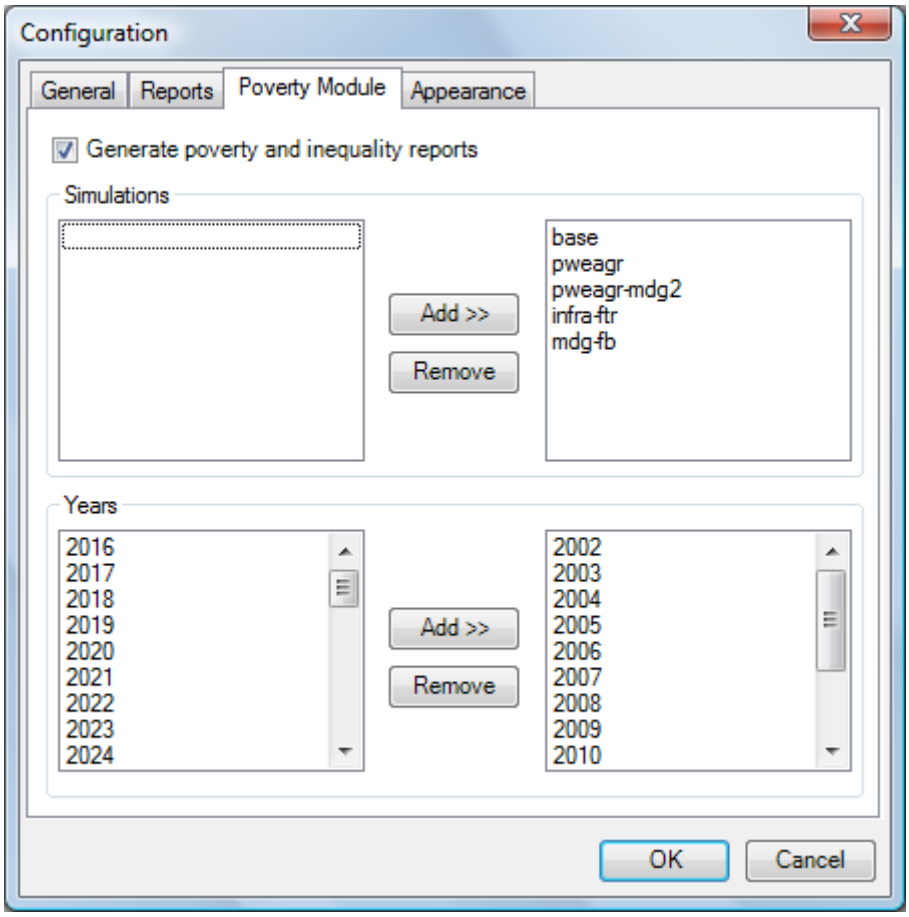


[15] In this case, the user can access simulation results using the GDX files trough the View | Files menu option.

Configuring the MAMS Poverty Module

To access the configuration options for the MAMS Poverty Module, click on "Configuration" and select the "Poverty Module" tab (see Figure 11.6). The available options are: (a) activate/deactivate the generation of poverty and inequality results, and (b) selection of the simulations and time periods to include in the poverty and inequality reports.

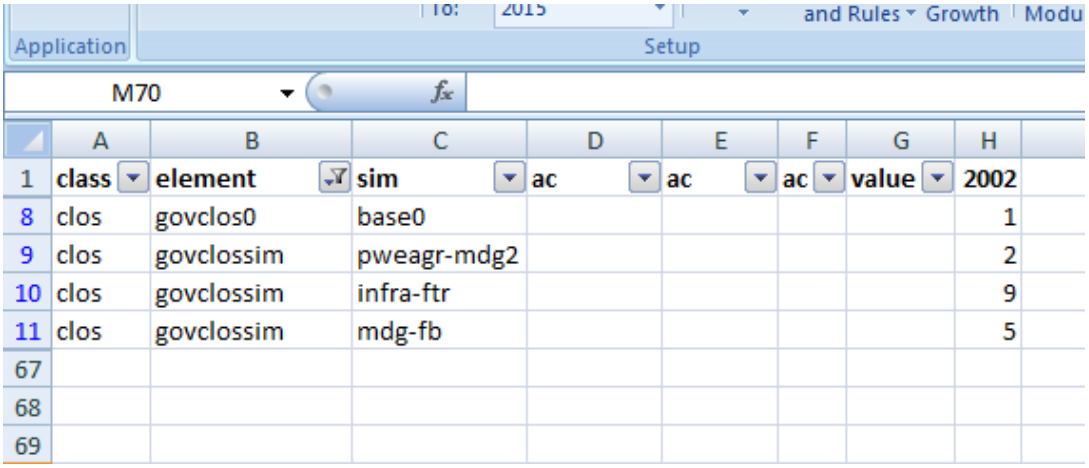
Figure 11.6: Configuration of MAMS Poverty Module



12. Summary Report of Closures and Shocks

In order to get a summary report of the closures and shocks used in the simulations, go to the "summary" sheet (see Figure 12.1). Notice that ISIM-MAMS does not validate the user input at the time of showing the Summary Report of Closures and Shocks.

Figure 12.1: Summary Report of Closures and Shocks
government closure in different in baseline and counterfactual simulations



	A	B	C	D	E	F	G	H
1	class	element	sim	ac	ac	ac	value	2002
8	clos	govclos0	base0					1
9	clos	govclossim	pweagr-mdg2					2
10	clos	govclossim	infra-ftr					9
11	clos	govclossim	mdg-fb					5
67								
68								
69								

13. The Expert Mode

The Expert Mode allows the user, among other things, to add new datasets to ISIM-MAMS. It should be used once a complete dataset (Core or MDG) for MAMS, including its reference scenario, has been developed and tested. The Expert Mode is not intended to help the user develop a new MAMS dataset from scratch. In addition, the Expert Mode allows the user to (a) export the contents of the ISIM-MAMS application Excel file and dataset to MAMS-in-GAMS (i.e., the program that runs MAMS without the interface and which is included in ISIM-MAMS), (b) use the Model Editor to select the MAMS parameters (i.e., elasticities, shocks, closure and rules, etc.) that are potentially accessible through the ISIM-MAMS, (c) use the Parameter Editor to select the behavior (e.g., validation rules) of each MAMS parameter in ISIM-MAMS, and (d) use the Profile Editor to select which of the MAMS parameters selected using the Model Editor are part of each Profile; a Profile determines which MAMS parameters can be edited using ISIM-MAMS.

To activate the Expert Mode, click on “Configuration” and select the “General” tab (see Figure 5.1). Then, activate the Expert Mode. This will make visible the “Model Manager” and the “Model Editor” buttons in the “Expert Mode” ribbon group (see Figure 13.1). To add a new dataset to be used with MAMS, click on “Model Editor” and then select the “Datasets” tab (see Figure 13.2).

Figure 13.1: The Expert Mode Ribbon Group

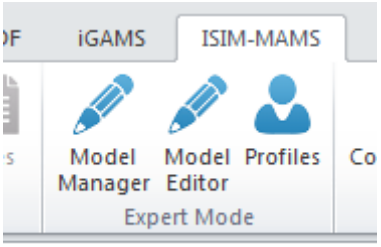
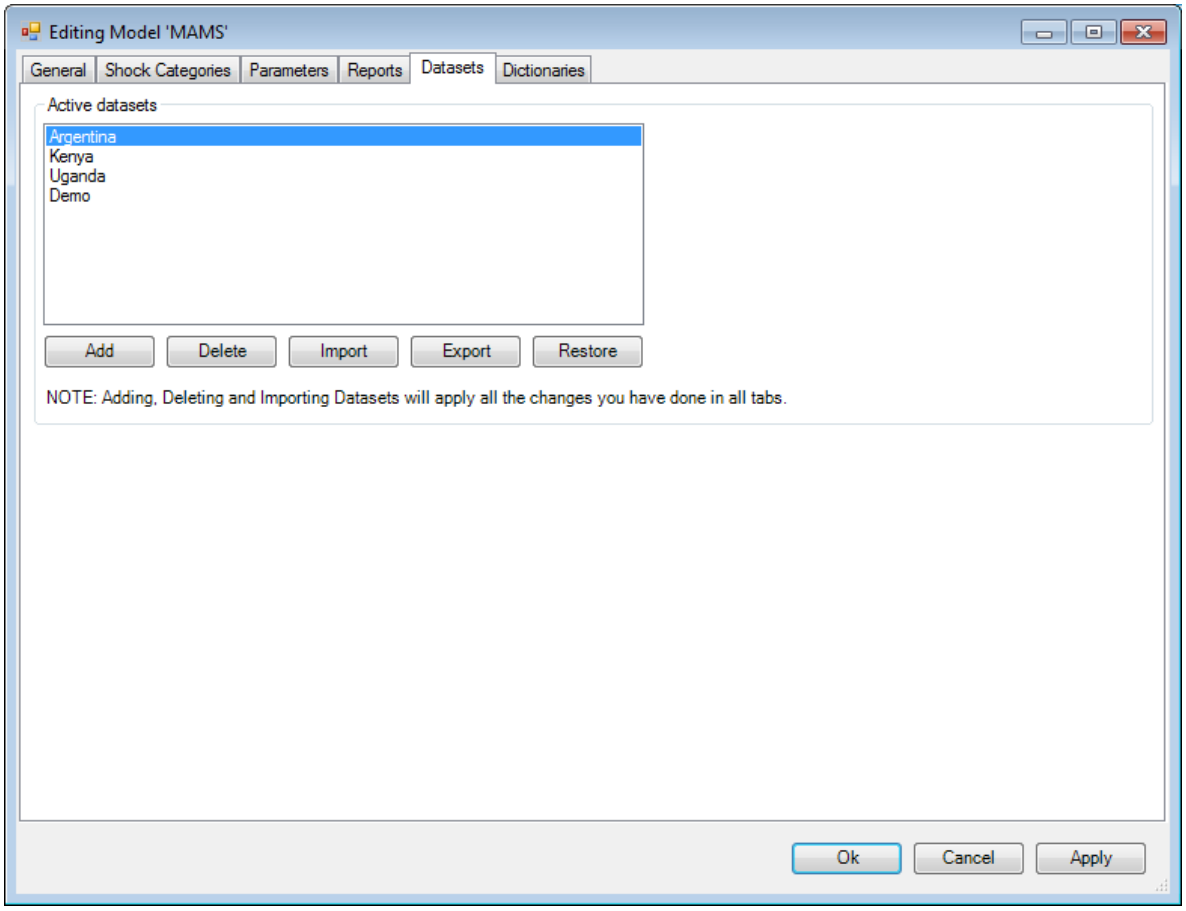


Figure 13.2: Managing Datasets



An ISIM-MAMS dataset for a country whose name is abbreviated with "arg" comprises the following six files, the contents of which are described in Lofgren (2010):

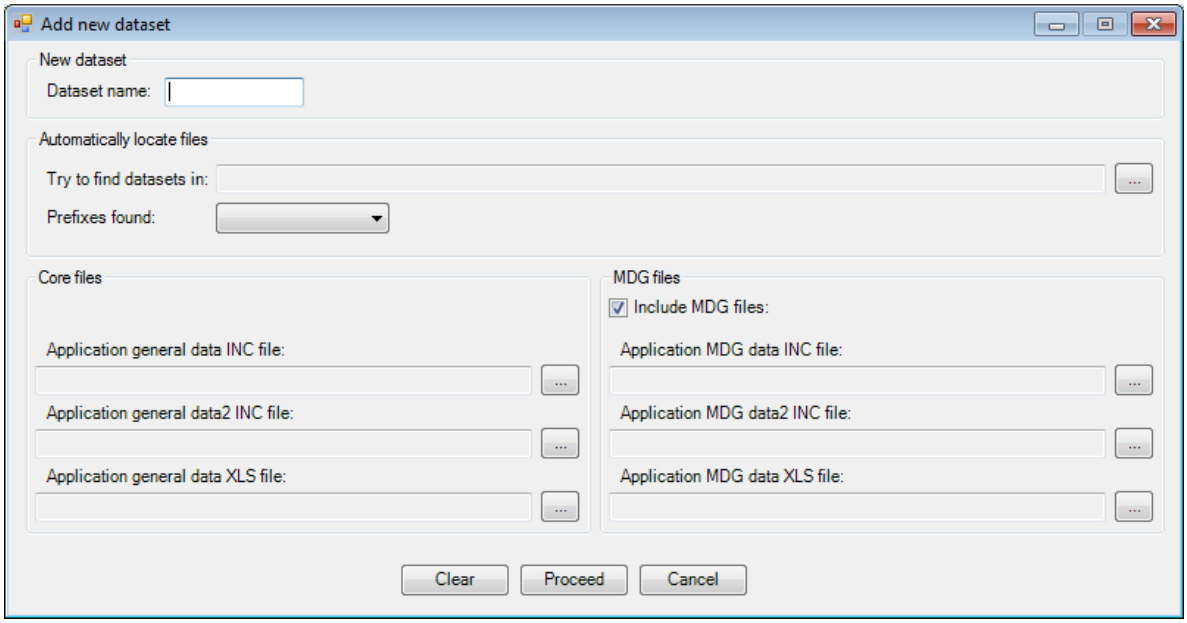
- arg-general-data.xls
- arg-mdg-data.xls
- arg-general-data.inc
- arg-general-data2.inc

- arg-mdg-data.inc
- arg-mdg-data2.inc

To facilitate the addition of a new dataset, we recommend that all six files start their name with the same abbreviation, “arg” in the example. To run the Core version of MAMS, only the three files without the word “mdg” in their names are required.

To add a new dataset to ISIM-MAMS, click on “Add” in the Dataset Manager; the “Add new dataset” window will appear (see Figure 13.3). Notice that the dataset files have to be closed at the moment when the new dataset is added to ISIM-MAMS. The user has two alternatives to add new datasets to ISIM-MAMS. On the one hand, the user can ask ISIM-MAMS to search for datasets in a certain folder (see section “Automatically locate files”). On the other hand, the user can locate each file manually (see sections “Core files” and “MDG files”). In both cases, the user has to introduce a name for the new dataset (see field “Dataset name”). Once finished, click on “Proceed”.

Figure 13.3: Adding New Datasets to ISIM-MAMS



Once a new dataset is added to ISIM-MAMS, the user can start creating new applications based on it. The user-added datasets can be exported and imported using the Expert Mode window. In addition, the Dataset Manager has a “Restore” button that allows restoring user-added datasets their original state. To remove/export/import/restore a dataset, select a dataset in the Dataset Manager and click on the respective button; a file with extension .mams is created when a dataset is exported. The .mams file can be imported

to a different (or the same) ISIM-MAMS installation using the Expert Mode.

IMPORTANT. ISIM-MAMS cannot check that the added dataset is compatible with the MAMS-in-GAMS model that is installed with ISIM-MAMS.

To export an ISIM-MAMS application to MAMS-in-GAMS, click on "Export to MAMS-GAMS" and select the destination folder. The following files will be copied to the selected location: app-general-data.xls, app-mdg-data.xls, app-core-sim.xls, app-mdg-sim, app-general-data.inc, app-general-data2.inc, app-mdg-data.inc, app-mdg-data2.inc, app-core-sim.inc, and app-mdg.sim; the content of those files is described in Lofgren (2010). The simulation files are created based on the information in the ISIM-MAMS application file, while the data files are a combination of the user input in ISIM-MAMS and the data in the original dataset. The application and corresponding dataset files cannot be exported to the selected MAMS Folder.

14. Defining and Running Counterfactual Scenarios: Some Examples

In this section we will show how to define and run, step by step, the following counterfactual scenarios using use the Demo dataset:

- Example 1: increase in the world price of agricultural products using the Core version of MAMS
- Example 2: previous example plus targeting of MDG 2 with direct tax financing
- Example 3: increase in foreign transfers channeled to the financing of other public infrastructure
- Example 4: targeting of MDG 2, 4, 5 and 7 with foreign borrowing financing

Finally, in Example 5 we will describe how to add a new dataset to ISIM-MAMS using the Expert Mode.

Example 1: increase in the world price of agricultural products using

the Core version of MAMS

1. Open Excel.

2. Click on the ISIM-MAMS tab; opens a ribbon with MAMS-specific buttons.

3. Create a new MAMS application by clicking on New in the Application ribbon group; then (1) introduce the name test for the new MAMS application, (2) select the Demo dataset, and (3) select the Core version of MAMS.

4. (optional) Change the government closure rule for pre-programmed reference scenario by clicking on (1) Closure and Rules in the Setup ribbon group, and (2) Government. The sheet closure0-and-rules0 will be added to the Excel file. Then, replace the default selection in column 2002 (i.e., 1). Specifically, select domestic borrowing as the mechanism for clearing the government budget in model setup (i.e., 6).

5. Run the model setup by clicking on Run Setup in the Setup ribbon group. MAMS will be run; a window will show the progress in running MAMS.

6. Create a new simulation by clicking on Scenario Manager in the Simulations ribbon group. Then, click on New simulation and (1) introduce pweagr in the name field, (2) introduce a short description in the description field, and (3) keep the Multi-pass default for the mode field. Once finished, click OK. The newly created simulation will be added to the Scenario Manager.

7. Go to the pwesim section in the external-shocks sheet. As explained, the Navigation Tree can be used to move across the Excel file. To define the counterfactual scenario, (1) in column sim, use the drop-down menu to select pweagr; (2) in column c (i.e., commodity), use the drop-down menu to select c-agr; (3) in columns 2005-2010, introduce 1.5; and (4) in the other columns, introduce 1 (i.e., keep the base year value). Notice that the default simulation period for the Demo dataset is 2002-2015, with 2002 as the base year.

8. Run the selected simulations by clicking on Run in the Simulations ribbon group. Again, a window will show the progress in running MAMS.

9. Once finished, new sheets with reports will be added to the Excel file. The user can access the results through macro reports, meso reports, the dashboard, and the pivot

table.

Example 2: previous example plus targeting of MDG 4 with direct tax financing

The following steps assume that, at least, steps 1-4 above have been completed.

1. Select the MDG version of MAMS by using the drop-down menu in the Setup ribbon group. Notice that the Run button will become disabled.

2. Run the model setup by clicking on Run Setup in the Setup ribbon group. MAMS will be run; a window will show the progress in running MAMS.

3. Create a new simulation by clicking on Scenario Manager in the Simulations ribbon group. Then, click on New simulation and (1) introduce pweagr-mdg2 in the name field, (2) introduce a short description in the field description, and (3) keep the Multi-pass default for the mode field. Once finished, click OK. The newly created simulation will be added to the Scenario Manager.

4. Go to the pwesim section in the external-shocks sheet. As explained, the Navigation Tree can be used to move across the Excel file. To define the new counterfactual scenario, (1) click on Add row; and (2) repeat step 7 in the previous example using pweagr-mdg2 as the simulation name. Alternatively, copy and paste the definition of simulation pweagr and change the simulation name (i.e., column sim) to pweagr-mdg2.

5. Go to the govclossim section of the closure-and-rules sheet. In column sim, select pweagr-mdg2. In column 2002, select 2. The option 2 will be applied to the whole simulation period.

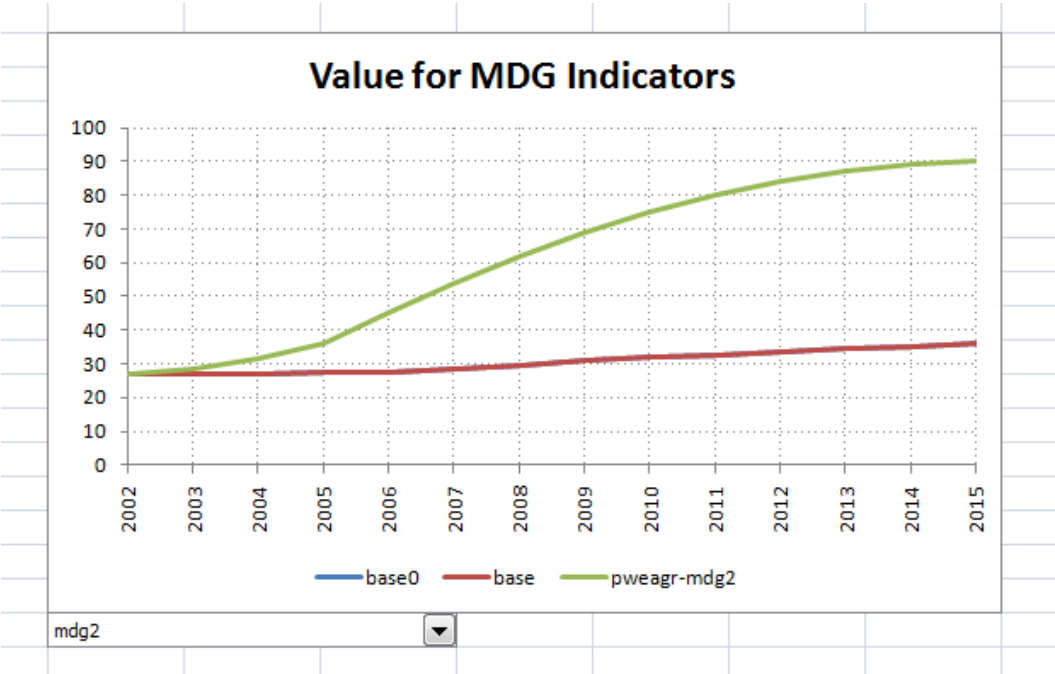
6. Go to the govspndrulesim section of the closure-and-rules sheet. In column sim, select pweagr-mdg2. In column ac, select c-edup1 (i.e., the commodity related to the public provision of primary education – the policy instrument that will be used to target the MDG 2). In column 2002, select 5.

7. Go to the mdgedutargetsim section of the mdg-targeting sheet. In column sim, select pweagr-mdg2. In column ac, select prom. In column acp, select c-edup1. In column 2015, introduce 0.98.

8. Run the selected simulations by clicking on Run in the Simulations ribbon group. Again, a window will show the progress in running MAMS. In this case, three simulations will be run: base, pweagr, and pweagr-mdg2. Of course, the user can select not to run the pweagr scenario.

9. Once finished, all the reports will be updated. For example, the dashboard will contain the following graph, which compares the evolution of the MDG 2 under the base and pweagr-mdg2 scenarios.

Figure 14.1: Evolution of MDG 2 example simulation



Example 3: increase in foreign transfers channeled to the financing of other public infrastructure

The following steps assume that the user is working with the MDG version of the Demo dataset.

1. Create a new simulation by clicking on Scenario Manager in the Simulations ribbon group. Then, click on New simulation and (1) introduce infra-ftr in the name field, (2) introduce a short description in the description field, and (3) keep the Multi-pass default for the mode field. Once finished, click OK. The newly created simulation will be added to the Scenario Manager.

2. Go to the govrecrulesim section of the closure-and-rules sheet. In column sim, select infra-ftr. In column ac, select trgovrow. In column 2002, select 2. This selection will allow the user to introduce a fixed GDP share for transfers to government from the rest of world.

3. Go to the govrecgdpsim section of the closure-and-rules sheet. In column sim, select infra-ftr. In column ac, select trgovrow. In columns 2003-2015, introduce 0.2. This selection will set the GDP share of transfers to government from the rest of the world to 20%; the base year value is 6%.

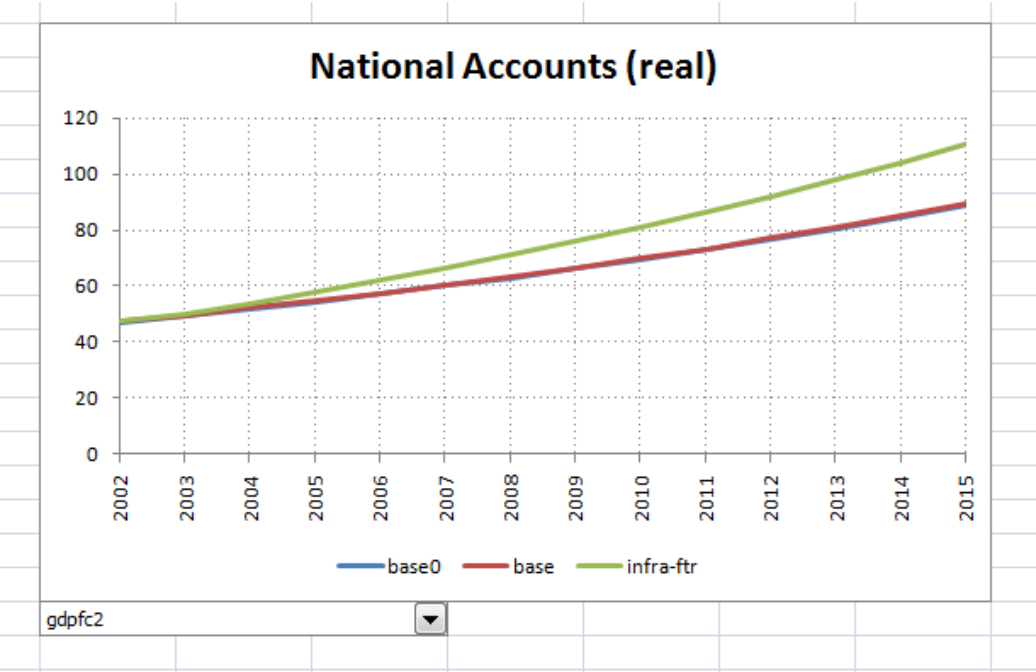
4. Go to the govclossim section of the closure-and-rules sheet. In column sim, select infra-ftr. In column 2002, select 9 (i.e., flexible government spending on one or more commodities).

5. Go to the govspndrulesim section of the closure-and-rules sheet. In column sim, select infra-ftr. In column ac, select c-oinf. In column 2002, select 5.

6. Run the selected simulations by clicking on Run in the Simulations ribbon group. Again, a window will show the progress in running MAMS. In this case, three simulations will be run: base, pweagr, and pweagr-mdg2. Of course, the user can select not to run the pweagr scenario.

7. Once finished, all the reports will be updated. For example, the dashboard will contain the following graph, which shows an increase in GDP at factor cost.

Figure 14.2: Evolution of GDP at Factor Cost
example simulation



Example 4: targeting of MDG 2, 4, 5 and 7 with foreign borrowing financing

Again, the following steps assume that the user is working with the MDG version of the Demo dataset.

1. Create a new simulation by clicking on Scenario Manager in the Simulations ribbon group. Then, click on New simulation and (1) introduce mdg-fb in the name field, (2) introduce a short description in the field description, and (3) keep the Multi-pass default for the mode field. Once finished, click OK. The newly created simulation will be added to the Scenario Manager.

2. Go to the govclossim section of the closure-and-rules sheet. In column sim, select mdg-fb. In column 2002, select 5 (i.e., foreign borrowing). The option 5 will be applied to the whole simulation period.

3. Go to the govspndrulesim section of the closure-and-rules sheet.

   a. Click on Add row. In column sim, select mdg-fb. In column ac, select c-edup1 (i.e., the commodity related to the public provision of primary education – the policy instrument that will be used to target the MDG 2). In column 2002, select 5.
   b. Click on Add row. In column sim, select mdg-fb. In column ac, select c-hlthg (i.e., the commodity related to the public provision of health – the policy

instrument that will be used to target the MDGs 4 and 5). In column 2002, select 5.

c. Click on Add row. In column sim, select mdg-fb. In column ac, select c-wtsn (i.e., the commodity related to the public provision of water and sanitation – the policy instrument that will be used to target the MDGs 7w and 7s). In column 2002, select 5.

4. Go to the mdgedutargetsim section of the mdg-targeting sheet.

   a. Click on Add row. In column sim, select mdg-fb. In column ac, select prom. In column acp, select c-edup1. In column 2015, introduce 0.98.
   b. Click on Add row. In column sim, select mdg-fb. In column ac, select mdg4. In column acp, select dummy. In column 2015, introduce 68.
   c. Click on Add row. In column sim, select mdg-fb. In column ac, select mdg5. In column acp, select dummy. In column 2015, introduce 217.5.
   d. Click on Add row. In column sim, select mdg-fb. In column ac, select mdg7w. In column acp, select dummy. In column 2015, introduce 62.5.
   e. Click on Add row. In column sim, select mdg-fb. In column ac, select mdg7s. In column acp, select dummy. In column 2015, introduce 54.

5. Run the selected simulations by clicking on Run in the Simulations ribbon group. Again, a window will show the progress in running MAMS. In this case, three simulations will be run: base, pweagr, and pweagr-mdg2. Of course, the user can select not to run the pweagr scenario.

6. Once finished, all the reports will be updated. As an exercise, define a similar scenario but using domestic borrowing as the financing mechanism.

Example 5: adding a new dataset to ISIM-MAMS

1. Activate the Expert Mode by going to Configuration | General and selecting "Activate Expert Mode"; as explained, a new icon will be added to the ISIM-MAMS Ribbon.

2. Open the Dataset Manager by clicking on "Dataset Manager" in the Expert Mode ribbon group. At this point, the dataset files should be located in a given folder; let's assume that we have the necessary six MAMS files for Rwanda located in the folder

"C:\Temp\test-em". Furthermore, assume that the files are named as rwa-general-data.xls, rwa-mdg-data.xls, rwa-general-data.inc, rwa-general-data2.inc, rwa-mdg-data.inc, and rwa-mdg-data2.inc.

3. Click on "Add"; the "Add new dataset" window will appear. In the "Dataset name" text box, introduce "Rwanda". In the "Try to find datasets in" text box, use the icon on the right to search for the "C:\Temp\test-em" folder. Then, use the drop down menu to select the rwa prefix. The rest of the form will be automatically populated. However, the user can select different Core and/or MDG files for the new dataset.

4. Click on "Proceed"; the Rwanda dataset will be added to ISIM-MAMS. Once finished, close the Dataset Manager window. Notice that the user can select to include or not the files needed to run the MDG version of MAMS.

5. To create a new MAMS application based on the Rwanda dataset, open a new Excel file and follow the procedures explained above. The new dataset will be available as an option in the New Application dialog box (see Figure 6.1).

References

Lofgren, Hans (2010). MAMS – A Guide for Users. World Bank DECPG. Mimeo.

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