

The MAMS database in Excel

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Overview

- Model code and database are separated:
 - model code: a generic set of files in GAMS;
 - country-specific database (including simulation definitions):
 - application-specific files in Excel;
 - GAMS (text) files that user typically will not change
 - anything that is not specific to a database appears in the model code

Overview (cont.)

- Model code is written to capture what is found in each Excel database:
 - sets and parameters with an application-specific disaggregation
 - selection among available alternatives for many assumptions (including rules for macro closures, factor markets, and government and non-government payments).

Overview (cont.)

- For each application, the Excel data files are:
 - app-general-data.xls: data needed for both model versions: MDG and core (MAMS without the MDG module)
 - app-mdg-data.xls: additional data needed for the MDG versions
- Instead of app: use a short name for your application (e.g. uga07).

Overview (cont.)

- The rest of this presentation:
 - comments on selected sheets in app-general-data.xls and app-mdg-data.xls
 - focus on what the data mean; not on sources or estimation.
- Appendix (not covered during the presentation) on alternative model versions, related Excel files and minimum disaggregations.

Overview (cont.)

- Additional Excel files to specify non-base simulations:
 - app-sim-core.xls – for core version.
 - app-sim-mdg.xls – for MDG version.
- The rest of this presentation: discussion of selected parts of app-general-data.xls and app-mdg-data.xls.

app-general-data.xls

- General observations about file structure:
 - each worksheet has multiple one-dimensional sets OR single multi-dimensional set OR single parameter OR indices (used to link to GAMS)
 - Green tab color: information is required
 - Yellow tab color: information is optional
 - Red tab color: do not change (unless structure is changed (only the index sheet))

Index

- Information to GAMS about location of information in app-general-data.xls
- The columns show: 1. item type (set, par); 2. item name; 3. location (range name [if >1 item on a sheet] or starting cell by sheet); 4. row dimension; 5. column dimension
- Often you may want to shift the starting cell down to create space for own work.

govclos0

Table. Rules for clearing the government budget

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;
6	domestic government borrowing (interest paid on debt)
7	government borrowing via monetary sector
8	separate treatment of current and capital budgets: [*] a. current budget: direct tax rates: uniform scaling for selected households (same as 3) b. capital budget: domestic government borrowing (same as 6) exogenous government savings [*]
9	government spending on one or more commodities (specified by government spending rule)

^{*}To separate the two, government saving (current receipts - current spending) is exogenous; for all other rules, it is endogenous.

govspndrule0

Table. Rules for government spending			
No.	Rule (disaggregated by spending item)	Controlling parameter*	Default (if controlling parameter is empty)
1	Fixed growth rate**	govspndgrw0	gdpgrw0
2	Fixed GDP share	govspndgdp0	base-year share
3	Fixed absorption share	govspndabs0	base-year share
4	Fixed educational quality for cycle of commodity***	eduqualgrw	NA****
5	Items under 1-4 are all flexible*****	NA	NA
*The controlling parameter defines the evolution over time for the item in question.			
**For consumption and capital stocks, growth rates are real; for other items, they are nominal in LCU (implicitly indexed to the numeraire) or FCU.			
***Only for education services in the MDG version; quality = [service level]/[enrollment]; parameter is found in app-mdg-data.xls			
****Data for the controlling parameter (eduqualgrw) is required.			
*****If other rule controls spending. Required for at least one commodity or capital stock if the government closure is 9.			

govspndrule0

Legal row labels:

- Commodities (in c) that the government consumes in the base-year
- Capital stocks (in fcap) in which the government invests in the base year; typically only needed for infrastructure capital stocks
- Aggregate transfers non-government from government (label: trngovgov)
- Transfers to rest of world from government (label: trrowgov)

govrecrule0

Table. Rules for government receipts			
		Controlling parameter*	Default (if controlling parameter is empty)
No.	Rule (disaggregated by spending item)		
1	Fixed rate (for taxes) / growth rate (other items)	taxrate0 / govrecgrw0	base-year rate / gdpgrw0
2	Fixed GDP share	govrecgdp0	base-year share
3	Fixed absorption share	govrecabs0	base-year share

*The controlling parameter defines the evolution over time for the item in question.

**Growth rates are nominal, in LCU (implicitly indexed to the numeraire) or FCU.

govrecrule0

Legal row labels:

- Tax accounts (row labels should be the same as the SAM accounts)
- Transfers to government from rest of world (row label: trgovrow)
- Aggregate transfers to government from domestic non-government institutions (row label: trgovngov)

govrecrule0

Legal row labels (cont.)

- Domestic government borrowing generating interest-bearing debt (e.g. bonds) (row label: gborz)
- Domestic government borrowing via the monetary system (row label: gbormsz)
- Government borrowing from rest of world (row label: fborgov)

ngovpayrule0

Table. Rules for non-government payments			
No.	Rule (disaggregated by spending item)	Controlling parameter*	Default (if controlling parameter is empty)
1	Fixed growth rate	ngovpaygrw0	gdpgrw0
2	Fixed GDP share	ngovpaygdp0	base-year share
3	Fixed absorption share	ngovpayabs0	base-year share

*The controlling parameter defines the evolution over time for the item in question.

**Growth rates are nominal, in LCU (implicitly indexed to the numeraire) or in FCU

ngovpayrule0

Legal row labels:

- Aggregate transfers to non-government from rest of world (label: trngovrow)
- Aggregate transfers to factors from rest of the world (label: trfacrow)
- Aggregate non-government borrowing from rest of the world (label: fborngov)
- Foreign direct investment (label: fdiz)
- Non-government stock changes (label: dstkngov)

siclos0

No.	household investment	household saving
1	clearing variable (endogenous real growth, GDP and absorption shares)	rule-determined savings rate for households
2	exogenous absorption share	clearing variable: uniform savings rate point change for selected households
3	exogenous absorption share	clearing variable: uniform savings rate scaling for selected households
4	exogenous GDP share	clearing variable: uniform savings rate point change for selected households
5	exogenous GDP share	clearing variable: uniform savings rate scaling for selected households

facclos0

- Interpretation:
 1. exogenous unemployment rate (≥ 0);
 2. endogenous unemployment rate (\geq minimum rate);

app-mdg-data.xls

- Structure (tab colors, role of index sheet) same as for app-general-data.xls.

- **sets-one-dimension**
 - mdg1: Irrelevant unless optional poverty data is provided; this project will use microsimulation to compute poverty and inequality indicators.
- **trgyrmdgedu(ac,t1)**
 - target year for MDGs; for education, translated into targets for earlier years for primary school entry and pass (promotion) rates.
- **mflabc(f,c)**
 - mapping between labor type f and the highest cycle it has completed, i.e.: population that has completed cycle c belong to labor type f (if they are part of the labor force).

- $\text{mwageprem}(c, f, fp)$
 - for student in c next highest and current labor segments are f and fp respectively
 - if student in c were to drop out of school without completing cycle c , then the student would belong to fp ;
 - if student in c were to continue schooling sufficiently to climb one notch in terms of labor force type (by educational attainment), then the student would belong to f

- `mdgkeyindic(ac,acp)`
 1. For mdg 5, unit = %; for other indicators, unit = share = %/100
 2. data for "goal2015" is used in reports and in definition of simulation parameters.
 3. data for "mdg2-baseyr" is superfluous; overwritten in `dmod2.gms` using data for entry and pass rates in primary school (sheet: `shredu0`).

- `mdgeduscen(ac,acp,acpp)`

1. Data on this sheet and the sheet `mdgeduelas` is used in the calibration of the MDG and education functions.
2. Each row shows a set of conditions that are made consistent as part of the calibration process: the "goal" is reached if the conditions in the preceding columns are reached in the year identified by `"trgyrmdgedu"` except for primary education, for which targeting will start in

$$\text{trgyrmdgedu} - \text{yrcyc} + 1.$$

(For example, if `trgyrmdgedu = 2015` and `yrcyc('c-edup1') = 4`, then the targeting of primary education outcomes starts from : $2015 - 4 + 1 = 2012$.)

3. Interpretation by column for mdgeduscen:

- c-hlthg: ratio between per-capita real health services in target and base years;
- c-wtsn: ratio between per-capita real water-sanitation services in target and base years;
- edu-qual: ratio between educational quality (real services per student) in target and base years;
- f-capoinf: ratio between “other infrastructure capital stocks in target and base years;
- qhpc: ratio between real household consumption per capita target and base years;
- mdg4: ratio between mdg4 indicator in target and base years;
- mdg7a: ratio between mdg7a indicator in target and base years;

3. Interpretation by column for mdgeduscen (cont.)

- mdg7b: ratio between mdg7b indicator in target and base years
- wage-prem: ratio between relative wages in next higher and current labor segments in target and base years;
- goal: value reached for the targeted indicator in 2015

4. Base-year values for the indicators (which have values for goals in trgyrmdgedu in the last column) are found on the following sheets:

- mdgkeyindic: mdg4, mdg5, mdg7a, mdg7b
- shredu0: other, education-related indicators

- `mdgeduelas(ac,acp,acpp)`
 1. Units for determinants (3rd index) identified in comments on `mdgeduscen` (preceding sheet);
 2. Elasticities are negative for cases where an increase (decrease) in the determinant leads to a decrease (increase) in the indicator (*ceteris paribus*);
- `ext_mdg0(mdg)`
 - Values should represent extreme values according to international experience (\approx lowest country-level mortality rates in global databases)
- `fpelas00(mdg,f,a)`
 - A negative value indicates that productivity of labor type *f* in activity *a* declines in response to improved health (with the `mdg4` indicator used as proxy)

- shredu0(behav,c,t1 1)
 1. For base year: data needed for all rows
 2. For years preceding base, data only needed for the (first) primary cycle:
 - a. shredu0('g1entry', 'c-edup1',t); for the single year $\text{baseyr} - \text{yrcyc}(\text{c-edup1}) + 1$
Example: if $\text{baseyr} = 2002$ and $\text{yrcyc}(\text{'c-edup1'}) = 4$, then data needed for: $2002 - 4 + 1 = 1999$
 - b. shredu0('pass', 'c-edup1',t); data needed for all years up to baseyr starting from the year identified under (a).

- $shrlabent0(c,t1)$
 - labor-force entry share among students leaving school during or at graduation from cycle c
 - Note: Value is zero for cycles for which departing students are too young to be part of the labor force
- $shrlabent20(f,t1)$
 - share of labor-force-age cohort outside school system that enters labor force as type f
 - $shrlabent20$ applies to population who never went to school or left school before reaching labor force age (typically those who only completed primary education or less). When this population reaches labor-force age, the indicated share enters the labor force.
 - value is zero for labor categories that require an education level so high that those who acquire it already are in labor-force age at graduation.

- **deprlab(f,t1)**
 - depreciation (attrition rate) for labor factor f in $t1$
 - main reasons for depreciation (attrition): retirement due to old age or illness; net out-migration
 - MAMS imposes an exogenous labor-force participation rate (among those in labor-force age who are not in school) – see the parameter `labpartrat0` in the file *app-data.general.xls*. `deprlab` is scaled endogenously to achieve this participation rate. Given this, for `deprlab` only relative values across labor types matter.
 - suggestion: if labor-type-specific data is not available, introduce plausible values (e.g. 0.02 = 2%) for all labor types.
- **eduqualgrw(c,t1)**
 - annual growth (improvement if >0) in quality for educational cycle c (units = shares; e.g. write 1% as 0.01)
 - definition of “quality”: real services per student in cycle c (irrespective of whether service is provided by government or non-government sectors).
 - data provided on this sheet only matter if `govspnd0(c,t) = 4`; see the file *app-data.general.xls*.

Appendix. Alternative model versions: files and minimum disaggregation

- Core version:
 - uses *app-general-data.xls* and *app-core-sim-core.xls*;
does not use *app-mdg-data.xls* or *app-mdg-sim.xls*
 - does not include the MDGs and their links to the labor market
 - *minimum* disaggregation:
 - Factors: labor, private capital, government capital
 - Sectors (Activities/Commodities: private, government
 - Institutions: Household, Government, RoW

Appendix. Alternative model versions (cont.)

- MDG version:
 - uses *app-general-data.xls*, *app-mdg-data.xls*, and *app-mdg-sim.xls*; does not use or *app-core-sim.xls*
 - also covers MDGs and their links to the labor market
 - *minimum* disaggregation:
 - Factors: labor (*by educational level*), private capital, government capital (*by function* – three education, health, water-sanitation, other infrastructure, other government)
 - Sectors (Activities/Commodities: private, government (*by function*))
 - Institutions: Household, Government, RoW