

Plenary Session II: Defining MAMS Scenarios – Available Closure Rules

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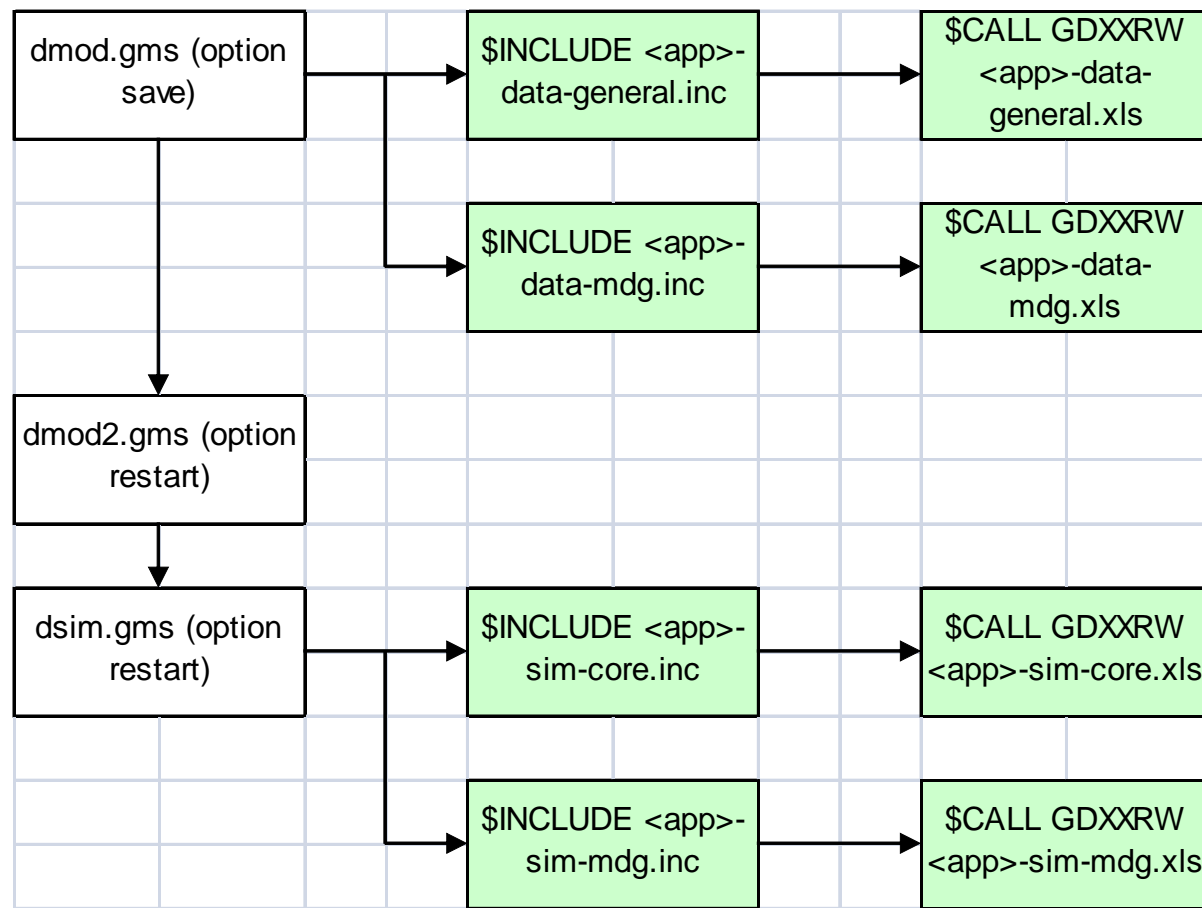
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Presentation for the Third Training Workshop of the
Project “Assessing Development Strategies to Achieve the
MDGs in Asia”, Jakarta, March 30 – April 2, 2010

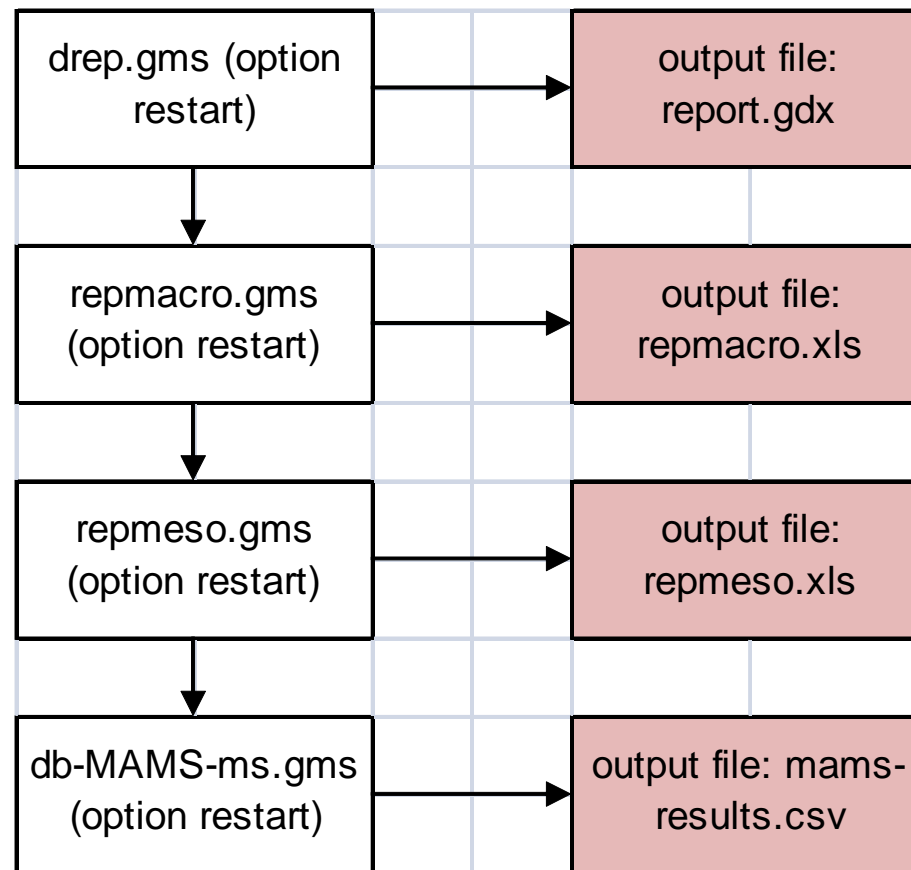
Outline

- Organization of MAMS files
- Different Types of Closure (i.e., ways of balancing supply and demand)
 - macroeconomic
 - factor markets
 - commodity markets
- Closure Rules for the “Achieving MDGs” Scenarios
- Defining Simulations in MAMS Using Excel

Organization of MAMS files – baseline + simulations



Organization of MAMS files -- reports



Macro Closure Rules

- Clearing mechanisms that ensure equality between receipts and outlays for
 - balance of payments' current account
 - savings-investment
 - government budget
- By default, the selections for the baseline (in <app>-data-general.xls) are applied to the other simulations (in <app>-sim-mdg.xls).

Balance of Payments -- rowclos

- Non-trade-related payments (transfers, foreign investment) are non-clearing, determined by their own rules
 - exogenous values in foreign currency
 - exogenous shares of GDP
 - exogenous shares of absorption
- The real exchange rate equilibrates inflows and outflows of FCU, by influencing export and import quantities.

Balance of Payments – cont.

- A BoP deficit (e.g., due to a decline in foreign aid) generates a depreciation of the real exchange rate
 - for producers: increased price for exports relative to price of domestic sales, increase in Q_E/Q_D
 - for consumers: increased price for imports relative to price of domestic purchases, decrease in Q_M/Q_D
- The exchange rate will change as much as needed to bring about the changes in export and imports needed to eliminate the imbalance.

Savings-Investment -- siclos

- Government investment
 - typically, determined by needs for capital stocks in government service production – follows current consumption
 - government closure rule (discussed below) assures that it is financed
- Foreign Direct Investment changes according to a “rule” (see below).
- The relationship between private savings and investments depends on siclos.

Savings-Investment – cont.

| No. | household investment | household saving |
|-----|---|--|
| 1 | clearing variable: investment quantities; endogenous 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 |

Government Budget -- govclos

- Select the variable that clears the government budget
 - essential for designing counterfactual scenarios
- The other components of the government budget follow some rule
 - for example, keep constant the ratio between government consumption and GDP

Government Budget – cont.

| 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: <ul style="list-style-type: none"> 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.

Rules for Government expenditures and incomes – not selected in govclos

- Should be specified for government expenditures and incomes that are not used to balance the government budget
 - expenditures in govrulespnd
 - incomes in govrulerec
 - NOTE: in the “achieving MDGs” scenarios government consumption is endogenous

Rules for Government Spendings

No. Rule (disaggregated by commodity)

- 1 Fixed real growth rates for government consumption*
 - 2 Fixed GDP share
 - 3 Fixed absorption share
 - 4 Fixed educational quality for cycle of commodity**
 - 5 All items under 1-4 are flexible***
-

*For infrastructure, fixed growth rate for capital, not consumption;

**Only for education services (one per level or cycle);
quality = [service level]/[enrollment].

***If other rule controls spending. Required for at least one commodity if government closure 9; required for MDG-related services when MDGs are targeted.

Rules for Government Incomes

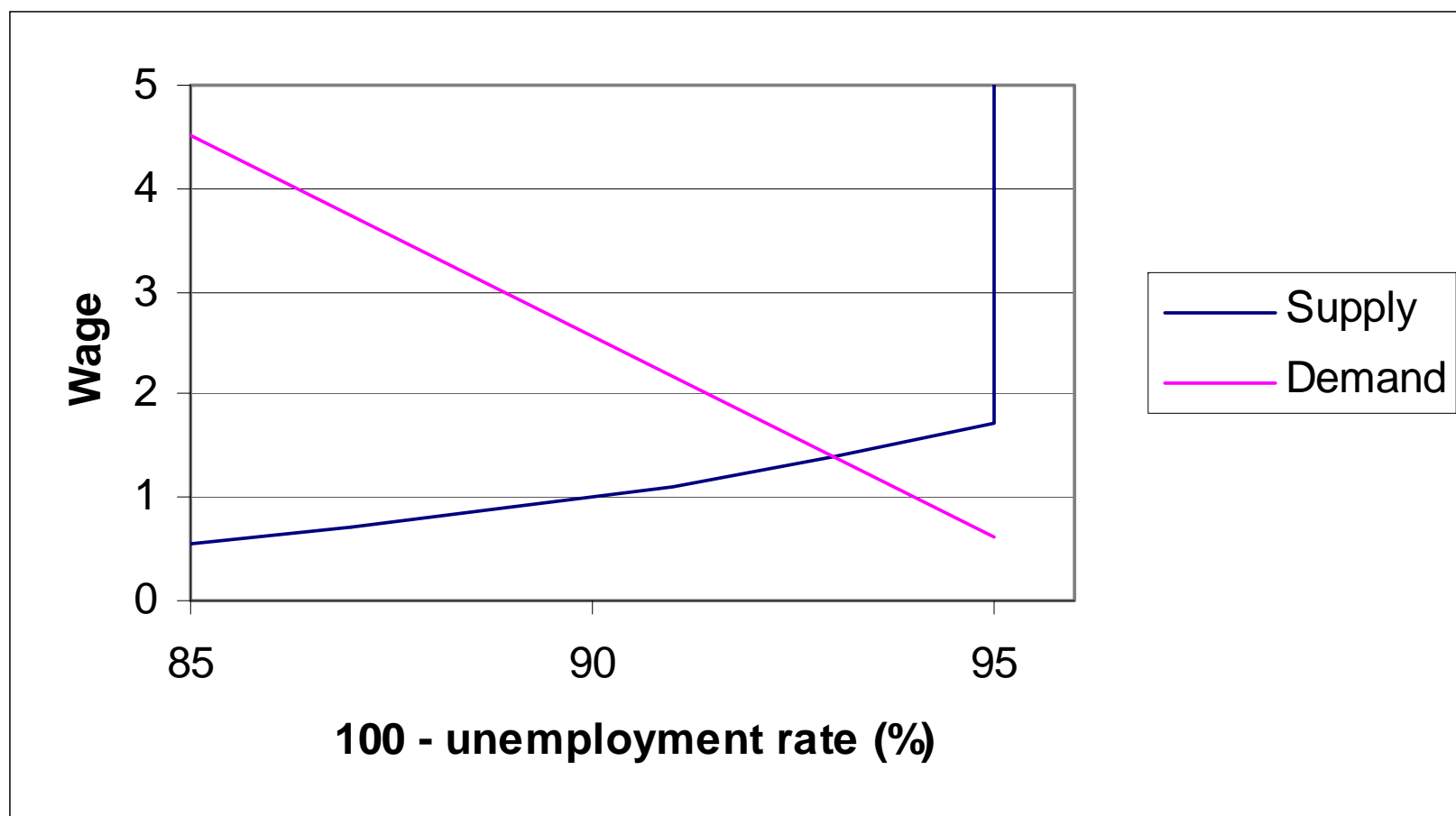
| | Fixed | |
|-----------------------------|---------------|-----------|
| | 1 | 2 |
| Direct taxes | rate | GDP share |
| Import taxes | rate | GDP share |
| Export taxes | rate | GDP share |
| Other indirect taxes | rate | GDP share |
| Transfers from RoW | value (FCU)** | GDP share |
| Government borrowing | | |
| -- bond | value | GDP share |
| -- monetary system | value | GDP share |
| Foreign borrowing | value (FCU) | GDP share |

*In addition, selected receipts may be flexible as part of the over-all government closures; if so, items 1 and 2 are both flexible. **FCU = foreign currency units.

Market Clearing for Factors

- Two alternatives
 - exogenous unemployment – typically zero – with wage as the clearing variable
 - endogenous unemployment; two possible regimes:
 - unemployment $>$ minimum unemployment – clears through unemployment rate
 - unemployment = minimum unemployment (i.e., full employment) – clears through wages
 - the reservation wage is a function of: employment rate (i.e., wage curve), pc consumption, etc.

Factor Market with Endogenous Unemployment



Market Clearing for Commodities

- Three categories
 - domestic output sold at the home market:
clears through prices
 - exports:
 - clears through quantities demanded by the row (i.e., small country assumption)
 - clears through export demand function with constant elasticity
 - imports: clears through quantities supplied by the row

Exogenous Evolution of Certain Macro Aggregates

- The model allows choosing how are going to evolve variable such as
 - tax collection by tax instrument
 - transfers to/from the rest of the world
 - transfers from the government to the households
 - debt
- Thus, it is possible to conduct a “dynamic calibration” of the model
 - also, replicate period baseyr-2009

Sheet macrorule0

- **trngovrow** = transfers from row to non-government domestic institutions (insdng)
- **trfacrow** = factor returns from row
- **trrowfac** = factor returns to row
- **fborngov** = foreign borrowing insdng
- **fdiz** = foreign direct investment

Sheet macrorule0 – cont.

- **1** = exogenous growth rates; see corresponding parameters
 - for example, if trngovrow=1, the (exogenous) growth rate is given by the data in the sheet trgrw.
- **2** = exogenous GDP share.
- **3** = exogenous absorption share.

Sheet macrogdp0 + Sheet macroabs0

[illegible]

Sheet macrogdp0 + Sheet macroabs0 – cont.

- The imposition or not of the values in macrogdp0 and macroabs0 depends on the values selected for siclos and govclos
 - if siclos=4 (i.e., exogenous private investment/GDP ratio), macrogdp0 can be used to impose a trajectory to the private investment/GDP ratio; use dkngov element
 - if govrulerec0=2 (i.e., exogenous tax collection/GDP ratio), macrogdp0 can be used to impose a trajectory to the tax collection/GDP ratio

Sheet macrogdp0 + Sheet macroabs0 – cont.

- **tax-dirhh, tax-va, tax-com, tax-tariff, tax-exp**
- **trgovrow** = transfers from the rest of the world to the government
- **gborz** = government domestic borrowing
- **gbormsz** = government borrowing via monetary system – no interest payments
- **fborgov** = government foreign borrowing
- **dkngov** = private investment

Closure Rules for Project Scenarios

– in <app>-data-general.xls

- In the baseline scenario, each country should select the relevant variable to balance the government budget.
- In addition, other indicators should follow reasonable paths – as explained above
 - private investment
 - government consumption
 - government borrowing, domestic and foreign
 - others

Closure Rules for Project Scenarios

– in <app>-sim-mdg.xls

- In the “achieving MDGs” scenarios, the government consumption of one or more services is endogenously adjusted; requires financing source through govclos.
- To achieve an MDG, government consumption of the relevant service should be made endogenous
 - for MDG 4/5, govrulespnd(‘c-health’,t1) = 5
 - govrulespnd = 5; no restrictions in
 - growth and share GDP or absorption
 - evolution of quality of education (c-edu/enrollment)

Closure Rules for Project Scenarios

– in <app>-sim-mdg.xls – cont.

- The following alternatives should be considered to balance the government budget:
 - 1 or 2 (direct and indirect taxes or only direct taxes) – be careful with the subsidies!
 - 4 (foreign grants) (?) – transfers from row to government
 - 5 (domestic debt – causes interest payments)
 - 6 (foreign debt – causes interest payments)

Closure Rules for Project Scenarios

– in <app>-sim-mdg.xls – cont.

- IMPORTANT; it is possible to combine different sources of financing to achieve the MDGs
 - one variable to clear the government budget
 - other(s) variable(s) with exogenous evolution but different from the BaU
 - for example, govclos=1 + macrogdpsim to increase the ratio fborgov/PIB – requires govrulerec('fborgov') = 2 (see below)

Simulations File

- definition of simulation names
 - sim + other-sim-sets
- definition of closure rules; for each simulation
 - govclos + govrulespnd + govrulerec + siclos + rowclos
 - by default, same values as BaU are used
 - (!) use siclos=1 in MDG simulations
- definition of MDGs achieving scenarios
 - mdgtargetdata – introduce sim + mdg + trgyr

Simulations File – cont.

- MAMS can be used to run other (non-MDG) simulations
 - pwesim + pwmsim
 - alphavagsim
 - trnsfrsim
 - qggrwbarsim
 - simulate an increase in government spending in infrastructure

An Example: Defining an MDG Simulation

- In **govclos** select the financing mechanism – overwrite selection for BaU.
- In **govrulespnd** select 5 for the relevant government service – c-wtsn for MDG 7ab
– government consumption selected service becomes endogenous
- In **siclos** select 1 for all MDG simulations – allows to capture crowding out of private investment.
- In **mdgtargetdata** introduce simulation and relevant MDG element.

Example Combining Sources of Financing

- show scenario **mdg2-tax-fb** en ury-sim-mdg.xls – folder MAMS-in-GAMS-ury-2010-03-04
 - use macrogdpsim in Excel simulations file