

ISIM-MAMS Exercises: Interpretation of Results; Terms of Trade Shocks

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Outline

- Introduction
- Definition of Scenarios
 - shocks, closure, and rules
- Key Model Equations and Variables
- Results

Introduction

- In this presentation, we show, step by step, how to perform and analyze MAMS simulations using the ISIM-MAMS user-friendly interface.
- In order to follow the exercises, you should have successfully installed
 - GAMS
 - ISIM-MAMS
 - Uganda 2009/10 v2 dataset

Definition of Scenarios: Shocks

- **pwefood-ex** = increase world export price food products; 25% 2011/12-2015/16
- **pwmfood-ex** = increase world import price food products; 25% 2011/12-2015/16
- **pwfood-ex** = increase world (export and import) price food products; 25% 2011/12-2015/16

Definition of Scenarios: Closure

- Government (**govclossim**) = **direct tax** rate is the clearing variable for the government budget
- Savings-Investment (**siclossim**) = **household investment** is the clearing variable (i.e., endogenous real growth, GDP and absorption shares).

Definition of Scenarios: Rules Gov Spending (**govspndrulesim**)

- c-edupgov = fixed growth rate at ref values
- c-edusgov = fixed growth rate at ref values
- c-edutgov = fixed growth rate at ref values
- c-healthgov = fixed growth rate at ref values
- c-wtsn = fixed growth rate at ref values
- c-oinf = fixed growth rate at ref values
- c-publicadm = fixed growth rate at ref values

Definition of Scenarios: Rules Gov Receipts (**govrecrulesim**)

- tax-dir = endogenous – see govclassim (!)
- tax-vat = fixed rates at ref values
- tax-imp = fixed rates at ref values
- trgovrow = fixed growth rate at ref values
- trgovngov = fixed growth rate at ref values
- gborz = fixed growth rate at ref values
- gbormsz = fixed growth rate at ref values
- fborgov = fixed growth rate at ref values

Definition of Scenarios: Rules Non-Gov Payments (**ngovpayrulesim**)

- `trngovrow` = fixed growth rate at ref values
- `trfacrow` = fixed growth rate at ref values
- `fborngov` = fixed growth rate at ref values
- `fdiz` = fixed growth rate at ref values

Accounts in the Uganda SAM for MAMS

Sectors (24)	Sectors (24) -- cont.	Interest payments (2)
<i>Private (17)</i>	<i>Government (7)</i>	Domestic interest payments
Agriculture	Primary education	Foreign interest payments
Flowers	Secondary education	
Coffee	Tertiary education	Institutions (3)
Tea	Health	Hosehold
Fishing	Water and sanitation	Government
Mining	Other infrastructure	Rest of the world
Other food	Public administration	
Beverages and tobacco		Capital accounts (3)
Textiles	Factors of Production (12)	Hoseholds
Petrochemical	Unskilled labor	Government
Other manufactures	Semi-skilled labor	Rest of the world
Electricity	Skilled labor	
Water and sanitation	Private capital	Investment accounts (9)
Primary education	Land	<i>Private (2)</i>
Secondary education	Government capital (7)	Gross fixed capital formation
Tertiary education		Stock changes
Health	Tax accounts (3)	<i>Government (7)</i>
Other services	Commodity taxes	Primary education
	Import taxes	Secondary education
	Direct taxes	Tertiary education
		Health
		Water and sanitation
		Other infrastructure
		Public administration

Key Aspects of Base Year: Trade Pattern

Commodity	EXPshr	EXP-OUTshr	IMPshr	IMP-DEMshr
c-agric	4.9	3.6	2.3	3.3
c-flowers	1.9	62.4	0.2	25.3
c-coffee	11.2	50.9	0.1	1.1
c-tea	2.3	39.2	0.0	0.1
c-fish	5.6	28.2	0.0	0.4
c-mining	0.3	10.3	0.8	36.9
c-othfood	5.8	7.5	5.7	13.3
c-beveragestobacco	11.4	23.9	2.5	11.8
c-textil	6.3	37.3	4.4	44.4
c-petrochemical	3.9	15.2	20.0	63.8
c-othmnf	15.0	28.9	38.3	66.6
c-elect	0.3	4.2	0.1	1.9
c-publicadm	0.6	2.1	3.5	19.0
c-oinf	0.0	2.1	0.0	19.0
c-othsvc	30.5	12.3	22.1	16.3
total	100.0	11.5	100.0	20.0

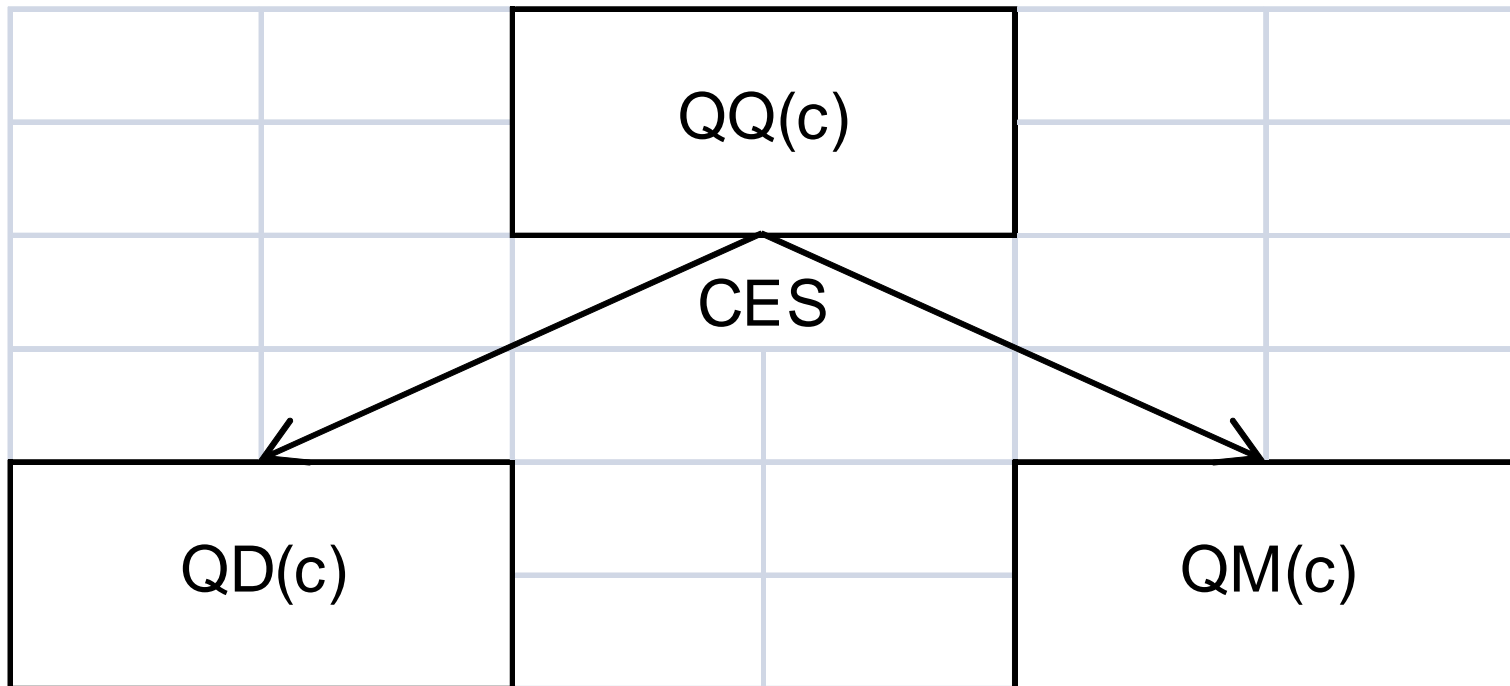
Key Aspects of Base Year: Factor Intensity

Activity	f-labn	f-labs	f-labt	f-capprv	f-land	total
a-agric	20.5	1.5	0.7	6.6	70.7	100.0
a-flowers	29.6	2.2	0.9	21.8	45.4	100.0
a-coffee	39.7	3.0	1.3	18.1	37.9	100.0
a-tea	55.6	4.1	1.8	8.5	30.0	100.0
a-fish	11.5	0.9	0.4	87.3		100.0
a-mining	11.3	5.3	1.8	81.7		100.0
a-othfood	13.5	6.4	2.1	78.0		100.0
a-beveragestobacco	17.1	8.0	2.7	22.4	49.9	100.0
a-textil	15.9	7.5	2.5	74.2		100.0
a-petrochemical	11.2	5.3	1.7	81.8		100.0
a-othmnf	16.2	7.6	2.5	73.7		100.0

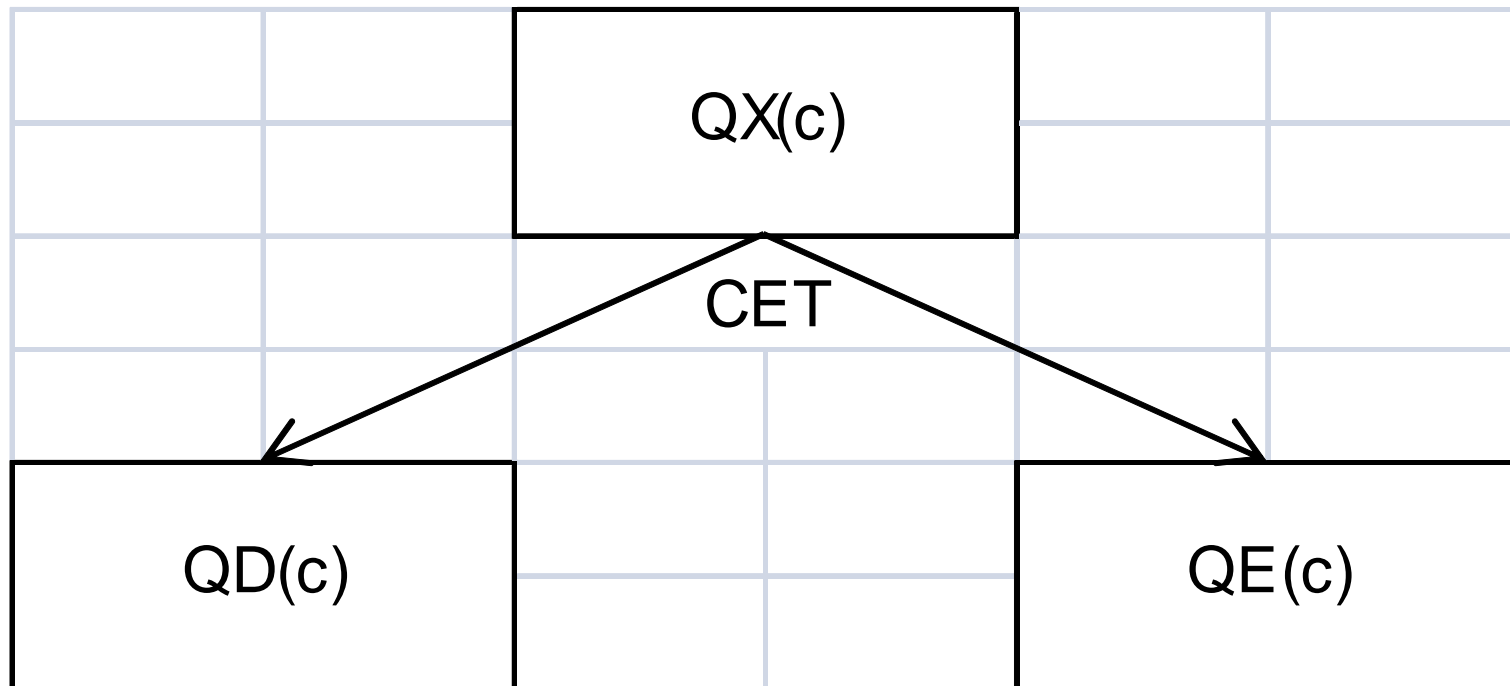
Key Aspects of Base Year: Factor Intensity – cont.

Activity	f-labn	f-labs	f-labt	f-capprv	f-land	total
a-elect	14.0	7.6	5.0	73.4		100.0
a-wtsn	10.2	17.0	72.9			100.0
a-construc	6.0	3.3	2.1	88.6		100.0
a-publicadm	8.3	12.8	78.9			100.0
a-edupprv	4.2	12.5	66.5	16.9		100.0
a-edusprv	4.2	12.5	66.5	16.9		100.0
a-edutprv	4.2	12.5	66.5	16.9		100.0
a-edupgov	4.8	14.5	80.7			100.0
a-edusgov	7.0	21.1	71.9			100.0
a-edutgov	2.9	7.4	89.8			100.0
a-healthprv	3.1	9.2	48.8	38.9		100.0
a-healthgov	5.0	15.0	80.0			100.0
a-oinf	10.1	17.0	72.9			100.0
a-othsvc	14.4	7.8	5.1	72.7		100.0

Domestic Products vs. Imports



Domestic Products vs. Exports



Key Equations and Variables

$$PM_{c,t} = pwm_{c,t} \cdot (1 + tm_{c,t}) \cdot EXR_t$$

$$\frac{QM_{c,t}}{QD_{c,t}} = \left(\frac{PDD_{c,t}}{PM_{c,t}} \cdot \frac{\delta_c^q}{1 - \delta_c^q} \right)^{\frac{1}{1 + \rho_c^q}}$$

$$PE_{c,t} = pwe_{c,t} \cdot (1 - te_{c,t}) \cdot EXR_t$$

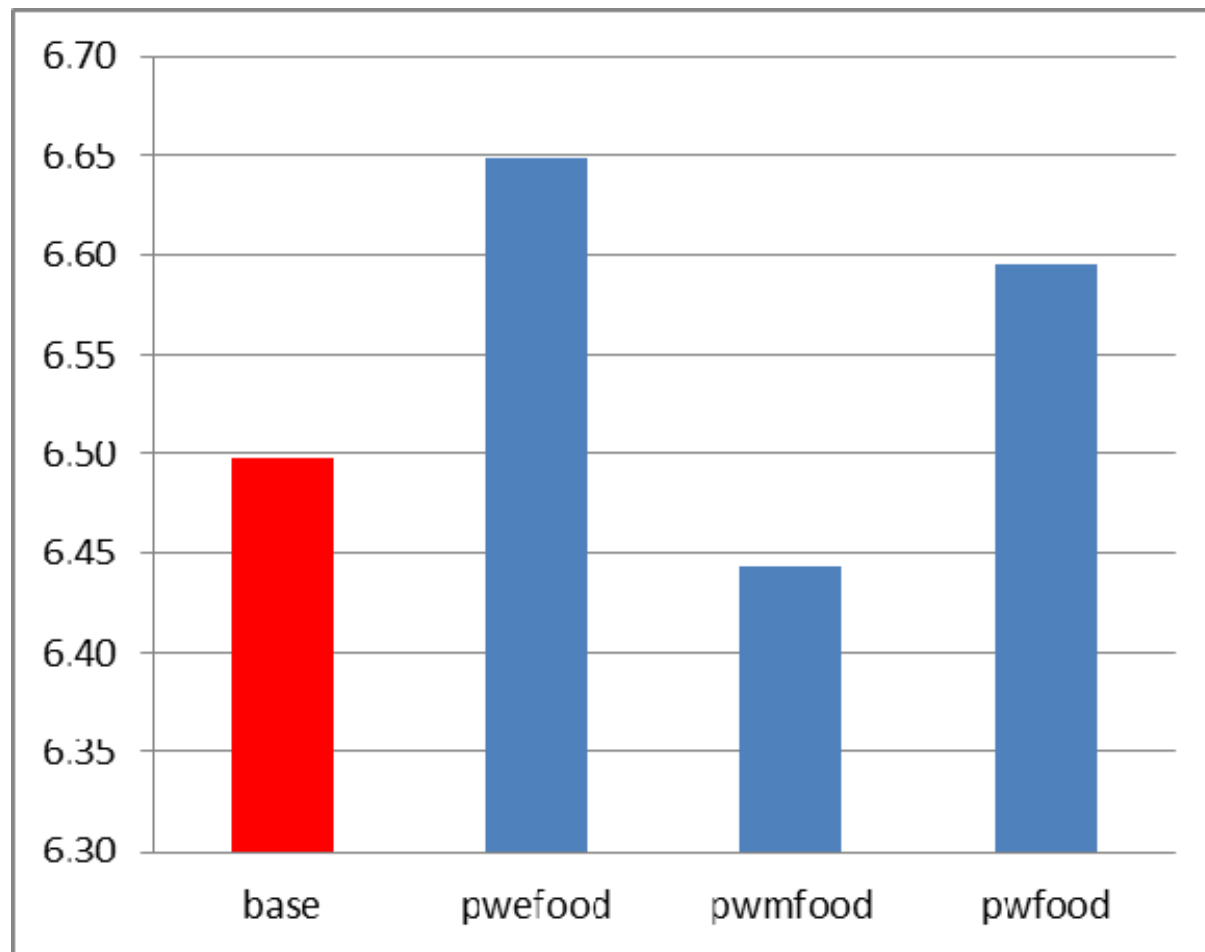
$$\frac{QE_{c,t}}{QD_{c,t}} = \left(\frac{PE_{c,t}}{PDS_{c,t}} \cdot \frac{1 - \delta_c^t}{\delta_c^t} \right)^{\frac{1}{\rho_c^t - 1}}$$

Key Equations and Variables: Balance of Payments (in FCU)

$$\begin{aligned}
 & \sum_c pwm_{c,t} \cdot QM_{c,t} + \frac{\sum_f YIF_{row,f,t}}{EXR_t} + \frac{\sum_{i \in insdng} TRII_{row,i,t}}{EXR_t} \\
 & + \overline{TRANSFR}_{row,gov,t} + \sum_{i \in insd} fintrat_{i,t} \cdot FDEBT_{i,t} = \\
 & \sum_c pwe_{c,t} \cdot QE_{c,t} + \sum_{i \in insdnh} \overline{TRANSFR}_{i,row,t} + \sum_h transfrpc_{h,row,t} \cdot \overline{POP}_{h,t} \\
 & + \sum_f \overline{TRANSFR}_{f,row,t} + \sum_{i \in insd} \overline{FBOR}_{i,t} + fdi_{row,t}
 \end{aligned}$$

In words, outflows of foreign exchange (left) = inflows of foreign exchange (right)

GDP at Factor Cost; average growth rate 2009/10-2015/16; percent



Macro Results

		Final year			
Indicator	2009	base	pwefood	pwmfood	pwfood
Absorption	392.01	6.26	6.75	6.10	6.58
Consumption - private	276.70	6.09	6.56	5.87	6.33
Consumption - government	33.60	6.59	6.59	6.59	6.59
Fixed investment - private	61.73	6.64	7.63	6.62	7.61
Fixed investment - government	19.03	7.74	7.59	7.72	7.57
Stock change	0.96	Eps	Eps	Eps	Eps
Exports	71.53	7.37	8.24	7.13	8.01
Imports	116.28	6.33	7.93	5.93	7.46
GDP at factor cost	319.17	6.50	6.65	6.44	6.59
Total factor employment (index)		4.96	5.32	4.91	5.27
Total factor productivity (index)		1.54	1.33	1.54	1.33
Real exchange rate (index)		0.25	-2.36	0.27	-2.31

Sectoral Results: Exports

	2009	base	pwefood	pwmfood	pwfood
c-agric	3.49	4.18	2.03	4.27	2.20
c-flowers	1.42	6.20	-0.59	6.26	-0.47
c-coffee	8.10	6.16	28.11	3.60	26.88
c-tea	1.69	7.10	13.04	6.66	12.82
c-fish	4.06	6.59	12.89	6.73	13.20
c-mining	0.23	7.58	4.72	7.67	4.86
c-othfood	4.16	6.41	7.66	6.37	7.73
c-beveragestobacco	8.10	6.29	-1.61	5.91	-1.85
c-textil	4.45	8.19	1.52	8.35	1.75
c-petrochemical	2.78	7.95	3.34	7.80	3.25
c-othmnf	10.64	7.84	1.28	7.92	1.42
c-elect	0.24	8.15	3.83	8.30	4.05
c-publicadm	0.45	7.51	2.04	7.45	2.06
c-oinf	0.01	7.13	2.34	6.92	2.21
c-othsvc	21.73	8.55	3.89	8.69	4.11
total	71.53	7.37	8.24	7.13	8.01

MDG Indicators

				Final year			
	1990	2009	goal2015	base	pwefood	pwmfood	pwfood
mdg2		15.5	100.0	60.1	61.4	59.5	60.8
mdg4	160.0	126.7	56.0	89.5	86.2	90.7	87.4
mdg5	506.0	388.9	131.0	279.6	269.8	283.0	273.2
mdg7w	44.0	73.8	89.0	77.6	78.0	77.4	77.8
mdg7s	43.0	63.8	71.5	65.5	65.6	65.4	65.5

Units: % for MDGs 1, 2, 7a, and 7b; per 1000 for MDG 4; per 100,000 for MDG 5

why there is an improvement? hint: analyze the determinants

Government Spending; real gov consumption; annual growth from base year to final year (%)

	2009	base	pwefood	pwmfood	pwfood
c-wtsn	0.02	6.42	6.42	6.42	6.42
c-publicadm	23.19	6.58	6.58	6.58	6.58
c-edupgov	5.19	6.56	6.56	6.56	6.56
c-edusgov	0.93	6.57	6.57	6.57	6.57
c-edutgov	1.33	6.59	6.59	6.59	6.59
c-healthgov	2.83	6.72	6.72	6.72	6.72
c-oinf	0.10	5.58	5.58	5.58	5.58
total	33.60	6.59	6.59	6.59	6.59

Real Per Capita Consumption; annual growth from base year to final year (%)

	2009	base	pwefood	pwmfood	pwfood
hhd	839.65	2.74	3.19	2.52	2.97
total	839.65	2.74	3.19	2.52	2.97