

Plenary session II:

Quick refresher on standard SAM and adaptation for MAMS

Marco V. Sanchez
(UN-DESA/DPAD)

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Why do we need a SAM?

- It provides a country dataset for a year on the basis of which most parameters and initial variable values of the model are computed, in a manner that the model solution precisely replicates the SAM.
- As such, the SAM implicitly provides the model with a consistent accounting framework of a country's socio-economic system because:
 - it is a square matrix → identical row and column accounts, and
 - for each account each cell shows a payment from the column to the row.
- As such, it enables MAMS reproduce the production structure and the generation and distribution of incomes, among others, for a particular country.

Main accounts in a “standard” SAM

- **Activities:** produce one or more commodities using factors and intermediate inputs.
- **Commodities:** goods and services
 - supplied by activities and/or via imports
 - demanded for exports and domestic (final and intermediate) use.
- **Factors:** services produced by stocks. Main types: labour, capital, land, other natural resources
- **Institutions:** entities that own factors, consume and invest, receive or pay taxes and transfers. Main types: households, enterprises, government, rest of world. Typically have a current account.
- **Auxiliary institutional accounts:** taxes, interest (rarely), saving, capital, and investment.

Accounts in an aggregated “standard” SAM

Account	Explanation
act	production activities
com	commodities
<i>fac</i>	<i>factors</i>
hhd	households (domestic non-government)
gov	government
RoW	rest of world
<i>tax-dom</i>	<i>domestic taxes</i>
<i>tax-imp</i>	<i>import taxes</i>
sav-inv	saving-investment (consolidated)

Cells in an aggregated “standard” SAM

Item	Explanation
prod	production (output)
cons	consumption
exp	exports
imp	imports
va	value added (=GDP at factor cost)
<i>va-g</i>	<i>value added paid to government</i>
<i>va-h</i>	<i>value added paid to household</i>
inv	investment
sav	savings
dtax	direct taxes
itax	domestic indirect taxes
mtax	import taxes (tariffs)
<i>trns</i>	<i>transfers</i>
<i>incf</i>	<i>factor income</i>

Aggregated standard SAM – verbal explanations

	act	com	fac	hhd	gov	RoW	tax-dom	tax-imp	sav-inv	total
act		prod								
com				cons	cons	exp			inv	
fac		va				incf				
hhd			va-h		trns	trns				
gov			va-g	trns		trns	itax+ dtax	mtax		
RoW		imp	incf	trns	trns					
tax-dom	itax			dtax						
tax-imp		mtax								
sav-inv				sav	sav	sav				
total										

Accounts in a more disaggregated “standard” SAM

Account	Explanation	Account	Explanation
a-agr	activity - agriculture	h-rur	household - rural
a-ind	activity - industry	h-urb	household - urban
a-ser	activity - services	gov	government
c-agr	commodity - agriculture	tax-d	taxes - domestic
c-ind	commodity - industry	tax-m	taxes - imports
c-ser	commodity - services	row	rest of world
f-lab	factor - labor	s-i	saving-investment
f-cap	factor - capital		

“Standard” SAM

	a-agr	a-ind	a-ser	c-agr	c-ind	c-ser	f-lab	f-cap	h-rur	h-urb	gov	tax-d	tax-m	row	s-i	total
a-agr				7.9												7.9
a-ind					25.3											25.3
a-ser						19.8										19.8
c-agr	0.3	2.7	0.1						1.3	0.6				3.0	0.0	7.9
c-ind	1.3	7.8	4.6						5.2	7.5	0.3			2.5	5.4	34.6
c-ser	2.0	4.2	2.1						2.5	3.0	4.5			1.6	0.3	20.3
f-lab	1.4	3.8	7.6													12.9
f-cap	2.0	6.0	4.8													12.8
h-rur							1.6	2.0		5.8	1.1			0.1		11.2
h-urb							11.2	10.8		3.3	1.6					26.9
gov											5.2		1.9	0.3		7.4
tax-d	0.2	0.7	0.5						0.7	3.0						5.2
tax-m				0.0	1.8	0.1										1.9
row				0.1	7.5	0.5	0.0			0.5	0.4					9.0
s-i									1.4	3.2	-0.5			1.6		5.7
total	7.9	25.3	19.8	7.9	34.6	20.3	12.9	12.8	11.2	26.9	7.4	5.2	1.9	9.0	5.7	

Stages and steps to adapt “standard” SAM for MAMS

- **Stage 1:** preparation of the standard SAM
 - Aggregation/disaggregation of sectors (activities + commodities)
 - Setting gross fixed capital formation
- **Stage 2:** adaptation of the adjusted standard SAM for MAMS
 - New sector (activity + commodity) disaggregation
 - Labour disaggregation by level of education
 - Non-labour factor disaggregation
 - Interest payments
 - Savings and capital accounts per institution
 - Investment accounts

Stage 1: preparation of the standard SAM

- Disaggregation of sectors that:
 - produce key exports;
 - are natural-resource-based sectors;
 - are particularly important for the economy (ex., in terms of employment generation); and
 - are subject to changes in world prices (ex., food, oil, etc.).
- Aggregation of sectors that are not very important.
 - helps to reduce the number of parameters needed to calibrate MAMS.
- Proper recording of gross fixed capital formation (GFCF)
 - Payments from the “s-i” account to the commodity accounts should solely record GFCF.
 - Changes in stocks by commodity accounted for through separate account.

Stage 2: adaptation of the standard SAM for MAMS

- New sector (activity + commodity) disaggregation.
 - Separation of private sectors from public ones.
 - Disaggregation into “private” and “public” for “Education” and “Health” sectors
 - detailed input-output
 - detailed supply and use tables with a proper mapping of intermediate consumption
 - other data sources or tailor-made data from the NA.

Stage 2: adaptation (cont.)

- Disaggregation of private and public education by cycle: primary, secondary and tertiary
 - The definition of the primary cycle has implications for achievement of MDG 2!
 - This will likely require compilation of very detailed data – from the Ministry of Education.
- Three more public sectors: “water and sanitation” (W&S), provision of “(other) public infrastructure”, and provision of “other government services”.

Stage 2: adaptation (cont.)

- *Other public infrastructure* essentially accounts for electricity and transport (public roads, bridges, airports, etc.); but the adaptation of the sector may be very country-specific.
- *Other government services* include all other government services not considered as part of the other government sectors; usually, the most important component is public administration.
- *W&S* could be solely provided by the private sector but under government regulation. MAMS can handle regulated sectors without problems.

Stage 2: adaptation (cont.)

- Labour disaggregation by level of education.
 - *f-labn*: workers with less than completed secondary education
 - *f-labs*: workers with completed secondary education
 - *f-labt*: workers with completed tertiary education (some diploma or degree!)
 - Cycles have to be consistent with those used to disaggregate the private and public education sectors
- The non-labour factors should be split up into: capital (*f-cap*), land (*f-land*), and natural resources (*f-natres*) if applicable.
 - *f-cap* needs to be split up into the capital factor (s) of the private sector (s) and those government sectors that record operating surplus (depreciation or rents)

Stage 2: adaptation (cont.)

- Accounts need to be included for, respectively, net domestic interest payments to the domestic private sector (*int-dom*) and net foreign interest payments to the rest of the world (*int-row*).
 - *int-dom* receives payments from the government (who borrows from the domestic private sector) and these are transferred to households
 - *int-row* receives payments from both the government and households and these are transferred to the row.

Stage 2: adaptation (cont.)

- Every institution has its own savings and capital accounts.
 - Each institution's savings are channeled to each institution's capital account in order to finance investment.
 - Transfers between institutional capital accounts reflect borrowing among institutions and so these are also used to finance investment.
- Separate investment accounts are included (one for the private sector as a whole and one for each government sector) to specify investment by sector of destination.
 - The standard SAM only specifies investment demand by commodity (investment by sector of origin).
 - Which capital accounts are financing private and public investments is also specified through the investment accounts.

Cells in the SAM for MAMS

Item	Explanation
prod	production of gov/priv commodity
cons	gov/hhd consumption of gov/priv commodity
exp	exports of private commodity
imp	imports of private commodity
interm	intermediate use of priv commodity by gov/priv activity
va	value added to labor/priv-capital from priv/gov activity
va-h	value added to hhd from labor/capital
incf	factor income to capital/RoW from RoW/capital
sav	gov/hhd/RoW savings
borr	borrowing
inv	investment use of private commodity for gov/priv capital
inv-g	investment in gov capital financed by gov
inv-p	investment in priv capital (financed by hhd or RoW)
dstk	stock change for priv commodity
dstk-g /dstk-h	stock change financed by gov / stock change financed by hhd
dtax	direct taxes
itax	domestic indirect taxes
mtax	import taxes
trns	transfers to gov/hhd/RoW from gov/hhd/RoW
intd	domestic interest to hhd from gov
intr	RoW interest (total)
intr-g /intr-h	RoW interest from gov / RoW interest from hhd

SAM for MAMS – verbal explanations

	a-prv	a-gov	c-prv	c-gov	f-lab	f-capprv	hhd	gov	RoW	tax-dom	tax-imp	int-dom	int-row	cap-hhd	cap-gov	cap-row	inv-prv	inv-gov	dstk	total
a-prv		prod																		
a-gov		prod																		
c-prv	interm	interm					cons	exp									inv	inv	dstk	
c-gov							cons													
f-lab	va	va																		
f-capprv	va						incf													
hhd				va-h	va-h		trns	trns		intd										
gov							trns	trns		itax+	mtax									
RoW							trns	trns		dtax		intr								
tax-dom	itax						dtax													
tax-imp		mtax																		
int-dom										intd										
int-row							intr-h	intr-g												
cap-hhd							sav								borr	borr				
cap-gov								sav						borr	borr					
cap-row								sav												
inv-prv													inv-p		inv-p					
inv-gov														inv-g						
dstk													dstk-h	dstk-g						
total																				

SAM for MAMS – numerical

	a-prv	a-gov	c-prv	c-gov	f-lab	f-capprv	hhd	gov	row	tax-dom	tax-imp	int-dom	int-row	cap-hhd	cap-gov	cap-row	inv-prv	inv-gov	dstk	total
a-prv		145.5																		145.5
a-gov			22.7																	22.7
c-prv	60.8	9.5				71.6	12.2									16.0	4.7	0.0		174.9
c-gov	1.4					6.2	15.2	0.1								0.0	0.0			22.9
f-lab	41.0	10.7																		51.7
f-capprv	37.8	2.2																		40.0
hhd				50.6	39.1		1.2	1.7			1.0									93.6
gov							7.0		7.7	3.5										18.3
row			25.8	0.2	1.1	0.9						0.5								28.4
tax-dom	4.5	0.3				3.0														7.7
tax-imp			3.5																	3.5
int-dom							1.0													1.0
int-row							0.5													0.5
cap-hhd						12.8														12.8
cap-gov							0.5							-0.2	4.3					4.7
cap-row								7.4												7.4
inv-prv												13.0			3.0					16.0
inv-gov														4.7						4.7
dstk													0.0							0.0
total	145.5	22.7	174.9	22.9	51.7	40.0	93.6	18.3	28.4	7.7	3.5	1.0	0.5	12.8	4.7	7.4	16.0	4.7	0.0	

Suggested references

- Lofgren, Hans and Carolina Diaz-Bonilla. 2009. "MAMS: An economy-wide model for the analysis of MDG country strategies – An application to Latin America and the Caribbean". In: Vos, Rob, Enrique Ganuza, Hans Lofgren, Marco V. Sanchez and Carolina Diaz-Bonilla (eds) *Public Policies for Human Development. Feasible Financing Strategies for Achieving the MDGs in Latin America and the Caribbean*, New York and Washington, D.C.: UNDP, UN/DESA, World Bank, and UN-ECLAC (forthcoming).
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