

**WORKING PAPER No 3**

**ENGLISH ONLY**

**STATISTICAL COMMISSION and  
ECONOMIC COMMISSION FOR  
EUROPE**

**CONFERENCE OF EUROPEAN  
STATISTICIANS**

**Joint UNECE/EUROSTAT/FAO/OECD  
Meeting on Food and Agricultural Statistics  
in Europe**  
(Geneva, 2-4 July 2003)

**STATISTICAL OFFICE OF THE  
EUROPEAN COMMUNITIES  
(EUROSTAT)**

**FOOD AND AGRICULTURAL  
ORGANISATION (FAO)**

**ORGANISATION FOR ECONOMIC  
CO-OPERATION AND DEVELOPMENT  
(OECD)**

**MACRO ANALYSIS OF AGRICULTURAL POLICIES**  
**METHODOLOGICAL ASPECTS RELATED**  
**TO AN APPLIED GENERAL EQUILIBRIUM MODEL\***

Supporting paper submitted by Italy

---

\* Prepared by Mr. Riccardo Magnani, Mr. Federico Perali, Mr. Paolo Polinori and Ms. Cristina Salvioni, Italy.

\*\* Paper posted on Internet as submitted by the country.

## 1. Demand for policy, Economic Models and Data The Macro–Micro/Micro-Macro Link

- **Demand for Economic Models**
  - Policy Makers (Macro Level)
- **Demand for Data**
  - Center for Policy Analysis (Micro and Macro Level)
- **Demand for Policy**
  - Agricultural Sector (Macro Level)
  - Farm-households (Micro Level)

## 2. Demand for Economic Models

The center for policy analysis supplies economic models to the policy makers

- **Macro Level Models**
  - Applied General Equilibrium Models
  - Social Welfare Analysis
  - I/O and SAMs
  - Multimarket models, Partial Equilibrium Models
- **Micro Level Models**
  - Farm-Household models
  - Individual Welfare Analysis
  - Single Farm/Firm activity analysis

## 3. Demand for Data

The supply of information from the Ag Sector to the policy maker through the Policy Center

- The center for policy analysis organizes the raw information, by building sector level time series (TS) and household level cross section (CS) data bases.
- The micro info allows the researcher to evaluate the welfare impact of policies on poverty and inequality for a) the whole economy, b) policy relevant groups of farmers or individuals.
- Both TS and CS data are needed to estimate parameters to be used in AGE models

## 4. Data and Models

- **TS – Sector level (MACRO)**
  - to implement Partial Equilibrium and Multi-Market models
- **CS – Farm-Household level (MICRO)**
  - to construct I/O-SAM and microsimulation models
- ❖ **The ISMEA approach embraces 5 survey type in one**
  - (a) Farm budget data
  - (b) Input/Output
  - (c) Time Use Budget
  - (d) Household Consumption Survey
  - (e) Household Income Survey

## 5. From Data to AGE Models

- The 1995 ISMEA Input/Output Table used to construct the activities and commodities account of the AGE model.
- The 1995 ISMEA Socio Economic Survey, the 1995 Bdi Socio Economic Survey, the 1995 ISTAT Consumption Survey, the 1995 Eurisko Leisure Survey used to construct the SAM (rural/urban).

## 6. The I/O table of the AGE

- The agricultural sector embraces all the COM (11 sectors)
- The Agro-industry includes meat, milk, cereals, vegetables, vegetable and novegetable oil, beverages, fodder industry, other agro-ind.
- Industry includes sectors relevant for the agricultural and the agro-ind.

## 7.I/O Sectors

SETTORI		
Aggregati		Originali ISMEA
1	CEREALI	Frumento tenero
		Frumento duro
		Riso
		Mais e altri cereali
		Foraggi
2	ORTAGGI	Patate
		Pomodori
		Altri ortaggi e legumi
3	COLTIVAZIONI INDUSTRIALI	Barbabietola da zucchero
		Soia
		Altre coltivazioni industriali
		Tabacchi greggi
4	VITE	Uva
5	OLIVO	Olive
6	FRUTTA	Agrumi
		Frutta fresca e secca
7	FLORICOLE	Floricole e altri prodotti delle coltivazioni
8	LATTE BOVINO	Latte bovino
9	CARNE BOVINA	Carne bovina
10	ALTRI ALLEVAMENTI	Silvicoltura
		Ovicapri
		Suini
		Pollame
		Conigli, selvaggina e altri prodotti zootecnici
11	PESCA	Pesca
		Prodotti Ittici
12	CARNI FRESCHE	Carni fresche e conservate
13	LATTE E PRODOTTI DEL LATTE	Latte e prodotti del latte
14	PANE PASTA TRASF. CEREALI	Pilatura e molitura di cereali
		Prodotti della panificazione e dolciumi
		Prodotti della pastificazione
15	ORTO-FRUTTA	Conservazione e trasformazione di frutta e ortaggi
16	OLI E GRASSI	Olio di oliva
		Oli di semi e grassi
17	MANGIMISTICA	Mangimi
18	ALTRE INDUSTRIE ALIMENTARI	Tabacchi
		Lavorazione delle barbabietole
19	BEVANDE	Vino
		Altri prodotti alimentari
20	COMBUSTIBILI E LUBRIFICANTI	
21	ENERGIA ELETTRICA	
22	ACQUA	
23	CONCIMI	
24	PESTICIDI	
25	ALTRI PROD. CHIM. E FARMAC.	
26	ALTRE INDUSTRIE	Macchine agricole e industriali
		Costruzioni e opere pubbliche
		Manutenzione e Ricambi
		Altre produzioni industriali
27	TRASP. - COMUNIC. - CRED. - ASSIC.	Trasporti e comunicazioni
		Credito e Assicurazioni
28	ALTRI SERVIZI	Altri Servizi

## 8. The Structure of the SAM

- Institutions include households, firms and government.

The importance of the model is the particular disaggregation of the rural hh in different socio-economic groups.

(Limited resources, Retirement, residential, professional lower sales, professional higher sales, large family farms, very large family farms, rural family)

## 9. Leisure time

- The time use budget is a relevant aspect of this model. Data come from the (a)ISMEA Survey and (b)Eurisco Survey for the urban family

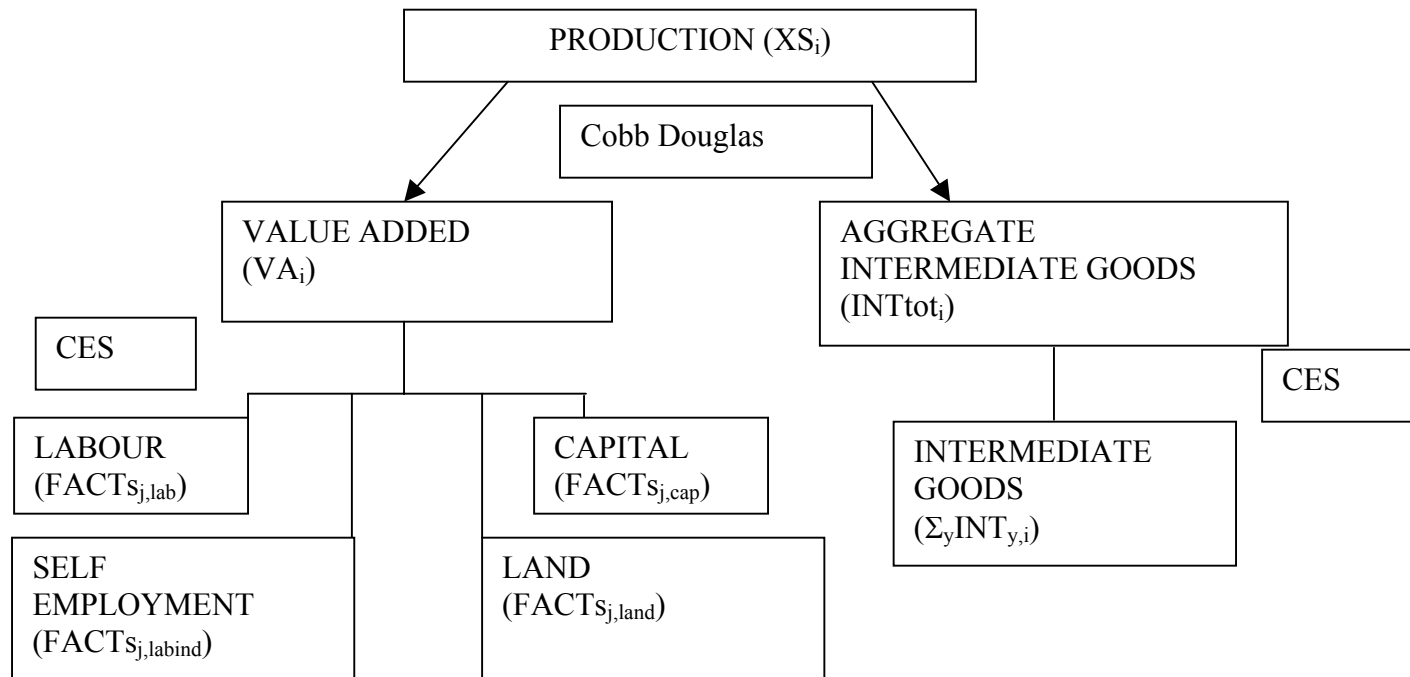
(a)  $\text{leisure} = h\_svas + h\_svaa + h\_cuio + h\_ripo$

(b)  $\text{leisure} = \text{cure} + \text{fsfc}$

agricultural households							RURAL HH	URBAN HH		
1	2	3	4	5	6	7	8	9	10	11
Limited resources	retirement	Residential	Commercial low income	Commercial high income	High sales	Very High sales	Rurali	High income	Medium income	Low income
0.513	0.543	0.463	0.532	0.518	0.512	0.500	0.542	0.723	0.669	0.639

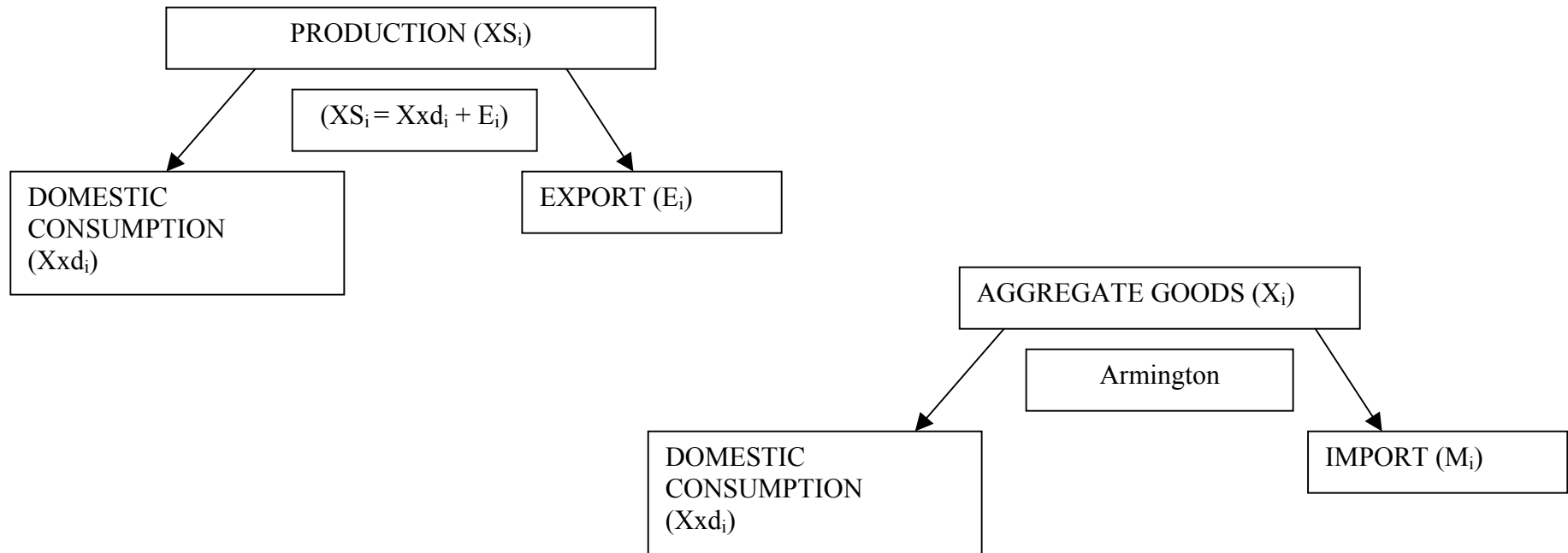
# 10 The AGE model (I)

## ■ Production



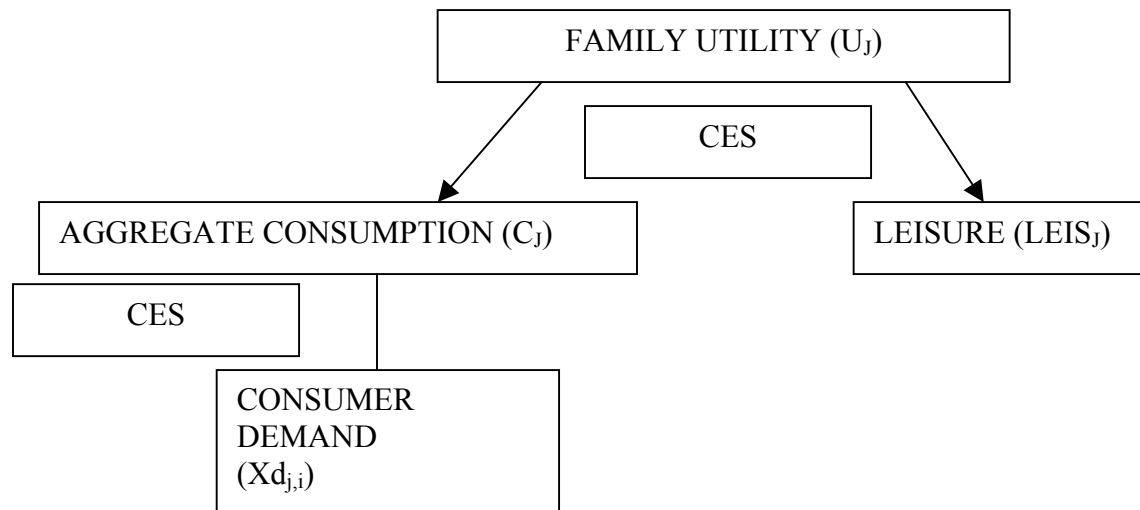
# 11 The AGE model (II)

## ■ Import/Export



# 92 The AGE model (III)

## ■ Consumption



# 103 The AGE model (IV)

## Equilibrium conditions

*Goods market:* 
$$X_i = \sum_j INT_{ij} + \sum_j Xd_{j,i} + Ggov_i + INV_i$$

*Labour market* 
$$\sum_i FACTd_{i,lab} = \sum_j FACTs_{j,lab}$$

*Self-employment market:* 
$$\sum_i FACTd_{i,labind} = \sum_j FACTs_{j,labind}$$

*Capital market:* 
$$\sum_i FACTd_{i,cap} = \sum_j FACTs_{j,cap} + capROW$$

*Landed market* 
$$\sum_i FACTd_{i,land} = \sum_j FACTs_{j,land}$$

# 114. A simulation example (I)

- To standardize the Agricultural value- added tax rate (5, 7, 10)

*Input prices impact*

Inputs	5%	7%	10%
$FACT_{s_j,lab}$	1.000	1.000	1.000
$FACT_{s_j,labind}$	0.950	0.931	0.902
$FACT_{s_j,cap}$	1.001	1.001	1.001
$FACT_{s_j,land}$	0.952	0.933	0.905

# 125. A simulation example (II)

## *Impact on family disposable income*

Family	5%	7%	10%
Limited resources	0.994	0.991	0.987
retirement	0.994	0.992	0.988
residential	0.994	0.992	0.988
Small family farm	0.996	0.994	0.992
Medium family farm	0.992	0.988	0.983
Large family farm	0.994	0.992	0.989
Very large f f	0.995	0.993	0.990
Rural	1.001	1.000	1.000
Urban low income	1.001	1.001	1.000
Urban medium income	1.001	1.001	1.000
Urban hig income	1.001	1.000	1.000

# 137. A simulation example (III)

## *Impact on leisure*

Family	5 %	7 %	10 %
Limited resources	0.995	0.993	0.990
retirement	0.995	0.993	0.990
residential	0.995	0.992	0.989
Small family farm	0.997	0.995	0.994
Medium family farm	0.992	0.990	0.985
Large family farm	0.995	0.993	0.991
Very large f f	0.996	0.994	0.992
Rural	1.001	1.001	1.002
Urban low income	1.001	1.002	1.002
Urban medium income	1.001	1.002	1.002
Urban high income	1.001	1.002	1.002

## 17. Conclusion

- (1) The Micro-Macro link can be successfully built if the developers of the micro and macro models work closely in the phases of model design within the same institution so that the micro-macro correspondence can be effectively incorporated.
- (2) For a sound micro-macro link to be established macro models should be micro-founded and micro models should be macro related using exact aggregation theory.

-----