



UNITED NATIONS

الاسواق

ESCWA

WELCOME

Session 12

Introduction of the government in the model: Definition
of government equations

Model AUTETA

A CLOSED ECONOMY WITH GOVERNMENT



Hypotheses

Model

- Closed Economy
- Government

Branches/Products

- Agriculture
- Manufacturing
- Services
- Public Administration

Factors of Production

- Labor (mobile between branches)
- Capital (fixed by branch)

Categories of Households

- Salary Households
- Household Capitalists

Sets

Industries and commodities

- $i, j \in I = \{AGR, MAN, SER, PUB\}$
(AGR=agriculture, MAN: manufacturing, SER: services, PUB: public administrations)

Sub-set of commodities and industries
(excluding public administrations)

$tr \in TR \subset I = \{AGR, MAN, SER\}$

(AGR: agriculture, MAN: manufacturing, SER: service)

- Sub-set of tradable industries and commodities, excluding services:

$bns \in BNS \subset TR = \{AGR, MAN\}$

Households

$h \in H = \{SAL, CAP\}$

(SAL: salaried, CAP: capitalists)

Equations

Production (1)

$$1. VA_j = v_j \cdot XS_j$$

$$2. CI_j = io_j \cdot XS_j$$

$$3. VA_{tr} = A_{tr} \cdot LD_{tr}^{\alpha_{tr}} \cdot KD_{tr}^{1-\alpha_{tr}}$$

$$4. LD_{tr} = \frac{\alpha_{tr} \cdot PVA_{tr} \cdot VA_{tr}}{W}$$

Production (2)

$$5. \quad KD_{tr} = \frac{(1 - \alpha_{tr}) \cdot PVA_{tr} \cdot VA_{tr}}{R_{tr}}$$

$$6. \quad LD_{PUB'} = VA_{PUB'}$$

$$7. \quad DI_{tr,j} = a_{ij_{tr,j}} \cdot CI_j$$

Revenue & Savings (1)

$$8. YH_{I_{SAL}} = W \cdot \sum_j LD_j + TG$$

$$9. YH_{I_{CAP}} = \lambda \cdot \sum_{tr} R_{tr} \cdot KD_{tr} + DIV$$

$$10. YDH_h = YH_h - DTH_h$$

$$11. SH_h = \psi_h \cdot YDH_h$$

$$12. CTH_h = YDH_h - SH_h$$

$$13. YF = (1-\lambda) \cdot \sum_{tr} R_{tr} \cdot DS_{tr}$$

Revenue & Savings (2)

$$14. SF = YF - DIV - DTF$$

$$15. YG = \sum_{tr} TI_{tr} + \sum_h DTH_h + DTF$$

$$16. TI_{tr} = tx_{tr} \cdot P_{tr} \cdot XS_{tr}$$

$$17. DTH_h = tyh_h \cdot YH_h$$

$$18. DTF = tyf \cdot YF$$

$$19. SG = YG - G - TG$$

Demand

$$20. C_{tr,h} = \frac{\gamma_{tr,h} CTH_h}{PD_{tr}}$$

$$21. INV_{tr} = \frac{\mu_{tr} IT}{PD_{tr}}$$

$$22. DIT_{tr} = \sum_j DI_{tr,j}$$

Price

$$23. PVA_{i,PUBI} + W$$

$$24. PCI_j = \frac{\sum_{tr} PD_{tr} DI_{tr,j}}{CI_j}$$

$$25. P_j = \frac{PVA_j \cdot VA_j + PCI_j \cdot CI_j}{XS_j}$$

$$26. PD_{tr} = (1 + tx_{tr})P_{tr}$$

Equilibrium

$$27. XS_{bns} = \sum_h C_{h,bns} + DIT_{bns} + INV_{bns}$$

$$28. XS_{PUB'} = \frac{G}{P_{PUB'}}$$

$$29. LS = \sum_j LD_j$$

$$30. KS_{tr} = KD_{tr}$$

$$31. IT = \sum_h SH_h + SF + SG$$

Verification of the Walras Law

$$32. \text{LEON} = XS_{iSER'} - \sum_h C_{h,iSER'} - DIT_{iSER'} - INV_{iSER'}$$

Variables

Variables in volume (quantity) (1)

$C_{tr,h}$: Consumption of household h in product tr

CI_j : Total intermediary consumption of branch j

$DI_{tr,j}$: Intermediary consumption in product tr by branch j

DIT_{tr} : Total intermediary demand for product tr

INV_{tr} : Final demand for product tr for finale investments

KD_{tr} : Capital demand of branch j

Variables in volume (quantity) (2)

KS_{tr} : Capital Supply in branch tr

LD_j : Labor demand of branch j

LS: Total supply of labor

VA_j : Added Value of branch j

XS_j : Production of branch j

Price

P_i : Price of product I (before taxes)

PCI_j : Intermediary consumption price index of branch j

PD_{tr} : Price of product tr (including taxes)

PVA_j : Price of added value of branch j

R_{tr} : Rate of return on capital of branch tr

W: Salary rate

Nominal Variables in value (1)

CTH_h : Household h consumption budget

DIV : Dividends

DTF: Revenue from direct enterprise income taxes

DTH_h : Revenue from direct taxes on household h income

G : Current public expenditure

IT : Total investments

SF : Enterprise savings

Nominal Variables in value (2)

SG: Government Savings

SH_h : Household h savings

TG: Government transfers to employed households

TI_{tr} : Revenue from indirect taxes on product tr

YDH_h : Disposable household h income

YF: Business income

YG: Government income

YH_h : Household h income

Other variables

LEON: Excess supply in the service market

Exogenous Variables (Closures)

DIV : Dividends

G: Current public expenditures

KS_{tr} : Capital supply in branch tr

LD : Total Labor (volume) supply

P_{agr} : Price of product agr – cash of the model

TG : Government transfers to employed households

Parameters (1)

A_{tr} : Scale Parameter (Cobb-Douglas – production function)

$a_{ij_{tr,j}}$: Coefficient (Leontief – intermediary consumption)

α_{tr} : Elasticity (Cobb-Douglas – production function)

$\gamma_{tr,h}$: Share of product tr in household h consumption budget

i_{oj} : Coefficient (Leontief – total intermediary consumption)

λ : Share of capital income from capitalist households

Parameter (2)

μ_{tr} : Share of product tr in total investments

ψ_h : Average propensity of household h to save

tx_{tr} : Indirect tax rate on product tr

tyf : Direct tax rate on business income

tyh_h : Direct tax rate on household h income

v_j : Coefficient (Leontief – added value)

Social Accounting Matrix for AUTETA

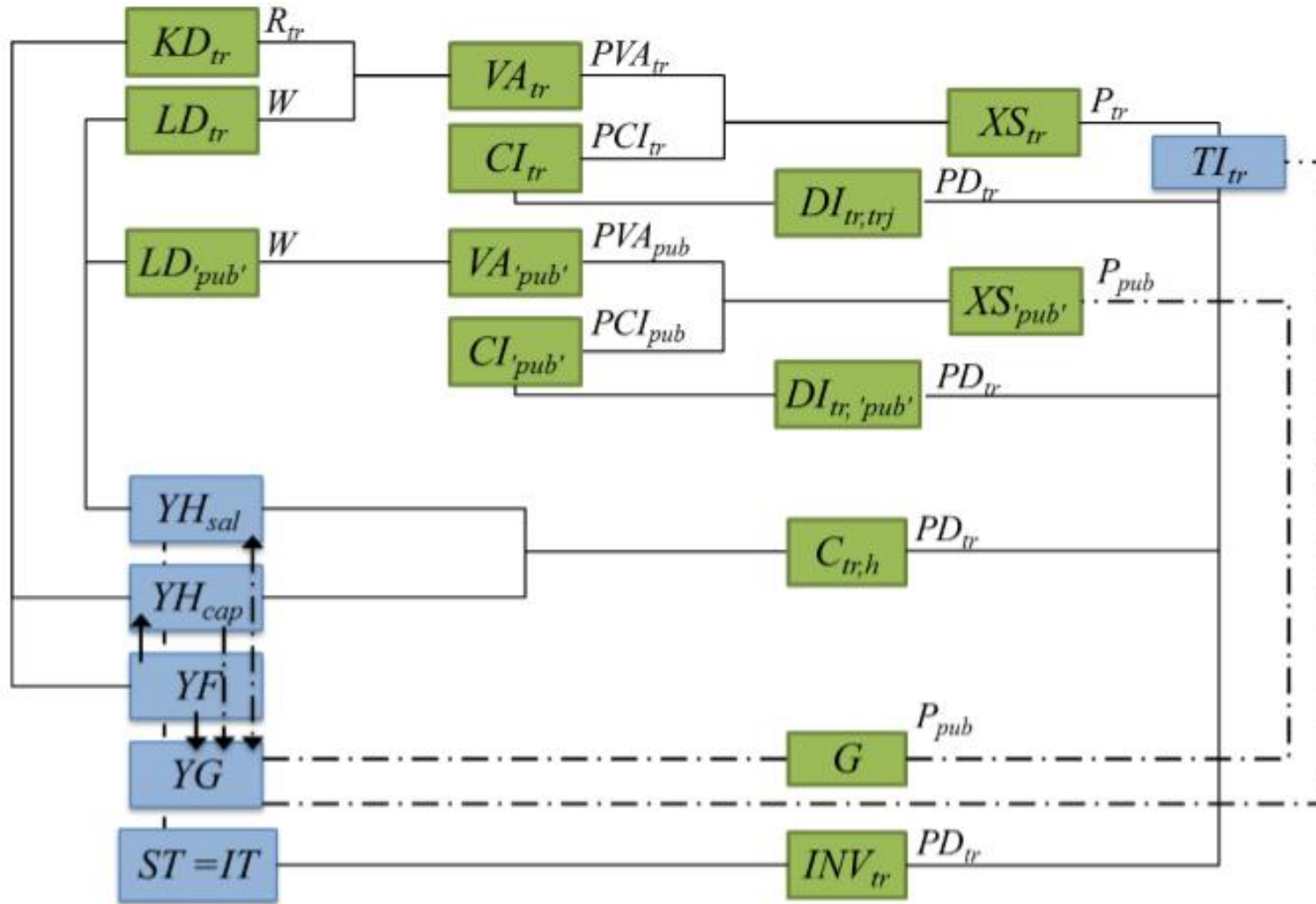
	FACTEURS		AGENTS				BRANCHES D'ACTIVITÉ				PRODUITS				ACC.	TOTAL
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	(1 à 15)
1. Main-d'œuvre							300	100	200	150						750
2. Capital							100	150	100							350
3. Ménages salariés	750					50										800
4. Ménages capitalistes		210			70											280
5. Entreprises		140														140
6. Gouvernement			40	28	7						10	25	15			125
7. Agriculture											500					500
8. Manufactures												625				625
9. Services													600			600
10. Administrations publiques														200		200
11. Agriculture			162	21			50	150	90	10					27	510
12. Manufactures			108	84			20	150	90	25					173	650
13. Services			270	105			30	75	120	15						615
14. Administrations publiques						200										200
15. Accumulation			220	42	63	-125										200
Total (1 à 15)	750	350	800	280	140	125	500	625	600	200	510	650	615	200	200	

Link between SAM & the Model

	FACTEURS		AGENTS			BRANCHES D'ACTIVITÉ				PRODUITS			ACC.	TOTAL
	1.	2.	3.	4.	5.	7.	8.	9.	10.	11.	12.	13.		(1 à 15)
1. Main-d'œuvre	$W \times \sum_j LD_j$				$W \times LD_j$	300	100	200	150				$W \times \sum_j LD_j$	750
2. Capital			$\lambda \sum_{tr} R_{tr} KD_{tr}$			100	150	100		$R_{tr} \times KD_{tr}$			$\sum_{tr} R_{tr} \times KD_{tr}$	350
3. Ménages salariés	750				50									800
4. Ménages capitalistes		210		DIV	70					TG				280
5. Entreprises		140									TI_{tr}		YF	140
6. Gouvernement			40	28	7								YG	125
7. Agriculture	$(1-\lambda) \sum_{tr} R_{tr} KD_{tr}$													500
8. Manufactures				DTH_k										625
9. Services														600
10. Administrations publiques		$PD_{tr} \times C_{tr,h}$												200
11. Agriculture														510
12. Manufactures	$W \times \sum_j LD_j$		162	21		50	150	90	10				$PD_{tr} \times INV_{tr}$	650
13. Services			108	84		20	150	90	25					615
14. Administrations publiques			270	105		30	75	120	15					200
15. Accumulation														200
Total (1 à 15)	750	350	800	280	140	500	625	600	200	510	650	615	200	200

YH_k (Total of column 3)
 YF (Total of column 5)
 YG (Total of column 6)
 IT (Total of column 14)

Schematic Representation



A dark, blurry night scene of a city street. The background is filled with out-of-focus lights from street lamps and buildings, creating a bokeh effect. In the lower-left quadrant, the words "THANK YOU" are written in a clean, white, sans-serif font. The overall mood is quiet and reflective.

THANK
YOU