TRADE ANALYSIS IMPACT TRAINING

Social Accounting Matrix and global databases

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Introduction (1)

- Economic policies undertaken in a particular sector can affect all the other sectors through its effects on output, input demand, employment and income generation.

- Conversely, changes in other sectors may affect production, employment and income distribution in that particular sector

The analysis of this type of interaction among sectors and institutions requires economy wide frameworks.

Introduction (2)

The basis of such analysis must be consistent and complete data set on all transactions among sectors and institutions:

- Consistent: for every income there should be a corresponding outlay or expenditure

- Complete: Both the receiver and the sender of any transaction must be identified

The SAM is an efficient framework to organize economic data in such a way

The input-output (1)

- The input-output table is the most important source to build a SAM. It presents in a synthetic way the production and exploitation accounts (obtained from national accounting) and realizes the equilibrium between total resources and total demand of goods and services.

- It’s reduced to a table with a double entries which can be read in rows or in columns.

- To simplify the exposition of the model, commodities and activities have been aggregated

The input-output model (2)

		Sectors (j) 1 ……n			Final demand	Total demand
Sectors (i)	1	P_1X_{11}	…….	P_1X_{1n}	P_1F_1	P_1X_1
	⋮	⋮		⋮	⋮	⋮
	n	P_nX_{n1}	…….	P_nX_{nn}	P_nF_n	P_nX_n
Value added Labor (k)	1	w_1L_{11}		w_1L_{1n}		
	⋮	⋮		⋮		
	s	w_sL_{s1}		w_sL_{sn}		
Other		Π_1		Π_n		
Taxes		T1		Tn		
Total supply		P_1X_1		P_nX_n		

The input-output table (3)

- The input-output tables are often used for assessing the impact of a change in the final demand of a given sector on all sectors of the economy. The technique used is attributed to Vassily Leontief and is known as the Leontief model.

- The basic idea of the model is that the amount of sector i's output required for the production of sector j's output X_{ij} is assumed to be proportional to sector j's output Xj.

- If a_{ij} is such input-output coefficient, then:

(1) $X_{ij} = a_{ij}.Xj, \quad i,j = 1.....,n$

The equilibrium between total supply and total demand for each sector is written:

(2) $$X_i = \sum_{j=1}^{n} X_{ij} + F_i$$

Substituting (1) into equation (2) yields:

(3) $$X_i = \sum_{j=1}^{n} a_{ij}.X_j + F_i, \quad i = 1....., n.$$

The input-output model (4)

This relationship between final demand and production also holds in changes:

(4) $$\Delta Xi = \sum_{j=1}^{n} aij.\Delta Xj + \Delta Fi$$

- If the final demand in a given sector *i* increases by ΔF_i , initially production increases by the same amount $\Delta X_i^1 = \Delta F_i$.

- This increase in production raises the intermediate demand for all sectors, including *i* itself, by $\Delta X_j^2 = \Sigma a_{ji} \Delta X_i^1$.

- To produce these intermediate inputs, however, more intermediate inputs are needed and there is a third round of effects $\Delta X_j^3 = \Sigma a_{ji} \Delta X_i^2$

- This leads to more and more effects and several rounds occur and the increase of output becomes smaller and smaller such that their total always has a limit. To calculate this limit, we use the matrix form:

The input-output model (5)

$X = AX + F$ $(I-A)X = F$ $X= (I-A)^{-1}F$ and

$\Delta X = (I - A)^{-1} \Delta F$

- $(I - A)^{-1}$ is a multiplier which can be used to calculate overall changes in sectoral outputs which result from changes in final demand.

- Once the change in X is known, changes in primary-input requirements can be similarly calculated:

  Assuming that the amount of labor category k needed for the production of one unit of product j, b_{kj}, is constant, the total amount of labor k required is $L = BX$

L is the vector of labor requirements, L_k, $k = 1,\ldots s$ and B is the matrix of b_{kj}'s

The input-output model (6)

Interpretation of the Leontief model

- The crucial assumption is that sectoral production is completely demand driven which means:
  - The production capacity is not fully used and that it can meet any increase in the demand
  - The increase in the demand will not increase the output price

- Because of these strong assumptions, input-output models are more useful as guidelines to potential induced linkage effects in a growing economy, than as predictive models.

- The underlying production function assumes constant returns to scale and no substitution among the different inputs.

Intermediate inputs can be disaggregated into domestic and imported goods. The multipliers can thus represent more closely the multiplier effect on the domestic economy

The social accounting matrix (1)

- A SAM is a square matrix in which each transactor or account has its own row and column. The payments (expenditures) are listed in columns and the receipts in rows.

- As the input-output table represents only the transactions between the activities accounts, it gives only a partial representation of the whole economic circuit and don't take into account the transfers which occur between all the economic agents.

- A SAM may be viewed as an I/O table that has been extended to cover the full circular flow of incomes, linking gross domestic product (GDP) on the supply side, represented by incomes accruing to factors and the government (indirect taxes net of subsidies), to GDP on the demand side, defined as the sum of domestic and foreign final demand for a nation's outputs net of imports.

- A SAM contains six accounts: the activities, commodities, and factors (labor and capital) accounts, institutions accounts which are generally divided into households, firms and government, the capital account and the rest of the world account.

The social accounting matrix (2)

The construction of a SAM leads to three positive outcomes:

- A SAM displays information in a manner that exhibits the structure of an economy in an illuminating way.
- By exposing inconsistencies between data from different sources, it contributes to improvements in data.
- A SAM provides all or at least a major part of the data needed for different types of other models, most importantly SAM multiplier models and computable general equilibrium (CGE) models.

Structure of a SAM

		EXPENDITURES								
		1 Activities	2 Commodities	3 Factors		4 Institutions			5 Capital account	6 Rest of world	7 Total
				Labor	*Capital*	*Households*	*Firms*	*Government*			
INCOMES	1 Activities		Domestic sales					Export subsidies			Production
	2 Commodities	Intermediate demand				Household Consumption		Government consumption	Investment		Domestic demand
	3 Factors										
	Labor	Wages								Factor incomes from abroad	Gross national product at factor cost
	Capital	Rent									
	4 Institutions										
	Households			Labor income	Distributed Profits	Intrahousehold Transfers	Transfers	Transfers		Transfers from Abroad	Households income
	Firms				Nondistributed Profits	Transfers		Transfers			Firms income
	Government	Value-added taxes	Tariffs Indirect taxes	Taxes Social Sec.	Taxes on profits	Direct Taxes	Taxes				Government income
	5 Capital account					Household savings	Savings	Government savings		Capital transfers	
	6 Rest of World		Imports	Factor payments			Current transfers abroad				Imports
	7 Total	Production	Domestic supply	Factor outlay		Household expenditures	Firms expenditures	Government expenditures	Total investment	Foreign exchange earnings	

The social accounting matrix (4)

- There is not a unique way of disaggregating and organizing data in a SAM. The number of accounts in each category depends on the objective of the study:

  - We can disaggregate the household accounts into different socioeconomic classes if the study is focused on distribution effects.
  - If agriculture is of interest, it has to be broken down into several activities

- SAMs also vary in the way transactions are recorded:

  Remittances can be introduced as receipts for the labor factor account or as transfer for households from the rest of the world.

- The most common use of SAMs is at the national level. However, they have also been built for regional economies and for villages. For example, the SAM 2012 for Tunisia (focused on agricultural and food trade).FinalRegional SAM-August15 (3).xlsx

The social accounting matrix (5)

The construction of a SAM (1)

- The construction of a SAM needs the use of many statistical sources: The main one is the input-output table which allows the representation of the majority of information regarding the activities account. The account of the institutional transfers, the trade statistics, the households budget and consumption survey, the employment surveys, the special surveys characterizing the agricultural farms as well as firms in the rest of the economy etc..

- In general, in published form, these data are not consistent with equilibrium conditions: for example, payments to labor from firms will not equal labor income received by households.

- A number of adjustments are required to ensure that equilibrium conditions hold (RAS method or entropy approach).

Thank you for your attention…