Input-Output Analysis

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Session 1.4

Alternative Structure of Input-Output Tables

Industry vs. commodity

- A firm may have a range of products. Categorization to which industry a firm belongs is conducted by its primary product.
- But there is secondary product.
- How to account for that? Need to distinguish
  - Industry account: compile and assign data to industry, where industry is cluster of establishments as classified by SIC codes according to primary products
  - Commodity account: compile data in terms of products, whether is a primary or secondary goods or service
- The concept of make and use matrices

The make matrix

- Make matrix shows the value of each commodity produced by each industry
- Consider 2-sector economy (industries A and B), producing 2 commodities.
- The make matrix is the following

	Commodities		Total output (industry)
	A	B	
Industry A	90	0	90
Industry B	10	100	110
Total production (commodity)	100	100	

- The main diagonal elements are the primary products of the industry (which defines the industry in the first place)

The use matrix (or, absorption matrix)

- Make matrix is not complete – we need use (or absorption) matrix
- We also need inputs to produce a particular commodity (also later we will need the primary inputs)
- It is also the commodity that would be distributed to the final user (so later we will need the final demand structure)

	Industries	
	A	B
Commodity A	10	10
Commodity B	10	7

Commodity and industry accounts together

	Commodities		Industries		Final Demand	Total Output
	A	B	A	B		
Commodity A			10	10	80	100
Commodity B			10	7	83	100
Industry A	90	0				90
Industry B	10	100				100
Value Added			70	93	163	
Total Inputs	100	100	90	110		200

U E Q V X W Q' X'

Use matrix

Make matrix

Definition of matrices

$V = [v_{ij}] =$ is the make matrix (dimension: n x m)
v_{ij} is the amount of commodity j produced by industry i.

$U = [u_{ij}] =$ is the use matrix (dimension: m x n)
v_{ij} is the amount of commodity i used by industry j.

$E = [E_i] =$ is the vector of final demand (dimension: m x 1)
$Q = [Q_i] =$ is the vector commodity gross output (dimension: m x 1)
$W = [W_j] =$ is the vector of industry value added input (dimension: 1 x n)
$X = [X_j] =$ is the vector of industry total output (dimension: n x 1)

In the above example:

$$\mathbf{U} = \begin{bmatrix} 10 & 10 \\ 20 & 7 \end{bmatrix} \quad \mathbf{V} = \begin{bmatrix} 90 & 0 \\ 10 & 100 \end{bmatrix} \quad \mathbf{E} = \begin{bmatrix} 80 \\ 83 \end{bmatrix}$$

$$\mathbf{Q} = \begin{bmatrix} 100 \\ 100 \end{bmatrix} \quad \mathbf{X} = \begin{bmatrix} 90 \\ 100 \end{bmatrix} \quad \mathbf{W} = \begin{bmatrix} 70 & 93 \end{bmatrix}$$

Example

- Singapore 2000 Input-Output uses the Make and Use matrix structure
- Let's look at the publication