





# *STAGE\_t: Violating LOOP?*

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# *CET Functions in CGE Models*

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- TWO apparent prices in commodity rows
  - **PQD and PWE** (*purchaser prices*)
    - NB: even if  $QE$  and  $QD/QDS$  are homogenous the tax rates ( $t_s$  and  $t_e$ ) can/do differ.
- In model: activities produce **two** differentiated commodities, which are supplied to different markets
- Hence LOOP is apparently not violated – see a fuller SAM representation
- Domestic demand
  - **PQD and PQCD**
    - NB: even if  $QCD$  and, say,  $QINTD$  are homogenous the tax rates ( $t_s$  and  $t_v$ ) can/do differ.

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[illegible]

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***BUT...CET and LOOP***

***There can only be one price in every row,  
AND the prices for each and every row are  
uniquely determined***

- Actually only one price in each row – **PQD and PWE**
- But **PE and PD** are not uniquely determined
  - only one column for each **activity**
  - profitable arbitrage if QE and QD are homogenous
- CET for row aggregation always violates LOOP
  - A trade off LOOP vv ‘realism’
  - Some models do not use CET for exports – homogenous
    - BUT tax rates can/do differ

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***Differential Commodity Taxes by  
Agent***

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**BUT...VAT and LOOP**

*There can only be one price in every row,  
AND the prices for each and every row are  
uniquely determined*

- Only one price in each row – **PQD and PQCD** {=  
 **$PQD \cdot (1 + tv)$** }
- But assume the composite commodity consumed by households and non-households is homogenous
  - The cost functions are identical
- Assumes profitable arbitrage is excluded/prohibited
- LOOP is not violated if
  - Arbitrage is prohibited
  - Composite commodities consumed by households and non-households are homogenous

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**IOT and SAMs**

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## Input Output Tables and SAMs

- IOT are valued at basic prices
- In IOT taxes are usually identified only by agent
- Disentangling the taxes is important
- 'Standard' IOT cannot provide the information required in adequately specified CGE models

**Using a standard IOT as the basis for commodity demand in a SAM for a CGE model is INADEQUATE and INCORRECT**

## The price system is usually underdefined

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## A SAM for a Simple Closed Economy

|                    |         | Com'ties |        | Act'ties |        | Factors |         | H'hold | Govt | Invest | Total |
|--------------------|---------|----------|--------|----------|--------|---------|---------|--------|------|--------|-------|
|                    |         | c_agric  | c_mnfc | a_agric  | a_mnfc | Labour  | Capital |        |      |        |       |
| <b>Commodities</b> | c_agric |          |        | 30       | 50     |         |         | 120    | 20   | 15     | 235   |
|                    | c_mnfc  |          |        | 50       | 100    |         |         | 150    | 60   | 40     | 400   |
| <b>Activities</b>  | a_agric | 215      |        |          |        |         |         |        |      |        | 215   |
|                    | a_mnfc  |          | 375    |          |        |         |         |        |      |        | 375   |
| <b>Factors</b>     | Labour  |          |        | 60       | 140    |         |         |        |      |        | 200   |
|                    | Capital |          |        | 65       | 75     |         |         |        |      |        | 140   |
| <b>Household</b>   |         |          |        |          |        | 200     | 140     |        |      |        | 340   |
| <b>Government</b>  |         | 20       | 25     | 10       | 10     |         |         | 30     |      |        | 95    |
| <b>Saving</b>      |         |          |        |          |        |         |         | 40     | 15   |        | 55    |
| <b>Total</b>       |         | 235      | 400    | 215      | 375    | 200     | 140     | 340    | 95   | 55     |       |

Prices built up from information in the columns, e.g., PQD

**Define: Purchaser prices = Basic Prices \* (1+GST)**

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### *'Standard' Input-Output in a SAM*

|             |         | Com'ties |        | Act'ies |        | Factors |         | H'hold | Govt | Invest | Total |
|-------------|---------|----------|--------|---------|--------|---------|---------|--------|------|--------|-------|
|             |         | c_agric  | c_mnfc | a_agric | a_mnfc | Labour  | Capital |        |      |        |       |
| Commodities | c_agric |          |        | 27.4    | 45.7   |         |         | 109.8  | 18.3 | 13.7   | 215.0 |
|             | c_mnfc  |          |        | 46.9    | 93.8   |         |         | 140.6  | 56.3 | 37.5   | 375.0 |
| Activities  | a_agric | 215.0    |        |         |        |         |         |        |      |        | 215.0 |
|             | a_mnfc  |          | 375.0  |         |        |         |         |        |      |        | 375.0 |
| Factors     | Labour  |          |        | 60      | 140    |         |         |        |      |        | 200.0 |
|             | Capital |          |        | 65      | 75     |         |         |        |      |        | 140.0 |
| Household   |         |          |        |         |        | 200     | 140     |        |      |        | 340.0 |
| Government  |         |          |        | 15.7    | 20.5   | 0.0     | 0.0     | 49.6   | 5.5  | 3.8    | 95.0  |
| Saving      |         |          |        |         |        |         |         | 40     | 15   |        | 55.0  |
| Total       |         | 215.0    | 375.0  | 215.0   | 375.0  | 200.0   | 140.0   | 340.0  | 95.0 | 55.0   |       |

**Tax revenues cannot be associated with individual commodities**

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### *Input Output in a SAM for CGE*

|             |         | Com'ties |        | Act'ies |        | Factors |         | H'hold | Govt  | Invest | Total |
|-------------|---------|----------|--------|---------|--------|---------|---------|--------|-------|--------|-------|
|             |         | c_agric  | c_mnfc | a_agric | a_mnfc | Labour  | Capital |        |       |        |       |
| Commodities | c_agric |          |        | 27.4    | 45.7   | 0.0     | 0.0     | 109.8  | 18.3  | 13.7   | 215.0 |
|             | c_mnfc  |          |        | 46.9    | 93.8   | 0.0     | 0.0     | 140.6  | 56.3  | 37.5   | 375.0 |
| Activities  | a_agric | 215.0    |        | 0.0     | 0.0    | 0.0     | 0.0     | 0.0    | 0.0   | 0.0    | 215.0 |
|             | a_mnfc  |          | 375.0  | 0.0     | 0.0    | 0.0     | 0.0     | 0.0    | 0.0   | 0.0    | 375.0 |
| Factors     | Labour  |          |        | 60.0    | 140.0  | 0.0     | 0.0     | 0.0    | 0.0   | 0.0    | 200.0 |
|             | Capital |          |        | 65.0    | 75.0   | 0.0     | 0.0     | 0.0    | 0.0   | 0.0    | 140.0 |
| Household   |         |          |        | 0.0     | 0.0    | 200.0   | 140.0   | 0.0    | 0.0   | 0.0    | 340.0 |
| GST         | c_agric |          |        | 2.6     | 4.3    |         |         | 10.2   | 1.7   | 1.3    | 20.0  |
|             | c_mnfc  |          |        | 3.1     | 6.3    |         |         | 9.4    | 3.8   | 2.5    | 25.0  |
| Government  |         |          |        | 10.0    | 10.0   | 0.0     | 0.0     | 30.0   |       |        | 50.0  |
| Saving      |         |          |        |         |        |         |         | 40     | 15    |        | 55.0  |
| Total       |         | 215      | 375    | 215.0   | 375.0  | 200.0   | 140.0   | 329.6  | 100.5 | 58.8   |       |

**Tax revenues associated with individual commodities**

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## *Use of IOT in a SAM for CGE*

- Requires
  - Identification of purchasing agent specific differences between Purchaser and Basic prices
    - Commodity taxes (illustrated)
    - Trade & transport margins (see STAGE)
  - Diagonal supply/make matrix
    - Specification of technologies for commodity production
    - Adjustment of activity transactions
    - (This problem is sidestepped in this illustration)
  - Large amount of extra data
    - Rarely published

  
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## *STAGE\_t: Violating LOOP?*

### **The End**

  
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