Micro SAM: Part 1

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Outline

- Micro SAM 1
  - Classification of Accounts
  - Distributional Invariance
  - Control totals
  - Commodity and Activity Accounts
  - Tax accounts
- Micro SAM 2
  - Factor Accounts
  - Household Accounts
- Micro SAM 3
  - Other Institutional Accounts
  - Disaggregating Commodity and Activity Accounts

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General Difficulties

- Data Inconsistencies
  - Inconsistencies due to revisions to the national accounts data
  - Supply and Use tables (SUT) that are not for the same year
  - Different years for surveys and censuses
- Imperfect and Incomplete information
  - Purposes for surveys and censuses
  - Mixed income accounts
  - Limited information about compensation of employees
  - Limited information about expenditure patterns by RHGs
  - Limited information about income sources for RHGs
  - Limited information about tax revenues & rates
  - Decisions to label data as confidential
  - …..

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General Difficulties

	h_a	h_b	h_c	total
c_1	2.13	0.50	18.36	**20.98**
c_2	2.27	0.70	10.55	**13.51**
c_3	15.82	18.69	8.14	**42.65**
c_4	6.90	12.09	3.86	**22.85**
total	27.13	31.97	40.91	**100.0**

1. how can the column categories be defined,
2. how can the row categories be defined,
3. are the account definitions in the expenditure survey the same as those in the SUT,
4. if the share estimates are derived directly from the expenditure survey, i.e., without first estimating household consumption expenditures, do the prior TVs differ,
5. estimating control totals, even if they are measured with error, is important

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Prices and Information

The Law of One Price (LOOP) means TVs reported
- in a column can be defined as $p_i * q_{ij}$
- column sum as $p_j * Q_j$ will equal the row sum ($p_i * Q_i$).

$$p_j = \sum_i p_i * \left(q_{ij} \middle/ Q_j \right) = \sum_i p_i * a_{ij}$$

The column coefficients, a_{ij}, are (value) quantity weights that define (average) costs, p_j, as the weighted sum of the prices of inputs, p_i

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Distributional Invariance

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Classification of Accounts
Distributional Invariance

"if we are primarily interested in the distribution of income among households and other institutions for which current expenditure is endogenous then, as a **rule of thumb**, we should be looking for an SAM for which min($[f]$, $[c]$) ≥ $[h]$, where f is the number of factors, c the number of commodities and h the number of households] since, beyond a certain point, the further disaggregation of households is not a priority because any gain in [the rank for h] is contingent on the [number of factor and commodity accounts] and not on [the number of RHG accounts]. It therefore follows from these arguments that [there is] a case for SAMs which achieve some proximate balance between [f], [c], and [h], depending on the ultimate purpose of the exercise." (Pyatt and Round, 2012, p 266, emphasis added).

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Classification of Accounts

Activities: usually limited by national accounts data and/or SUT

IF the functional distribution of income, i.e., between factors, is important then the number of activities ≥ the number of factors

IF the distribution of income between RHGs is important then the number of factors ≥ the number of RHGs

IF RHG welfare is important then
- **Consumption patterns matter**
- **Determinants of consumption patterns matter**
- **Income sources matter**

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Control Totals

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Control Totals

A control total provides an estimate of the sum of the transactions in a $n*m$ sub-matrix, i.e., scalars, vectors and matrices.
Estimates of control totals can be measured with or without error. Macro-SAMs and control totals, e.g., *C, G, I, M, X*.

limited information means that quantifying SEs is often **subjective**
" .. it is impossible to find any fully operational basis for quantifying this information."

Lecomber, 1975, p5.

Lessons
- more control totals are better than fewer,
- estimates of the SE for priors and control totals are important
- estimates of SEs may need to be subjective
- the accuracy of an estimated SAM depends on the information in the priors

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Using Control Totals

Scalar control total

$$S_{ij} = T_{ij} \Big/ x \qquad\qquad T_{ij} = \frac{T_{ij}^*}{\sum\limits_{i,j} T_{ij}^*}.x = S_{ij}^*.x$$

Vector control totals

$$S_{ij}^{R*} = \frac{T_{ij}^*}{\sum\limits_{j} T_{ij}^*} \qquad OR \qquad S_{ij}^{C*} = \frac{T_{ij}^*}{\sum\limits_{i} T_{ij}^*}$$

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Commodities and Activities

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Why Use Supply & Use Tables (SUT)

- IOT are derived from SUT, e.g.,
  - choose the commodity or activity accounts for the IOT
  - select the technology **assumption** to apply
  - **linearly transform** the SUT based data to generate **an** IOT
- Data systems collect data by '**natural**' definitions
  - Commodities, e.g., trade, (final & intermed) demand, etc
  - Activities, e.g., agriculture, manufacturing, services
- IOT use '**unnatural**' definitions of commodities and/or activities
- *Convert to IOT based SAM after completing SAM*

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Adding SUT Data

- Four cases
  1. SUT for the Chosen Year: The Simple Cases
     - Should match aggregates from macro-SAM
       - Relatively small error bounds
  2. SUT for an Adjacent Year: Using Share data for Aggregates
     - Assume structural detail *limited* to account totals
       - 'Smallish' error bounds
  3. A Complete but 'Distant' SUT: Using Coefficients
     - Assume structural detail has changed
       - Moderate error bounds
  4. Incomplete SUT
     - Estimate a consistent SUT and proceed as above
       - Error bounds could be any of the above

Rest the tempation to use data that have been estimated to construct a previous SAM for the country. IF the previous SAM was compiled professionally, you should be able to replicate the exercise and use these data sources for your own efforts

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Tax Accounts

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Tax Revenues
Tax revenues <u>NOT</u> tax rates

1. identify major tax instruments, e.g., national accounts data on total revenues by tax
2. identify how the different tax instruments are levied
3. collect data on applied tax rates for each instrument
4. determine the tax instruments to be included in the SAM
   a. segment between taxes that are levied in different ways
   b. avoid aggregating revenues that are levied in different ways
   c. make sure the taxes relevant to policy choices are separate
   d. Include an aggregate of tax instruments not separately identified (if omitted the SAM will be incomplete/distorted);
5. ensure the total revenues by each of the selected tax instruments are control totals and assume these control totals are measured with little error.

Distinguish between taxes and **subsidies** (-ve taxes)

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Taxes/Subsidies on Commodities/Products

	c_1	c_2	c_3	c_4	Total revenue
VAT	49	35	1	40	125
Import duties	4	8	24	5	41
Excise tax	16	43	0	22	81
Fuel tax	0	50	0	0	50
Other taxes	2	5	3	4	14
Taxes on Products	**71**	**141**	**28**	**71**	

Two vectors of control total

1. Row – Government accounts
2. Column - SUT

Same for subsidies

Check applied rates are sensible

NB: VAT is a tax on commodities

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Taxes/Subsidies on Activities

- Activities
  - Production taxes (*a*)
  - Intermediate input use (*c,a*)
- Factors
  - Employment taxes (*f,a*)
  - Factor use taxes (*f,a*)

Subsidies are major policy instruments
- **applied at activity level (*a*)**
- **applied at commodity level (*c*)**
- **both activity and commodity (*c,a*)**

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Taxes on Income & Wealth

- Paid by Institutions
  - RHG, e.g.,
    - Income taxes (*h*)
      - Income, CGT
    - IHT (*h*)
    - ….
  - Enterprises
    - Corporation taxes (*e*)
    - Royalties (*e*)
    - …..

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The End

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