

Price & volume measures:

3.2 – Practical methods & problem areas

Tim Jones
SIAP consultant/lecturer

Objectives

After this session, participants will be aware of:

- Issues in GDP(E) at constant prices
- The production side
 - Output indicators
 - Problem areas
 - Intermediate consumption
 - The trouble with double deflation
 - Single deflation and single indicators
 - Possible exceptions

Price and volume decomposition

Estimates at constant prices (3 ways recap)

- Quantities times base year price = $p_{i,0} * q_{i,t}$
- Base year value times quantity relative (or indicator) = $v_{i,0} * q_{i,t}/q_{i,0}$
- Current value divided by price relative = $v_{i,t} / (p_{i,t}/p_{i,0})$

GDP Expenditures

- Household final consumption expenditure
 - Overall CPI? CPI components
- Government (& NPISH) final consumption
- Capital formation
 - Buildings & public works:
 - Volume indicators & Construction Price Index
 - Machinery and equipment: Import prices & PPIs
 - Software, R&D, ...: ??
 - Inventories
- External trade – (see session 4.2)

Production side: output indicators

- Output at current prices
 - Turnover (adjusted for finished inventories & WIP)
 - Turnover
 - Quantities times corresponding prices
 - Base year values extrapolated with QIs and PPIs
- Output at constant prices
 - Turnover deflated using PPI components
 - Quantities times base year prices
 - Base year value extrapolated with QIs

Output indicators: special cases

What do you use for

- Construction?
- Wholesale and retail trade?
(volume of sales and of withdrawals from stock assumed identical, implying fixed mark-ups at constant prices)
- Road transport services?
- Financial services?
- Public administration?

Discussion

But there is more...

Intermediate consumption (IC)

Do you have

- Estimates of IC at **current** prices?
 - For every activity?
 - Every year?
 - In detail?
 - Based on a sample?
- Or is the input-output ratio assumed constant?
- Another method?

“Double deflation”

To measure and deflate IC by activity is

- Correct in theory
- Virtually impossible in practice
 - Except partially in one or two special cases
 - Otherwise it is too prone to data errors
 - Resulting value added is too volatile, meaningless
- Definitely wrong if the current price input-output ratio is assumed to be fixed
- Some countries do it using a detailed SUT framework, but still make many assumptions.

Single deflation

- Deflating value added directly
- In general, this method is not correct and not recommended
 - Except for some non-market services such as public administration (where output is only measurable in terms of inputs, labour and the consumption of fixed capital)
 - If the current price input-output ratio is assumed to be fixed then deflating output gives the same result

Single extrapolation

A key assumption:

- To produce $x\%$ more output, you will need the same $x\%$ more inputs (in terms of volume)
 - To make 20% more cloth, you need 20% more cotton.
 - To wash twice as many clothes, you need twice as much soap and water and electricity.
- This is a first order approximation, ok for short term comparisons, especially if the data are weak

What the SNA says

15.129 Although it is recommended that volume estimates of transactions in goods and services and hence gross value added should be derived in a supply and use framework, it is not essential. Indeed, it may not be practical to do so due to a **lack of data** or a **lack of resources**. In these circumstances, or if the **data on output and intermediate input are judged to be of insufficient quality**, it may be **better to abandon the attempt** to measure value added as the difference between two series subject to error and to try to estimate the volume movements of value added directly using only one time series, that is a “**single indicator**” method instead of double deflation. One such single indicator method is to **extrapolate value added in proportion to the volume changes in the corresponding levels of output**.

Special cases

- Agriculture
 - Possible to relate quantity of inputs to area cultivated
- Electricity production
 - A variety of technologies:
 - Coal, petroleum, gas, hydro, nuclear
 - If the mix changes, constant price input-output ratio may change
 - But take care...

Questions?