What is a Monetary Union Price Index?

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Abstract: This short note discusses the interpretation and construction of a consumer price index for an economic area consisting of several countries during the transition period to a common currency.

On January 1, 1999, the European Monetary Union (EMU) is scheduled to start. Its composition in terms of Member States is not yet clear but the decision is planned to take place in early 1998. Immediately after that, i.e. before the EMU is actually started, an aggregation of price change to this new economic area will be on the agenda. An MUICP (Monetary Union Index of Consumer Prices) will come into being. The purpose of this little note is to bring up some conceptual questions relating to the interpretation and construction of an MUICP, especially for the period before the Union is actually formed.

1. Some facts about the EMU

The chief objective of the MUICP is assumed to be the measurement of inflation with regard to its common currency - the *euro*. How should this be done? We start by citing some facts about the EMU that are known so far. The source is EMI (1995):

One year before the start of the EMU (stage three), the Council will decide which countries will participate. At the starting date (but not before) the exchange rates of the currencies of the participating Member States will be replaced by irrevocably locked conversion rates. We thus have the identity $P_j=c_jp_j$, where P_j is the price in euro, p_j the price in the national currency and c_j the euro conversion factor of the currency in country j. National banknotes will remain the only banknotes with legal tender status until the introduction of European banknotes.

At most three years after the start of the EMU European banknotes and coins in the new currency euro will be issued. Six months after their first day of introduction, national banknotes and coins will lose their legal tender status. For the purpose of price measurement this means that, for some time after the start of the EMU, prices will still have to be measured in the old national currency. For a transitory period thereafter it will be possible to measure prices in both currencies.

2. The definition of an MUICP

A simple approach to the construction of an MUICP is to consider the national indexes I_j for country j as given and right away ask the question: what weights shall be used to weigh these together? We then obtain:

$$MUICP^{0t} = \sum_j \ddot{e}_j I_j^{0t} , \qquad\qquad (1)$$

where λ_j are the country weights. Current Eurostat practice, as applied to the EICP (European Index of Consumer Prices, covering all 15 EU Member States), is that it consists of a measure of private consumption expressed in a common currency through PPPs rather than exchange rates.

But in order to see more clearly what is involved here it is useful to return to first principles and define our index as a fixed basket of products k and countries j so that the basic index concept could be written as a ratio of double sums over products and countries:

$$MUICP^{0t} = \frac{\sum_j \sum_k Q_{jk}^b P_{jk}^t}{\sum_j \sum_k Q_{jk}^b P_{jk}^0}, \tag{2}$$

where b is the period of the index basket and prices are compared from 0 to t, essentially giving us Laspeyres' type comparisons. With this formulation it follows immediately that the prices P have to be expressed in some common numeraire or, simply speaking, the same currency. This currency should naturally be the euro or its predecessor, the ecu. (2) divides into two variants depending on whether currency conversion is done at 0 and t separately (double conversion) or with a common factor (single conversion).

With double conversion we obtain from (2)

$$MUICP^{0t} = \sum_j \left(\frac{c_j^0 \sum_k Q_{jk}^b p_{jk}^0}{\sum_j c_j^0 \sum_k Q_{jk}^b p_{jk}^0} \right) \frac{c_j^t}{c_j^0} \left(\sum_k \frac{Q_{jk}^b p_{jk}^0}{\sum_k Q_{jk}^b p_{jk}^0} \frac{p_{jk}^t}{p_{jk}^0} \right) = \sum_j \lambda_j^0 C_j^{0t} I_j^{0t} \tag{3}$$

and with single conversion

$$MUICP^{0t} = \sum_j \left(\frac{c_j \sum_k Q_{jk}^b p_{jk}^0}{\sum_j c_j \sum_k Q_{jk}^b p_{jk}^0} \right) \left(\sum_k \frac{Q_{jk}^b p_{jk}^0}{\sum_k Q_{jk}^b p_{jk}^0} \frac{p_{jk}^t}{p_{jk}^0} \right) = \sum_j \lambda_j I_j^{0t} . \tag{4}$$

Here p denotes price in the national currency as opposed to P which is the price in the common currency. The conversion factors are denoted c_j with a superscript 0 or t when they refer to a particular period.

Now, the country weights λ have a clear interpretation. They are i) price updated from the weight period b to 0 and ii) converted into a common currency by c_j. In (3) the change in conversion rate, $C_j^{0t} = c_j^t / c_j^0$, enters into the computation which may not be desirable. On the other hand, in (4) which is equivalent to (1) it is not clear what time stamp to put on the c_j. It also seems desirable that iii) the measure of private consumption entered into the λ conforms to the concept used in the HICP.

For comparisons between periods which are both after the start of the EMU the distinction between (3) and (4) disappears.

The final question is whether actual exchange rates or PPP's should be used as conversion factors. Exchange rates are the natural choice, since they will converge to the actual fixed conversion factors used after January 1 1999. Indeed, for a within-link comparison with single conversion from December 1998 to any month 1999, the fixed conversion factor seems to be the only reasonable choice.

Reference

EMI (1995): The changeover to the single currency. European Monetary Institute, November 1995.