Proposal for framework of interindustry accounts to be used in EUKLEMS

By Marcel Timmer

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In this note I try to develop a guide to the compilation of time series of inter-industry accounts for EU countries in the EUKLEMS project. This is a second draft to be extended into a implementation guide for the collection of the necessary data from NSOs and the estimation procedures involved in producing these series. In writing, I rely heavily on fruitful discussions with the data coordination group, and in particular with Pirkko Aulin-Ahmavaara, Mun Ho and Jörg Beutel.

1. Notation

The following price concepts are being used: basic prices, producer prices and purchaser prices. According to the ESA (see Eurostat 2002 p. 123):

Purchasers' price (excluding any deductible VAT)
- Non-deductible VAT
- Trade and transport margins
= **Producers' price**
- Taxes on products (excl. non-deductible VAT)
+ Subsidies on products
= **Basic price**

In this note I follow the notation by Aulin-Ahmavaara and Toivola (2005)[1]

Commodities i, i=1,..,m
Industries j, j=1,..,n
Final uses f, f=1,..6

[1] Extended to allow for seperate import prices.

A capital V in front of a symbol is used to indicate value.

Quantities

S_i = the quantity of the total supply of product i

U_i = the quantity of the uses of the product i

M_i = the imported quantity of product i

Y_j = output of industry j

Y_{ij} = the quantity of commodity i produced by industry j

X_{ij}^M = the quantity of imported commodity i used as intermediate input by industry j

X_{ij}^D = the quantity of domestically produced commodity i used as intermediate input by industry j

F_{if}^M = quantity of imported product i used in final use f

F_{if}^D = quantity of domestically produced product i used in final use f

Prices

p_{ij}^Y = the basic price received by industry j for selling commodity i

p_{ij}^M = the purchase price paid by industry j for intermediate consumption of imported commodity i

p_{ij}^D = the purchase price paid by industry j for intermediate consumption of domestic commodity i

p_{if}^M = the purchase price paid by industry j for final consumption of imported commodity i

p_{if}^D = the purchase price paid by industry j for final consumption of domestic commodity i

p_j^Y = the basic output price received by industry j

p_i^D = the basic price of domestically produced commodity i.

p_i^M = the basic price (c.i.f) of imported commodity i.

Taxes and subsidies on products

TV_{ij}^D = non-deductible value added tax on domestic product i used as intermediate in industry j.

TV_{ij}^M = non-deductible value added tax on imported product i used as intermediate in industry j.

T_{ij}^{XD} = other taxes net of similar subsidies on domestic product i used as intermediate in industry j.

T_{ij}^{XM} = other taxes net of similar subsidies on imported product i used as intermediate in industry j.

T_{if}^{FD}, T_{if}^{FM} TV_{if}^{FD} and TV_{if}^{FM} are the respective (net) taxes on final uses

Small-case t indicate respective (net) tax rates.

Value added components

T_j^O = other taxes, net of similar subsidies, on production paid by industry j

T_j^L = other taxes, net of similar subsidies, on use of labour paid by industry j

T_j^K = other taxes, net of similar subsidies, on use of capital paid by industry j

LC_j^E = labour compensation of employees in industry j

LC_j^S = (estimated) labour compensation of self-employed in industry j

LC_j = labour compensation of all workers in industry j

OS_j = operating surplus/mixed income in industry j

K_j = quantity of capital services used by industry j

L_j = quantity of labour services used by industry j

VA_j = value added of industry j at basic prices

In the National Accounts the following definition holds: $VA_j = LC_j^E + OS_j + T_j^O$

Suppose mixed income can be divided into labour income and operating surplus and other taxes on production are allocated to capital and labour inputs: $T_j^O = T_j^K + T_j^L$. In that case, value added can be written as: $VA_j = VK_j + VL_j$ with

$VL_j = T_j^L + LC_j$

$LC_j = LC_j^S + LC_j^E$

$VK_j = T_j^K + OS_j - LC_j^S$

Aggregate GDP

GDP at market prices can be calculated from expenditure, income and production side (formula's to be added)

2. MFP growth at the industry level

We assume that the production frontier for industry j has distinct labour, capital and intermediate inputs, and that the function is separable in these inputs, so that:

$$Y_j = f(K_j, L_j, M_j, X_j, t)$$
$$g(Y_{1j},..,Y_{mj}) = f(K_{1j},..,K_{Kj}, L_{1j},..,L_{Lj}, M_{1j},..,M_{mj}, X_{1j},..,X_{mj}, t) \quad (1)$$

Under the standard assumptions, MFP growth ($d\ln t_j$) can be derived as follows

$$d\ln t_j = \sum_i \overline{w}_{ij}^{Y} Y_{ij} d\ln Y_{ij} - \sum_i \overline{w}_{ij}^{M} X_{ij}^{M} d\ln X_{ij}^{M} - \sum_i w_{ij}^{X} X_{ij}^{D} d\ln X_{ij}^{D} - \overline{w}_j^{K} d\ln K_j - \overline{w}_j^{L} d\ln L_j \quad (2)$$

With a bar denoting period averages and

$\overline{w}_{ij}^{Y} = (VY_j)^{-1} p_{ij}^{Y} Y_{ij}$

$\overline{w}_{ij}^{M} = (VY_j)^{-1} p_{ij}^{XM} X_{ij}^{M}$

$\overline{w}_{ij}^{D} = (VY_j)^{-1} p_{ij}^{XD} X_{ij}^{D}$

$\overline{w}_j^{L} = (VY_j)^{-1} VL_j$

$\overline{w}_j^{K} = (VY_j)^{-1} VK_j$

Growth of MFP is derived as the real growth of output minus a weighted growth of inputs. The growth of K and L is not dealt with any further here (see WP 2 and WP 3). For the rate of volume change of the aggregate output of an industry the commodity weights should be seen from the producer's point view i.e. reflect marginal revenue products. This means basic prices, which include the subsidies on products received by the producer. The input weights should be seen from the user's point of view i.e. reflect the marginal cost paid by the user. Therefore they should include taxes on commodities paid by the user (non-deductible VAT included) and exclude the subsidies on commodities. Margins on trade and transport should be included as well in the standarde approach (see e.g. OECD 2001)

Alternative treatment of trade and transport margins

An alternative is to capture the trade and transport margins paid by the consuming sector in the intermediate input flows from the trade and transport sectors. This provides a much clearer picture on the role of trade and transport services as a separate input. In addition, it gives flexibility to experiment with alternative volume measures. This reallocation is not unprecedented. In the move from ESA79 to ESA95, part of the transport margin has already

been "moved" from being a margin to intermediate consumption or final consumption of transport services. This depends on the unit that pays for the transport (Eurostat 2002, para 4.2.4.3). This new treatment meant a very important reduction in transport margins. Second, current movements in wholesale and retailing make the treatment of trade services as margins obsolete. They should be regarded as purchases of separate services since there are other options to get the goods delivered, e.g. business to business deliveries (see also Pirkko's note of 20/7/04, Diewert 2005). As long as volume of margins follow the volume of sales, the MFP growth rates will be equivalent. In the remainder of this paper we assume that TT are captured in the intermediate input flows from the trade and transport sectors.

3. Supply and Use tables

We derive both outputs and intermediate inputs from a time series of inter-industry transaction tables. These tables consist of Supply and Use tables (SUT) conforming the ESA 1995 framework (see Eurostat 2002 for good overview). A Use table allocates the use of each commodity among intermediate consumption and final demand categories (see figures 1 and 2). A Supply table shows the supply of each commodity by domestic industries and imports (see Figure 3). To bridge the different valuation concepts of the use and supply tables (from basic to purchase prices) valuation matrices are also part of this system (see Figure 4). In figure 5, a flow chart of the transformation of SUT from purchaser prices to basic prices is presented. The standard Supply table (S) contains a S at basic prices, a vector for imports cif, a vector for total S at basic prices and a transformation of total S at purchase prices. This transformation to purchasers' prices is achieved by various column vectors which are reflecting the totals of the valuation matrices fot trade and transport margins, and net taxes on products (Beutel 2005 provides a small numerical example).

In the most general formulation as (2) above based on a USE table at purchase prices, each commodity needs its own deflator. One cannot assume that the purchase price of commodity i is independent of its use as trade and transport margins will differ across users, as will net taxes. However, this assumption is much more plausible for basic prices.[2] To make this model workable, we make the following assumption:

Assumption 1: Basic prices are identical in all uses. This is true for domestically produced goods on the one hand, and imported goods on the other:

[2] Even at a detailed level this might still not hold. All entries are bundles of goods, and the mix of goods might differ per entry. Also, it is based on prices averaged over the year, so even with identical bundles, when then are purchased at different points in time, prices will be different (Diewert 2005).

$$\frac{p_{ij}^{XM}}{\left(1+tv_{ij}^{XM}+t_{ij}^{XM}\right)}=\frac{p_{if}^{FM}}{\left(1+tv_{if}^{FM}+t_{if}^{FM}\right)}=p_i^M$$

$$\frac{p_{ij}^{XD}}{\left(1+tv_{ij}^{XD}+t_{ij}^{XD}\right)}=\frac{p_{if}^{FD}}{\left(1+tv_{if}^{FD}+t_{if}^{FD}\right)}=p_i^D$$

Note that although we assume that basic prices are independent of their use, purchase prices can still differ due to the net taxes on commodity and non-deductible VAT which will differ across users. With this assumption, the following identities hold in this framework

(1) For each commodity i: total supply at basic prices = total use at basic prices, which is equivalent to

$$\sum_j p_{ij}^Y Y_{ij}+p_i^M M_i=p_i^D\sum_j X_{ij}^D+p_i^D\sum_f X_{if}^D+p_i^M\sum_j X_{ij}^M+p_i^M\sum_f X_{if}^M \qquad (5)$$

(2) for each industry j: value of output at basic price = value of intermediate input at purchase prices + value added at basic price

$$\sum_i p_{ij}^Y Y_{ij}=\sum_i p_i^D X_{ij}^D+\sum_i p_i^M X_{ij}^M+LC_j^E+OS_j+T_j^O$$

These identities can be used when checking the consistency of SUTs (see below).

In principle, from a SUT we can extract all the data on values (weights) which is needed to estimate MFP. To be more precise, the following set of tables (all commodity x industries) is needed for our purposes:

1. USE table for domestic output at basic prices
2. USE table for imports at basic (c.i.f.) prices
3. SUPPLY table at basic prices
4. VALUATION matrices for USE tables
    a. Trade margin table (retail and wholesale separate if possible)
    b. transport margin table (by mode of transport if possible)
    c. non-deductible VAT on commodities
    d. other taxes net of subsidies on domestic commodities
    e. other taxes net of subsidies on imports

The level of detail in the valuation matrices will differ across countries. In principle, the more detail the better. But according to the ESA 95 only one margin table and one net tax table is

sufficient, so this is the level of detail which most NSO will have. Of course under some kind of proportionality assumption, detailed valuation matrices can be generated on the basis of vector totals.

4. Availability of Supply and Use tables

Time series of SUTs in current and constant prices which are ESA 1995 compatible in principle contain all the information needed. Comparability also means that *industry outputs* at both current and constant prices have to be equal to the respective National Accounts values, provided the NA follows the ESA 95.

Assumption 2: *industry outputs* at both current and constant prices have to be equal to their respective National Accounts values

Unfortunately not all countries have these sets of tables. Often they are only available for 1995 onwards. For earlier years there is normally information on inter-industry deliveries but not in the form of product by industry SUTs. Instead, symmetric input-output tables (industry by industry) are mostly available. Roughly, based on the data availability four groups of countries can be distinguished (see statistical roadmap for details):

A. NSOs which have already produced long-term series of SUTs in current and constant prices which are ESA 1995 compatible, or will due so in the coming months:
Denmark, Finland, Netherlands, France.

B. Countries with short series of constant price SUT for 1990s and IO tables for earlier years:
Germany, Luxembourg, Sweden

C. Countries with long-term series of current price SUT and IO and reasonable deflators:
Italy, Austria, UK, Spain

D. Countries with long-term series of current price SUT and IO but without reasonable deflators:
Belgium, Ireland

E. Countries with no SUT or IO before 1995:
Eastern European countries, Greece, Portugal

In principle, the tables of countries in group A contain all the information needed. Nevertheless, two adjustments might be necessary:

FISIM Adjustment: In case the tables are not adjusted for FISIM, an adjustment must be made

Why? In the next three years all European NSOs will move to a system in which FISIM is allocated to users, which is the preferred method also from the perspective of productivity measurement. But some countries will be faster in the introduction than others. This will introduce international incomparabilities. Therefore the default option is the distribution of FISIM to the users. Possible methods include the following: proportional to output (Eurostat advice), proportional to directly measured financial services or proportional to outstanding loans.

Industry detail adjustment: In case the level of detail of industries in the SUT does not fit the EUK list of industries, breakdowns must be made. See appendix for list of EUK industries and products.

Obviously the feasibility of this depends on the data situation and resources available. For some countries and time-periods it will be impossible to fulfill this condition. For others it would require extra work, e.g. based on census material (although the input structure will be problematic).

For the countries in group B and C long-term constant SUTs should be constructed. This is described in sections 5 and 6 (see Aulin-Ahmavaara, and Toivola, 2005 for a description of the Finnish case). Group D countries need special attention concerning the availability of deflators. Finally, tables for countries in group E can only be made for 1995 onwards using the same techniques as for group B and C.

NB It is clear that deriving time series of current and constant price SUT is a complex task. Countries vary greatly in their data availability, especially pre ESA 95. There is no uniform approach which will fit all cases. In the next section I outline a general approach which needs to be refined on a country-by-country basis to provide a workable solution.

5. Derivation of time series of current price SUTs

Our aim is to generate long-term series of ESA 95 compatible SUTs with FISIM distributed. Compatibility with the NA also entails the following

Assumption 2A: For NA timeseries and IO or SUT tables made in the same vintage of the ESA system, the SUT or IO tables should be adjusted to match NA output, import, intermediate input and final demand at current prices.

This amounts to saying that we take the NA series at current prices as the best possible estimates which we are not able to improve upon. This however, is not necessarily true for the constant price tables.

1. ESA95 compatible SUT

Start with the recent tables which are compatible with ESA 95. Two adjustments might be necessary (see above): distribution of FISIM and disaggregation of some sectors. For the earlier years normally only IO benchmark tables are available which are non-compatible (based on ESA 1968 or ESA 1979)

2. Non-compatible tables

For benchmark tables not compatible with ESA 95, adjustments are needed. Essentially there are two ways to deal with the non-compatible benchmark tables.

2.1 The first is trying to bring the IO-table to conform the ESA 95 standard and then extract the SUTs from the IO-tables. In the note by Jorg Beutel (2005) it is shown how this extraction can be done. Conforming older vintage tables to ESA 95 standards in particular involves moving software from intermediate consumption to investment, distributing FISIM and adding imputations for depreciation of government owned capital. Also in many cases the IO-table will be at purchase prices. The SUT should be at basic prices so margins need to be removed (see Aulin-Ahmavaara and Toivola (2005) p. 8/9).

2.2 The second approach is to derive a series of IO-tables based on ESA79, without trying to conform 1995 ESA. Growth rates of intermediate inputs and output must be linked to the ESA95–series somehow, e.g. through a link year. The advantage of this route is that no adjustments need to be made to the original IO-tables, and that the timeseries on output and value added used for intrapolation the benchmark tables (see below) fit much better as these series are also based on ESA79. Especially when the break between ESA95 based tables and old ESA series is large this is an attractive option. A good example is Germany because for this country the ESA95/ESA79 break coincides with the unification. Compiling SUTs for all Germany in 1985 seems useless.

3. Consistent time-series of supply by commodity

In both approaches (2.1 and 2.2) benchmark tables need to be intrapolated as we need full time-series. This is done by combining the benchmark tables with timeseries on industry output and intermediate input. The first step is to construct consistent time-series of supply tables, which can subsequently used to generate time-series of use-tables

3.1 Construct consistent time series on industry output and imports, e.g. from National Accounts.

3.2 Intrapolate supply table with industry output and imports series to get time series of supply by commodity

4. Time series of USE tables

On the basis of the supply tables and series on value added and final demand, estimates of USE tables for non-benchmark years can be made.

4.1 From national accounts derive time series on value of final demand categories for as many commodities as possible.

4.2 construct time series of value added and its components at basic prices, e.g. from National Accounts

4.3 Take time series on industry output from 3.1 and subtract value added from 4.2 to get total of intermediate consumption by industry at producer's plus non-deductible prices. These must be adjusted to basic price concept.

4.4 Take total supply by commodity from 3.2 and subtract final demand by commodity from 4.1 to get total intermediate consumption by commodity at basic prices:

4.5 We now have time series for the column and row totals of the USE table at basic prices. These can be combined with the benchmark USE tables to generate a time series of USE

4.5.1 in case of extrapolation of one table only (e.g. from the earliest or latest available table) extrapolation techniques can be used such as developed by Beutel (Chapter 14 in Eurostat 2002)

4.5.2 in the case of intrapolation between two benchmarks a RAS-like technique can be used

4.6 Separation of imports to have domestic and import USE tables at basic prices.

4.7 Construct valuation matrices of margins and taxes.

4.8 Finally, check the created SUTs on internal consistency, see identities (5)-(7) described in section 3 above.

A couple of common problems will be encountered in performing steps 3 and 4.

Potential problems in Step3

- the supply table should be at basic prices. However, industry output might not be at basic prices. Adjustments should be made.
- probably imports need to be adjusted from fob to cif price basis.
- even after adjustment the NA figures on output and imports might be different from the SUT figures (see below).

Potential problems in Step 4

- Final demand will be at purchaser prices so need to be adjusted. Margins should be removed, as net taxes. The latter will depend heavily on tax system in a country (see Aulin-Ahmavaara, and Toivola (2005) p. 9).
- the separation of imports and domestically produced intermediates will be hard. In some cases the benchmark import matrix does not exist. Some kind of proportionality assumption can be used instead.

Intrapolation techniques

Our default option concerning intraplation is (biproportional) RAS. Other techniques will be experimented with. RAS can be performaed at various totals (e.g. gross output or total

intermediate inputs, total use or total intermediate use). More experimentation is needed in this area

6. Derivation of time series of constant price tables

Having generated time-series of 1995 ESA compatible current price SUTs, deflation of output Y and the intermediate input matrices X and M is needed. Generally, this should be done at the lowest level possible. The level of aggregation in the SUT we are dealing with is treated as the elementary level of aggregation. This means that commodities at the elementary level are treated as homogeneous commodities. Therefore, we need for each the domestically produced basic prices (which might differ across producing industries) and the imported c.i.f. price.

We have assumed that the same basic price index is used to deflate all uses of a product. Also, we assumed that the current value and volume change of the output of an industry should be in line with national accounts. Thus, the obvious source for the deflators is the (implicit) output deflator from the NA.[3] The constant price value in each cell of the supply table is obtained by deflating the current price value by the implicit price index of the respective column (i.e. industry). In this system the same product produced by different industries will have different prices. Summing each of the rows over industries gives the constant price values for the output by product. The deflators by product, (chained) Paasche price indices, are again obtained by dividing current price values by the constant price values just calculated.

These price indices can be used to deflate the uses. If we use the same basic price index by product to deflate all the uses, the rows of the use table are balanced (regardless of the way in which the price indices are obtained). The columns are balanced, if we are ready to accept the value added at constant prices by industry we obtain as the difference between the values of output at constant prices on the one hand and the values of intermediate inputs in basic prices at constant prices added by the values of net taxes on products at constant prices on the other. To find out this value we need to calculate the net taxes on products at constant prices. Note that this is not consistent with the use of superlative indices (Moyer et al 2004).

Thus let p_j^Y the implicit basic output price for industry j from the NA, and p_i^D the basic output price of product i, then we assume that all output of industry j has the same basic price:

$p_{ij}^Y = p_j^Y \quad \forall i$. And so $p_i^D = \sum_j w_{ij} p_j^Y$ with $w_{ij} = \frac{p_{ij}^Y Y_{ij}}{\sum_j p_{ij}^Y Y_{ij}}$

[3] NB Especially in earlier years many NAs used single deflation techniques for value added. So the gross output deflator can be derived from subtracting constant price value added growth from current price VA growth! Therefore it is important to know how constant price value added series in the NA have been constructed. For example, sometimes input or quantity indicators have been used, especially in non-market services. One has to be careful in using this kind of data to derive output deflators.

This shows how the basic price of domestically goods can be calculated. Import price indices by commodity can be derived from National Accounts or from trade statistics. If not available one can always use the domestic price. Volume changes of output at basic prices and intermediate inputs at basic prices are defined as follows:

$$d\ln Y_j = d\ln VY_j - d\ln p_j^Y$$
$$d\ln X_{ij}^M = d\ln VX_{ij}^M - d\ln p_i^M$$
$$d\ln X_{ij}^D = d\ln VX_{ij}^D - d\ln p_i^D$$

In addition, we need deflated values of the nondeductible VAT and other net taxes on products to calculate the total input volumes. In case no industry deflators are available from the NA, alternative sources could be used. For example, producer price indices and wholesale price indices. These should be producer or, preferably, basic prices at the lowest level of detail.[4] The Supply table can be used to transform product prices into industry output prices.

A particular situation in which we will have prices of goods depending on their use is when we get data from NSOs derived from a SUT deflated at a lower level of aggregation than we have. In that case the assumption of identical basic prices in different uses of the same commodity does not hold. Forcing identical prices means throwing away information which is not recommended.

Real value added is derived as a residual (double deflation) by subtracting weighted growth of intermediate input from growth of output. This value added might differ from the NA value, for example in cases when no double deflation has been used in the NA.

References

Aulin-Ahmavaara and Toivola (2005), *On the construction of time-series of inter-industry accounts for EU-economies with value added tax*, mimeo, available through EUKLEMS website

Aulin-Ahmavaara, Pakarinen and Toivola (2005), *Integrated industry-level and aggregate TFP-measures: different approaches*, mimeo presented in London meeting, August 2004.

Beutel (2002), Chapter 14 in Eurostat (2002)

Beutel (2005), *Compilation of SUT at basic prices*, Note presented at second meeting of EUKLEMS DC group, 25 februari 2005, Amsterdam.

[4] The problem with these indices is that the weights of the 1-2-3 and 4 digit level industries have to be (EU-regulation) kept constant until the base year is changed (every five years). So if we have them at a low level, we can reweight annually.

Diewert, E. W. (2005), *The treatment of indirect taxes and margins and the reconciliation of industry with national productivity measures*, January 2005, WP 05-06, Department of Economics, University of British Columbia, Vancouver.

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Moyer et al. (2004), "Aggregation Issues in Integrating and Accelerating BEA's Accounts: Improved Methods for Calculating GDP by Industry" in Jorgenson, Dale W., J. Steven Landefeld and William D. Nordhaus, Editors (2004) *A New Architecture for the U.S. National Accounts*, NBER.

OECD (2001), *Productivity Manual*, OECD, Paris.

Figure 1 Domestic USE table at purchase prices

	Industries 1 .... j .... n	Total intermediate use	Final demand 1 .... f	Total use
Commodities 1 : i : m	$p_{xij}X_{ij}$	VX_i	$p_{Xif}X_{if}$	VU_i
Total intermediate input at purchase price	VX_j			
Capital	VK_j			
Labour	VL_j			
Taxes on production	T_j			
Gross value added at basic price				
Gross output at basic prices	VQ_j			

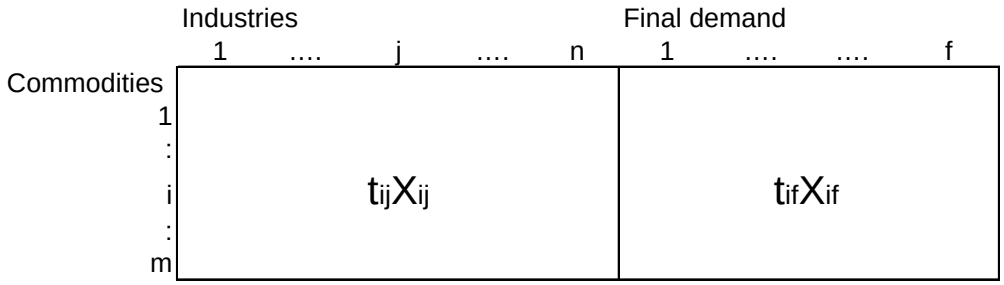
Figure 2 Import USE table at basic prices

	Industries 1 .... j .... n	Total	Final demand 1 .... f
Commodities 1 : i : m	$p_{mi}M_{ij}$	VM_i	$p_{mi}M_{if}$
Total	VM_j		

Figure 3 SUPPLY table at basic prices

	Industries 1 .... j .... n	Import	Total
Commodities 1 : i : m	$p_{yj}Q_{ij}$	$p_{mi}M_i$	p_iS_i
Total	VQ_j		

Figure 4 Valuation matrix: use-side table of net taxes on domestically produced commodities



Annex 1 EUK list of industries

TOT	**TOTAL ECONOMY**
AtB	**AGRICULTURE, HUNTING, FORESTRY AND FISHING**
A	…AGRICULTURE, HUNTING AND FORESTRY
1	……Agriculture
2	……Forestry
B	…FISHING
C	**MINING AND QUARRYING**
10t12	…MINING AND QUARRYING OF ENERGY PRODUCING MATERIALS
10	……Mining of coal and lignite; extraction of peat
11	……Extraction of crude petroleum and natural gas and services
12	……Mining of uranium and thorium ores
13t14	…MINING AND QUARRYING EXCEPT ENERGY PRODUCING MATERIALS
13	……Mining of metal ores
14	……Other mining and quarrying
D	**TOTAL MANUFACTURING**
15t16	…FOOD PRODUCTS, BEVERAGES AND TOBACCO
15	……Food products and beverages
16	……Tobacco products
17t19	…TEXTILES, TEXTILE PRODUCTS, LEATHER AND FOOTWEAR
17t18	……Textiles and textile products
17	……*Textiles*
18	……*Wearing Apparel, Dressing And Dying Of Fur*
19	……Leather, leather products and footwear
20	…WOOD AND PRODUCTS OF WOOD AND CORK
21t22	…PULP, PAPER, PAPER PRODUCTS, PRINTING AND PUBLISHING
21	……Pulp, paper and paper products
22	……Printing, publishing and reproduction
221	……*Publishing*
22x	……*Printing and reproduction*
23t24	…CHEMICAL, RUBBER, PLASTICS AND FUEL PRODUCTS
23	……Coke, refined petroleum products and nuclear fuel
24	……Chemicals and chemical products
244	……*Pharmaceuticals*
24x	……*Chemicals excluding pharmaceuticals*
25	……Rubber and plastics products
26	…OTHER NON-METALLIC MINERAL PRODUCTS
27t28	…BASIC METALS AND FABRICATED METAL PRODUCTS
27	……Basic metals
28	……Fabricated metal products
29	…MACHINERY, NEC
30t33	…ELECTRICAL AND OPTICAL EQUIPMENT
30	……Office, accounting and computing machinery
31t32	……Electrical engineering
31	……*Electrical machinery and apparatus, nec*
313	…… *Insulated wire*
31x	…… *Other electrical machinery and apparatus nec*
32	……*Radio, television and communication equipment*
321	…… *Electronic valves and tubes*
322	…… *Telecommunication equipment*
323	…… *Radio and television receivers*
33	……Medical, precision and optical instruments
331t3	…… *Scientific instruments*
334t5	…… *Other instruments*

34t35	...TRANSPORT EQUIPMENT
34	.....Motor vehicles, trailers and semi-trailers
35	.....Other transport equipment
351	*.....Building and repairing of ships and boats*
353	*.....Aircraft and spacecraft*
35x	*.....Railroad equipment and transport equipment nec*
36t37	...MANUFACTURING NEC; RECYCLING
36	.....Manufacturing nec
37	.....Recycling
E	**ELECTRICITY, GAS AND WATER SUPPLY**
40	...ELECTRICITY AND GAS
40x	.....Electricity supply
402	.....Gas supply
41	...WATER SUPPLY
F	**CONSTRUCTION**
G	**WHOLESALE AND RETAIL TRADE**
50	.....Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of fuel
51	.....Wholesale trade and commission trade, except of motor vehicles and motorcycles
52	.....Retail trade, except of motor vehicles and motorcycles; repair of household goods
H	**HOTELS AND RESTAURANTS**
I	**TRANSPORT AND STORAGE AND COMMUNICATION**
60t63	...TRANSPORT AND STORAGE
60	.....Inland transport
61	.....Water transport
62	.....Air transport
63	.....Supporting and auxiliary transport activities; activities of travel agencies
64	...POST AND TELECOMMUNICATIONS
JtK	**FINANCE, INSURANCE, REAL ESTATE AND BUSINESS SERVICES**
J	...FINANCIAL INTERMEDIATION
65	.....Financial intermediation, except insurance and pension funding
66	.....Insurance and pension funding, except compulsory social security
67	.....Activities related to financial intermediation
K	...REAL ESTATE, RENTING AND BUSINESS ACTIVITIES
70	.....Real estate activities
70imp	*.....Imputation of owner occupied rents*
70x	*.....Other real estate activities*
71t74	.....Renting of m&eq and other business activities
71	*.....Renting of machinery and equipment*
72	*.....Computer and related activities*
73	*.....Research and development*
74	*.....Other business activities*
741t4	*..... Legal, technical and advertising*
745t8	*..... Other business activities, nec*
LtQ	**COMMUNITY SOCIAL AND PERSONAL SERVICES**
L	...PUBLIC ADMIN AND DEFENCE; COMPULSORY SOCIAL SECURITY
M	...EDUCATION
N	...HEALTH AND SOCIAL WORK
O	...OTHER COMMUNITY, SOCIAL AND PERSONAL SERVICES
90	.....Sewage and refuse disposal, sanitation and similar activities
91	.....Activities of membership organizations nec
92	.....Recreational, cultural and sporting activities
921t2	*.....Media activities*
923t7	*.....Other recreational activites*
93	.....Other service activities
P	...PRIVATE HOUSEHOLDS WITH EMPLOYED PERSONS
Q	...EXTRA-TERRITORIAL ORGANIZATIONS AND BODIES

Annex 2 Final demand and value added categories in EUKLEMS

Fuse	**…FINAL USE**
HHC	……Private domestic final consumption
HHCx	……Household consumption
HHCNp	……Non-profit consumption
Gov	……Government consumption
GFCF	……Gross fixed capital formation
Inv	……Changes in inventories and valuables
Exp	……Exports
VA	**…...Value added at basic price**
Comp	……...Compensation of employees
Wag	……Wages and salaries
Soc	……Social premiums for employers
GOS	……...Gross operating surplus
NOS	……...Net operating surplus
ComImp	……...Imputed compensation for employers and own-account workers
NOSx	……...Return to assets
Depr	……...Consumption of fixed capital
NTaxGO	……...Net taxes on production
TaxGO	……...Taxes on production
SubGO	……...Subsidies on production