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**“Comparison of inputs-output tables in different countries”**

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The paper provides international comparisons of input-output table among most industrialized countries (Europe, United States, Canada, Japan, Australia). This analysis is made in structure.

Firstly, it reveals the **input structure of each industry** (by column), specially the **technical coefficients**. The use table columns show the cost of production in the corresponding industry. The industries are gathered to obtain a classification in a high level : for example, agriculture, manufactured goods, construction, transport, energy, trade, services, etc,... Given this industry output and the intermediate consumption obtained in the use table, it is possible to measure value added as a residual variable.

Secondly, it describes the use of **different kinds of products** (by row). Every product is shown as being used in intermediate consumption by industries or in final use. Final expenditure is broken down into final consumption expenditure of households, final expenditure of general government and NPISH, gross fixed capital formation, changes in inventories and acquisition less disposal of valuables and exports.

We will see some differences of structure between countries : differences in technical structure of production, with a special look to technical coefficient.

## 1. HOW COUNTRIES COMPILE THE SUT ?

### 1.1. Framework of SUT to make international comparisons

The use table contains three important parts: the section on intermediate uses; the section on final uses; the section on value added.

- The section on **intermediate uses** shows purchases of products by industry, in order to produce their output. These purchases form intermediate consumption of industries.
- The section on **final uses** shows final demand categories and the values of the products going to these categories. The uses of goods and services - intermediate consumption and final uses - are valued at purchasers' price which is the price of a product paid by the purchaser, i.e. excluding deductible VAT, and therefore already reflecting those 'product specific' taxes less subsidies, and also trade and transport margins, which were added in the supply table. In other words, the use table implicitly includes these taxes and margins in order to attain identities between supply and use.
- The section on **value added** in the use table shows the costs of each industry in terms of factor costs, for example compensation of employees, other net taxes on production, consumption of fixed capital and operating surplus (net). These estimates of other taxes on production (net of subsidies on production) include production taxes paid by the industry or the subsidies received by the industry excluding those 'product specific' taxes used to derive the total supply of products in the supply table. For the new supply and use tables it is mandatory to separate gross operating surplus into consumption of fixed capital and net operating surplus.

It is mandatory for the five-yearly symmetric input-output tables to present supplementary information on fixed capital formation by industries, Capital stock and labour inputs, in order to calculate the labour productivity and the total factor productivity. This kind of supplementary information is not mandatory for the use tables.

For exports, ESA 95 adopts an equivalent concept of price: the 'free on board' price (FOB). This price is considered a particular purchasers' price which is specific to exportations. In the official data submission programme for the European Union it is requested to separate exports into intra-EU exports and extra-EU exports.

Government final consumption expenditure in table 5.1 should be split into two categories:

- Collective consumption expenditure: the total expenditure that benefits society at large; and
- Individual consumption expenditure: the individual expenditure that benefits directly the individuals in the society. Household may pay part of it (i.e. partial payments of households).

Some additional rows are introduced in order to make up for the differences that result from different valuation methods applied in the input-output table.

For instance, in the use table of the official data submission programme an 'Adjustment items' row is included, consisting of 'territorial correction'. This is because households final consumption expenditure, as broken down by product, includes direct purchases of non-residents on the domestic territory which have to be treated as exports. The complement direct purchases of residents abroad have to be treated as imports and thus included in the total households final consumption expenditure.

Note that SNA93 and ESA95 separate two additional rows:

- The purchases of residents abroad are treated as both imports and households final consumption expenditure. Thus a certain amount has to be entered in the imports column of the supply table and also entered in the column of households consumption final expenditure in the use table.
- Purchases of non-residents on domestic territory are treated as exports if they are included in the households final expenditure column through the process of balancing, and deducted from households final consumption expenditure. Thus the corresponding amount is entered in the exports column and deducted in the column of households final consumption expenditure.

**Table 1: Use table at purchasers' prices (current and constant)**

	Industries (NACE Rev. 1)					$\Sigma$ (1)	Final uses a) b) c) d) e) f) g)					$\Sigma$ (3)	$\Sigma$ (1) + $\Sigma$ (3)
	1	2	...	60									
	(1)					(2)	(3)					(4)	(5)
1							Final uses at purchasers' prices						
2							Final consumption expenditure:						
:							a) by households						
Products	:	Intermediate consumption at purchasers' prices by product and by industry				(1)	b) by NPISH						
(CPA)	:						c) by government						
:	:						Gross capital formation:						
:	:						d) gross fixed capital formation						
:	:						e) changes in inventories						
:	:						Exports:						
:	:						f) intra EU						
:	:						g) extra EU						
60	:												
Adjustment items	:												
$\Sigma$ (1)	(2)	Total intermediate consumption by industry					Total final use by type						Total use
Compensation of employees	of												
Other net taxes on production	on												
Consumption of fixed capital	(3)	Components of value added by industry											
Operating surplus, net	)												
$\Sigma$ (3)	(4)	Value added by industry											
$\Sigma$ (1) + $\Sigma$ (3)	(5)	Output by industry at basic prices											

## 1.2. Presentation of the use table

The compilation of the use table is linked with the compilation of the supply table. Between the supply and uses tables, two types of identities hold (provided supplies and uses are valued consistently):

- a) The identity by product: SUPPLY = DEMAND.

By definition, the total of each row in the use table is equal to the corresponding row in the supply table.

***Total supply by product at purchasers' prices = Total use by product at purchasers' prices***

- b) The identity by industry: INPUTS = OUTPUT.

The other identity concerns the column: the total of each column in the use table equals, by definition, the corresponding column total in the supply table.

***Total output by industry at basic prices = Total intermediate consumption by industry at purchasers' prices + value added***

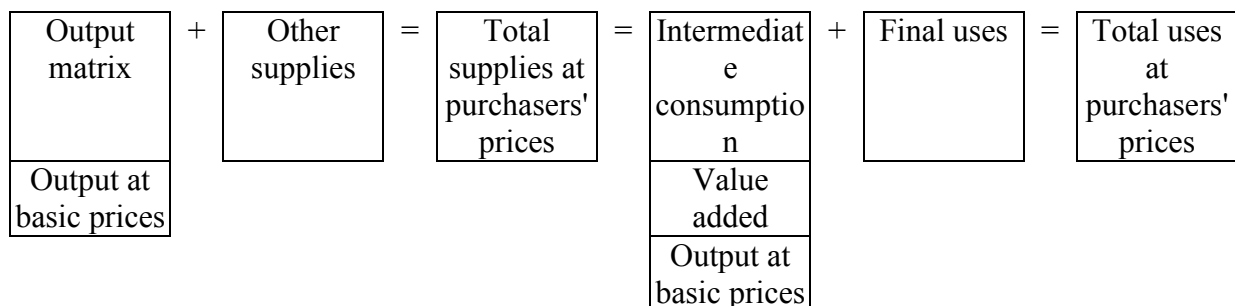
In the use table, output is shown by industry (Table 5.2). ESA 95 recommends the retention of the 'local kind of activity unit' (local KAU) for this analysis. The group of all local KAUs engaged on the same, or similar, kind-of-activity constitutes an industry.

The classification used for industries is the NACE rev.1, with the CPA used for the classification of products. These two classifications are fully aligned to each other: at each level of aggregation, the CPA shows the principal products of the industries according to the NACE rev. 1.

In the SUT, the classification for products is at least as detailed as the classification for industries, e.g. the three digit-level of the CPA and the two digit-level of the NACE rev. 1. An adaptation of these two classifications must necessarily be made in each country, to adapt to local specificity of the output and final uses. We should refer to 60 Products (CPA) and 60 industries (NACE Rev. 1) which are mandatory for supply and use tables.

In an input-output table, the intermediate consumption of products is broken down according to users activity ('use matrix').

### The supply and use tables of ESA 95



### *1.2.1. A numerical example (Table 2)*

The numerical example of a normal supply-and-use system is built on SNA93 and ESA95 principles: output valued at base prices, plus taxes on products (including VAT on products), minus subsidies on products, plus trade and transport margins, plus imports, to give total supply at purchasers' prices and, finally, uses at purchasers' prices.

The example can be applied, in particular, to the compilation of input-output tables. However, we have simplified it with respect to ESA95. In the example, five industries (and products) are included: a, b, c, trade (which includes transport), and administration services.

- Industry (a) could be understood as agriculture and basic products,
- industry (b) as manufacturing goods,
- industry (c) as services industry

and with the corresponding products (a), (b) and (c).

There are trade and transport margins on product (a) and on product (b). We assume, nevertheless, that the output of trade (and transport) is not exactly equal to the total of trade (and transport) margins for products (a) and (b), because it also includes maintenance and repair services (motor vehicles for instance) and intermediate consumption items in transport (subcontracting, warehousing, parking, business tourism, etc.).

In Table 2, the 'taxes on product' column includes VAT and is net of subsidies on products. For sake of simplicity, we also assume that output by industry makes up total market output, output for own final use and other non-market output. For instance, the output of industry (a) includes implicitly 3 of output for own final use which is produced by household.

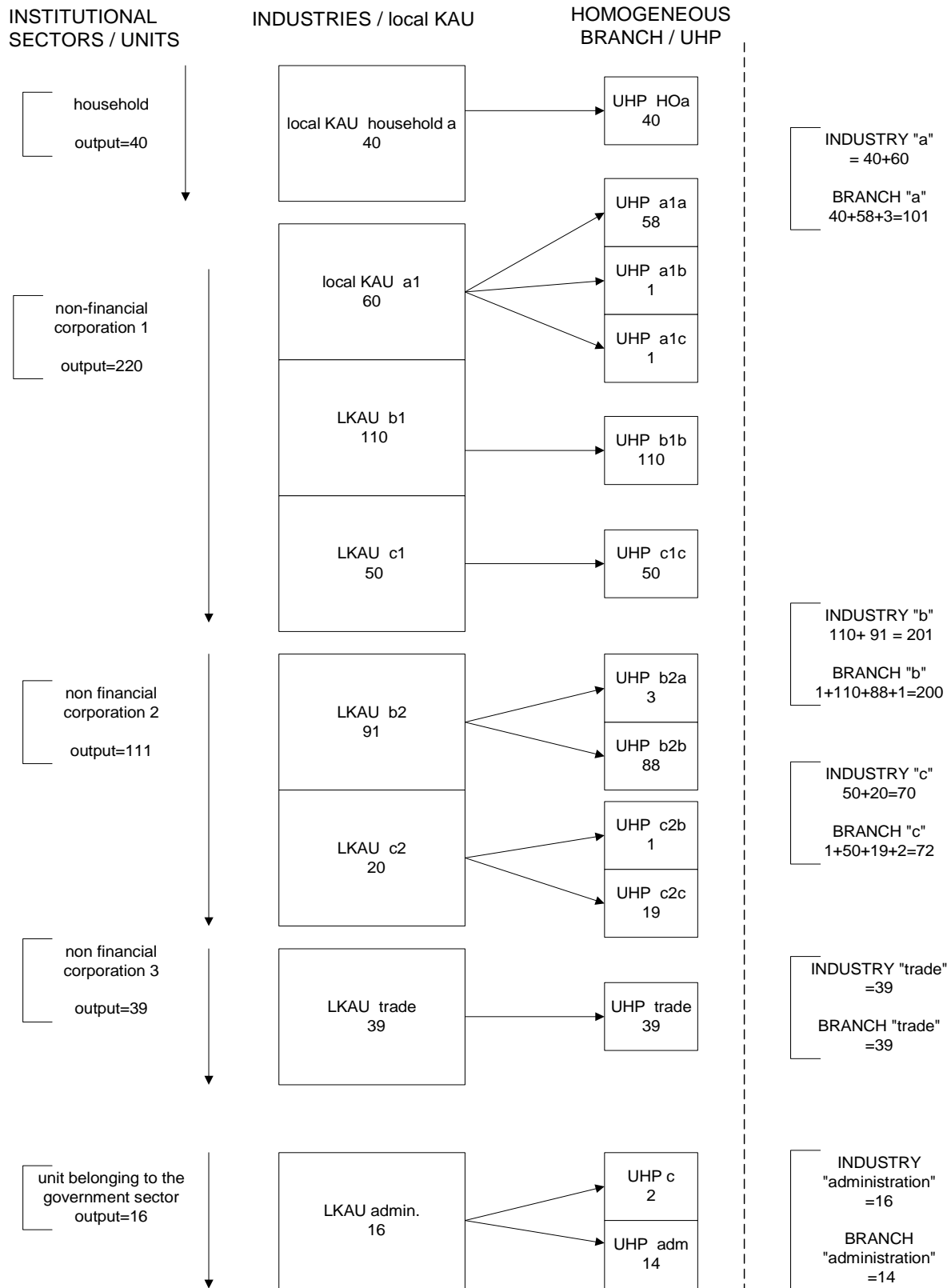
Figure 1 gives the fictitious example linked to Table 2 with one institutional unit belonging to the sector of households, three institutional units (unit 1 to unit 3) belonging to the sector of non-financial corporations and one institutional unit belonging to the general government sector.

The institutional unit 1 belonging to the sector of non-financial corporations is partitioned into 3 (local) kind-of-activity units (a1, b1 and c1) the principal activities of which are a, b and c (see ESA paragraph 2.106).

Then, each local KAU is partitioned into units of homogeneous production (UHP). An homogeneous branch consists in a grouping of UHPs (ESA 95 paragraph 2.114). For example, local KAU a1 is divided into 3 UHPs (a1a, a1b, a1c): output of products a, b and c is respectively equal to 98, 1 and 1.

In this example, we assume that we have production and generation of income accounts at the institutional unit level. At the level of each local KAU, we only have output and value added, and also the number of wage and salary earners. In order to compile generation of income accounts by industry, it is thus necessary to allocate the different components of value added (compensation of employees, taxes and subsidies, etc) in the use table (section value added) by means of some assumptions.

**Figure 1: Institutional sectors, industries and branches linked with the example (in terms of output)**



As a classic input-output table, our example consists in two parts:

- 1) The first part of Table 2 is the supply table. It shows the breakdown of output of industries by products into columns (output matrix). The rows of the table also show other components of the supply of products: imports, and the transformation into purchasers' prices.
- 2) The second part of table 2 is the use table. It shows uses of products. These products can be used as IC by industries (use-matrix) or as final uses. Note that in this table there are partial payments (2) by households on administrative products (for example school fees or tickets of museums).

The bottom of this second part provides a breakdown of value added into compensation of employees, operating surplus, and other (net) taxes on production. This part can be supplemented with non-monetary data such as numbers of employees, labour inputs, stocks of fixed assets and gross fixed capital formation.

A row 'territorial correction' (Cor. Ter. in Table 2) is added because of the difference between two different concepts of final consumption. Households final consumption expenditure of the central framework refers to expenditures incurred by resident households. On the other hand, because detailed data on imports and exports refer to cross-borders movements, final consumption expenditure as it is shown, broken down by products, is a concept of final consumption on the domestic territory.

In order to obtain households final consumption expenditure, it is thus necessary to:

- add purchases of residents abroad (10) both to imports and to (resident) households final consumption expenditure;
- subtract from the final consumption on the domestic territory purchases by non-residents (20), and to add it to exports.

In the example, the first item is shown under imports on the "Territorial correction" row of the supply table. In the use table, the second item is shown under exports on the "Territorial correction" row, while only the difference between the two adjustments is shown under households final consumption expenditure. As purchases by non-residents on the domestic territory is larger than purchases by residents abroad.

The use of other non market services product (i.e. admin. In the table) as intermediate consumption by businesses is possible (for example, payment for some government services) but is very small, and it is assumed here to be zero. One assumes here that intermediate consumption of other non market services by industry "admin" is equal to 1.

**Table 2: The supply and use tables of ESA 95 (fictitious example)**

**PART 1: SUPPLY TABLE**

		Industries					Total output	Imports	Trade margins	Taxes on products	Total supply
		a	b	c	trade	adm					
Products	a	98	3	0	0	0	101	20	12	1	134
	b	1	198	1	0	0	200	40	14	3	257
	c	1	0	69	0	2	72	15	0	13	100
	trade (1)	0	0	0	39	0	39	0	-26	0	13
	admin. (2)	0	0	0	0	14	14	0	0	0	14
	cor. ter. (3)	0	0	0	0	0	0	10	0	0	10
Total		100	201	70	39	16	426	85	0	17	528

**PART B: USE TABLE**

		Industries					Total intermediate use	Final consumption expenditure				Total consumption	GFCF	Change in inventories	GCF	Exports	Final uses	Total uses
		a	b	c	trade	adm		Hous	NPISH	Govin	Govco							
Products	a	30	5	11	0	3	49	52	0	0	0	52	0	3	3	30	85	134
	b	5	70	12	2	5	94	74	0	2	0	76	40	2	42	45	163	257
	c	10	20	15	11	0	56	27	0	3	0	30	4	0	4	10	44	100
	trade	1	2	2	5	1	11	2	0	0	0	2	0	0	0	0	2	13
	admin	0	0	0	0	0	0	2	1	5	6	14	0	0	0	0	14	14
	cor. ter.	0	0	0	0	0	0	-10	0	0	0	-10	0	0	0	20	10	10
Total		46	97	40	18	9	210	147	1	10	6	164	44	5	49	105	318	528
Compensation		23	60	16	9	6	114	0	0	0	0	0	0	0	0	0	0	114
Taxes on production		4	9	2	1	1	17	0	0	0	0	0	0	0	0	0	0	17
Subsidies		-1	-1	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	-2
Cons. of fixed capital		3	6	2	2	0	13	0	0	0	0	0	0	0	0	0	0	13
Operating surplus, net		25	30	10	9	0	74	0	0	0	0	0	0	0	0	0	0	74
Value added		54	104	30	21	7	216	0	0	0	0	0	0	0	0	0	0	216
Total		100	201	70	39	16	426	147	1	10	6	164	44	5	49	105	318	744

(1) Trade is supposed to include transport and repairs in the classifications, so that a part of supply (13) is going to uses.

(2) Admin. means “other non market services”,

(3) cor. ter. means “territorial correction” .



We find the two identities mentioned before by row and by column:

- output of industry a (100) is equal to IC (46) plus value added (54).
- total supply of product a (134) is equal to total use of product a (134).

The same holds for every industry and every product and also for the total respectively (426 and 528). GDP is equal to 233 in that example.

There are three possibilities to value it.

GDP = sum of finals uses minus imports = 318 - 85 = 233

GDP = output - intermediate consumption + taxes on products (net of subsidies) = 426 - 210 + 17 = 233

GDP = compensation of employees + GOS + net taxes on production and imports = 114 + 87 + 15 + 17 = 233

with GOS (gross operating surplus) = net operating surplus + consumption of fixed capital = 74 + 13 = 87.

Note that a concept of actual final consumption has been introduced in SNA93 and ESA95 that is very useful for the study of households' behaviour in comparing actual final consumption among nations. In Table 2, final consumption expenditure is broken down according to the institutional sectors which actually incur expenditures for different purposes. Expenditures made by government for collective purposes such as public administration, defence, security, general health improvement, etc. benefit the society as a whole, but not specific individuals. In Table 2, it corresponds to the amount of 6. This is referred to as the collective consumption expenditure of general government.

Besides expenditure for collective benefit, the government also incurs expenditures which benefit specific individuals, for instance health, care, education, food aid, etc. These items are classified in division 14 if the *Classification of Individual Consumption by Purpose* (COICOP) and cross-classified with divisions in the *Classification of the Functions of Governments* (COFOG). This is referred to as individual consumption expenditure of general government.

The final consumption expenditures by general government on individual goods and services are also called *social transfers in kind* by general government in SNA 93 and ESA 95. Social transfers in kind provided to individuals may take two different forms:

- a) *Social benefits in kind (D631)* (see paragraph 4.105 of ESA 95). "They can be subdivided into those where beneficiary households actually purchase the goods and services themselves and are reimbursed, and those where the relevant services are provided directly to the beneficiaries. In this second case, general government units or NPISHs produce or purchases, entirely or in part, goods and services which are directly provided by their producers to the beneficiaries." In Table 2, the corresponding figures are 2+3.
- b) *Transfers of individual non-market goods or services (D632)* (see paragraph 4.106 of ESA 95). "They consist of goods or services provided to individual households free or at prices which are not economically significant, by non-market producers of government units or NPISHs ". So they are included in their output. In Table 2, the corresponding figures are 1 (coming from NPISHs) plus 5 (coming from general government).

Thus final consumption expenditure by general government and NPISHs sectors which is made for the benefit of individuals can be added to households' final consumption expenditure in order to derive households' actual final consumption. The latter concept measures the actual final consumption of households whether paid by themselves or by other institutions.

## 2. INTERNATIONAL COMPARAISONS

### 2.1. share between value added and production in % period 1995 and 2000

We can observe a decrease of share between VA and production during period 1995 to 2000. It means that in period of strength increase of GDP, the share of IC increase more quickly than the share of valued added because of subcontracting specially in terms of services and subcontracting of capacity.

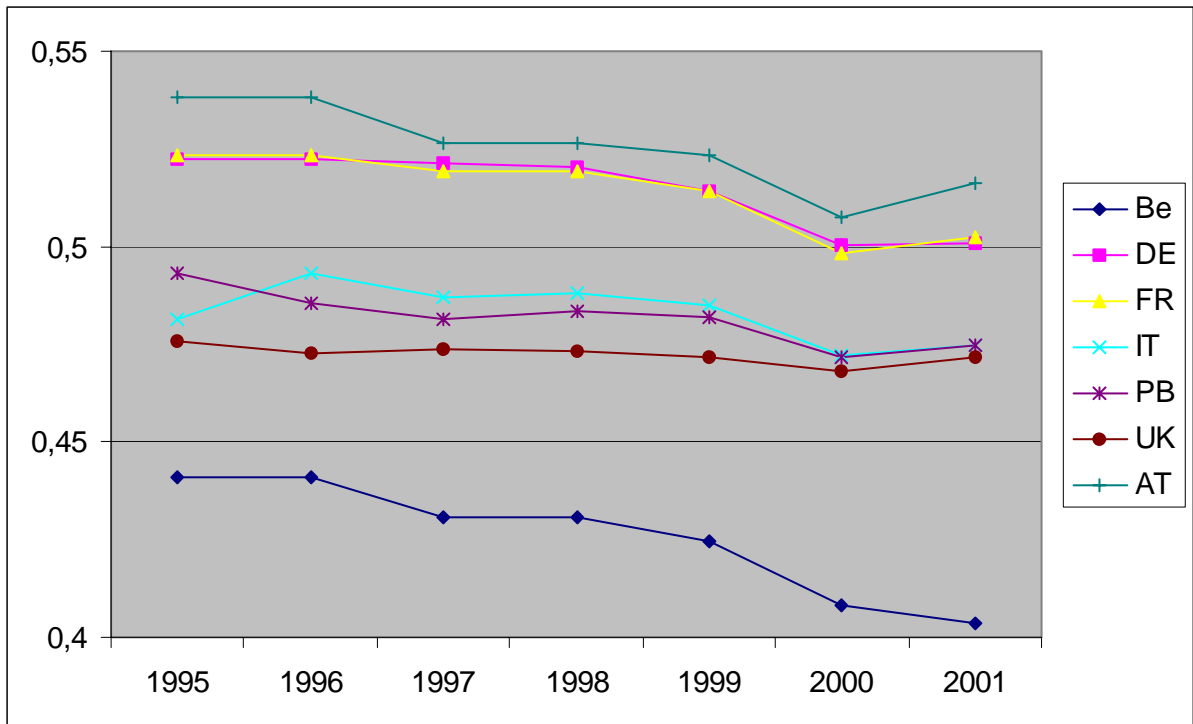
Some curves are very parallel as for instance curves of France and Germany.

In practise, it is necessary to first distinguish specialised sub-contracting. Whenever a firm, because of its own strategy, does not intend to master a specific part of the industrial process, it will then call for a specialised sub-contractor, selected upon twin criteria of know-how and technical equipment. This sub-contracting relates to goods (raw materials or manufactured goods) and relates to an activity different from that of the company which buy it. One must regard the provided raw material as intermediate consumption.

In another situation, though used to making a product itself, a firm exceptionally delegates some particular production to a sub-contractor because it has a does not have the 'capacity' (sub-contracting of capacity). This occasional call for sub-contracting is quite separate from specialised sub-contracting.

**Figure 2**

*Share between Value added and Production in some European countries (in %)*



## **2.2. Share between product in total IC in (normally year 1999)**

It is not very easy to make international comparisons %. Next tables presents share of intermediate consumption by product of the whole economy in different countries (normally year 1999 except for some countries example United States). Some comments could be made.

1/ Different countries have not the same conceptual treatment about subcontracting. Some of them include in the production and in IC. We can observe that in the structure of construction industry. The share of construction products varies from 40% in UK , 35% in Nederland but almost 0,2% in United States. Maybe in the new SUT of that last country, it will be change according to the recommendations of SNA 93.

Production includes normally products supplied by one local KAU to another within the same institutional unit to be used as intermediate inputs or for final uses. In this case, it is normally to include subcontracting in production.

2/ For agriculture, the diagonal corresponds especially to the production of hay, bleaches on grass and forages, for which there is no market, and also grains and plants for sowing and planting. Market prices are applied to the known quantities.

In energy, one part of the output of certain goods - specifically designed in the NACE - is consumed within the same group of the NACE in which they are produced: hard coal consumed by coal mines in the production of coal briquettes; lignite consumed in the production of lignite briquettes, coke and coke dust, natural gas, refinery products and other petroleum products, electrical energy consumed by power stations and their auxiliary services; energy consumed for pumping.

3/ Total IC of services are similar in the different countries, near than 43%. On the other hand, one can observe that this ratio varies from 54% in United Kingdom and in United States to 32,2% in Spain (46,5% in Germany). Anglo-Saxons are thus the most advanced. But it is necessary to relatives these conclusions more closely by studying the various types of services.

The service sector to be analysed here include trade and transport, finance and insurance, real estate and rental, business and personal service and hotels, automobile repairs, research and entertainment, education, health and public administration.

This variation is explain by the business services more or less internal or external with the companies. Divergence are linked to statistical reasons but also to effects of structure.

For example, the use of services by branches of energy vary according to countries' because of importance of nuclear energy where some services like research are important inputs. In France, the use is thus higher than in the other countries of Europe.

In Hotel and restaurant or construction, this ratio of uses of services varies according the concentration degree of enterprises.





