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**Eurostat's ESA 95 manual on Input-Output:**

**Valuation matrices  
(First complete draft)**

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## ***Abstract***

*Starting from the valuation concepts of product flows in the ESA 1995 (SNA 1993) this chapter of the manual outlines the concepts of the different valuation matrices which build the necessary bridges between the valuation at basic prices and at purchasers prices. These valuation matrices consist of the trade margin matrices, the transport margin matrices and the matrices on product taxes/product subsidies.*

*The chapter describes the concepts and definitions of the different valuation matrices and outlines compilation methods. The compilation of the valuation matrices is a complex task as a lot of different types of margins have to be distinguished and matrices both for the supply of margins and the use of margins has to be considered. Furthermore, there is usually less data available for the compilation of these matrices and different kinds of assumptions may be necessary.*

*The main emphasis of this chapter will be on practical aspects of the compilation of these matrices. Relations to other chapters of the manual – especially concerning balancing – will be shown.*

This chapter deals with the various kinds of valuation matrices that are necessary to bridge the different valuation concepts of the product flows and to achieve a valuation of the supply and use flows as homogeneous as possible. The main content of this chapter reflects therefore the concepts and methodology of the trade margin and the transport margin matrices and of the taxes less subsidies on products.

The topics dealt here have many relations to topics treated in other chapters of this handbook. A most important link exists to the chapter on balancing as also trade and transport margins have to be balanced. Furthermore, also the chapters on the supply and use table compilation have many relations to this chapter as in these chapters all aspects of supply and use are dealt with, with the exception of the trade and transport services and the taxes/subsidies on products. Another important link exists to the chapters on constant prices and on the transformation of supply and use tables into symmetric input-output tables.

Because of the specific requirements of the valuation concepts in the system, it was seen preferable to deal with the valuation matrices in a separate chapter and thus covering both the supply-side as well as the use-side valuation concepts and the transformation of the use flows into a valuation consistent with the supply-side valuation.

This chapter is organised in four parts: in the first subchapter the valuation concepts of the system are dealt with and the kinds of valuation matrices are explained. Subchapters two and three deal with the elaboration of the trade and transport margin matrices and the last subchapter with the matrices on product taxes/subsidies.

# 1. Valuation concepts of product flows

## 1.1 Valuation concepts in the ESA 1995

The 1995 ESA distinguishes two main valuation concepts of the flows of goods and services: purchasers prices and basic prices:

**Purchaser prices:** The purchasers price is the amount paid by the purchaser, excluding any deductible VAT, in order to take delivery of a unit of a good or service at the time and place required by the purchaser. The purchasers price of a good includes any transport charges paid separately by the purchaser to take delivery at the required time and place.

**Basic price:** The basic price is the price receivable by the producer from the purchaser for a unit of a good or service produced as output minus any tax payable on that unit as a consequence of its production or sale (i.e. taxes on products), plus any subsidy receivable on that unit as a consequence of its production or sale (i.e. subsidies on products). It excludes any transport charges invoiced separately by the producer. It includes any transport margins charged by the producer on the same invoice, even when they are included as a separate item on the invoice.

The difference between these two basic valuation concepts relates therefore to the trade and transport margins on the one hand, and taxes less subsidies on products on the other. If we introduce also the concept of producers prices (which was the main valuation concept in the former system), the difference between these two valuation concepts can be attributed to the two factors.

**Producers prices:** The producer price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any VAT, invoiced to the purchaser. It excludes any transport charges invoiced separately by the producer.

Thus, the relationship between the different types of prices can be shown as follows:

	Purchasers price
minus	Trade and transport margins
=	Producers price
minus	Taxes on products
plus	Subsidies on products
=	Basic prices

Trade and transport margins are the difference between purchasers and producers prices, and taxes less subsidies on products are the difference between producers and basic prices. Even if the concept of producers prices is not any more part of the system, the relationship still holds and the valuation at producers prices may be an intermediate level in the compilation process. Both in the supply and use tables as well as in the symmetric input-output tables the flows of goods and services should at the end be valued at **basic prices**.

However, the **basic data** which are used to compile the supply and use tables have different valuations:

- Production/output data are usually valued at basic prices or at producers prices;
- Data on intermediate consumption and final use are usually valued at purchasers prices;
- Imports are valued at cif-prices (= price of a good delivered at the frontier of the importing country, or the price of a service delivered to a resident, before the payment of any import duties or other taxes on imports or trade and transport margins within the country);
- Exports are valued fob (= price of a good at the frontier of the exporting country, or the price of a service delivered to a non-resident, including transport charges and trade margins up to the point of the border, and including any taxes less subsidies on the goods exported).

Without separating the different valuation components of the product flows a supply and use framework cannot be balanced and made consistent. It is thus the task of the valuation matrices to bridge the differences between the valuation of purchasers prices and the valuation at basic prices. The **valuation matrices** comprise all flows that are related to the supply and use of trade and transport margins and the supply and use of taxes less subsidies on products. The supply-side valuation matrices are needed to balance supply and use at purchasers prices and the use-side valuation matrices are needed to transform the use data from purchasers prices into basic prices. **Figure VI.1** shows the valuation matrices and their role in the compilation of the supply and use framework.

At the supply-side, data on the trade and transport margins by products as well as data on the product taxes/subsidies classified by products are needed. These data are to be added to the total supply at basic prices which then results into total supply at purchasers prices. This enables to balance supply and use at purchasers prices.

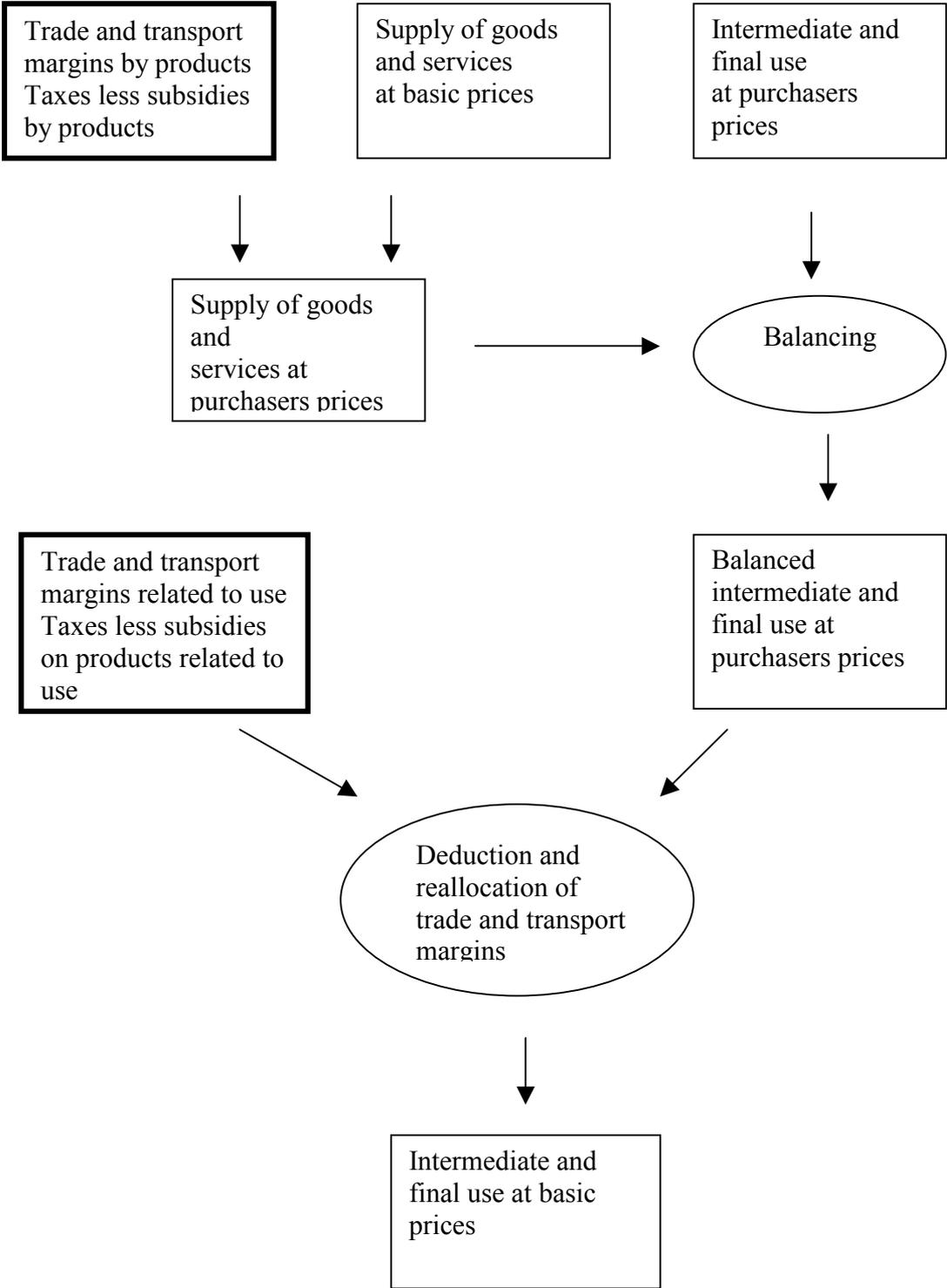
The second kind of valuation matrices relate to the trade and transport margins and taxes less subsidies on products incorporated in the use flows at purchasers prices. The product totals of these use-side valuation matrices should of course be the same as the totals at the supply side. Deducting these use-side valuation data from the use data at purchasers prices results into use data at basic prices. The last step is the column-wise reallocation of the use-side trade and transport margins from the products dimension to which the margins are bound to the margin products.

It should be noted that figure VI.1 only shows the basic structure of the compilation process relating to the valuation matrices. In practical application some of the steps could be done simultaneously and also recalculations might be necessary when required from the experience of the balancing procedure.

It should also be noted that a balanced supply and use framework does not necessarily end with a valuation of supply and use at basic prices. The use data could still be valued at purchasers prices, whereas the supply data be valued at basic prices. However, for analytical purposes also the use data should have the same valuation as the supply data. Also for the transformation process of the supply and use data into symmetric input-output data the separation of the trade and transport margins and the product taxes less subsidies included in the purchasers prices is advisable.

Figure VI.1

The role of the valuation matrices in the supply and use framework



For input-output analytical purposes a **valuation as homogeneous** as possible is required as the input-output relations measured in monetary units are interpreted as technical relations. A unit of a specific input product should represent the same “physical quantity” in whatever production process it is used. Thus, a valuation at purchasers prices is a less homogeneous option as the shares of trade and transport margin differ from industry to industry and also from and between the final uses; the same is true for the shares of product taxes less subsidies. A valuation at producers prices is obviously more homogeneous as the different shares of trade and transport margins are eliminated. In the same way a valuation at basic prices is even more homogeneous as also the different shares of product taxes less subsidies are eliminated. Thus, basic prices is the preferable valuation concept in the supply and use framework and it is also the valuation concept that in practice can be achieved.

## 1.2 The valuation matrices in the supply and use framework

This subchapter describes the full set of valuation matrices in more detail. Table 9.5 of the 1995 ESA – here reproduced as **table VI.1** – can be taken as a starting point. This table shows the structure of the supply table at basic prices, including a transformation into purchasers prices. The left subpart of this table starts with the domestic output of the various industries showing the products produced by them, valued at basic prices. As this part of the table does also include the output of trade and transport margins, they have to be deducted in column (5) in order to avoid double counting. However, it has to be noted that in the output table trade and transport margins are classified as service products, whereas in the subsequent column (5) the trade and transport margins are classified by the products on which trade and transport margins are to be added in order to result into the supply of products valued at purchasers prices.

The product taxes less subsidies are not included in the output matrix as the output is valued at basic prices. The inclusion of the imports cif by products results into the total supply by products at basic prices (column 4).

Column (5) and (6) refer to the supply of trade and transport margins by products and the supply of taxes less subsidies on products. Adding these two columns to the total supply at basic prices results into total supply at purchasers prices (column 7). Column (5) and (6) are thus the necessary bridge to compare and balance total supply with total use, both valued at purchasers prices.

In order to achieve column (5) – total supply of trade and transport margins by products – the elaboration of additional submatrices is necessary: supply-side trade and transport margin matrices. The structure of this matrices is shown in **table VI.2**. It shows the output of trade and transport margins by industries and products. It thus shows which industries have produced trade and transport margins classified by the products traded and transported. The column totals of this matrix is then to be entered as column (5) in the supply table at basic prices, including a transformation into purchasers prices (table VI.1).

In practice the elaboration of this supply-side trade and transport margin matrix will - according to the data sources - be subdivided into several matrices according to the kinds of trade and transport margins. Thus, matrix VI.2 is itself an aggregation of analogous matrices for each of the different types of trade and transport margins.

**Table VI.1 A supply table at basic prices, including a transformation into purchasers prices**

		Industries (NACE)						$\Sigma$ (1)	Imports c.i.f.	Total supply at basic prices	Trade and transport margins	Taxes less subsidies on products	Total supply at purchasers' prices	
		1	2	3	4	...	... n							
		(1)												(2)
<b>Products (CPA)</b>	1	(1)	Output by product and by industry at basic prices											
	2													
3														
4														
.														
.														
.														
.														
.														
m														
(Adjustment items)														
$\Sigma$ (1)	(2)	Total output by industry								0				

**Table VI.2: Supply-side trade and transport margin**

		Industries (NACE)				$\Sigma$ (1)
		1	2	3 ...	... n	
		(1)				(2)
<b>Products (CPA)</b>	1	(1)	Output of trade and transport margins by industry and product			
	2					
	3					
	.					
	.					
	.					
	.					
	.					
	.					
	m					
$\Sigma$ (1)	(2)	Trade and transports margins by product				

As valid for all supply matrices both trade and transport margins can be produced by each industry. However the bulk of the output of trade margins will be produced by the trade industries and the bulk of transport margins by the transport industries.

Similarly to the supply-side trade and transport margin matrices, also the column (6) of table VI.1 is the result of separate calculations on the amount and structure of product taxes less subsidies by products. Column /6) of table VI.1 is an aggregation of the different product taxes and product subsidies.

**Table VI.3** shows the structure of the use table at purchasers prices. This table comprises three submatrices: the intermediate consumption matrix showing intermediate consumption by industries and products, the final uses matrix, showing final uses by types and products, and the value added matrix, showing the components of value added by industries.

Both the intermediate consumption and the final uses matrix are valued at purchasers prices, thus including trade and transport margins and including product taxes less subsidies. Here it should also be noted that purchasers prices do not include deductible VAT. Adding the column total of the intermediate consumption (column 2) with the column total of the final uses matrix (column 4) results into the total uses by products at purchasers prices which should equal to the total supply at purchasers prices.

**Table VI.3 A use table at purchasers prices**

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

The value added matrix is of no interest in this chapter and is treated in chapter IV of part A of this handbook. However, the value added matrix is needed to show the balance between the output at basic prices by industries between of supply table and the sum of intermediate consumption and value added of the use table.

The transition of the use table from purchasers prices into basic prices involves the elaboration of use-side trade and transport margin matrices and of use-side matrices of product taxes less subsidies. **Table VI. 4** shows such an use-side trade and transport margin matrix. This matrix has the same dimension as the intermediate consumption and final uses matrix at purchasers prices. It shows the allocation of the trade and transport margins for each product to each element of the use table at purchasers prices. Hence, it tells how much trade and transport margins are included in the purchasers price or in other words which amounts need to be deducted from the purchaser price in order to achieve the valuation of basic prices, if the same is done also for the product taxes less subsidies.

A differing valuation between supply and use with respect to trade and transport margins is only possible in the case of (tangible) goods, but not for the services. Therefore, the use-side trade and transport margin matrix will only have entries in the goods part of the product classification applied. This would also include non-customised software products that are classified in the service part of the European product classification.

The total column sum of table VI. 4 must be equal to the total supply of trade and transport margins as shown in column (5) of the supply table. As the information basis to construct table VI. 4 is usually very poor, some balancing between the supply and use of trade and transport margins might be necessary. Furthermore, according to the data base available, it may be necessary to start with table VI. 4 to arrive at an estimate of total trade and transport margins by products. In this case the use-side estimates will have to be checked by supply side-data or by plausibility at least. In the case of having estimated supply-side data first, these data will serve as a basis for allocating the supply of trade and transport margins to the various use categories. However, it should already be noted here that some balancing might be necessary anyway to achieve plausible relations for the necessary link between the supply valuation and the use valuation.

As is shown in the chapter on balancing, it is preferable to deal with the all **balancing** in one step and to balance the supply and use of margins, of product taxes/subsidies, of non-margin domestic products and of imports in a simultaneous approach. Whether done in practice simultaneously or in a stepwise procedure, the supply of trade and transport margins must equal the use, and furthermore, the relation between the use data at purchasers prices must be plausible with the use data at basic prices.

Having elaborated matrix VI. 4, the next step is to deduct the trade and transport margins from each single entry in the use table. Furthermore, it is necessary to reallocate the deducted trade and transport margins to the specific trade and transport service products distinguished in the product classification applied.

Similarly, also a use-side matrix on product taxes less subsidies has to be estimated. The layout of this table is equal to that of the use-side trade and transport margin matrix as can be seen in **table VI. 5**. This table shows the amount of product taxes less subsidies included in the purchasers price. For the estimation of these data the relations between the value or the physical quantity and the tax rate of the specific product will have to be used. Contrary to the



**Table VI.5 Use-side taxes less subsidies on products table**

	Industries (NACE)					$\Sigma$ (1)	Final uses						$\Sigma$ (3)	$\Sigma$ (1) + $\Sigma$ (3)		
	1 2 3 ...			... n			a) b) c) d) e) f)									
	(1)						(2)	(3)							(4)	(5)
Products (CPA)	1	(1)	Taxes less subsidies on products on intermediate consumption by product and by industry  - taxes on products by kind - subsidies on products by kind						Final consumption expenditure:							
	2								a) by households							
	3								b) by NPISH							
	.								c) by government							
	.								Gross capital formation:							
	.								d) gross fixed capital formation and valuables							
	.								e) changes in inventories							
	m								f) exports							
									Taxes less subsidies on products on final uses:							
									- taxes on products by kind							
									- subsidies on products by kind							
$\Sigma$ (1)	(2)		Taxes less subsidies on products for Intermediate consumption by industry						Taxes less subsidies on products for final uses by type							Total taxes less subsidies on products

trade and transport margins no specific information on distribution channels or transport deliveries is needed here. However, for the estimation of table VI. 5 some detailed supplementary calculations may be needed as the products that are taxed might only be a part of the product group distinguished at the classification level applied (see also chapter II).

Similarly to the mentioned problem of data availability, the estimation of product taxes less subsidies may start from the use-side and then shifted to the supply-side. As already said supply and use of product taxes less subsidies has to be balanced and the correct relation between the product flow and the tax bases and tax rates to be considered.

Having estimated table VI.5 the data have to be deducted from the use-data at purchasers prices and shown as a separate row in the use table (concerning VAT see subchapter VI.4).

After these steps, the use table has been transformed into a valuation at basic prices, thus the same as the supply table. **Table VI. 6** illustrates the resulting use table. Note that the product flows - now valued at basic prices - still do not distinguish between domestic and imported products. The elaboration of the import matrices is explained in chapter IX.

The estimation of the trade and transport margins is thus an important step in the compilation of supply and use tables. The amounts involved are of great magnitude, especially as concerns the trade margins. The data situation for the compilation of the valuation matrices is often quite poor. Thus, plausible assumptions have to be made. Also, it might be advisable to make benchmark estimates for a year with a favourable data situation which then could be used for subsequent years.

The valuation matrices are not only an inevitable part of the matrices to be estimated in a supply and use framework, but they are also strongly related to the product data to which they pertain. The compilation of the valuation matrices has to be integrated in the total elaboration process and specifically also in the balancing procedure.

**Table VI.6 A use table at basic prices**

		Industries (NACE)		$\Sigma$ (1)	Final uses		$\Sigma$ (3)	$\Sigma$ (1) + $\Sigma$ (3)
		1 2 3 ...	... n		a) b) c) d) e) f)			
		(1)	(2)	(3)	(4)	(5)		
<b>Products (CPA)</b>	1	(1) Intermediate consumption at basic prices by product and by industry			Final uses at basic prices:  Final consumption expenditure: a) by households b) by NPISH c) by government  Gross capital formation: d) gross fixed capital formation and valuables e) changes in inventories f) exports			
	2							
	3							
	.							
	.							
	.							
	.							
	.							
	.							
	M							
$\Sigma$ (1)	(2)	Total intermediate consumption at basic prices by industry			Final use at basic prices			Total output
Net taxes on products	(3)	Net taxes on products for intermediate consumption by industry			Net taxes on products for final use			Total net taxes on products
$\Sigma$ (1) + (3)	(4)	Total intermediate consumption at purchasers prices by industry			Total final uses by type			Total use
Compensation of employees Other net taxes on production Consumption of fixed capital Operating surplus, net	(5)	Components of value added by industry						
$\Sigma$ (5)	(6)	Value added by industry						
$\Sigma$ (1) + (3) + $\Sigma$ (5)	(7)	Output at basic prices by industry						

## 2. Trade margins

### 2.1 Definition and kinds of trade margins

The 1995 ESA defines a trade margin in para. 3.60:

A **trade margin** is the difference between the actual or imputed price realised on a good purchased for resale and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed of. By convention, holding gains and losses are not included in the trade margin. However, in practice, data sources may not allow to separate out all the holding gains and losses. Trade margins are valued at basic prices.

The concept of trade margins can thus be applied for single goods, for trading activities of a statistical unit, for the trading activities of industries and for total trading activities of the economy.

In practice, trade margins are derived as the difference between the trading sales and the costs of goods purchased for resale adjusted by changes in stocks (if possible, adjusted by holding gains and losses):

$$\begin{array}{r} \text{Trade sales (at basic prices)} \\ \text{minus Costs of goods purchased for resale (at purchasers prices)} \\ \text{minus Trading stock at the beginning of the period (at purchasers prices)} \\ \text{plus Trading stock at the end of the period (at purchasers prices)} \\ \text{= Trade margin (at basic prices)} \end{array}$$

In order to derive trade margins, either for single goods, for industries or for the total economy, data on trading sales (trade turnover), data on goods purchased for resale and trading stock at the beginning and at the end of the period must be available. Usually, structural business statistics or specific trade surveys do deliver such data at the level of industries. However, trading is also an important secondary activity of nearly all industries.

Trade margins are the measurement concept of trading activities in the system, regardless whether done by traders as their main activity or by other industries as part of their secondary outputs.

Trading is defined as **resale of goods without any transformation**. However, certain operations (manipulations) associated with trade are included in the definition of trading, such as the sorting, mixing, breaking bulk and re-packaging for distribution in smaller lots. Also included may be other services if not separately invoiced such as installation in situ.

Trade services are usually distinguished between **wholesale and retail sale**. Wholesale is the re-sale (sale without transformation) of new and used goods to retailers, industrial, commercial, institutional or professional users; or to other wholesalers. Retailing is re-sale (sale without transformation) of new and used goods, mainly to the general public for personal or household consumption or utilisation. This distinction is important with respect to the allocation of the trade margins to the use categories. However, this distinction is not always easy to observe and may become more and more doubtful.

When trade margins are derived from structural business statistics or similar sources they include trade services which are not be considered as trade margins. This is valid for the **trade services on used goods, waste and scrap**. Also trade services where a domestic enterprise buys goods in a foreign country A and sells them to foreign country B is not to be considered as part of the trade margins as these margins are not part of the difference between supply and use of goods (**transit trade**). These trade services have to be treated as service exports.

Because of the valuation concepts of imports (cif) no imports of trade margins need to be considered.

## 2.2 Compilation of trade margins matrices

### 2.2.1 Supply-side trade margin matrices

As already mentioned above, due to availability of data sources one might start the compilation of the trade margin matrices either from the supply side or from the use side. Starting from the use side means that estimates are made on the share of trade margins included in each element of the use table at purchasers prices. Such shares depend on the typical product margin ratios and the share of the use flow delivered via the trade channels. Normally, such information cannot be gathered by asking enterprises and other users as they might only have information on the last step in the distribution channel (where they have bought the product), but clearly not on the steps earlier, and even for this last step they do not know the margin ratio implicitly invoiced to them. Thus, plausible assumptions both on the margin ratios and on the share of purchases via distributive channels will have to be made.

It seems therefore quite logical to start the compilation with the **supply side** resulting in data on the total amount of trade margins by products. At least structural business statistics or special trade surveys might provide data on total trade margins by industries which needs then to be transformed into data by products. Starting at the supply side also allows to check the assumptions made when the commodity-flow method has been used for estimating or checking use data. Lastly, also in case of benchmark estimates it is advisable to calculate the full range of supply and use-side trade margin matrices by exploiting all available data sources and thus to lay a basis for subsequent calculation rounds. Needless to repeat that supply and use of trade margins by products must be equal at the end.

Data on trade margins produced by industries and by products are usually not available from surveys. If this would be the case these data could directly be entered into the supply table. Of course, adjustments for holding gains and losses would have to be made and also any additions to ensure full coverage of trade margin supply because of underreporting, hidden economy and similar national accounts adjustments. In most cases only data by industries are surveyed without a breakdown by products and/or by wholesale and retail trade.

The data usually available are such that total **trade margins by industries** can be derived: namely trade turnover, value of goods purchased for resale and changes in trading stocks. It has to be checked whether the data available cover all industries as trading is an activity carried out in almost all industries, whether market or non-market. If this is not the case, specific estimates have to be made. It might for instance be the case that for certain industries only total output is known without distinguishing between trade output and other output. In such cases estimates based on plausible assumptions should be made to achieve data on total

trade margins of the economy. Trading is also an important secondary output in many service industries other than trade, from barber shops to museums, from hotels to recreational and sporting industries.

In order to transform trade margins by industries into trade margins by products, it is necessary to subdivide the trade margins by each industry into the trade margins by products considering the range and share of products traded and the margin ratios connected to each product. Furthermore, it is necessary to subdivide the trade margins into wholesale and retail trade margins. It is obvious that this transformation cannot be done in one step as information is not directly available. In this transformation one would need both the shares of the goods traded as well as the typical margin ratios of each product and the shares of wholesale and retail trade for each good. It is therefore recommended to do it in a stepwise procedure and to start with the trade turnover.

**Trade turnover** data by industries are the starting data to derive trade margins by industries. Such data are available at least for those industries which are covered by the structural business statistics. The **first step** would be to separate trade turnover into wholesale trade turnover and retail sale trade turnover. In structural business statistics a distinction between wholesale and retail trade turnover is often surveyed in the trade industries, but not in the other industries. However, in such cases the value of products purchased for resale is not required to distinguish between wholesale and retail sale so that trade margins by industries subdivided into wholesale and retail trade margins cannot be derived on the basis of survey data.

Any industry can both produce wholesale and retail sale services. This is valid for trade industries as well as for all other industries. Whether such cases are important depends normally on the kind of industry.

The subdivision of trade turnover into **wholesale and retail trade turnover** has to be done by using plausible assumptions if no survey based data are available. For example, one can assume that trade turnover of restaurants and hotels will likely be retail trade turnover, the same with trade turnover of hairdresser shops, cinemas and theatres. On the other hand, trade activities of advertising agents will more likely be wholesale trade. In manufacturing the situation is more complex as in many industries the trade activity covers both wholesale and retail trade, but the bulk of trade activities there will probably be of the wholesale type. Manufacturing industries are trading in similar products that are also produced by them or in complementary products and such trade sales will usually be of wholesale type. These industries are also importers of such products which will also be normally classified as wholesale trade. On the other hand, there are industries where a split between size classes might be relevant for the adequate allocation of the type of trade performed. To take the bakery industry as an example: the trade of small bakeries is likely of retail sale type, whereas the trade of the big sized ones is probably of wholesale type.

The distinction between wholesale and retail trade is relevant for all industries, even if for some only wholesale or retail trade might occur in practice. Wholesale industries are classified in the industry classification NACE Rev. 1 under division 51, retail industries under division 52. However, it should be noted that division 51 covers also commission trade which is not part of the trade margins. Furthermore it has to be noted that division 50 "Sale, maintenance and repair of motor vehicles and motorcycles (including parts and accessories),

and retail sale of automotive fuel” is a mixture of both wholesale and retail trade activities as well as of non-trade activities.

The **second step** is then the subdivision of the **trade turnover by products** which would result into two trade turnover matrices industries by products, one for wholesale and one for retail trade turnover (see **table VI.7**). The likely data base for this step is usually also very poor. It might be the case that for the trade industries such data are surveyed, but not for the other industries. Here again, plausible assumptions are needed. It would not be wrong to assume that for instance hairdressers are trading in cosmetic articles, that hotels are trading in souvenirs, newspapers, journals and food and beverages, that museums are trading in books, multimedia products and so on. However, the share of each product group still has to be estimated. The general rule, that working at a certain detailed level gives plausible results in the aggregates, even if no or less information is available, is also valid here.

Estimating trade turnover by products is for some industries a difficult task. This is valid for many branches in the trade industries where usually a lot of goods are traded, such as in the non-specialised trade, but also in some specialised trade branches. On the other hand, there are some branches where one can easily make plausible assumptions on the trade pattern, such as the retail sale with shoes, where surely about 80 - 90% of the turnover will be turnover with shoes, the rest with textiles, accessories for shoes, cleaning preparations and the like. Clearly, it is more easy to make some estimates for retail branches compared to wholesale branches as the first ones are better known from everyday life and more homogeneous (with the exception of supermarkets and other non-specialised retail trades). Furthermore, one can try to get some data from the trade chains which - because of the computerisation of their commercial activities - do have detailed information on the goods traded.

The wholesale branches are usually more difficult because of the higher level of heterogeneity. Of course there are branches with a clear concentration on one or a few product groups, such as the wholesale of motor vehicles, the wholesale of mineral oil, and some others. On the other hand there are branches with very broad groups of products traded and others with a high level of specialisation. This makes it more difficult to achieve plausible estimates and some single information on specific units may not be representative for the total branch. Also in manufacturing it will be difficult to estimate trade turnover structures by goods traded without any information as the specialisation can also be very high. Again one can try to get some information by asking selected units with important trade turnovers.

Having compiled the two trade turnover matrices one can check the trade turnover with the supply of the goods (domestic production and imports) as well as the relation between wholesale and retail trade turnover. These relations will vary between products, especially between consumer, intermediate and capital goods. Such checks should ensure that the trade turnover estimated is in some plausible relation to the supply of the goods.

Having established trade turnover matrices, the next step is to transform these data into margin data. This could be done by **multiplying the trade turnover matrix by the assumed product margin ratios**. Margin ratios are defined here as the share of a trade margin in relation to the trade turnover. Such margin ratios can be defined at the level of products (product groups) or at the level of industries which would give information on the average margin of that industry.

**Table VI.7 Trade turnover matrices**

		<b>Industries (NACE)</b>	$\Sigma$ (1)	<b>Industries</b>	$\Sigma$ (2)
		(1)	(2)	(3)	(4)
<b>Products (CPA)</b>	1	Wholesale trade turnover by product and by industry		Retail trade turnover by product and by industry	
	2				
	3				
	.				
	.				
	m				
		Total wholesale turnover by industry		Total retail trade turnover by industry	

In transforming the trade turnover matrices we have in principle two options: we either can apply for each industry the average margin ratio of that specific industry for all the products traded or we can apply a specific product margin ratio to all trade turnover of that product irrespective of the industry. The first approach uses the idea of the industry technology and the second one that of the product technology. Thus, the question is to be discussed which of the alternatives is the best approximation to reality. Of course, one has also to take into account the wholesale and retail trade distinction.

If one is analysing trade data one would see that obviously margin ratios are differing between wholesale and retail and also within wholesale and retail between the different trade branches. Taking retail trade branches as examples, usually the margin ratios of petrol stations are much lower than margin ratios of the food and beverage trade branch, those of cosmetic articles and pharmaceuticals are more higher than those of household articles, and so on. Normally, wholesale trade margin ratios are smaller than the corresponding retail sale margin ratios. If the typical margin ratios differs between the trade branches and the trade branches have their specific trade pattern, one can conclude that obviously trade margin ratios are strongly connected with the goods traded. Thus, the assumption of product specific margin ratios seems to be more adequate for the transformation of the turnover matrices.

Thus, the **next step** is to explore source for **product specific margin ratios**, both for wholesale and for retail sale. One possible source might be to compare and relate the prices observed in the consumer price index (adjusted by VAT) and in the wholesale trade price index, if available. For comparable and representative goods one could derive a typical retail product margin ratio. The same could be done by using price data of production price index and compare them with wholesale price index information, which would provide proxies for wholesale margin ratios. In case of regulated prices the price levels in the different distribution channels could also be used. It is clear that all such sources might not be comprehensive enough and the comparison work might also be very laborious.

A much more easy way is to use the margin ratios of the single trade branches as proxies for the product margin ratios. So, one could use the margin ratio of the retail trade branch with shoes as the typical retail margin for shoes. This would easily be possible for trade industries which are defined by the products traded (specialised trade) and where one product group is dominating. Of course, one would have to avail trade data at a very desegregated level.

Having established a set of product specific margin ratios, the multiplication of the trade turnover matrix could then be performed on the assumption that these product specific margin ratios are valid in all industries trading that product. The **next step** would be to compare the resulting wholesale and retail trade margins by industries (summed up over the products and the wholesale and retail trading) with the surveyed (or estimated) trade margins by industries. Ideally there should be no difference between these two sums. However, there will be some differences. The reasons for differences could be errors in the trade turnover matrix, in the subdivision between wholesale and retail trading, in the assumed or derived product margin ratios and in the fact that the assumption of the “product technology” may not be correct.

The differences should be analysed and adequate changes in the data be implemented. The goal would be to minimise the difference and thus to best approximate the estimated trading pattern of each industry to the given totals. In certain industries the assumption of product specific trade ratios might not be valid. One example could be the mail order houses whose average margin ratio might be quite higher than in the specialised trade branches. Here the

difference between the estimated margin and the given totals might be quite high, indicating that the basic assumption might be wrong.

It is the task of the compiler of the trade margin matrices to check the data and the assumptions made. At the end, there will be a certain amount of difference left, which then should be allocated to the products on a pro-rata basis, so that the estimated trade margins are equal to the given totals by industries. In doing so, the hierarchy of the product specific margin ratios is ensured, even if the absolute levels (see mail order house example) are differing between industries.

**Figure VI.2** summarises the estimation steps to arrive at supply-side trade margin matrices. It should not be neglected that in these steps of compiling supply-side trade margin matrices a lot of uncertainties will have to be dealt with. This has to do with the usually weak data base but also with the tremendous changes in the trade industries, both with respect to changing forms of supply of trade services, the ongoing concentration in retail trade branches, the increase in the size of shops, as well as with the increasing importance of internet trade, and many more reasons. Furthermore, the magnitudes involved are extremely high. For certain products trade margins could be up to more than 100 % of total supply at basic prices.

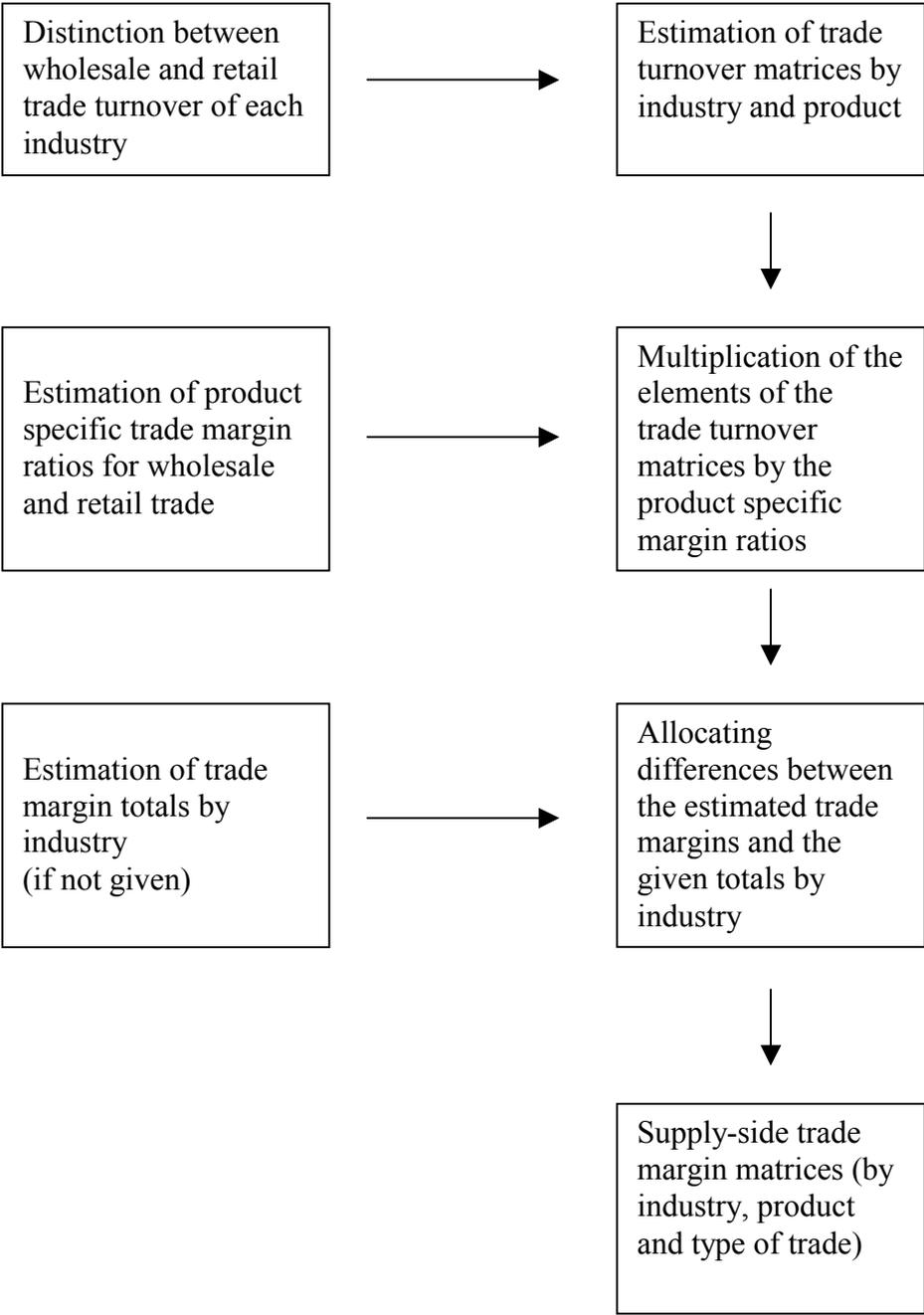
Despite these uncertainties, the estimation procedure as explained here has some important **advantages**: it allows to check trade turnover by products as well as trade margins by products with the supply of these products; it also supports the commodity-flow estimates in that the size of the total trade margins by products, the distributive channels as well as the assumed margin ratios could be taken into account. This compilation method should thus be followed as much as possible depending on the data sources, or at least for a benchmark calculation.

It should be remembered that in these trade margin matrices only those trade margins should be included that form the difference between use at purchasers prices and supply at basic prices. Trade services in second hand goods, scrap and waste or similar commodities not considered as products should be treated separately. Also the transit trade services need to be separated.

Last but not least, attention should be given to the **level of detail** at which the trade margin matrices should be compiled. It is preferable that the product level should be more desegregated than the level of detail of the final supply and use tables. Products may be considered to be subdivided according to the needs of the commodity-flow method, according to the different product margin ratios and to details desirable for the compilation of the certain use data (e.g. to allocate the products and their margins to the purpose categories of private consumption expenditures). Also at the level of industries may be increased in order to adequately estimate the turnover matrices and the margin matrices derived thereupon. So, for example, in trade a detailed level of the trade branches should be used, not only for the estimation of the turnover matrix but also for the subsequent steps to be able to check and ensure consistency between the calculated trade margins and the given industry totals.

Figure VI.2

The compilation process of supply-side trade margins



## 2.2.2 Use-side trade margin matrices

In order to transform the use table from purchasers prices into basic prices, the deduction of the trade and transport margins as well as the net product taxes is necessary. This subchapter here deals with the calculation of the use-side trade margin matrices as shown in table VI. 4. These matrices show the amount of trade margins by products and industries and final uses.

**Data availability** seems even to be more worse than for the supply-side matrices, for the mere fact that buyers of the goods do not know the share of the trade margins in the price they have to pay. Sometimes they even do not know whether they have bought from a trader or not. Only in the obvious cases that the buyer has bought in a retail shop or at a wholesale trader the buyer knows that the price paid includes some trade margin, without knowing the amount of the incorporated margin. All the distribution channels before the final seller is certainly totally unknown to the buyer.

The calculation of the use-side trade margin matrices has to be based on **plausible assumptions** and balanced with the estimated total supply of the trade margins. Ideally, the following types of information might be necessary.

- for each single element of the use table the share of the purchases that has been bought via trade (for all involved steps in the distributive channel),
- the relevant margin ratios of the products.

The unknown component is clearly the distributive channel. It could also be that the margin ratio of certain products vary between users. Here plausible assumptions have to be made. Also, the distinction between wholesale and retail trade comes into play. As explained, this distinction does neither concern the size of the margin ratios nor quantity of the products traded, it refers to the type of the buyer of the trade service (broad distinction between industries and consumers).

It could be assumed that in **intermediate consumption** only wholesale trade services are involved, again with some possible exceptions, such as buying stationery materials by handicrafts, smaller shops and small scale enterprises. On the other hand, one can assume that most of the retail margins may be allocated to **private consumption** expenditures, with also some exceptions, when consumers have access to the wholesale channel directly. Of course, a good part of the consumer expenditures on goods may not involve trading services at all, when directly bought from the producer of the good (e.g. bakeries, tailors, etc.). As concerns the wholesale services connected with private consumption, the situation might differ very much. Some of the products bought in retail trade might have been delivered from wholesalers, whereas others directly form the producers of the goods.

Similar considerations may be undertaken for **capital formation** for which mostly the wholesale channel is important and to a very small part also the retail sale channel (e.g. products bought by private households when constructing their own dwellings or making major repair, but also the valuables).

In **inventories** only wholesale margins can be involved, but not retail sale margins. However, the problem is that logically one cannot allocate margins to changes in stocks, but only to stock data, more specifically stock data of the end of the period. In practice, this means that trade margins will be allocated only to increases in stocks.

For exports one can assume that only wholesale margins are involved, also with some exceptions, the most important relating to the goods bought by non-resident travellers (tourists). In case that VAT statistics is available, one can base the estimates on the turnover data of the exports reported by the trade industry. This would not cover trade of goods in exports by industries other than trade.

Some other more general considerations relate to the share of imports, i.e. imported goods are more likely to be bought via wholesale trade; the size of the enterprises in the different industries, i.e. small enterprises may more likely buy certain goods also via retail trade, and the like.

The allocation of the trade margins to the single use elements will have to be done in a **stepwise procedure**, starting with the flows for which the best quality information is given or the assumptions seem to be of most plausible character. In this first step also the margins calculated in commodity-flows will be utilised as well as information given from VAT statistics. After this step those margins/use elements will be allocated which can only be based on assumptions. For all these steps the total supply of trade margins from the supply-side calculations forms the constraints.

In all these steps the details available from the supply-side should be utilised as much as possible; this especially refers to the details of products. The resulting use-side trade margin matrices should also be checked on **overall plausibility**, both with regard to the relations between allocated wholesale and retail trade margins as well as concerning the relations between the use data at purchasers prices and the allocated trade margins. It could be the case that based on such checks also the supply-side margin data will have to be changed.

Having achieved final use-side trade margin matrices, these matrices have to be deducted from the use matrices at purchasers prices and the margin values for each industry and final use category aggregated and allocated to the trade margin products according to the product classifications. The wholesale trade margins have to be allocated to CPA division 51 and the retail sale margins to division 52. However, wholesale and retail trade margins on motor vehicles and motorcycles (for both including parts and accessories) as well as retail trade margins on automotive fuel have to be allocated to CPA division 50. It is thus advisable to separate these trade margins in the whole compilation process as best as possible.

### **3. Transport margins**

#### **3.1 Definition and kinds of transport margins**

Apart from the trade margins the transport margins are other valuation component relating to the delivery chain of the products from the producer to the final user. Transport margins represent freight transportation services of products when paid by the buyer of the product or when invoiced separately by the seller. Transport margin are defined as follows:

**Transport margins** are the transport costs for transportation of products paid separately by the purchaser and included in the use of products at purchasers prices but not in the basic price of a manufacturers' output or in the trade margins of wholesalers or retail traders.

Such **transport margins include** in particular:

- transport of goods from the place where it is manufactured or sold to the place where the purchaser takes delivery of it in case the manufacturer or trader pays a third party for the transport, if this amount is invoiced separately to the purchaser;
- transport of goods arranged by the manufacturer or by the wholesale or retail trader in such a way that the purchaser has to pay separately for the transport costs even when the transport is done by the manufacturer or the wholesale or retail trader himself.

The definition of the transport margins is thus related to the way the transportation costs are paid. This means that transport margins cannot be derived from the output of the respective transportation services, information of the payments between the two related parties of the seller and the buyer is required. This definition of transport margins in the 1995 ESA is thus much more restricted compared to the former system as it included the transport costs paid by the seller. However, in the old system transportation costs paid by the seller was not to be included in its output.

Both the old and the new definition was consistent as only those transport services are regarded as transport margins that form part of the difference in the valuation of supply and use. The new treatment may be considered as being more adequate with the bookkeeping of the firms, but make the elaboration of the transport margins more difficult.

Based on this basic definition, all the following transportation costs are **not recorded as transport margins**, because they do not contribute to the valuation difference between basic prices and purchasers prices:

- if the manufacturer or trader transports the goods himself, these transportation costs will be included in the basic price of the manufacturer's or trader's output; this transport represents an ancillary activity and the individual costs of transport will not be identifiable as transportation costs;
- if the manufacturer arranges for the goods to be transported without a separate invoice for the transport services, these transport costs will be included in the basic prices of the manufacturer's output; these transportation costs will be identifiable as such and be recorded as part of the manufacturer's intermediate consumption;
- if wholesale and retail traders arrange for goods to be moved from where they take delivery of them to where another purchaser takes delivery, these costs will be included in the trade margin if no separate charge is made for transportation to the purchaser (i.e. these costs will be part of the intermediate consumption of the wholesale and retail traders);
- if a household buys goods for final consumption purposes and arranges for transport by a third party, these transport costs are recorded as final consumption expenditure on transport services and not included in some trade or transport margin;
- if a domestic carrier transports goods from country A to country B through the domestic territory (transit transport), this will also not be considered as a transport margin as it does

not relate to goods that forms part of domestic supply and use; these transportation services will be recorded under export of services;

- also transportation services of domestic carriers outside domestic territory are not part of the transport margins, but export of services;
- freight transportation of used goods, scrap and waste, earth and similar freight connected with construction projects are also not part of transport margins as these goods are not considered as products.

Contrary to the trade margins there could also be **imported transport margins** when a foreign carrier transports freight in the domestic territory.

According to the modes of transport several kinds of transport margins have to be distinguished. In addition, the services of forwarding agencies do also form part of the transport margins when paid separately by the buyer. Last, but not least transport insurance services have also to be considered under the same terms as the general definition of transport margins. Transport insurance services have to be recorded as the other insurance services based on the service charge concept.

In total, the following **kinds of transport margins** have to be taken into account:

- |                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>- road</li><li>- railway</li><li>- water</li><li>- air</li><li>- pipeline</li><li>- forwarding</li><li>- transport insurance</li></ul> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Compared to the trade margins, the transport margins are of much lower size, and are according to the definition in the ESA much lower than they were before in the old system. However, the complexity of the transport margin is much bigger, not only because of the different kinds of margins, but also because of their definition itself. Also the data situation gives rise to many practical elaboration problems. The relation between the supply of goods and the transport margins connected with them is much more loose than in the case of trade margins. Several reasons can be given for this fact: the transport costs are usually not related to the value of the goods transported, much transportation is done as ancillary activity; and, the way transportation costs are paid might differ from product to product and from transaction to transaction.

## 3.2 Compilation of transport margin matrices

### 3.2.1 Supply-side transport margins

Similarly to the case of trade margin matrices, it is recommended to start the transport margin matrices also with some **supply-side calculations** for the same reasons: there is no direct information on the amount of transport margins included in the purchasers prices and a comprehensive estimation of the transport margins in an economy may be used as benchmark data for other years also.

Starting from the supply-side involves firstly the identification of the **transport services** produced on goods in the different industries. As shown in the subchapter above, not all of these transport services will be regarded as transport margins for the following reasons: there are transport services on goods not considered as products in the system, such as the transport of **used goods** (including removal services), of scrap and waste, of earth and similar goods in relation to construction projects. A second reason relates to **transit transport** where a domestic carrier transports goods from a foreign country A to a foreign country B. Thirdly, all **transportation outside the domestic territory** in connection with imports and exports of goods are to be considered as transport services, but not as transport margins. Only those transport services that contribute to the difference between the supply of products at basic prices and the use of products at purchasers prices are to be treated as transport margins.

Furthermore, according to the definitions of the 1995 ESA the transport margins are even of less coverage compared to the old system, as transport costs are only part of the purchasers price if the purchaser has to pay for it separately. If the seller pays for the transportation and does not invoice it to the buyer separately, these transportation costs have to be shown as part of the intermediate consumption of the seller. Thus, only in the case that the **buyer arranges for the transportation and/or pays for it directly**, these transportation costs form part of the difference between supply at basic prices and use at purchasers prices and are thus to be entered in the transport margins matrices.

It would have to be explored whether the direct payment of transportation costs by the buyer is of great importance. Of course, it will exist, but for simplicity one could argue that in reality these cases are of less importance and conclude that there are no transport margins at all.

If we do not apply this extreme assumption, the calculation of the transport margins according to the 1995 ESA is a complicated task. From the supply-side alone we are not able to distinguish between transport services paid by the seller from those – only relevant – transport services paid by the purchaser. Starting from the output of transport services in the different industries only the total transport service can be calculated. From this total output we have to deduct the transport revenues related to transit transport, transport outside domestic territory, transport revenues related to freight not considered as products, and last but not least transport revenues paid by the seller. Furthermore, we have to subdivide the resulting transport margins by products and by mode of transport.

Usually, information of the revenues not to be considered as transport margins as well as information on the products transported are not available in monetary terms. Structural business statistics will only provide us with total revenue data. One possibility is to make use of **transportation statistics** which normally survey transportation activities in physical terms by providing data on the transport distance, whether domestic, cross-border or transit transport, the transport volume in terms of weight and ton-kilometres and the kinds of goods transported. Transportation statistics may also cover all the different modes of transport (road, railway, water, air, pipeline).

The use of such transportation statistics could thus be a source to achieve estimates on these unknown components. The data on ton-kilometres will have to be multiplied with appropriate **transport tariffs** (transport prices). Such tariffs will vary between the goods transported as different kinds of transport vehicles have to be used. Transport tariffs do also vary according to the transport distance.

The transformation of the physical transport volumes into monetary revenues by using the transport tariff information has to be checked with the total output of relevant transport revenues. There will be differences between these two totals and the estimated transport revenues by products will have to be aligned to the transport revenues surveyed in structural business statistics. The reason for such differences are weak data, underreporting of transport statistics, inadequate assumptions concerning the actual transport tariffs.

Utilising transport statistics information would ideally result into supply-side data on transport services which includes transport services paid by the seller as well as by the buyer. A separation of these two components can only be made by using information on the use-side (i.e. transport costs paid by the seller). Transport statistics supports also the estimation of the value of transit transport and transportation outside domestic territory connected with imports and exports. Furthermore, transportation statistics can also be used to estimate the imports of transportation services (i.e. transportation services provided by foreign carriers in the domestic territory). One would have to assume that the same transport tariffs are also valid for the foreign carriers.

**Transportation costs paid by the seller** are usually surveyed in structural business statistics, at least as one separate cost item. By definition these transportation costs relate to the goods produced or traded. Based on the structure of the output and the products traded an estimate can be made on the structure of the products for which the transportation costs have been paid for. At least, one can assume that the transport costs are proportional to the value of the products produced or traded. However, this is very implausible assumption and the estimate will be of poor quality.

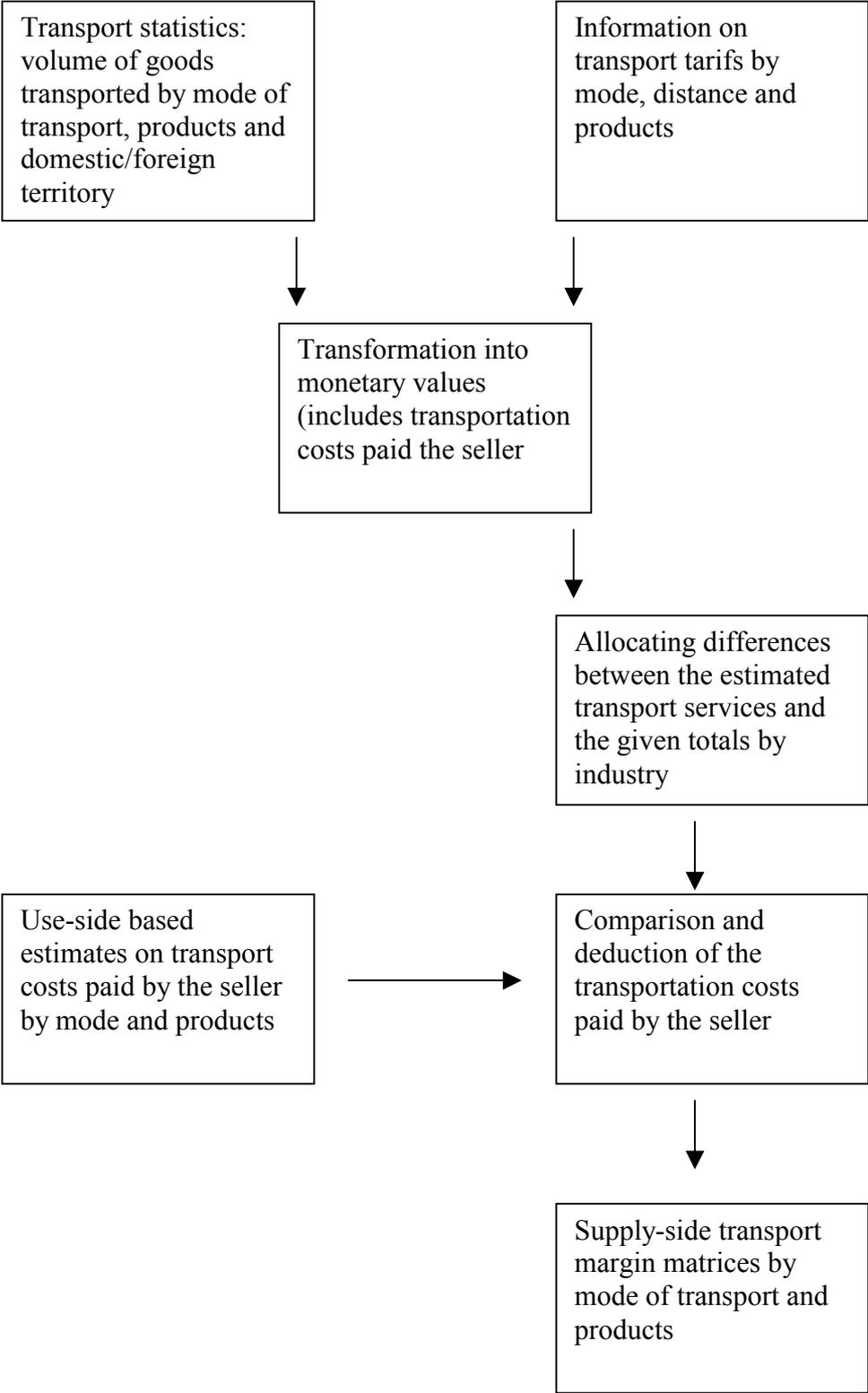
However, such a poor estimate will have to be used to compare the transport costs paid by the purchaser with the total transport services of the supply-side. Conceptually, the transport costs paid by the purchaser has to be deducted from total transport service as calculated on the basis of transportation statistics in order to achieve an estimate on total transport margins by products. Because of the uncertainties in all the data entered into these calculations and the assumptions to be made, the results might not be directly usable for the further calculations. However, this approach makes best use of the data sources that might be available. **Figure VI. 3** summaries the principal compilation steps of supply-side transport margins.

Contrary to the trade margins the magnitude of the transport margins and even of the transport services is much smaller. In some cases the imbalance between supply and use of a product might be much bigger than the transport margins of that specific product, however estimated. It could thus be considered to concentrate on those products where important transportation services are involved. Such products normally are the agricultural and forestry products, energy products, iron and steel products and products related with construction. However, this may vary between countries.

For the forwarding agents services we do have the same elaboration problems as for the transportation itself. However, the forwarding agents services are much more related to the transportation costs and estimates could be based on the structure of the transportation margins. However, not all is organised by forwarding agents. Forwarding agent are usually engaged in cross-border transportation rather than in domestic transportation.

Figure VI.3

The compilation process of supply-side transport margins



Transport insurance services are usually a very small part of the transport margins. Here also, they may be more important for cross-border transportation than for domestic transportation. A main difference is that the insurance premiums depend on the value of the goods transported rather than on any transport costs.

### **3.2.2 Use-side transport margin matrices**

The calculation of the use-side transport margin matrices has to deal with the same uncertainties in the available data and estimates of the supply-side margins. Of course, transport services of transit transportation and transport services outside domestic territory can easily be entered into the export column under transport services and the transport margins related to exports allocated to the specific export products.

The allocation of the transport margins to the use data will have to be based on **plausible assumptions** starting from the total supply of transport margins. The estimation of the transport costs paid by the seller can only marginally be used as an indication of the allocation of transport margins. One cannot assume that neither an allocation should not take place to users that have reported a certain amount of transport costs paid by themselves at all nor to any product that the user has in its intermediate consumption. Only part of the transport costs may have been paid by the purchaser and only for certain inputs.

Because of the weak data base one may concentrate on the products with large transport margins involved and allocate the remaining products according to some plausible assumptions. As only a part of all transport services are transport margins it is thus also difficult to check the resulting data on plausibility. Of course, supply and use of transport margins should be equal, but the estimation of the one side is not independent from the estimation of the other side (if both approaches have been applied at all).

Having achieved the final use-side transport margin matrices, these matrices have to be deducted from the use matrices at purchasers prices and the total margins by industry and final uses be allocated to the transport services of the product classification: railway, road and pipeline to CPA division 60, water to division 61, air to division 62, forwarding to division 63, and transport insurance to division 66.

## **4. Product taxes and subsidies**

### **4.1 Definition of product taxes and subsidies**

Taxes less subsidies on products are the other valuation component in addition to the trade and transport margins. Compared to them, the elaboration of the matrices of product taxes/subsidies is less complicated and usually also the data situation is more favourable. The definition of product taxes/subsidies is of general national accounts importance and not just an aspect of the supply and use framework. The main task of the supply and use tables compilation work with regard to the product taxes/subsidies is to create the relation between the different kinds of taxes/subsidies and the product flows. The classification of the different taxes/subsidies of a country to the categories of taxes/subsidies according to the 1995 ESA as well as data on the amounts of each single product tax/subsidy can be taken as given.

The attribution of each single product tax/subsidy to the respective product items is therefore the first compilation step which directly results into column (6) in table VI.1. The second step is to attribute the product taxes/subsidies to the respective use data at purchasers prices, and then to deduct the taxes less subsidies from the use data. A further specific task relates to VAT: here also calculations have to be made on the non-deductible VAT.

The 1995 ESA defines product taxes and product subsidies as follows:

**Taxes on products** are taxes that are payable per unit of some good or service produced or transacted. The tax may be a specific amount of money per unit of quantity of a good or service, or it may be calculated ad valorem as a specific percentage of the price per unit or value of the goods and services produced or transacted. – As a general principle, taxes, in fact assessed on a product, irrespective of which institutional unit pays the tax, are to be included in taxes on products, unless specifically included in another heading.

**Subsidies on products** are subsidies payable per unit of a good or service produced or imported. The subsidy may be a specific amount of money per unit of quantity of a good or service, or it may be calculated ad valorem as a specific percentage of the price per unit. A subsidy may also be calculated as the difference between a specified target price and the market price actually paid by the buyer. A subsidy on a product become payable when the good is produced, sold or imported. By convention, subsidies on products can only pertain to market output or to output for own final use.

The 1995 ESA distinguishes three types of product taxes:

- value added type taxes,
- taxes and duties on imports excluding VAT,
- taxes on products, except VAT and import taxes.

For all these different types of product taxes the 1995 ESA gives further definitions and lists typical examples. It should be noted that the 1995 ESA also treats profits of fiscal monopolies which are transferred to the State as product taxes.

Taxes should be recorded when the activities, transactions or other events occur which creates the liabilities to pay taxes. The amounts to be recorded in the system are determined by the amounts due for payment only when evidenced by tax assessments, declarations or other instruments which create liabilities in the form of clear obligations on the part of taxpayers. The system does not impute missing taxes not evidenced by tax assessments. Subsidies are recorded when the transaction or the event (production, sale, import, etc.) which gives rise to the subsidy occurs. Thus, the system requires that the taxes/subsidies are recorded at the time of the causing transaction or event. Therefore tax revenue data have only to be time adjusted (due to be paid); no imputations of taxes because of any kind of tax evasion needs to be calculated.

## 4.2 Compilation of product tax and subsidy matrices

The first compilation requirement refers to the column (6) vector of table VI.1. The product taxes less product subsidies are **shown by products**. This step necessitates to classify the different product taxes/subsidies according to the product classification used. Mineral oil taxes will be attributed to CPA division 23, tobacco tax to division 16 and so on, or to the appropriate more detailed level of the classification in use. The same has to be done for the product subsidies.

As mentioned above, the amounts of the different product taxes/subsidies can be taken from the respective government revenues and need to be time adjusted (due to be paid). No further compilation steps would be needed to arrive at the required column of product taxes less subsidies for the supply matrix at purchasers prices (column (6) of table VI. 1).

However, in cases where the basic output data of the industries are not available at basic prices but at producers prices only, specific calculations have to be done to attribute the respective taxes/subsidies to the output elements of the supply matrix and to deduct these values from the output data at producers prices. These calculations have to be based on the actual taxation basis of each single product tax according to the tax legislation. The same has to be done for the product subsidies.

The **second compilation step** with respect to the product taxes/subsidies refers to the allocation of the product taxes/subsidies at the use side (intermediate use and final uses) at purchasers prices to achieve table VI. 4. For those product categories for which product taxes/subsidies have been allocated the share of the tax/subsidy component in the purchaser price has to be calculated. This step needs to be based on the appropriate **taxation basis** according to tax legislation.

In order to adequately allocate the product taxes/subsidies to the use elements not only the appropriate tax rates have to be explored but also the share of the use flows at which the tax rate is to be applied. A certain product classification category might not only include flows that are taxed but also other types of products not taxed, and/or certain products may be free of taxes for certain users. For instance, the mineral oil tax may not only have different tax rates for the different mineral oil products, also some of them might have a tax rate of zero (kerosene) and some users might be tax exempted (agriculture). Therefore, the allocation of the product taxes/subsidies would be more easier if it would be possible to compile the supply and use framework at a level of product detail where a one to one relation between the product classification item and the product taxes/subsidies would be given. Furthermore, in cases that product taxes/subsidies are linked to the physical quantities, such additional information might be necessary.

On the other hand it can be noted, that usually product taxes/subsidies are restricted to only a small group of products, and furthermore, quite a few product taxes cover the bulk of them. This is even more the case with product subsidies.

A specific product tax is the **Value Added tax (VAT)**. According to the 1995 ESA, VAT is to be recorded net in the sense that

- output of goods and services and imports are valued excluding invoiced VAT,

- and that purchases of goods and services are recorded inclusive of non-deductible VAT. VAT is recorded as being borne by the purchasers, not sellers, and then only by those purchasers who are not able to deduct it.

Thus, the greater part of VAT is therefore recorded as being paid on final uses, mainly on household consumption. A part of VAT, however, is paid by enterprises, mainly by those which are exempted from VAT.

According to the definition of purchasers prices, non-deductible VAT is included in the purchaser price, but not deductible VAT. Thus, the use table at purchasers prices (see table VI. 3) includes non-deductible VAT. In order to balance supply and use, non-deductible VAT by products has to be estimated and either included in column (6) of table VI. 1 or deducted from the use table and after balancing added again.

The calculation of non-deductible VAT has to identify those industries and final users that are exempted from VAT (= are not allowed to deduct VAT from its purchases) and to relate the VAT rates to the product classification used. Both steps need to be based on the actual VAT legislation. Usually, there are only two or three different VAT rates valid. However, some product items in the product classification applied might be heterogeneous with regard to the VAT tax rates. Thus, additional breakdowns of those product groups might be necessary.

The identification of the activities that are VAT exempted is the other requirement. Here again, only a certain part of an industry might be VAT exempted and appropriate subdivisions might be helpful. It could also be the case that certain VAT exempted industries are normal VAT payers for their secondary outputs. The VAT legislation may also have specific rules for very small enterprises that has to be considered (thresholds).

It should also be considered that purchases of non-residents recorded under exports do also include non-deductible VAT (if no VAT reimbursements have been granted). On the other hand, purchases of residents abroad, recorded under household consumption, do not include domestic VAT.

It is important to note that for VAT exempted industries non-deductible VAT has to be calculated both for intermediate consumption as well as for capital formation (and if appropriate for inventories also). Total calculated non-deductible VAT should equal time adjusted VAT revenues by government.