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Documents

**Norwegian Methodology for
Supply and Use Tables and Input-
Output Tables**

Contents

PART I	5
1.1. Introduction	5
1.2. International reporting requirements	5
1.3. Overview of the Document	6
2. THE SUPPLY AND USE TABLES (SUT)	7
2.1. Equations describing the Supply Table	7
2.2. Equations describing the Use Table	8
2.3. Figures illustrating the Supply Table and the Use Table	9
2.4. Equations describing the Value Added Table	14
3. CLASSIFICATIONS REQUIRED FOR SUT	15
3.1. The dimension of SUT	15
3.2. Valuation classes	16
3.3. Classification of Industries	16
3.4. Classification of Final consumption expenditure	17
3.5. Classification of Gross fixed capital formation by type and by industry and Change in inventories	17
3.6. Classification of Products	17
3.7. Conversion tables for products	18
4. DATA AND STRUCTURE FOR MAIN ACCOUNTS	18
4.1. Introduction	18
4.2. Production accounts for Market producers	19
4.3. Production accounts for Non-market producers: Central and Local government services and Non-profit institutions serving households (NPISHs)	20
4.4. The Aggregation accounts and Technical accounts	21
5. FIXED FORMAT FOR CLASSIFICATION CODES	24
5.1. Fixed format for classification of input data to SUT	24
5.2. Format for classification of Suppliers, Users and Income components	24
5.3. Format for classifications of Products	26
6. ESTABLISHING SUT IN CURRENT PRICES FOR THE FIRST YEAR	27
6.1. The Supply Table (T1) at producer's value	27
6.2. The Use Table (T2) from purchaser's value to producer's value	28
6.3. Balancing the Supply Table and the Use Table at producer's values	35
6.4. Calculating the complete Use Table with subsidies and taxes on products and at basic values	36
6.5. Computing the complete Supply Table	38
7. CREATING THE INCOME COMPONENTS OF VALUE ADDED	40
8. CORRECTING SUT IN CURRENT PRICES	42
8.1. Introduction	42
8.2. Correcting T1 at producer's values (13-Values)	43
8.3. Correcting T2 at purchaser's values (19-Values)	44
8.4. Correcting trade margins (14R-Values)	44
8.5. Correcting transport margins (14T-Values)	45
8.6. Automatic balancing of products with a simplified "RAS"	45
8.7. Automatic correction of theoretical VAT	45

9. UPDATE TO A NEW YEAR.....	47
10. TOURIST SATELLITE ACCOUNTS.....	47
PART II. SUT/CONSTANT	48
1. MAIN OBJECTIVE.....	48
1.1. Introduction.....	48
1.2. International recommendations.....	48
1.3. Advantages of calculating values at constant prices in a Supply and Use framework.....	48
2. CONSTANT PRICE COMPILATION OF ANNUAL DETAILED SUPPLY AND USE TABLES.....	49
2.1. Introduction to the constant price methodology.....	49
2.2. The "assembling file" called the "SAM catalogue".....	50
2.3. Overview of the constant price compilation process.....	50
2.4. Shift effect because of price discrimination between different users.....	52
2.5. Shift effect because of differences in the rates for product taxes and product subsidies between different users.....	52
2.6. Annual chaining.....	52
3. PRICE INDICES AND OTHER DATA INPUT REQUIRED.....	53
3.1. Price indices required.....	53
3.2. Price indices for Exports at purchaser's value and Imports at basic value.....	53
3.3. Price indices for Market producers.....	54
3.4. Constant price compilation for Non-market producers.....	55
3.5. Deflating domestic use.....	55
3.6. Deflation of trade margins, transport margins, product taxes and product subsidies.....	55
3.7. Balancing the Supply Table and the Use Table at basic values and compiling SUT in the different types of valuation.....	56
3.8. Constant price compilation of the Aggregation accounts.....	56
3.9. Balancing the Aggregation accounts for Trade margins and Transport margins in constant prices.....	56
3.10. Constant price compilation of Product taxes and Product subsidies.....	57
3.11. Constant price compilation of Household final consumption at purchaser's values.....	57
4. ORGANISATION OF REQUIRED DATA INPUT	58
4.1. Introduction.....	58
4.2. Price indices for imports, domestic production to the domestic market and to exports.....	58
4.3. Wage indices for calculation of input price indices for different industries.....	59
4.4. The structure of the "SAM catalogue".....	59
4.5. Consumption of fixed capital for central and local government in current and constant prices for calculation of input price indices for government.....	61
5. CONSTANT PRICE COMPILATION, EXPLAINED BY EQUATIONS.....	62
5.1. Schematic outline of the Supply Table in constant prices.....	62
5.2. Schematic outline of the Use Table in constant prices.....	64
6. USE TABLE. EXPORTS IN CONSTANT PRICES.....	67
6.1. Use Table (T2) Deflation of Exports at fob/purchaser's value.....	67
6.2. Use Table (T2) Deflation of Trade margins (basic value) and Transport margins on exports..	67
6.3. Use Table (T2) Deflation of Product taxes and Product subsidies related to exports.....	68
6.4. Use Table (T2) Calculation of price indices for Exports in producer's values and basic values.....	70

7. SUPPLY TABLE. DOMESTIC PRODUCTION AND IMPORTS IN CONSTANT PRICES	71
7.1. Supply Table (T1) Introduction.....	71
7.2. Deflation of Imports and Custom duty in basic value.....	71
7.3. Deflation of Domestic production in basic value.....	72
7.4. Deflation of Domestic production from producer's value.....	73
7.5. Constant price figures for Product taxes and Product subsidies (11- and 12-values).....	74
8. BALANCING T1 AND T2 IN BASIC VALUE IN CONSTANT PRICES.....	75
8.1. Balancing Supply and Use in basic values.....	75
8.2. Compiling constant price figures for the different domestic use in basic values [STAGE 8] ..	75
9. COMPILING THE COMPLETE DOMESTIC USE TABLE IN ALL TYPES OF VALUATION IN CONSTANT PRICES	76
9.1. Domestic Use, Constant price figures for Trade and Transport margins.....	76
9.2. Domestic use. Constant price figures for product taxes, product subsidies and VAT.	77
10. BALANCING THE CONSTANT PRICE FIGURES FOR THE "AGGREGATION ACCOUNTS"	78
10.1. Balancing aggregation accounts 27015 - 27292 and 28111 - 28990 in constant prices.....	78
10.2. Products with the code 009100 - 009990 (Transactions in used capital goods):	79
10.3. Balancing the technical accounts 27500 Trade margins in constant prices	80
10.4. Balancing the technical accounts 27600 Transport margins in constant prices	81
11. COMPILING THE COMPLETE SUPPLY TABLE IN CONSTANT PRICES.....	82
11.1. Supply Table, Constant price figures for Product taxes, Product subsidies and for Purchaser's value.	82
11.2. Supply Table, Constant price figures for Import taxes	82
11.3. Balancing constant price figures for product taxes (11-values) and product subsidies 12-values) as calculated in T1 and T2].	83
11.4. Transferring constant price figures for trade and transport margins and related taxes and VAT calculated in T2 to T1.....	83
12. CORRECTION OF HOUSEHOLD CONSUMPTION WITH THE CONSUMER PRICE INDICES	84
12.1 Correction in constant prices.....	84
12.2. Correction in current prices.....	85
13. BALANCING THE CONSTANT PRICE FIGURES FOR THE CONSUMPTION OF FIXED CAPITAL FOR THE GOVERNMENT	86
PART III. SUT/IOT	87
1. Main objective	87
1.1. Supply and Use Tables in Current and Constant Prices.....	87
1.2. Methodology for transformation to Input-Output Tables.....	88
1.3. International reporting requirement	89
2. Overview of corrections from the SUT format to the format required for international Supply Table, Use Table and IOT.	90
2.1. Change of units used in the SUT accounts.....	90
2.2. Overview of the different stages of the corrections from the established SUT format to the format required for international Supply Table, Use Table and IOT.	91
3. From SUT to SUT_MOD_I.....	93

3.1. SUT_MOD_I, a database for Econometric Models	93
3.2. Removing the “Aggregation accounts for undistributed intermediate consumption”.....	94
4. From SUT_MOD_I to SUT- MOD-II.....	99
4.1. The database for preparing Supply Tables and Use Tables for reporting to International Organizations.....	99
4.2. Changing the recording of “Account 29505 for Custom duty at basic value”	99
4.3. Removing the “Aggregation accounts for Capital formation by types of fixed asset”	99
4.4. Proportional distribution of the correction of VAT for International reporting	101
4.5. Illustration of the Supply and the Use Tables for International reporting.....	105
5. From SUT_MOD_II to SUT_MOD_III.....	107
5.1. SUT_MOD_III, a database for compiling IOT to International Organisations.	107
5.2. Removing account 27500, “Aggregation account for Trade margins”	107
5.3. Removing account 27600, “Aggregation account for Transport margins ”	108
5.4. Dealing with Products without Suppliers	109
6. From SUT_MOD_III to Input-Output Table IOT-T4 with product flows.....	112
6.1. The point of departure	112
6.2. Split of Imports between Competitive and Complementary Imports.....	113
6.3. Detailed Input-Output Table with the product flows at basic value.....	113
7. Deriving IOT-T5 from IOT-T4.....	121
7.1 Detailed Input-Output Tables without product flows.....	121
8. Deriving IOT-T6 from IOT-T5	123
8.1 Catalogues for encoding to aggregated Input-Output Tables	123
8.2 Input-Output Tables for international reporting	124
9. Classification required for reporting to International organisations	127
10. SUT and IOT at constant prices	128
11. Inverse matrices. Industry by Industry.....	128
ANNEX 1. CLASSIFICATION STANDARD FOR SUPPLY AND USE TABLES	129
ANNEX 2. ACCOUNT TYPES USED FOR DETAILED IOT-T4 AND IOT-T5.....	132
REFERENCES:.....	133

PART I

1.1. Introduction

The Supply and Use tables (SUT) should serve both statistical and analytical purposes and should be fully integrated in the National Accounts system for a country, ref. SNA 93 chapter XV and ESA 95 chapter 9.

Supply and Use Tables (SUT) should have at least the following main functions:

- SUT represent an integral part of and check on the economic statistics and the national accounts estimates produced for the economy.
- SUT are based on available economic statistics and different estimates derived from secondary data.
- SUT represent an important tool for constant price estimates (the double deflation technique) giving balanced SUT in both current and constant prices.
- SUT are important for analysing the effect of imports and exports on the economy.
- SUT are converted to Industry format Input-Output tables (IOT) in current and constant prices.
- SUT and IOT represent statistical databases for econometric models and economic planning.

The National Accounts SUT compilation system described in this document has been developed in Statistics Norway over many years, and many staff members, both National Accounts and IT experts, have been involved in the work. Senior Adviser Steinar Todsén has been particularly involved in the specification and testing of the current version of the system, and has also commented on the documentation.

1.2. International reporting requirements

According to the present data delivery programme to Eurostat, EU's statistical office, are all the 30 EEA countries (27 EU countries, Iceland, Lichtenstein and Norway) obliged to provide the following tables in a fixed Excel format to Eurostat:

Annually: (with a delay of 36 months)

Supply Tables and Use Tables at current prices and previous year's constant prices. (60 NACE industries and 60 CPA products)

- Table 15. Supply Table at basic values, including a transformation into purchaser's values.
- Table 16. Use Table at purchaser's values

Every five years: 1995, 2000, 2005 etc. (with a delay of 36 months):

Input-output tables at current prices (60 NACE branches or 60 CPA products), specified by:

- Table 17. Input-Output Table at basic values,
- Table 18. Input-Output Table for domestic output at basic values,
- Table 19. Input-Output table for imports at basic values.

Other countries should also prepare comparable Supply Table, Use Table and the Input Output Table in Excel format for reporting to UN and other international organisations.

“Eurostat Manual of Supply, Use and Input-Output Tables” (2008 edition) gives a detailed description of the methodological advantages of SUT as an integral part of the compilation of national accounts.

Some of the main advantages are:

- Integration of GDP calculation
- Consistency at a detailed commodity level
- Efficient confrontation of different primary sources

- Identification of gaps in primary sources
- Ideal framework for different value concepts
- Best framework for calculation of variables at constant prices (double deflation)

1.3. Overview of the Document

The Document gives a description of a verifiable and efficient set-up for compiling national accounts with integrated SUT in current and constant prices and the conversion to Input-Output Tables (IOT).

Part I. “SUT/CURRENT” gives a description of the methodology for establishing, balancing and interactive correction and annually updating of detailed Supply and Use Tables (SUT) in current prices.

Part II. “SUT/CONSTANT” gives a description of the integrated process for converting to SUT in constant, previous year’s prices and the final balancing of SUT in current prices. Integrated in the final balancing is a correction of total Value Added Tax (VAT) from theoretical VAT to actual VAT (accrued basis).

Part III. “SUT/IOT” gives a description of transformation of the detailed SUT to international requirements for reporting SUT and IOT at different level of aggregation:

Part I and Part II are replacing the previous published documents from Statistics Norway. Documents 2005/5 SNA-NT “SUT/STARTER” and Documents 2005/4 SNA-NT “SUT/CONSTANT”.

Statistics Norway has developed a software application with a graphical user interface for compiling the SUT and IOT according to the methodology described here. An updated User guide follows the software.

Part I. “SUT/CURRENT” gives an explanation of the structure of the SUT with types of accounts and classifications and gives a description of:

- Formats for the classifications of Suppliers, Users and Products.
- Formats for Tables to be used for registering or transferring the input data (current prices) to SUT.
- Formats for Tables to be used for registering VAT rates and Trade and Transport margins percentages.
- Formats for Tables to be used for registering absolute figures for Product Taxes and Product Subsidies, specified as totals by products.

The purpose is to give a detailed description of “What happens in the black box” during the compilation of the Supply and Use Tables (SUT). SUT are first compiled in current prices. The different stages of the compilation process are explained by the equations applied when the SUT are compiled, corrected or updated.

The detailed SUT are established, balanced and updated with the following types of valuation: basic values, producer’s values, trade margins, transport margins, product taxes, product subsidies, VAT and purchaser’s values.

- The Term “Establish” refers to the process of creating and compiling a first set of SUT from scratch.
- The Term “Correction” refers to the process of correcting one and one value after having a first set of SUT. By an interactive correction procedure, the whole SUT is recalculated and balanced each time one value is corrected.
- The Term “Update” refers to the process of using new absolute data or applying value indices to one set of SUT to create another set, where the new values are projections of the first SUT.

2. THE SUPPLY AND USE TABLES (SUT)

2.1. Equations describing the Supply Table

The Supply Table (T1) is illustrated by matrix H, defined by:

$$H = \left[h_{ip}^v \right]_{\substack{v \in \{1,2,\dots,a\} \\ i \in \{1,2,\dots,b\} \\ p \in \{1,2,\dots,c\}}}$$

v represents *Value Classes*

Includes 10-, 11-, 12-, 13-, 14R-, 14T-, 15-, 16-, 17-, 18-values in the Norwegian National Accounts (NNA)

See chapter 3.2.

i represents *Suppliers (i= d+z)*

d. Production accounts (Accounts from 22XXX to 26XXX)

and Aggregation accounts (Accounts from 27XXX to 29XXX)

z. Import accounts (Accounts from 521XX to 529XX)

p represents *Products* (Classification codes from 000015-999999).

Dimensions of NNA:

Number of Suppliers (Production, Aggregation and Import accounts) b=305

Number of Import accounts, y = 25

Number of Products c =1420

NOTE: 15-values, 16-values and 18-values are introduced in the NNA , but are not required for following the Norwegian methodology.

T_d equals total Supply from a Production or Aggregation account at producer's values, labelled d, defined in T1 by:

$$T_d = \sum_{p=1}^c h_{dp}^{13} + \sum_{p=1}^c h_{dp}^{14R} + \sum_{p=1}^c h_{dp}^{14T} + \sum_{p=1}^c h_{dp}^{15} + \sum_{p=1}^c h_{dp}^{16} + \sum_{p=1}^c h_{dp}^{17} + \sum_{p=1}^c h_{dp}^{18}, d \in (1,2,\dots,e)$$

Total Domestic Supply: $T = \sum_{d=1}^e T_d, d \in (1,2,\dots,e)$

T_z equals Supply of Products from one Import accounts, given in T1 by:

$$T_z = \sum_{p=1}^c h_{zp}^{13}, z \in (1,2,\dots,y)$$

Total Import: $T = \sum_{z=1}^y T_z, z \in (1,2,\dots,y)$

S is a row vector giving Total Domestic Supply and Imports, classified by Products in the different value classes, defined by:

$$S_P^V = \sum_{d=1}^e h_{dp}^v + \sum_{z=1}^y h_{zp}^v$$

NOTE: The basic value for imported products is defined as the value at the border. This includes both goods at CIF value ($H_{z,p}^{10}$) and custom duties ($H_{29505,p}^{10}$).

- Goods at CIF value, by product codes, are supplied by account 52XXX as basic value (10-value)
- Custom duty, by product codes, are supplied by account 29505 as basic value (10-value). This recording is important both for the current and constant price compilation of SUT

For international reporting of SUT and IOT, custom duty specified by products are deducted from basic value (10-value) and added to product taxes (11), specified by products and users, see Part III.

Figure 1 gives a schematic outline of the Supply Table, called T1.

The outline of the rows and columns of the Supply Table confirms with the Matrix presentation given in table 2.5 in SNA 93 and with a combined SUT, shown in Table 9.3 in ESA 95.

The format is transposed compared with table 15.1 in SNA 93 and table 15 in ESA 95.

2.2 Equations describing the Use Table

The Use Table (T2) without Value added (Bd), is illustrated by matrix N, and defined by:

$$N = \left[n_{pj}^v \right]_{\substack{v \in \{1,2,\dots,a\} \\ p \in \{1,2,\dots,c\} \\ j \in \{1,2,\dots,g\}}}$$

v represents *Value Classes*,

p represents *Products*,

j represents *Users (j = d+s):*

- **d** *Production and Aggregation accounts*
- **s** *Final Users* .

The maximum number of value classes in the Use Table: **a** = 11,
(Includes 10-, 11-, 12-, 13-, 14R-, 14T-, 15-, 16-, 17-, 18- and 19- values as in the Norwegian National Accounts (NNA)).

Dimensions of NNA:

- *Number of Products, c = 1420.*
- *Number of Users (Production, Aggregation and Final use accounts), j = 820.*

Total intermediate consumption of products (p) at purchaser's value (19-Value) to a Production account labelled (d) is expressed by:

$$\sum_{p=1}^c n_{pd}^{19}, d \in (1,2,\dots,e)$$

Total final use T_s given in T2 at purchaser's value (19-value):

$$T_s = \sum_{p=1}^c n_{ps}^{19}, s \in \{1, 2, \dots, a\}$$

S is a column vector giving Total Use aggregated over Users and classified by Products in the various value classes, defined by:

$$S = \left[S_p^v \right] = \sum_{j=1}^g n_{pj}^v, v \in \{1, 2, \dots, a\}$$

$$p \in \{1, 2, \dots, c\}$$

NOTE: The schematic outline of the rows and columns of the Use Table illustrated in Figure 4 is as shown in table 15.2 in SNA 93 and table 16 in ESA-95. This format of the Use Table also conforms with the Matrix presentation given in table 2.5 in SNA 93 and with a simplified combined Supply and Use Table, as shown in Table 9.3 in ESA 95.

The Use table T2, defined by matrix N, will, during the procedure of balancing SUT, be split into the matrices M and R. The relationship between the matrices N and M is defined by:

$$N = M : R$$

M is Use in T2, without the accounts for "Change in inventories and Residuals", defined by:

$$M = \left[m_{pj}^v \right]$$

$$v \in \{1, 2, \dots, a\}$$

$$p \in \{1, 2, \dots, c\}$$

$$j \in \{1, 2, \dots, g\}$$

v represents Value classes,

p represents Products,

j represents Users, but not Change in inventory/Residuals

R is Change in inventories and Residuals, specified by products.

- $R = \left[C_{p,87XXX}^{13} \right] + \left[r_{p,87400}^{13} \right], p \in \{1, 2, \dots, c\}$
- C represents Change in inventories
- r represents Residuals.

2.3. Figures illustrating the Supply Table and the Use Table

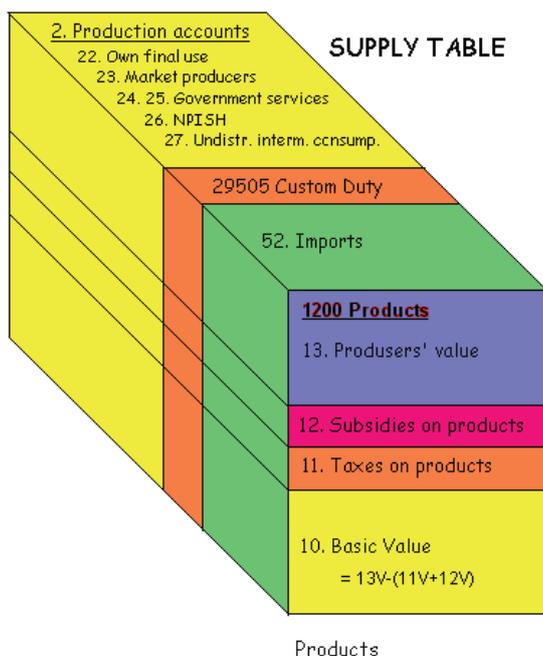
Figure 1 and 2 give an illustration of the format of the Supply Table

Figure 3 and 4 give an illustration of the format of the Use Table

Figure 1. Supply Table (T1) Suppliers x Products, by value classes:

T1 SUPPLY OF PRODUCTS	Basic value 10-value =13-value -11-value +12-value	Taxes on products 11-value Subsidies on products 12-value	Producer value 13-value = 10-value + 11-value -12-value	Retail and wholesale trade marg Basic value 14R-value. Transport margins 14T-value	Taxes on products collected by traders 15-value	Subsidies on products paid to traders 16-value	Value added tax. None deduct. One book value correction 17-values	Sales tax or Special tax on invest- ment 18-value	Total
	<i>Products p,p,p,p,p</i>	<i>Products p,p,p,p,p</i>	<i>Products p,p,p,p,p</i>	<i>Products p,p,p,p,p</i>	<i>Products p,p,p,p,p</i>	<i>Products p,p,p,p,p</i>	<i>Products p,p,p,p,p</i>	<i>Products p,p,p,p,p</i>	<i>Products p,p,p,p,p</i>
Domestic production 22, 23, 24, 25, 26-acc.	H ¹⁰ _{d,p}	H ¹¹ _{d,p} -H ¹² _{d,p}	H ¹³ _{d,p}						T _{d,p}
Distribute account 27015-299			H ¹³ _{d,p}						T _{d,p}
Retail, Wholesale trade marg 27500				H ^{14R} _{27500,p}	H ¹⁵ _{27500,p}	- H ¹⁶ _{27500,p}			T _{27500,p}
Transport margins 27600				H ^{14T} _{27600,p}					T _{27600,p}
Types of fixed assets 28111-			H ¹³ _{d,p}						T _{d,p}
VAT 29501 Investment levy 29502							H ¹⁷ _{29501,p}	H ¹⁸ _{29502,p}	T _{29501,p} T _{29502,}
Taxes on products 29503		<i>Included in Prod. acc. 22,23,24, 25, 26</i>							
Subsidies on products 29504		<i>Included in Prod. acc. 22 -26</i>							
Custom duty 29505	H ¹⁰ _{29505,p}		H ¹³ _{29505,p}						T _{29505,p}
Product tax Import 29506		H ¹¹ _{29506,p}	H ¹³ _{29506,p}						T _{29506,p}
Correction for VAT value 29507							-H ¹⁷ _{29507, 000970}		-T _{29507, 00970}
Imports 52xxx	H ¹⁰ _{z,p}		H ¹³ _{z,p}						T _{z,p}
TOTAL	S ¹⁰ _p	S ¹¹ _p S ¹² _p	S ¹³ _p	S ^{14R} _p S ^{14T} _p	S ¹⁵ _p	S ¹⁶ _p	S ¹⁷ _p	S ¹⁸ _p	T _p

Figure 2
Overview of the Supply Table



The Supply table is first established in Producer's value.
Time adjusted taxes, allocated to products, are distributed between domestic suppliers and imports of the products.
Time adjusted subsidies, allocated to products, are distributed between domestic suppliers of the products.
At the end of the automatic balancing procedure, the Supply table is calculated in Basic values

The Supply Table gives detailed information about the supply of products (goods and services) from:

2. Production accounts

- Account 22. Production accounts, Own final use
- Account 23. Production accounts, Market producers
- Account 24. Production accounts, Non-market producers, Central government services
- Account 25. Production accounts, Non-market producers, Local Government services
- Account 26. Production accounts, Non-market producers, NPISHs
- Account 27. Aggregation accounts for trade margins & undistributed intermediate consumption (to facilitate the balancing)
- Account 28. Aggregation accounts for fixed capital formation by type of asset.
- Account 29. Technical accounts for Custom duty, Import tax and VAT

52. Imports

- Account 52. Imports, specified by type of imports

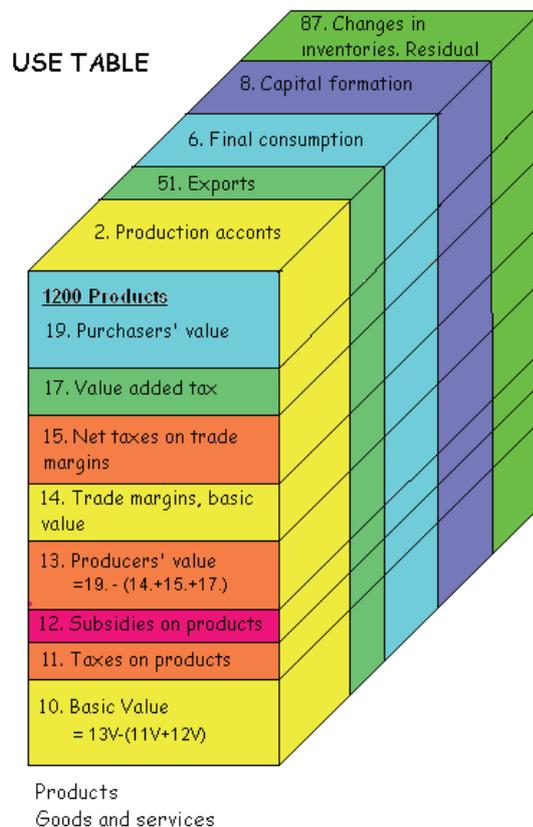
The following account types show which value classes are used for the product flows:

- Account type 10. Basic value
- Account type 11. Taxes on products (paid by the producers)
- Account type 12. Subsidies on products (paid to the producers)
- Account type 13. Producer's value

Figure 3. COMPLETE USE TABLE (T2) Products x Users, specified by the different value classes:

T2 PRODUCTS <i>BY VALUE CLASSES</i>	Domest Production 22, 23, 24, 25, 26- account	Undistri- buted input 27015- 27292	Trade- Transp. margin 27500 27600	Types of fixed assets 28111- 28990	VAT 29501 Inv.- Sales- tax 29502	Custom duties 29505 Prod tax import 29506	E X P O R T	FINAL DOMES- TIC USERS 61-69 82-86	Change in inventories, Resi- duals	T O T A L
10. Basic v.	$N^{10}_{p,d}$	$N^{10}_{p,d}$	$N^{10}_{p,ds}$	$N^{10}_{p,ds}$	-	-	$N^{10}_{p,s}$	$N^{10}_{p,s}$	$N^{10}_{p,s}$	S^{10}_p
11. Taxes on products	$N^{11}_{p,d}$	$N^{11}_{p,d}$	$N^{11}_{p,d}$	$N^{11}_{p,d}$	-	-	$N^{11}_{p,s}$	$N^{11}_{p,s}$		S^{11}_p
12Subsidies on products	$N^{12}_{p,d}$	$N^{12}_{p,d}$	$N^{12}_{p,d}$	$N^{12}_{p,d}$	-	-	$N^{12}_{p,s}$	$N^{12}_{p,s}$		S^{12}_p
13 Producer's value	$N^{13}_{p,d}$	$N^{13}_{p,d}$	$N^{13}_{p,d}$	$N^{13}_{p,d}$	-	-	$N^{13}_{p,s}$	$N^{13}_{p,s}$	$N^{10}_{p,s}$	S^{13}_p
14R. Retail wholesale margins, Basic value	$N^{14R}_{p,d}$	$N^{14R}_{p,d}$	-	-	-	-	$N^{14R}_{p,s}$	$N^{14R}_{p,s}$		S^{14R}_p
14T. Transp margins, Basic value	$N^{14T}_{p,d}$	$N^{14T}_{p,d}$	-	-	-	-	$N^{14T}_{p,s}$	$N^{14T}_{p,s}$		S^{14T}_p
15. Taxes products, by traders	$N^{15}_{p,d}$	$N^{15}_{p,d}$	-	-	-	-	?	$N^{15}_{p,s}$		S^{15}_p
16. Subsid. products, to traders	$N^{16}_{p,d}$	$N^{16}_{p,d}$	-	-	-	-	?	$N^{16}_{p,s}$		S^{16}_p
17. Value added tax	$N^{17}_{p,d}$	-	-	-	-	-	?	$N^{17}_{p,s}$	N^{17}_{000970}	S^{17}_p
18. Tax on investment	$N^{18}_{p,d}$	-	-	-	-	-	-	$N^{18}_{p,s}$		S^{18}_p
19. Input	$N^{19}_{p,d}$	$N^{19}_{p,d}$	$N^{19}_{p,d}$	$N^{19}_{p,d}$	-	-	$N^{19}_{p,s}$	$N^{19}_{p,s}$	$N^{10}_{p,s}$	S^{19}_p
31. Value added	B_d	B_d	$B_d=0$	$B_d=0$	$B_d=0$	$B_d=0$	-	-	-	
TOTAL	T_d	T_d	T_d	T_d	T_d	T_d	T_s	T_s	T_s	T_s

Figure 4
Overview of the Use Table



The Use table in Purchaser's value (19 value is decomposed into the different valuation matrices:

Investment levies (Account type 18)
 Non-refundable VAT (Account type 17)
 Product subsidies to traders (Account type 16)
 Product taxes paid by traders (Account type 15)
 Retail and wholesale margins, basic value (Account 14 R)
 Transport margins (Account type 14T)
 Producer's value (Account type 13)

The producer's value is further decomposed into:

Subsidies on products (Account type 12)
 Taxes on products (Account type 11)
Basic value (Account type 10)

Balancing and correcting changes in inventories:

In the first phase of the balancing of supply and use of each product at producer's values, the change in inventories is residually determined. The residuals are then corrected to an acceptable level. The corrections are first made manually, based on an evaluation of data and statistical sources and finally by an automatic "RAS" method.

The Use Table gives intermediate use of products by industries and final use, specifying domestic final use and exports:

2. Production accounts

Intermediate use of products:

Account 22. Production accounts, Own final use, specified by industries
 Account 23. Production accounts, Market producers, specified by industries
 Account 24. 25. Production accounts, Non-market producers, Central and Local government, specified by industries
 Account 26. Production accounts, Non-market producers, NPISHs, by industries
 Account 27, 28, 29 Aggregation and technical accounts

Final use of products:

Account 51. Exports, specified by type of exports
 Account 6. Final consumption expenditure, specified by the COICOP, COFOG and COPNI classifications
 Accounts 82-86. Fixed capital formation accounts, specified by industries
 Account 87. Change in inventories and Residuals, specified by products

The complete Use table shows the valuation matrices with the product flows:

- Account type 10. Basic value
- Account type 11. Taxes on products (paid by the producers)
- Account type 12. Subsidies on products (paid to the producers)
- Account type 13. Producer's value
- Account type 14R Retail and wholesale margins, basic value
- Account type 14T Transport margins
- Account type 15. Taxes on products (collected by retail or wholesale traders).
- Account type 16. Subsidies on products (paid to wholesale or retail traders)
- Account type 17. Value Added Tax (VAT)
- Account type 18. Investment levies (A special Norwegian tax)
- Account type 19. Purchaser's value

2.4. Equations describing the Value Added Table

Domestic Supply specified by Production accounts at basic value is given in T1, defined by:

$$T_d^{10} = \sum_{p=1}^c h_{dp}^{10}, d \in (1, 2, \dots, e)$$

Total intermediate consumption of products (p) at purchaser's value (19-value) to a Production account labelled (d) is defined by:

$$\sum_{p=1}^c n_{pd}^{19}, d \in (1, 2, \dots, e)$$

Value added (B_d), for a Production account at basic value (10-Value), labelled d, is defined by:

$$B_d^{10} = [b_d^{10}] = T_d^{10} - \sum_{p=1}^c n_{pd}^{19}, d \in (1, 2, \dots, e)$$

p represents *Products*,

d represents *Production and Aggregation accounts*

The total of income components, except operating surplus, for the industry d is given by:

$$I_d = \sum_{k=1}^f i_{kd}, d \in (1, 2, \dots, e)$$

Operating surplus, D_d , for a Production account labelled d, is given by:

$$D_d = B_d - \sum_{k=1}^f i_{kd}, d \in (1, 2, \dots, e)$$

k represents *Income Components*

d represents *Production accounts*

The total of income components, except operating surplus, for the industry d is given by:

$$I_d = \sum_{k=1}^f i_{kd}, d \in (1, 2, \dots, e)$$

Operating surplus, D_d , for a Production account labelled d, is given by:

$$D_d = B_d - \sum_{k=1}^f i_{kd}, d \in (1, 2, \dots, e)$$

k represents *Income Components*

d represents *Production accounts*

Gross domestic product GDP = Total Value added at basic value + Taxes on products, net.

Figures for Value added (B_d) (specified by the Production and Aggregation accounts) are transferred from the Use Table (T2) to the Table for value added (T3), see Figure 5.

Figure 5. Table for value added (T3)

31. VALUE ADDED Income components:	Production accounts	Technical accounts for taxes, subsidies on products, VAT, and Custom duty
31XXX accounts	22XXX, 23XXX, 24XXX, 25XXX, 26XXX	29501, 29502, 29503, 29504, 29505, 29506, 29507
311XX Compensation of employees	I_{kd}	
31211 Taxes on products		29503
31212 Product taxes on imports		29506
31220 Other taxes on production	I_{kd}	
31250 Customs duty on imports		29505
31270 VAT (Value added tax), corrected VAT		29501, 29507
31280 Investment levy or Sales tax		29502
31310 Subsidies on products		29504
31320 Other subsidies on production	I_{kd}	
38000 Consumption of fixed capital	I_{kd}	
Balancing item: 31910 Operating surplus/Mixed income	D_d'	$D_d' = 0$
31000 Value added	B_d (basic value)	

A more detailed description is given in chapter 7.

3. CLASSIFICATIONS REQUIRED FOR SUT

3.1. The dimension of SUT

When starting a SUT project, a set of classification codes has to be established. Only then can it be verified that the input data is applicable. The classification codes used should preferably be kept unchanged for some years to facilitate the use of value indices for updating the SUT from one year to the next year.

The catalogues for SUT have to cover NA-classification for Suppliers and Users with:

- Industry codes (aggregates of NACE or ISIC),
- Types of final expenditure (based on SNA93/ ESA 95),
- Product codes (aggregates of CPA or CPC).

The application requires a fixed format for the NA-classification codes to be used.

To illustrate the NA-classification with the codes for Suppliers and Users, an extract of the classification used in Norway to produce SUT, with English text, is attached to this document as an example, see Annex 1.

For reporting to international organisations (EU, UN, and OECD) a minimum classification is required for industries (ref. A60 classification of SNA93/EU95), products (ref. P60 classification of SNA93/ESA95) and types of final expenditure (ref. SNA93/ESA95). For many purposes a more detailed breakdown for industries and products relevant for the country's economy are very useful. The classification introduced should be an aggregate of the detailed international classifications, NACE or ISIC and CPA or CPC).

3.2. Valuation classes.

The following types of valuation classes are introduced for the product flows both in the Supply Table and in the Use Table (In the NNA specified by 1400 CPA related products)

- 10 Basic Value
- 11 Taxes on Products
- 12 Subsidies on Products (with a negative sign)
- 13 Producer's Value = 10 v. + 11 v. + 12 v.
- 14R Trade Margins, Basic Value
- 14T Transport Margins
- 15 Taxes on Product related to Trade Margins (paid by the traders)
- 16 Subsidies on Product related to Trade Margins (paid to the traders) (with a negative sign)
- 17 Non-deductible Value Added Tax (with a total correction for the difference between time adjusted book value for VAT and theoretical compiled VAT)
- 18 Investment Levy or Sales tax (Only if relevant)
- 19 Purchaser's Value = 13v. + 14Rv. + 14Tv. + 15v. + 16v. + 17v. +18v.

Note: The prefix 10 – 19 is used together with the product codes to illustrate types of valuation.

3.3. Classification of Industries

When starting a SUT project, a Catalogue with the classification codes have to be established.

An extract of the classification codes with English text' as used in the NNA, is shown in Annex 1.

The classification for the production accounts and capital formation accounts distinguish between "Market producers", "Producers for own final use" and "Other non-market producers". Other non-market producers are further subdivided between "Producers of central government services", "Producers of local government services" and "Non profit institutions serving households" (NPISH). The industry classification used in the Norwegian SUT is an aggregated version of NACE rev.1 with three-digit codes, specifying 200 industries. The 200 industries are decomposed into 150 industries for Market producers and the same classification where it is relevant, for Producers for own final use and Other non-market producers.

By subdividing the SUT into the groups: Market producers, Producers for own final use and Other non-market producers, a link is established to the Institutional sector accounts.

The classification for industries is found under the following types of accounts:

Account type 22-26. Production accounts divided between "Market producers", "Producers for own final use" and "Other non-market producers" and with a further subdivision by industries.

Account type 82-86. Capital formation accounts have the same classification of industries as for the production accounts.

ISIC-rev 3 and ISIC-rev 4

The principle followed for grouping activities in the UN classification ISIC, is a classification based on kind of commodities or services manufactured or sold, the raw material employed in the manufacturing process and the use to which the goods or services are generally put.

From 2008 the new revised classification ISIC rev. 4 has replaced ISIC rev. 3.

NACE rev.1 and NACE rev. 2

The statistical office of the European Union (EU), Eurostat has adopted NACE as EU's industrial classification. The first two digits of the codes for NACE rev.1 and ISIC rev.3 are identical. The third and fourth digits are different for certain activities where NACE is more detailed than ISIC. By aggregating the NACE-groups (at the fourth digit), direct links will be established to the ISIC's third and fourth digit groups.

From 2009 the revised classification NACE rev.2 has replaced NACE rev. 1.

3.4. Classification of Final consumption expenditure

The following classifications should be introduced with the following SUT prefix:

Prefix 61. COICOP classification for household consumption expenditure

Prefix 64, COFOG for central government final consumption expenditure

Prefix 65 COFOG for local government final consumption expenditure

Prefix 66 COPNI for final consumption expenditure of the NPISHs

For compiling "Tourist satellite accounts" (TSA), COICOP for household consumption expenditure should have the a three-split with the following prefix:

Prefix 61. Residents in the country plus residents who are tourists abroad

Prefix 68. Resident who are tourists in the country

Prefix 69. Non-resident who are tourists in country

3.5. Classification of Gross fixed capital formation by type and by industry and Change in inventories

Gross fixed capital formation by type of fixed assets:

Prefix 28. The classification for gross fixed capital formation by type of fixed assets should at least be as detailed as the classification adopted in ESA95 and SNA93 on fixed assets.

Gross fixed capital formation by industry:

Prefix 82, 83, 84,85, 86. Gross fixed capital formation should also be broken down by industry in full accordance with the industry classification for the production accounts.

Change in inventories

Prefix 87. Change in inventories for all products is compiled automatic during the balancing process.

The following 87*** accounts are always required:

87000 Change in inventories and residuals for goods

87400 Change in inventories and residuals for services

3.6. Classification of Products

For the NA products, 6-digit codes are required for the SUT.

Important start for a SUT project is to decide the relevant product classification to be used.

One goal is to specify rather homogenous products. Another goal is to specify products to such detail that only one rate for product taxes and product subsidies apply to one type of use of the product. In the Norwegian SUT, about 1420 products, specified by six-digit codes, are defined with a link to the CPA-codes or as aggregates of the CPA-codes.

When deciding on the product codes, the need for specifications of products in the Tourism Satellite Accounts should also been taken into accounts if relevant.

HS

The most common international commodity classification is the customs nomenclature *Harmonised commodity description and coding system* (HS 1988). The HS includes only goods (merchandise) and is used for external trade statistics. Goods are grouped according to the nature of the material of which they are made. The HS is the basis ("building block") for UN's commodity classifications like SITC, rev.3 and CPC, see below. HS covers about 5000 products at the most detailed 6-digit level. The first four digits of the HS relate to the grouping of the international customs tariff nomenclature. The two next digits give international statistical divisions. Further expansion of HS is nationally determined and varies from country to country.

CPC

UN's Central Product Classification (CPC) is a standard product classification to be used for statistics classifying products (both goods and services) in detail. The building blocks of the CPC are "the transportable goods" element of the HS. The most detailed CPC groups follow a 5-digit code (1800 products). The aim has been to construct homogeneous product groups, concerning the production process, the use and the storing possibilities etc. CPC has its own codes with no direct link to ISIC Rev.3, but most CPC 5-digit codes can be linked to one ISIC Rev. 3 group as the main producer. For some CPC products, it is impossible to establish such a link because the principle of "main producer" has not been the leading principle for the HS goods.

CPA

EU's main product standard CPA, covers both goods and services and is a nomenclature for general use. As opposed to CPC, priority has been given to establish a link to the activity classification. Every CPA product is a characteristic product in only one NACE Rev.1 industry. The accounting structure of CPA (6-digits) is designed so that the first 4 digits give the NACE Rev.1 codes for the industry being the main producer/supplier of the product. The next two digits specify characteristic products for that industry. Each industry will have one or more characteristic products. The new CPA 2008 is revised according to the revised ISIC. Rev. 4.

3.7. Conversion tables for products

Conversion tables (encode lists) have to be established to give a link between the NA-product classification being developed and the detailed goods classification (HS-groups) used for the External Trade Statistics. The conversion table should be constructed at the same time as the NA-product classification.

Conversion tables must also be established to define the relationship between the NA-product classification and the codes used in different types of Annual Economic surveys, Income statements, Other accounting or production statistics and Government finance statistics.

4. DATA AND STRUCTURE FOR MAIN ACCOUNTS.

4.1. Introduction

This chapter gives an introduction to the Production and Capital Formation accounts and the Aggregation and Technical accounts.

4.2. Production accounts for Market producers.

Production accounts should be established for the different industries with a direct link to the available accounting or structural statistics.

Output could be registered at producer's value defined as:

	Sales of goods and services, specified by NA-products
plus	Produced for own account (Construction work etc. for own account, also included in fixed capital formation), specified by NA-products
gross	
plus	Change in stocks, finished goods and work in progress
plus	Income from secondary activities (e.g. Contract work; Trade margins calculated as income from sale of goods, bought for resale, minus use of goods for resale)
plus	Income from rental of buildings, machinery, equipment etc.

Output has to be registered as CORRT1-files, which is the file format used for registering values for production and imports (cif), specified by suppliers and products at producer's values (13-Values), see chapter 6.1.

Intermediate consumption could be registered at purchaser's value, defined as:

	Cost of used goods and services which again is defined as: Use of raw materials at purchaser's values by main products.
plus	Other main inputs as electricity, water, fuel, telephone etc.,
plus	Rental of buildings, machinery, equipment etc.
plus	Repairs and maintenance

Intermediate input has to be registered as CORRT2-files, which is the file format used for registering use of products, specified by industries at purchaser's values (19-Values), see chapter 6.2.

23602. Production accounts. Scheduled motor bus transport, An example.

19. Intermediate exp. at purchaser's values	13. Output at producer's values
000020 Office equipment	602214 Public passenger transport by road
000036 Post, bankservices	602212 Rental services of buses and coaches with driver
230000 Petroleum products	
251100 Rubber, tyres, tubes	
502010 Repair of motor cars	
633010 Travel agency and tour operator services	
660100 Insurance services	
703110 Real estate services.	
741100 Legal services	
<u>Total input at purchaser's values</u>	
▪ 31000 Value added at producer's value (Residual)	
Output at producer's value (Calculated automatic)	Output at producer's value (The total)

Value added at producer's value for the different industries will be calculated as a residual, defined as:
Total output at producer's value
minus Total intermediate input at purchaser's value.

Note: During the compilation process, it is very important to control the automatic compiled figures for Value added for the different industries.

Wages and salaries in cash and kind and Consumption of fixed capital, paid by the different industries have to be registered as CORRT3-files, see chapter 7.

4.3. Production accounts for Non-market producers: Central and Local government services and Non-profit institutions serving households (NPISHs)

Main sources are central and local government accounts, which should cover all units of the general government. Government finance statistics should be compiled using the same definitions and classifications as in the national accounts system or with a direct link to these classifications. This would facilitate an efficient and integrated data flow from the government accounts to the national accounts system and also to the IMF Government Finance statistics.

In accordance with SNA93, the value of the output of services from general government have to be calculated as the sum of the expenditure components: intermediate consumption, consumption of fixed capital and compensation of employees. On the output side, gross output is equal to the sum of the government fees (sales of goods and services) and government final consumption expenditure (the residual).

To be able to insert separate compiled constant price figures for Consumption of fixed capital for each of the government industries, Consumption of fixed capital has been given a separate product number .

Both revenue and expenditure should be defined and classified by economic type and at least for expenditure also by the SNA/ESA COFOG groups.

In many countries, estimation of intermediate consumption by products for the government is difficult, as the government accounts normally do not provide a standardised breakdown of purchases of goods and services. The example in the table below gives suggested aggregated product groups, which could be used to facilitate the use of a detailed and standardised breakdown of products for both the Supply Table and the Use Table within the SUT framework.

24751. Production accounts. Central government. Public administration, An example.

<u>19. Intermediate expenditure at purchaser's values:</u>	<u>13. Output at producer's values</u>
000020 Office equipment, cleaning material.	751061 Administration. Central government consumption of fixed capital,
000022 Food used in government institution	751161 Administration, Central authorities, Central government consumption (excl. consumption of fixed capital)
000032 Business travel	
000120 Repair non-residential buildings	751171 Administration, Central authorities, Central government fees
401016 Electrical energy	752461 Administration, Police services, Central government consumption (excl. consumption of fixed capital)
<u>19.Total intermediate expenditure at purchaser's value:</u>	752471 Administration, Police services, Central government
(Total wages and Consumption of fixed capital have to be calculated to estimate total output at producer's value.)	
<u>Output at producer's value (Calculated automatic)</u>	<u>Output at producer's value (Calculated automatic)</u>

Central government accounts will also be the data source for the different types of taxes and subsidies (Taxes on products, incl. custom duties, Subsidies on products, Other taxes on production and Other subsidies on production and VAT recorded), see chapter 6.

4.4. The Aggregation accounts and Technical accounts.

4.4.1. Different types of Aggregation accounts

Different types of aggregation accounts are introduced to facilitate the compilation and balancing of the detailed SUT and also to give extra information within the SUT framework. By introducing these extra accounts, the SUT framework includes double counting which has to be removed for international reporting.

4.4.2. "Undistributed intermediate consumption"

The aggregation accounts for "Undistributed intermediate consumption" (accounts in the interval 27015-27299) are introduced to limit the details needed for specifying intermediate input, specially for certain service industries. An aggregation account will receive the ordinary NA-products, but supply only one "Aggregation product", named after the supplying Aggregation account.

Example of useful Aggregation Accounts for "Undistributed intermediate consumption":

27020 "Office equipment, cleaning material, tools etc" (supplying one product 000020)
 27022 "Food consumed in government institutions" (supplying one product 000022)
 27080 "Repair, buildings" (supplying one product 000080)

The software requires at least one account in the interval 27015 - 27299 and at least one product to and from this account

27020. Office equipment, cleaning material.

<u>Use Table (T2):</u>	<u>Supply Table (T1):</u>
19. Input at purchaser's values:	13. Output at producer's values:
222212 Trade advertising material	000020 Office equipment, cleaning material
245132 Detergents and washing products	
252428 Other plastic products	
401000 Electricity , water	
641000 Post , Telephone etc	
<i>19. "Total intermediate expenditure at purchaser's value" is identical to " Output at producer's value"</i>	
Output at producer's value	Output at producer's value

"Tourist satellite accounts"

For the conversion from the ordinary SUT to "Tourist satellite accounts" (TSA) required accounts could be as 27033. Hotel services, business travel expenditure, domestic. Such accounts should cover the different industries intermediate consumption related to domestic business travel. In the TSA this expenditure is defined as tourist consumption. See the following example:

27033. Hotel services, business travel expenditure, domestic.

19. Input at purchaser's values:	13. Output at producer's values:
551000 Hotel services	000033 Hotel services, business travel exp., domestic
601010 Transport of passengers by long distance trains	

602210 Taxi services and rental services of passengers	
611011 Coastal water transport, passengers	
621010 Passenger transport by air	
<i>19. "Total intermediate expenditure at purchaser's value" is identical to "Output at producer's value"</i>	
<i>Value added equal to zero !</i>	
Output at producer's value (Calculated automatic)	Output at producer's value (Calculated automatic)

REMEMBER: Don't register Supply from these 27-accounts. Total supply from these 27-accounts a one product is created automatically, named after the supplying Aggregation account.

The Aggregation accounts for "Undistributed intermediate consumption" (accounts in the intervals 27015-27299) are removed when converting for international reporting, see Part III SUT/IOT.

4.4.3. "Trade and Transport Margins"

The aggregation account 27500 for "Trade margins" and account 27600 for "Transport Margins" are introduced to enable a detailed distribution of the Trade margin services and the Transport margin services by products and by users in the Use Table.

The Trade margin account 27500 will receive detailed NA-products for trade services at purchaser's value (identical to output at producer's value (13-value)) and supply trade margins distributed by detailed products at producer's value (recorded as 14R values plus 15-values minus 16 values) distributed by users.

27500. Retail and wholesale trade margins, An example.	
Use Table (T2):	Supply Table (T1) :
19. Input at purchaser's values:	Trade margins at producer's- value:
401035 Sale of electrical energy to households	specified by products/goods (p), and distributed by users.
501000 Trade margins on motor vehicles	
505000 Trade margins on motor fuel	
510100 Trade margins on wholesale trade	Trade margins at basic value (14R- values)
521100 Trade margins on retail trade	plus Trade margins, product taxes (15-values)
<i>19. "Total intermediate expenditure at purchaser's value" is identical to "Output at producer's value"</i>	minus Trade margins, product subsidies (16-val):
<i>Value added equal to zero!</i>	$H^{14R}_{27500, p} + H^{15}_{27500, p} - H^{16}_{27500, p}$
Output at producer's value	Output at producer's value

The Transport margin account 27600 will receive detailed NA-products for transport services at purchaser's value (identical to output at producer's value (13-value)) and supply transport margins distributed by detailed products at producer's value (recorded as 14T values) distributed by users.

4.4.4. Gross fixed capital formation by type of fixed assets and by industry

The aggregation accounts for "Capital formation by type of fixed asset" (accounts 28XXX) are introduced to be able to classify fixed capital formation both by products, by type and by industry. A capital formation by type of fixed asset account (28XXX) will receive detailed NA-products, but

supply only one “product”, called “Capital formation by type product”, named after the supplying “Capital formation by type of fixed assets account”.

28119. Aggregation account for types of fixed assets “Holiday homes, cottages” An example.

<u>Use Table (T2)</u>	<u>Supply Table (T1)</u>
19. Input at purchaser’s values:	13. Output at producer’s values:
451100 Site preparation	008119 Holiday homes, cottages
452110 General construction work	
452290 Roof framing work	
453100 Electrical installation work	
<i>19. “Total intermediate expenditure at purchaser’s value” is identical to “Output at producer’s value”</i>	
<u>Output at producer’s value</u> (Calculated automatic as a sum)	<u>Output at producer’s value</u> (Calculated automatic)

Gross fixed capital formation should also be broken down by industry in accordance with the industry classification for the production accounts.

Gross fixed capital formation specified by type off asset and by industry (accounts 83xxx, 84xxx, 85xxx, 86xxx) should be defined as:

- Purchases of new and second hand assets, specified by type of assets
- Value of sold assets (Most important for cars)

Gross fixed capital formation is recorded at purchaser’s value as CORRT2-files, see chapter 6.2.

4.4.5. Technical accounts for VAT, product taxes, subsidies

The input format for registering theoretical VAT, time adjusted product taxes and time adjusted product subsidies and trade and transport margins are explained in chapter 6.2.

VAT is recorded according to theoretical VAT by using VAT rates distributed by products and type of users.

The figures for theoretical VAT will be currently updated during the compilation process.

After finalised both the current and the constant price compilation for a year, the total figure for theoretical VAT is corrected to total actual VAT, see chapter 8.7.

The product taxes and subsidies are cash receipts time adjusted, so that the cash is attributed when the activity take place to generate tax liability. In the NNA, the time adjustment is based on the average time difference between the activity and the cash tax receipt (approximately two months).

Cash values for other taxes and subsidies are specified by industry, if possible at estimated accrual values.

The following technical accounts are introduced for VAT, product taxes and product subsidies.

29501	VAT (Theoretical compiled non-refundable Value added tax) (17-value).
29502	Investment levy or Sales tax (18-value) (Not obligatory)
29503	Taxes on products (11-value)
29504	Subsidies on products (12-value)
29505	Customs duty on imports (10-value)
29506	Product taxes on imports (11-value)
29507	A correction figure for VAT (usually negative) for the difference between the “Time adjusted accrued value for VAT” and the “Theoretical compiled value for VAT”.

By the final balancing of the Supply Table and the Use Table, the supply from the 29-accounts is created automatically in the Supply Table, see chapter 6.5.

EXCEPTIONS:

- **Supply from 29505: Custom duty on imports**, from the External trade statistics have to be registered at basic value, specified by products (the same as for imports).
- **Supply from 29507: A total figure for "Time adjusted accrued value for VAT has to be registered". The correction figure is calculated automatically.**

5. FIXED FORMAT FOR CLASSIFICATION CODES**5.1. Fixed format for classification of input data to SUT**

When starting a SUT project, a set of classification codes has to be established. Only then can it be verified that the input data is applicable. The classification codes used should preferably be kept unchanged for some years to facilitate use of value indices for updating the SUT from one year to the next year.

The application requires a fixed format for the different account types and classification codes to be used. When the database is accessed for the first time, the database with classification codes, tables and views have to be created. To illustrate the Classification Codes for Suppliers and Users, an extract of the standard classification codes (as used in NNA) with English text is attached, see Annex 1.

5.2. Format for classification of Suppliers, Users and Income components.

The code list for Suppliers, Users and Income components can be registered in an EXCEL spreadsheet in columns A –F as illustrated below:

Column	Contents
A	Activity code (suppliers, users, income components)
B	1 shows that the code is a supplier
C	2 shows that the code is a user
D	3 shows that the code is an income component
E	Short text (max. 16 characters)
F	Long description

A	B	C	D	E	F
<i>Activity code</i> <i>5 digits</i>	<i>1</i> <i>1 digit</i>	<i>2</i> <i>1 digit</i>	<i>3</i> <i>1 digit</i>	Short text <i>16 characters</i>	Long text with more detailed description
23010	1	2		Agriculture	Agriculture
23020	1	2		Forestry, logg.	Forestry, logging and related services
31000		2	3	Value added	Value added
31100			3	Comp. of employe	Compensation of employees
61011		2		Flour, grits, bisc	Flour,grits, biscuits, cripsbread etc
61012		2		Bread & cakes	

83010		2		Agriculture	Agriculture
83010		2		Forestry, logg.	Forestry, logging and related services
87000		2		Change in inv.	Change in inventories and residuals

In the example the two first digits (prefix) of the Codes for Supplier/User show "Types of accounts"
23 is the prefix for Production accounts for market producers.

31 is the prefix for Income components of value added.

61 is the prefix for Final consumption expenditure of households

83 is the prefix for Capital formation accounts for market producers

87 is the prefix for Change in inventories, Residuals.

The three next digits give the classification codes for Industries, Income components or Final use.

The next columns, B, C, D are a technical supplement to the Supplier/User codes, showing:

- In column B with the figure 1, that the codes are used in T1, the Supply Table
- In column C with the figure 2, that the codes are used in T2, the Use Table
- In column D with the figure 3, that the codes are used in T3, the Value added table

With an Excel-macro, the Excel input file is converted to the catalogue called "USER.DAT"

An extract of the Catalogue "USER.DAT":

SUPPL/USER (2+3 digits)	T1/T2 (3 dig.)	SHORT TEXT (16 char.)	LONG TEXT (80 char.)
23010	12	Agriculture	Agriculture
23020	12	Forestry, logg.	Forestry, logging and related service activities
-----	--	-----	-----
31000	23	Value added	Value added
31100	3	Comp. of employe	Compensation of employees
-----	--	-----	-----
61011	2	Flour, grits, bisc	Flour and grits, biscuits, cripsbread etc
61012	2	Bread & cakes	Bread and cakes
83010	2	Agriculture	Agriculture, hunting and related service activities
83010	2	Forestry, logg.	Forestry, logging and related service activities
87000	2	Change in inv.	Change in inventory, Residuals (goods)

The two first digits of the Codes for Supplier/User, give "Types of accounts".

23 is the prefix for Production accounts for market producers,

31 is the prefix for Income comonents of value added

61 is the prefix for Final consumption expenditure of households,

83 is the prefix for Capital formation accounts for market producers,

87 is the prefix for Change in inventories, Residuals.

The three next digits give the classification for industries, income components or types of final use.

The second column, which is a technical supplement to the Supplier/User codes, shows with:

- *the figure 1, that the codes are used in T1, the Supply Table*
- *the figure 2, that the codes are used in T2, the Use Table*

The Short text in English (or another language) entered in the format showed, is used for producing tables with text. The long text in English (or another language) is used as Catalogue documentation. The classification codes established for the first year for Suppliers and Users, should by preference, be kept unchanged for some years to facilitate use of value indices for updating the SUT from one year to the next year. To be able to use value indices for updating to the next year, it is more important to retain the same classification for industries and final users than for products.

5.3. Format for classifications of Products

The code list for products can be registered in an EXCEL spreadsheet in columns A – D as illustrated below:

Column	Contents
A	Product code
B	The residual user for this product
C	Short text (max. 16 characters)
D	Long text

Both Codes, Short and Long text in English (or another language) will be entered in (or converted to) the required format showed in the following:

With an Excel-macro, the Excel input file is converted to the catalogue called “PRODUCT.DAT”

Extract of the Catalogue “PRODUCT.DAT” with codes for products

PRODUCTCOD 6 digits)	USER (5 digits)	SHORT TEXT (16 char.)	LONG TEXT 70 char.)
011111	87000	Durum wheat	Durum wheat
011115	87000	Barley	Barley
701000	87400	Life insurance.ser.	Life insurance services
702011	87400	Pens.fund.serv	Pension funding services
351121	87910	Cruise ships, ferry	Cruise ships, ferry boats and the like
060003	87930	Changes in livestock	Changes in livestock

Note: 6-digits codes have to be used for the Product codes.

The second column, which is a technical supplement to the PRODUCT codes, called "The residual user for this product" gives links between the codes for products and the codes used for categories of "Changes in inventories/Residuals". This information is required for the automatic balancing between supply and use of each product.

The Short text in English entered in the format showed, is used for producing tables with text. The long text in English (or another language) is used as Catalogue documentation.

Products (goods), which can be stored, are "linked" to the "USER" code 87000. This means that during the automatic balancing process of the product flows, the difference between Supply and Use of products (goods) that can be stored, are allocated to account 87000. This is an obligatory account.

Products (services), which cannot be stored, are linked to the "USER" code 87400. This means that during the automatic balancing process of the product flows, the difference between Supply and Use

of products (services) which can not be stored, are allocated to account 87400, for further manual or RAS corrections. This is an obligatory account.

Products as "Cruise ships, ferry boats" with a long production period (products under processing) are allocated to "Work in progress " linked to the "USER" code 87910.

Products as "Change in livestock", "Change in stocks in fish farming", "Change in stocks, growth in planted forest" are linked to the "USER" code 87930

Correction of VAT is linked to the "USER" code 87970

6. ESTABLISHING SUT IN CURRENT PRICES FOR THE FIRST YEAR

6.1. The Supply Table (T1) at producer's value.

The Supply table T1 can be illustrated by the matrix H_{ip}^{13} , defining the product flows (p) from domestic suppliers and imports (i), at producer's values (13-values), see chapter 2.1.

CORRT1-FILE

A CORRT1-file is the file format used for registering values for production and imports (cif), specified by product at producer's values (13-Values).

Input data can be registered in an EXCEL spreadsheet in columns A –E as illustrated below:

Column	Contents
A	CORRT1 shows that the data are going into the Supply Table T1
B	The code for the supplying industry, in this case 23111
C	13 shows that the data are in Producer's Value, which is called value 13 in T1
D	Shows the codes for the products
E	Contains the values, in this case in million NOK

During the computer run the Excel CORRT1- file is converted to the fixed layout required for loading the CORRT1-file data into the database from ASCII (text) files with the format as shown below:

Supply of specified products: CORRT1-file

CORRT1	SUPP CODE	VALUE/PRODUCT CODE	VALUE
6 digits	2+3 digits	2+6 digits	Value
CORRT1	23211	13XXXXXX	2000
CORRT1	23211	13XXXXXX	4000

CORRT1 is a technical name for all records in a CORRT1-file.

5-digit codes are used for Supplying industries (as 23211 for Manufacture of pulp).

8 digit codes are used for the products where the first 2-digit codes show type of valuation (13 for producer's value) and the next 6-digits codes show the product codes.

Note: Totals should not be recorded. Total supply from an industry (as 23211) or total import for an import group, will by the software be calculated automatically as a sum.

To be able to keep records of the different input files, the file name should be written according to a given standard. For the illustrated file, we could write 92321113.CT1, where the first digit (9)

represents the year, 200(9), the next five digits give the Supplier code (23211), the next two digits (13) represent producer's value of the data. The "extension" has always to be written CT1, for a CORRT1 file.

6.2. The Use Table (T2) from purchaser's value to producer's value

6.2.1. The T2 Matrix at purchaser's value (19-value)

The Use Table (T2) can be expressed by the matrix M_{pj}^{19} , illustrating Use of Products without the accounts for "Changes in inventories/Residuals", see chapter 2.2.

M_{pj}^{19} is the matrix defining the product flows (p) to intermediate and final consumption, fixed capital formation and exports (j) at purchaser's value (19 value).

I. CORRT2-file

A CORRT2-file is the file format used for registering absolute values for intermediate use, domestic final consumption and exports (fob) of products at 19 values (purchaser's values).

The input data are in columns A to E.

Column	Contents
A	CORRT2 shows that the data are going into the Use table T2
B	19 shows that the data are in Purchaser's Value, which is called verdi_19 in the table T2
C	Shows the codes for the products
D	The code for the user, in this case industry 23111
E	Contains the values, in this case in million NOK

During the computer run the Excel CORRT2- file is converted to the fixed layout required for loading the CORRT2-file data into the database from ASCII (text) files with the format as shown below:

Use of products (absolute values): CORRT2-file

CORRT2	VALUE/PR. CODE	USECODE	VALUE
<i>6 digits</i>	<i>2+6 digits</i>	<i>2+3 digits</i>	<i>Value</i>
CORRT2	19XXXXXX	23211	400
CORRT2	19XXXXXX	23211	500
CORRT2	19XXXXXX	23211	-8
CORRT2	19XXXXXX	23211	100

CORRT2 is a technical name for all records in a CORRT2-file.

8 digit codes are used for the products where the first 2-digit codes show type of valuation (19 for purchaser's value) and the next 6-digits codes show the product codes.

5-digit codes are used for the User (as 23211 for Manufacture of pulp).

Note: Totals should not be recorded. Total intermediate or final use will by the software be calculated automatic as a sum.

The file names should be written according to the given standard. For this file, we should write 91923211.CT2, where the first digit (9) represents the year (200)9, the next two digits (19) represent purchaser' value, the next five digits (23211) give users code. "Extension" is always written CT2, meaning CORRT2-file.

REMEMBER: IT IS NECESSARY TO SPECIFY USE BY ALL ACCOUNTS AS CORR2-FILES, INCLUDING USE BY THE SPECIAL AGGREGATION ACCOUNTS With Prefix 27 AND 28.

ALL ACCOUNTS STARTING WITH THE PREFIX 87 ARE COMPILED AUTOMATICALLY DURING THE BALANCING OF THE SUPPLY AND USE TABLE.

6.2.2. Overview of the data input for compiling the valuation matrices

The detailed Use Table is first compiled in purchaser's values. Following that different valuation matrices are compiled for VAT; trade margins, transport margins, producer's values, product taxes, product subsidies, and finally basic values,

Compilation of VAT and different types of product taxes and product subsidies -	Description of the different Valuation Matrices in the Use Table:
INVESTMENT TAX (18-values) Not required	Investment tax specified by products and users as 18 values
VALUE ADDED TAX (17-values) Alternative data input:	Value added tax matrix, specified by products and users as 17 values. Short explanation of data input:
i. VAT-ORD "MOMS-ALMEN"	The general VAT rate
ii. VAT FIX "MOMS FAST"	Shows products, which regardless of users, will have the ordinary VAT -rate (VAT-ORD) listed in table i.
iii. VAT PROD "MOMS_PRO"	Listing products, which regardless of users are not to be levied with VAT or will have a different VAT-RATE
iv. VAT USER "MOMS_MOT"	Listing users which are not to be levied with VAT or pay a different VAT rate
TAXES ON PRODUCTS SUBSIDIES ON PRODUCTS	Information about total values for product taxes and subsidies, used to compile valuation matrices:
S11 Taxes on products paid by producers	Absolute values for taxes on products paid by producers, specified by products
U11	Combinations of users and products exempt from taxes on products paid by producers
S12 Subsidies on products paid to producers	Absolute values for subsidies on products paid to producers, specified by products
U12	Combinations of users and products exempt from subsidies on products paid to producers
S15 Taxes on products paid by retailers	Taxes on products paid by retailers, by product
U15	Combinations of users and products exempt from taxes on products paid by retailers
S16 Subsidies on products paid to retailers	Subsidies on products paid to retailers
U16	Combinations of users and products exempt from subsidies on products paid to retailers

6.2.3. Calculating T2. Matrix for investment tax (18-Values)

The Norwegian investment tax is a special type of tax levied on products to capital investment In Norway the investment tax, which has a lower rate than VAT, is replacing the value added tax. The current investment tax rate for a year (specified by product and industry) has to be recorded from the governments accounts and been expressed as a fixed per cent of the purchaser's value minus investment tax.

Investment tax (18-values) are not required for the software to work.

M^{18} is the calculated investment tax (18-Values), specified by Products and Users.

$$M^{18} = [m_{pj}^{18}] = \begin{bmatrix} \frac{Y_{11}}{1+Y_{11}} m_{11}^{19} & \dots & \frac{Y_{1j}}{1+Y_{1j}} m_{1j}^{19} \\ \dots & \dots & \dots \\ \frac{Y_{p1}}{1+Y_{p1}} m_{p1}^{19} & \dots & \frac{Y_{pj}}{1+Y_{pj}} m_{pj}^{19} \end{bmatrix}$$

where Y gives rates of Investment tax and is of the same order as the matrix M^{19} purchaser's values and each element of matrix M^{19} is multiplied by the corresponding element of matrix Y .

Matrix Y , which gives investment tax rate for a year, is taken from the following FILE:

FILE WITH 18-VALUES FOR INVESTMENT TAX (specified with 4 decimals):

PRODUCT	USER.CODE	INVESTRATE
(6 digits)	(2+3 digits)	Percentages
Product code	Industry code	0,1200

A value (INVESTMENT TAX rate) is entered only when the rate is different from zero.

The rates of investment tax are calculated for the flow of investment products (from investment by type) to the accounts for fixed capital formation for the different industries. (In the Norwegian case, investment tax is also levied on some products that are delivered to intermediate consumption in the national accounts system.)

6.2.4. Calculating T2. Matrix for value added tax (VAT) (17-Values)

The Norwegian methodology follows the SNA93 recommendation with "net system of value added tax".

Non-deductible VAT is recorded as theoretical VAT.

M^{17} is the calculated VAT (17-Values), specified by Products and Users.

$$M^{17} = [m_{pj}^{17}] = \begin{bmatrix} \frac{K_{11}}{1+K_{11}} m_{11}^{19} & \dots & \frac{K_{1j}}{1+K_{1j}} m_{1j}^{19} \\ \dots & \dots & \dots \\ \frac{K_{p1}}{1+K_{p1}} m_{p1}^{19} & \dots & \frac{K_{pj}}{1+K_{pj}} m_{pj}^{19} \end{bmatrix}$$

where K gives rates of VAT and is of the same order as the matrix M^{19} , and each element of matrix M^{19} is multiplied by the corresponding element of matrix K .

The matrix K is compiled from information stored in four different tables. The information about the current VAT rates for a year (specified by product and users) have to be recorded from the governments accounts and been expressed as a fixed per cent of the purchaser's value minus VAT:

⇒ Certain products might not to be levied with VAT, regardless of use.

⇒ Certain products might have a rate of VAT that differs from the general rate.

Information about the combinations of Products and Users for which VAT has to be calculated and which rate to use, have to be recorded in different TABLES

Note: The VAT rates are given as a per cent of purchaser's value (19-value) exclusive of VAT (17-value)

i.e. 20% VAT is written 0.2000.

In the NNA adaptation, the following general rules apply for all products:
No VAT on exports (51 account) and changes in inventories (87-account)

The following shows the TABLES introduced for compiling VAT:

TABLE i. VAT-ORD ("MOMS-ALMEN") SHOWS THE ORDINARY VAT-RATE:

<p>VAT RATE: <u>The general Value Added rate:</u> <u>(5 digits)</u> 0.2000 (Example of presentation of 20.00 % VAT as 5 digits rates as a percentage of producer's values.)</p>

TABLE ii. VAT FIX ("MOMS FAST") SHOWS PRODUCTS, WHICH REGARDLESS OF USERS, WILL HAVE THE ORDINARY VAT-RATE (VAT-ORD) LISTED IN TABLE i:

<p>PRODUCTS: <u>6 digits</u> <u>List with product codes</u></p>
--

In the Norwegian case, we find a few products where the ordinary VAT-ORD rate ("moms-almen") is used, independent of type of user.

For products not listed in TABLE ii, the rules listed in TABLE iii and TABLE iv will apply:

TABLE iii. VAT PROD ("MOMS PRO") LISTING PRODUCTS, WHICH REGARDLESS OF USERS ARE NOT TO BE LEVIED WITH VAT OR WILL HAVE A DIFFERENT VAT-RATE:

PRODUCTS	VAT RATE
<u>6 digits</u>	<u>Percentages</u>
Product code	0 (Example of 0 % VAT)
Product code	0.1000 (Example of 10 % VAT)

In the Norwegian case we find about 400 products on this list of products with non-standard VAT tax rate. Among these products are output from Central and Local government. For most of these products, the VAT rate is zero. For some products, as electricity for domestic use, an alternative rate is used in the northern regions of Norway. For the National Accounts, an average of rates for different regions have to be estimated.

In other countries as Bulgaria we find a very high threshold for registering in the VAT register (50.000 levy = 250.000 NOK). In Norway we have had no threshold, but from the year 2004 the threshold for being able to register in the VAT register is a turnover more than 50.000 NOK

For products not listed in any of the other tables, the ordinary VAT rate will be used, but always checked against the users.

TABLE iv. VAT USER ("MOMS MOT") LISTING USERS WHICH ARE NOT TO BE LEVIED WITH VAT OR PAY A DIFFERENT VAT RATE:

USERS	VAT RATE
<u>2+3 digits</u>	<u>Percentages</u>
User code	0 (If % = 0)
User code	0.5500 (Example of presentation mode for 55% of the ordinary VAT rate)

Note: The procedure presented in *TABLE ii VAT-FIX* concerning Products for which VAT-ORD is to be levied regardless of Users, will be dominant for most products, compared with the procedure presented in *TABLE iv*.

The procedures presented for **Products in TABLE iii and Users in TABLE iv** are used in combination:

- ⇒ For products listed in **TABLE iii**, the VAT will be compiled with the given VAT rate
- ⇒ For products not listed in **TABLE iii**, the VAT on the product will be compiled with the ordinary rate (VAT-ORD), i.e. 20.00 %.
- ⇒ **TABLE iv** will then be checked. For Users listed in this TABLE, the ordinary VAT rate will be multiplied by the VAT rate in this TABLE.

EXAMPLE with VAT-ORD equal to 0.2000:

TABLE	TABLE ii VAT FIX	TABLE iii VAT-PROD	TABLE iv VAT-USERS	RESULT
	<i>product code</i>	<i>percentage</i>	<i>percentage</i>	<i>percentage</i>
-	<found>	not found	not found	0.2000
	<not found>	0.1000	0.55	0.0550
	<not found>	0		0
	<found>	<not found>	0.9	0.2000
	<not found>	0.1000	0	0

By combining the TABLES ii, iii and iv, the VAT rate K_{pj} is compiled for the various Product x User combinations.

NOTE: Products x User combinations, which are not listed in any of the TABLES, will have the ordinary VAT rate VAT-ORD ("MOMS-ALMEN").

6.2.5. Calculating T2. Matrix for product taxes collected by Retail and Wholesale traders (15-Values)

M^{KE} is an auxiliary matrix, defined as Purchaser's value less VAT (and investment tax in Norway):

$$M^{KE} = M^{I9} - M^{I8} - M^{I7}$$

M^{15} is the Product taxes collected by Retail and Wholesale Traders, given by:

$$M^{15} = [m_{pj}^{15}] = m_{pj}^{KEU15} \times \frac{S_p^{15}}{\sum_{j=1}^g m_{pj}^{KEU15}}$$

where S^{15} is a column vector ($c \times 1$) giving absolute values for the "Sum of Product Taxes collected by Traders", classified by relevant products. Taxes are registered as positive values.

M^{KEU15} is of dimensions ($c \times g$) given by:

$$M^{KEU15} = [m_{pj}^{KEU15}] = \begin{bmatrix} u_{11}^{15} m_{11}^{KE} & \cdot & \cdot & u_{1j}^{15} m_{1j}^{KE} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ u_{p1}^{15} m_{p1}^{KE} & \cdot & \cdot & u_{pj}^{15} m_{pj}^{KE} \end{bmatrix}$$

U^{15} with elements from 0 to 1000 is of the same order as M^{KE} , and each element in matrix U^{15} is multiplied by the corresponding element in matrix M^{KE} .

S15 AND U15 ARE TAKEN FROM THE FOLLOWING TABLES:

TABLE S 15 WITH VALUES FOR S 15:

PRODUCT <u>6 digits</u>	VALUE
Product code	Absolute value
Product code	Absolute value

Note: S15 specifies absolute values for product taxes, classified by product.

TABLE WITH VALUES FOR U 15:

PRODUCT <u>(6 digits)</u>	USER <u>(2+3 digits)</u>	VALUE <u>3 digits</u>
Product code	Industry code	1 - 999
Product code	Industry code	1 - 999

NOTE:

Combinations of Product (p) x User (j) where taxes are not to be calculated, are registered with 0. Combinations of Product (p) x User (j) where taxes are to be calculated with a reduced rate, are registered with values from 1 to 999. All other combinations of Product (p) x User (j) where no value is registered, will automatic be given a value = 1000.

Value = 0 indicates where product taxes are not to be calculated, and these combinations will be eliminated.

Values from 1 to 999 indicates where product taxes are to be calculated with a different rate than the normal full rate. The value X, where $0 < X < 1000$, indicates the % $((X / 1000) * 100)$ of the normal full rate.

Value = 1000 indicates where product taxes are to be calculated with the normal full rate.

6.2.6. Calculating T2. Matrix for product subsidies paid to Retail and Wholesale Traders (16-Values)

The procedure for compiling products subsidies is analogous with the methodology described above for product taxes.

S16 AND U16 ARE TAKEN FROM THE FOLLOWING TABLE:

TABLE S16 WITH VALUES FOR S 16:

PRODUCT <u>(6 digits)</u>	VALUE
Product code	Absolute value
Product code	Absolute value

Note: S16 specifies absolute values for product subsidies, classified by product.

TABLE WITH VALUES FOR U 16:

PRODUCT <u>(6 digits)</u>	USER <u>(2+3 digits)</u>	VALUE <u>3 digits</u>
Product code	Industry code	1 - 999
Product code	Industry code	1 - 999

NOTE:

Combinations of Product (p) x User (j) where subsidies are not to be calculated, are registered with 0.
 Combinations of Product (p) x User (j) where subsidies are to be calculated with a reduced rate, are registered with values from 1 to 999.

All other combinations of Product (p) x User (j) where no value is registered, will be given a value = 1000.

Value = 0 indicates where product subsidies are not to be calculated, and these combinations will be eliminated.

Values from 1 to 999 indicates where product subsidies are to be calculated with a different rate than the normal full rate. The value X, where 0 < X < 1000, indicates the % ((X /1000)*100) of the normal full rate.

Value = 1000 indicates where product taxes / subsidies are to be calculated with the normal full rate.

6.2.7. Calculating T2. Matrix for Retail, wholesale trade margins at basic values(14R-Values).

M^{KT} is an auxiliary matrix, defined as Purchaser's value (19) less (Investment tax in Norway 18), VAT (17), Subsidies on products paid to Traders (16), Taxes on products collected by Traders (15).

$$M^{KT} = M^{19} - M^{18} - M^{17} - M^{16} - M^{15} = M^{13} + M^{14R} + M^{14T}$$

We define retail and wholesale trade margins as $TRM = \frac{M^{14R}}{M^{13}}$

TRM: The Trade Margin rates is "the total absolute value of retail and wholesale margins (M^{14R}) as a percentage of Producer's values (M^{13}) and is of the same order as M^{KT} .

TRM is taken from the following input file for TRADE MARGIN RATES:

File with (14R) FOR TRADE MARGIN RATES (TRM) (specified with 4 decimals):

Trade and transport margins

The input data are in columns A to C.

Column	Contents
A	The code for the products
B	The code for the users
C	The margin rates

PRODUCT	USER	MARGIN RATE
(6 digits)	(2+3 digits)	0.2600 (Example of presentation of 26 %)

A value (trade margin rate) is entered only when the rate is different from zero. The trade margin rates have to be estimated by products and users and are difficult to estimate.

M^{14R} (of dimensions c x g) is the calculated *Retail and wholesale trade margins at Basic Value*, is:

$$M^{14R} = [m_{pj}^{14R}] = \begin{bmatrix} \frac{trm_{11}}{1+trm_{11}+ttm_{11}} m_{11}^{KT} & \dots & \frac{trm_{1j}}{1+trm_{1j}+ttm_{1j}} m_{1j}^{KT} \\ \dots & \dots & \dots \\ \frac{trm_{p1}}{1+trm_{p1}+ttm_{p1}} m_{p1}^{KT} & \dots & \frac{trm_{pj}}{1+trm_{pj}+ttm_{pj}} m_{pj}^{KT} \end{bmatrix}$$

6.2.8. Calculating T2. Matrix for Transport margins at basic values (14T-Values)

Note: The producer's values of the Trade Margins are not known at this stage in the production process.

We define transport margins rates as $TTM = \frac{M^{14t}}{M^{13}}$.

Transport margin rates are taken from the following file for TRANSPORT MARGIN RATES:

File with 14T-Values for TRANSPORT MARGIN RATES (TTM) (specified with 4 decimals):

<u>PRODUCT</u>	<u>USER</u>	<u>MARGIN RATE</u>
(6 digits)	(2+3 digits)	0.2600 (Example of presentation of 26 %)

A value (transport margin rate) is entered only when the rate is different from zero.

The transport margin rates have to be estimated by products and users and are difficult to estimate.

M^{14T} (of dimensions $c \times g$) is the calculated *Transport Margins at Basic Value*, given by:

$$M^{14T} = [m_{pj}^{14T}] = \begin{bmatrix} \frac{ttm_{11}}{1+trm_{11}+ttm_{11}} m_{11}^{KT} & \dots & \frac{ttm_{1j}}{1+trm_{1j}+ttm_{1j}} m_{1j}^{KT} \\ \vdots & \ddots & \vdots \\ \frac{ttm_{p1}}{1+trm_{p1}+ttm_{p1}} m_{p1}^{KT} & \dots & \frac{ttm_{pj}}{1+trm_{pj}+ttm_{pj}} m_{pj}^{KT} \end{bmatrix}$$

6.2.9. Calculating T2. Matrix at producer's values (13-Values)

$$M^{13} = M^{19} - M^{18} - M^{17} - M^{16} - M^{15} - M^{14R} - M^{14T}$$

The Supply Table (T1) and the Use Table (T2) are first balanced at producer's value during a later stage when also the first estimates for Change in inventories, specified by products are compiled, see chapter 4.4.

After calculating M^{13} the following value set could have been calculated:

M^{12} product subsidies (12-Values), M^{11} product taxes (11-Values) and M^{10} basic values (10-Values).

By introducing certain Aggregation accounts (27-accounts) as residual accounts, the calculations of basic values (10-Values) can first be carried out after balancing the residual accounts (Changes in Inventories etc).

For the 27-accounts for services, 19-Values are always equal to 13-Values, while 10-Values will diverge from 13-Values when there are product taxes/subsidies on the services that are delivered to the 27-accounts.

6.3. Balancing the Supply Table and the Use Table at producer's values

Chapter 2.2 explain that the Use table T2, defined by matrix N, will, during the procedure of balancing SUT, be split into the matrices M and R. The relationship between the matrices N and M is defined by:

$$N = M : R$$

M is Use in T2, without the accounts for "Change in inventories and Residuals"

From T1 gives Supply of a product in 13 value and from T2 gives Use of a product in 13 value.

R is Change in inventories and Residuals, specified by products.

$$r_{p,87XXX}^{13} = S_p^{13} - \sum_{j=1}^g m_{pj}^{13}$$

By the automatic product balancing at producer's values, the catalogue for products will decide the allocation of products (Change in inventories and Residuals) between the different 87 accounts

87000	Residual - Account for the balancing, in 13-Values, of Supply and Use of goods (products that can be stored)
87400	Residual - Balancing account for the balancing, in 13-Values, of Supply and Use of services (products that can not be stored). (Will be removed during the balancing process)
879XX	Residual - Balancing account for the balancing, in 13-Values, of Supply and Use of special specified products, like change in livestock (products that can be stored).

Changes in inventories (87-accounts) at basic values (10-Values) and at purchaser's values (19-Values) are assumed to be identical with change in inventories at producer's values (13 values), i.e. there are no margins, taxes or subsidies on changes in inventories

6.4. Calculating the complete Use Table with subsidies and taxes on products and at basic values.

6.4.1. Calculating T2. Matrix for product subsidies (12-Values)

M13 (of dimensions $c \times g$) gives Use of products at producer's values (13-Values) classified by users.

Total Use in producer's value, classified by product and aggregated over all users,

is given by: $\sum_{j=1}^g m_{pj}^{13}$

M12 is of dimensions ($c \times g$), gives subsidies levied on products (only negative values), (12-Values):

$$M^{12} = [m_{pj}^{12}] = m_{pj}^{13u12} \times \frac{S_p^{12}}{\sum_{j=1}^g m_{pj}^{13U12}}$$

where S^{12} is a column vector ($c \times 1$) which gives Total absolute values for subsidies classified by products.

M^{13U12} is of dimensions ($c \times g$), decided by:

$$M^{13U12} = [m_{pj}^{13U12}] = \begin{bmatrix} u_{11}^{12} m_{11}^{13} & \cdot & \cdot & u_{1j}^{12} m_{1j}^{13} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ u_{p1}^{12} m_{p1}^{13} & \cdot & \cdot & u_{pj}^{12} m_{pj}^{13} \end{bmatrix}$$

where U^{12} has the same dimension as M^{13} and the possible values are between 0 and 1000. Every element in matrix U^{12} is multiplied by the corresponding element in matrix M^{13} .

S12 AND U12 ARE TAKEN FROM TABLES

TABLE S12 with Values for S12

PRODUCT (6 digits)	VALUE
Product code	Absolute value
Product code	Absolute value

Note: S12 specifies total absolute values for product subsidies (registered as negative values), classified by products.

TABLE with Values for U 12

PRODUCT (6 digits)	USER (2+3 digits)	VALUE 3 digits
Product code	Industry code	0 - 999
Product code	Industry code	0 - 999

NOTE: Combinations of Product (p) x User (j) where subsidies are not to be calculated, are registered with 0. Combinations of Product (p) x User (j) where subsidies are to be calculated with a reduced rate, are registered with values from 1 to 999. All other combinations of Product (p) x User (j) where no value is registered, will by the software be given a value = 1000.

Value = 0 indicates where subsidies are not to be calculated, and these combinations will be eliminated.

Values from 1 to 999 indicates where subsidies are to be calculated with a different rate than the normal full rate. The value X, where $0 < X < 1000$, indicates the % $((X / 1000) * 100)$ of the full rate.

Value = 1000 indicates where product taxes are to be calculated with the normal full rate.

6.4.2. Calculating T2. Matrix for product taxes (11-Values)

M11 is of dimensions (c x g), gives taxes levied on products (positive values), (11-Values)

The procedure for compiling taxes on products is analogous with the methodology described above for subsidies

S11 AND U11 ARE TAKEN FROM THE FOLLOWING TABLES:

TABLE S11 with Values for S11

PRODUCT (6 digits)	VALUE
Product code	Absolute value
Product code	Absolute value

Note: S11 specifies total absolute values for product taxes (positive values), classified by products.

TABLE with Values for U11

PRODUCT (6 digits)	USER (2+3 digits)	VALUE 3 digits
Product code	Industry code	0 - 999
Product code	Industry code	0 - 999

NOTE: Combinations of Product (p) x User (j) where taxes are not to be calculated, are registered with 0. Combinations of Product (p) x User (j) where taxes are to be calculated with a reduced rate, are registered with values from 1 to 999. All other combinations of Product (p) x User (j) where no value is registered, will by the software be given a value = 1000.

Value = 0 indicates where product taxes are not to be calculated, and these combinations will be eliminated.

Values from 1 to 999 indicates where product taxes are to be calculated with a different rate than the normal full rate. The value X, where $0 < X < 1000$, indicates the % $((X / 1000) * 100)$ of the full rate. Value = 1000 indicates where product taxes are to be calculated with the normal full rate.

6.4.3. Calculating T2. Matrix at basic values (10-Values)

Total Use in basic value, classified by product and aggregated over all users, is given by:

$$\sum_{j=1}^g m_{pj}^{10} = \sum_{j=1}^g m_{pj}^{13} - \sum_{j=1}^g m_{pj}^{12} - \sum_{j=1}^g m_{pj}^{11}$$

6.5. Computing the complete Supply Table

6.5.1. Balancing margins, product taxes and product subsidies between T2 and T1

The Supply Table (T1) is illustrated in chapter 2.3 by Figure 1.

Figure 1 shows S as a row vector (column sums) giving total Supply, specified by products, in the various value classes.

In T1 the row vector (column sums) $S_p^{11}, S_p^{12}, S_p^{14R}, S_p^{14T}, S_p^{15}, S_p^{16}, S_p^{17}$ and S_p^{18} , will be determined as identical to the column vector (row sums) $S_p^{11}, S_p^{12}, S_p^{14R}, S_p^{14T}, S_p^{15}, S_p^{16}, S_p^{17}$ and S_p^{18} , computed in T2, as illustrated by chapter 2.3, Figure 3.

$S_p^{11}, S_p^{12}, S_p^{15}$ and S_p^{16} are taken from the TABLES with values for S11, S12, S15, S16 specified by products.

In T1, the following rows specified by products will be created in this phase:

- ⇒ S_p^{14R} is entered as row 27500 x 14RXXXXXX (Retail and wholesale margins, basic value)
- ⇒ S_p^{14T} is entered as row 27600 x 14TXXXXXX (Transport margins, basic value))
- ⇒ S_p^{15} is entered as row 27500 x 15XXXXXX (Taxes on products, collected by traders) NOT REQUIRED
- ⇒ S_p^{16} is entered as row 27500 x 16XXXXXX (Subsidies on products paid to traders) NOT REQUIRED
- ⇒ S_p^{17} is entered as a row 29501 x 17XXXXXX (VAT)
- ⇒ S_p^{18} is entered as a row 29502 x 18XXXXXX (Investment tax) NOT REQUIRED

Note: Possible product taxes and product subsidies allocated to transport margins will be treated as ordinary product taxes (11-values) and product subsidies (12-values).

6.5.2. Calculating T1. Product subsidies (S12 by products) distributed by domestic suppliers.

The total figure for **Subsidies on products S_p^{12}** is identical in T1 and T2 and is taken from the TABLE S12.

$H^{23/12}$ denotes subsidies on products from Domestic supply accounts.

$$H^{23/12} \text{ is given by: } h_{ip}^{23/12} = \left(\frac{S_p^{12}}{\sum_{i=23001}^{23999} h_{ip}^{23/13}} \right) \times h_{ip}^{23/13}$$

Note: $i = 23XXX$ indicates that product subsidies are only paid to Domestic market producers (23 accounts).

If product subsidies also are paid to 22-accounts, 24-accounts, 25-accounts and 26-accounts, these accounts have also to be included by correcting some codes in the computer program.

6.5.3. Calculating T1. Product taxes (S_p¹¹ by products) distributed between domestic suppliers and imports.

The total figure for “Taxes on products” S_p¹¹ is identical in T1 and T2 and is taken from the TABLE S12.

The sum of custom duties (account 29505) and imports of goods and services (account 52XXX), is expressed by H^{IA/13}

$$H^{IA/13} = [h_p^{IA/13}] = [h_p^{29505,13} + h_p^{52XXX,13}]$$

Domestic production minus exports (account 51XXX) of products recorded in producer’s values (13-values) is expressed by H^{PA/13}:

$$H^{PA/13} = [h_p^{PA/13}] = \left[\sum_{i=23001}^{23999} h_{ip}^{23,13} - m_p^{13,51XXX} \right]$$

NOTE: If product taxes also are paid by 22-accounts, 24-accounts, 25-accounts and 26-accounts, these accounts have to be included in this equation

Product taxes on imported products, hp29506/11 is called "import taxes".

h_p^{29506/11} is computed for the vectors 29506 x 11 in the Supply table (T1)

The following equation is based on the assumption that product taxes related to the import of a product (h_p^{29506/11}) represents the same share of the total product taxes (S_p¹¹) as import tax (h_p^{29506/11}) plus the sum of custom duties and imports (H^{IA/13}) represents of import tax (h_p^{29506/11}) plus the sum of custom duties and imports (H^{IA/13}) plus domestic supply of the product minus exports of the product (H^{PA}) i.e.:

$$\frac{h_p^{29506/11}}{S_p^{11}} = \frac{h_p^{29506/11} + H^{IA/13}}{h_p^{29506/11} + H^{IA/13} + H^{PA/13}}$$

This equation has import tax hp29506/11 as the unknown variable. The solution is the equation below.

$$h_p^{29506} = -1/2 \left(H^{IA/13} + H^{PA/13} - S_p^{11} \right) + \sqrt{\left[H^{IA/13} \times S_p^{11} \right] + \left[1/2 \left(H^{IA/13} + H^{PA/13} - S_p^{11} \right) \right]^2}$$

By this equation, product taxes are distributed by imported products (the vector 29506 x 11xxxxxx) expressed by h_p^{29506/11} in the Supply table.

Note: If for a product (goods and services), exports (account 51XXX) is larger than or equal to domestic production from account 23, H^{PA} will be less or equal to zero. h_p^{29506/11} will be defined equal to S_p¹¹. This means that for the product, the total product tax S_p¹¹ will be allocated to imports as "import tax".

7. CREATING THE INCOME COMPONENTS OF VALUE ADDED

Value added for each industry (Bd) is calculated from T1 and T2 as the "Balancing item 31000". The Balancing item is transferred to new tables for Value Added, called T3 for basic value, and T3_13 for producer's value),

Note: For the technical "Aggregation accounts" 27 and 28, Value Added, should be equal to zero.

T3. VALUE ADDED and INCOME COMPONENTS

31. VALUE ADDED in basic value Income components	FROM PRODUCTION ACCOUNTS	FROM TECHNICAL ACCOUNTS
New data to be registered:		
31111 Wages and salaries in cash	22,23,24,25,26	
31112 Wages and salaries in kind	22,23,24,25,26	
31121 Employers' social contributions, actual	22,23,24,25,26	
31123 Employers' social contributions, imputed	22,23,24,25,26	
Data from Government Accounts (to be registered):		
31220 Other taxes on production	22,23,24,25,26	
31320 Other subsidies on production	22,23,24,25,26	
Automatic transferring from T1:		
31250 Customs duty	22,23,24,25,26	29506
31270 VAT		29505
31280 Investment levy		29501
Balancing item:		
31900 Gross operating surplus/Gross mixed income	22,23,24,25,26	27,28,29
38000 Consumption of fixed capital(to be registered):	22,23,24,25,26	
New balancing item:		
31910 Operating surplus / Mixed income.	22,23,24,25,26	27,28,29
31000 Value added at basic value From T2	22,23,24,25,26	27,28,29

Note: Value added at basic value by industries can be calculated from value added at producer's value by deducting 31211 and 31212 Product taxes and adding 31310 product subsidies, all specified by industries.

Technical accounts for distribution of product taxes and product subsidies.

29501	VAT (Theoretical compiled non-refundable Value added tax) (17-value).
29502	Investment levy or Sales tax (18-value) (Not obligatory)
29503	Taxes on products (11-value)
29504	Subsidies on products (12-value)
29505	Customs duty on imports (10-value)
29506	Product taxes on imports (11-value)
29507	A correction figure for VAT (usually negative) for the difference between the "Time adjusted book value for VAT" and the "Theoretical compiled value for VAT".

Data which are registered in T3:

Establishing individual objects (absolute figures): CORRT3-file

Income Components

The input data are in columns A to D.

Column	Contents
A	CORRT3 shows that the data are going into the Income Components table T3
B	Shows the codes for the income components
C	The code for the users
D	Contains the values, in this case in million NOK

A CORRT3 file is used for registering those income components that are not being calculated in T1 or T2. 31XXX indicates components of the value added (31) and a 3-digit code representing form of income.

Example of a CORRT3 file:

CORRT3	VALUE ADDED	USE CODE	VALUE
Position	Pos. Position	Position	Position
<u>1 - 6</u>	<u>19/2021 - 23</u>	<u>31-35</u>	<u>41 - 51</u>
CORRT3	31XXX	23211	400
CORRT3	31XXX	23211	500
CORRT3	31XXX	23211	-8
CORRT3	31XXX	2XXX	
CORRT3	38XXX	23211	400

The file name should be written according to the given standard. We should write 83123XXX.CT3 where the first digit (8) will represent the year 199(8), the next 2 digits (31) will give value added components, and the next 5 digits give user codes. "Extension" will always be written CT3, meaning CORRT3-file.

Data which are transferred from T1:

Income components transferred from T1.

For each industry the Income components will be added up:

31211. Product taxes by:

31211 x 22*** in T3 = 22*** x S 11***** from T1,
31211 x 23*** in T3 = 23*** x S 11***** from T1,
31211 x 24*** in T3 = 24*** x S 11***** from T1,
31211 x 25*** in T3 = 25*** x S 11***** from T1,
31211 x 26*** in T3 = 26*** x S 11***** from T1,

(The total of S15 and S16 is included as S11 and S12 in the wholesale and retail trade industries)

NOTE: product taxes are registered as positive values.

31310. Product subsidies by:

31310 x 22*** in T3 = 22*** x S 12***** from T1,
31310 x 23*** in T3 = 23*** x S 12***** from T1,
31310 x 24*** in T3 = 24*** x S 12***** from T1
31310 x 25*** in T3 = 25*** x S 12***** from T1
31310 x 26*** in T3 = 26*** x S 12***** from T1

NOTE: Product subsidies are registered as negative values.

31212. Taxes on products from import will be transferred

(31212 x 29506 in T3) = (29506 x S 11***** from T1)

31250. Custom Duty will be transferred

(31250 x 29505 in T3) = (29505 x S 10***** from T1) (Alternatively sum 13-Values)

31270. VAT will be transferred

(31270 x 29501 in T3) = (29501 x S 17***** from T1)

31280. Investment tax will be transferred

(31280 x 29502 in T3) = (29502 x S 18***** from T1)

Calculation of 31900 Gross Operating Surplus

Gross operating surplus, D_d , is given by: $D_d = B_d - \sum_{k=1}^f I_{k,d}$, $d \in (1,2,\dots,e)$

k represents Income components.

d represents Production accounts

Gross Operating Surplus will be calculated for all the industries/aggregation accounts (i.e. from account 22010 to account 29506 inclusive).

Operating Surplus 31910 for an industry will be calculated as the difference between Gross operating surplus 31900 and Consumption of Fixed Capital 38000, i.e. for industry 23010:

31910 x 23010 = (31900 x 23010) - (38000 x 23010).

Note: Custom duty specified by products, are transferred from Basic value (10-value) to be treated as Product tax (11-value) included in account 29503 for international reporting of SUT, see Part III SUT/IOT.

The correction figure for VAT is distributed in the Use Table by products and users in proportion with the compiled theoretical VAT, when converting for international reporting of IOT, see Part III SUT/IOT.

8. CORRECTING SUT IN CURRENT PRICES

8.1. Introduction

After having established the first version of the SUT-tables for a base year, there is need for manual controls and correction runs as described in this chapter.

Corrections can take place in two different ways, either by loading a CORR-file or by interactive corrections.

A general rule are:

Where CORRT1- and CORRT2-files are used, the input files should be checked before establishing and later updating of SUT. The results of the calculations based on TINDT1-file and TINDT2-file must also be checked.

When the Supply and Use tables are established, the following types of checks are important:

- Check the total figures for production, intermediate consumption, value added and gross capital formation for the different industries.

- Check the total figures for final consumption, product taxes, product subsidies, import and export.

The first estimates for Households final consumption must be evaluated in relation to the first computed figures for Trade margins and Change in inventories/residuals.

For products where Change in inventories cannot be accepted (delivery of electrical power, trade margins and all services) the production or use must be changed.

T1 is always corrected in 13-Values (producer's values).

T2 is normally corrected in 19-Values (purchaser's values)

T2 might also be corrected directly in 13-Values (producer's values) (Note. only for Product X User combination where we don't have 15- and 16-values.

In T2, corrections can also be carried out for 14R-values and 14T-values (trade margins and transport margins).

8.2. Correcting T1 at producer's values (13-Values)

The following formats can be used:

1. Correction of individual objects: CORRT1-file, see chapter 5.2.
2. Total-correction. TINDT1-file:

Value indices for supply

Excel worksheet with input data in columns A to E.

Column	Contents
A	TINDT1 shows that the data are going into the Supply Table T1
B	The code for the supplier
C	13 shows that the data are in Producer's Value
D	TOTAL means that the index is used for all products for the selected supplier
E	Contains the indices, with the previous year = 1

TINDT1-file:

TINDT1 6 digits	Supplier 2+3 digits	VALUE/TOTAL 2+5digits	Index
TINDT1	23211	13TOTAL	1.1600
TINDT1	23221	13TOTAL	1.2000
TINDT1		13TOTAL	

A TIND1-file will be used to register value indices for the Supplier industry, without product specification.

The file name should be written according to a given standard. If we write, 123XXX13.TT1, the first digit (1) indicates year, the next 5 digits indicate Supply code, the next 2 digits (13) indicate the value and "extension" has to be written TT1 for a TIND1-file.

The first step is that the TIND1-file is used to generate a CORRT1-FILE. By using a value index for an industry, the CORRT1-FILE will show that supply from the industry of all products are changed proportionally to the supply from that industry in the previous version of T1.

Note: All corrections that are carried out result in a new total balancing of T1 and T2.

8.3. Correcting T2 at purchaser's values (19-Values)

The following formats can be used:

- I. Single object correction (absolute number): CORRT2-file, see chapter 4.2.
- II. TOTAL-CORRECTIONS TINDT2-file

USE TABLE (T2) at purchaser's values (19-values)

Data are loaded into the database from ASCII (text) files with a fixed layout:

Value indices for use

The input data are in columns A to E.

Column	Contents
A	TINDT2 shows that the data are going into the Use table T2
B	19 shows that the data are in Purchaser's Value
C	TOTAL means that the index is used for all products to the selected user
D	The code for the user
E	Contains the indices, with the previous year = 1

Total-corrections TINDT2-file:

TINDT2	TOTAL	USER	INDEX
6 digits	2+5 digits	2+5 digits	
TINDT2	19TOTAL	23211	1,100
TINDT2	19TOTAL	23212	1,250
TINDT2	19TOTAL		

With these corrections, a value index in 19-Values is given for the user, without product specification (possibly a new total transformed into a value index). When using a value index, the use of all products in the version under compilation (t+1) will be changed proportionally to the use of the products in the previous version (t).

The file name should be written according to a given standard.

If we write 81923XXX.TT2, the first digit (8) always indicates the year, the next 2 digits (19) always indicate value set, and the next 5 digits indicate user code and "extension" is always written TT2 meaning TINDT2-file.

The first step is that the TIND2-file is used to generate a CORRT2-FILE. By using a value index for an industry, the CORRT2-FILE will show that the use of all products in the version under compilation (t+1) will be changed proportionally to the use of the products in the previous version of T2.

8.4. Correcting trade margins (14R-Values)

The trade margins can be corrected by introducing new trade margin rates for the combination of products and users. The following format has to be used:

Single object's correction (percentages): PERCT2R-file

PERCT2	VALUE/PRODUCT.CODE	USER	Trade Margin rate
7 digits	3+6 digits	2+3 digits	<i>Percents with 4 decimals.</i>
PERCT2R	14RXXXXXX	23211	0.2200
PERCT2R	14RXXXXXX	23211	0.1234
PERCT2R	14RXXXXXX	23211	0.2000

8.5. Correcting transport margins (14T-Values)

The transport margins can be corrected by introducing new transport margin rates for the combination of products and users. The following format has to be used:

Single object's correction (percentages): PERCT2T-file

PERCT2 7 digits	VALUE/PRODUCT.CODE 3+6 digits	USER 2+3 digits	Transport Margin rate Percents with 4 decimals.
PERCT2T	14TXXXXXX	23211	0.1100
PERCT2T	14TXXXXXX	23211	0.0099
PERCT2T	14TXXXXXX	23211	0.0020

8.6. Automatic balancing of products with a simplified “RAS”

The purpose of this "RAS" method is:

Remove residuals recorded as Change in inventories for services.

Balance the "Aggregation accounts for Undistributed intermediate consumption (27-accounts

Balance the “Gross fixed capital formation by type of fixed assets (28 accounts).

The starting point is the Use Table T2 where the Total for each user (e.g. intermediate consumption by industries) is assumed to be correct. The adjustment takes place in four steps:

1. Fixed capital formation by type of fixed asset

Proportional adjustment of the product flows to the Gross fixed capital formation by type of asset accounts (28XXX accounts) in the Use Table, so the totals are equal to the corresponding value in the Supply Table.

2. Balancing of Supply and Use of products which are services

The use of each service is adjusted proportionally, to ensure that the residual recorded for services as Change in inventories is removed.

Only the Supply to intermediate consumption, Supply to the Aggregation accounts for intermediate consumption and Supply for fixed capital formation by asset type, are adjusted.

The adjustment will change the totals for each user. This will be corrected in the next step.

Note: Final consumption expenditure for households is exempted from being changed

3. Aggregation accounts for Undistributed intermediate consumption

Balanced by adjusting the value for the 27-accounts in T1 to the new total in T2.

The corresponding products in T2 are adjusted accordingly.

4. Adjustment of the Total for each User

Finally, the Total for each User is returned to its original value by adjusting the flows of **goods** proportionally. The flows of services are left unchanged.

Total intermediate consumption by industry is adjusted to the value before the start of step 1.

The Aggregation accounts for fixed capital formation by asset type are returned to values from step 1.

The Aggregation accounts for services are not adjusted.

8.7. Automatic correction of theoretical VAT.

When SUT for two years have been compiled and a constant price compilation can be implemented, the constant price compilation will lead to a final correction of the current price SUT.

After the balancing of SUT and the constant price compilation, an automatic correction of the theoretical calculated figures for 17-value (VAT) is carried through, see PART II “SUT/Constant prices”.

For the first year of compiling SUT, the correction of theoretical VAT have to be carried out without a constant price compilation. The total figure for compiled theoretical VAT will be corrected to the actual time adjusted figure so the cash is attributed when the activity took place to generate the tax liability.

The time adjusted actual value for VAT from the Government accounts is recorded as one input figure.

1. The correction figure is calculated automatic as the difference between the time adjusted actual value for VAT and the computed theoretical VAT as 17-values (VAT).
2. This automatic compiled correction figure is recorded as supply from account 29507 of product 000970 and is normally negative.
3. In the Use Table, product 000970 is automatic balanced against account 87970.

Supply: Industry Product	Use: Product	User	Residual
Correction			
XXXXX 29507 000970 -	XXXXX 000970	87970	-

The correction is also implemented in the constant price SUT in the same way as for current prices. The VAT correction figure in constant prices is calculated by multiplying the constant price theoretical VAT with the relationship between the current price VAT correction and the theoretical VAT in year t-1.

$$Hf^{17}_{29507,000970} = \sum_p Hf^{17}_{29501,p} \times \frac{H^{17}_{29507,000970}(t-1)}{\sum_p H^{17}_{29501,p}(t-1)}$$

For Supply and Use Tables and Input- output Tables for international reporting, the correction figure for VAT is spread as a correction figure for all 17-values distributed proportionally by products and users in the Use Table, see Document Part III SUT/IOT.

9. UPDATE TO A NEW YEAR

After having finalised the first base year in current prices, the updating to the next year in both current and constant prices can take place.

The SUT has first to be updated in current prices.

The updating can take place in two different ways, either by loading CORR-files or by using a TIND-files.

Manual controls and correction runs are described in chapter 8.

The general rules are:

- **T1 is always updated in 13-Values (producer's values).**
- **T2 is normally updated in 19-Values (purchaser's values)**
- **T2 might also be updated in 13-Values (producer's values) (*only for Product X User combination where we don't have 15- and 16-values.*)**

The results of calculations based on TINDT1-file and TINDT2-file, must also be checked.

The first estimates for Households final consumption can be updated from the previous year by using TINDT2-files. The first estimated figures must be evaluated in relation to the first computed figures for Trade margins and Change in inventories/residuals. The first figures for theoretical VAT must also be evaluated and compared with the accrual value for VAT.

For products where Change in inventories cannot be accepted (delivery of electrical power, trade margins and all services) the production from the industry supplying the service or use must be changed.

After having completed two years. the constant price compilation converting the current year in the previous years prices can take place.

10. TOURIST SATELLITE ACCOUNTS

Within the standardised concepts and standards in the SNA93, important economic transactions, such as transactions related to tourism cannot easily be identified. Satellite accounts were introduced in SNA93 to expand the analytical capacity of national accounting for selected areas in a flexible manner, without overburdening or disrupting the central system.

The Norwegian system for "*Tourism satellite accounts*", has been developed with a direct link to the SUT.

For countries where income from tourism is important for the economy, the classifications introduced for the National Accounts with SUT should illuminate transactions related to tourism. Both industries and products of particular interest for tourism should be detailed in the National Accounts classification for the country. As a result *Non-resident tourism consumption* should be specified and separated from *Final domestic household consumption expenditure*

From other business expenditure, it should be possible to specify business and professional travelling, which is recorded as tourism consumption expenditure in the Tourism Satellite Accounts.

The Tourism Satellite Accounts can be directly derived from the SUT. The accounting structure and methodology should be fully integrated into the National Accounts' SUT format. The Tourism Satellite Accounts in SUT format will give estimates for tourism consumption according to purpose and distributed by products used for tourism consumption. The SUT format can also be converted into an "Industry format" Input-Output Table (IOT). Based on the IOT, the contribution of tourism consumption to GDP and employment can be calculated. The IOT can also be used to study the direct

effects on the economy of changes in tourism demand (given the assumption of a stable relationship between different industries, import and final demand).

The methodology of the Tourism Satellite Accounts should follow the recommendation given in the manual “2008 Tourism Satellite Account: Recommended Methodological Framework TSA:RMF”, jointly presented by UNSD, Eurostat, OECD, UN and UNWTO. The TSA focuses on the concept of the *visitor* and on measuring her or his demand for goods and services.

PART II. SUT/CONSTANT

1. MAIN OBJECTIVE

1.1. Introduction

PART II gives a detailed description of the compilation procedure and the equations applied when converting SUT in current prices to SUT in constant prices (previous year's prices).

The final stage is simultaneous balancing of SUT in both current and constant prices. The structure and dimensions of SUT are the same for the current price and the constant price versions.

1.2. International recommendations

The ESA95 transmission program requires that the EU Member States compile Supply and Use Tables at both current and constant prices on an annual basis.

Commission Decision 98/715/EC of 30 November 1998 clarifies ESA-95 and the Annex A to the Regulation (EC) No 2223/96 as concerns the principles for measuring prices and volumes in national accounts. It introduces the A/B/C classification for the methods to be used.

- A methods are the most appropriate methods;
- B methods are those methods which can be used when A method cannot be applied.
- C methods should not be used.

Handbook on price and volume measurement in national accounts was released by Eurostat on December 2001, following the work in several Task forces. The Handbook follows earlier decisions and regulations concerning recommendations for "best-practice" and definitions on A-, B- and C-methods for different parts of the national accounts system.

Commission Decision from 17 December 2002 gives a further clarifying as concerns the principles for measuring prices and volumes. The Decision covers large equipment, computers and other information processing equipment, construction work, different services, public administration and defence services, education, health and social work services and imports and exports of goods and services.

1.3. Advantages of calculating values at constant prices in a Supply and Use framework

The calculation of values at constant prices, volume indices and price indices for the transactions of goods and services in the national accounts is considerably supported by the use of a SUT calculation scheme.

SUT available at current prices, provide an excellent compilation framework for constant price estimates.

SUT give a readily available overview of the extensive set of transaction data, price indicators, and volume indicators.

SUT at constant prices, when established in an accounting framework, give volume indices and deflators of several variables and at different levels of aggregation that are interrelated in a systematic way.

SUT at constant prices give the opportunity to analyse the constant price estimates of values at basic prices in their relation to trade and transport margins, taxes on products, and values at purchaser's prices.

2. CONSTANT PRICE COMPILATION OF ANNUAL DETAILED SUPPLY AND USE TABLES.

2.1. Introduction to the constant price methodology

The constant price methodology in the Norwegian national accounts follows the recommendations given in SNA-93 and ESA-95 and newer recommendation and decision, referred to in chapter 1.

Important conditions for the Norwegian methodology are:

- Annual, balanced Supply and Use Tables (SUT) (complete valuation matrices).
- Detailed distribution by products (detailed commodity flows).
- Compilation of each current year in the previous years prices (annual chaining).
- Value added for the different industries, calculated as balancing items (double deflation).

The Supply Table at current and the previous year's prices contains the following value classes:

- Basic values
- Taxes on products (paid by the producers)
- Subsidies on products (paid to the producers)
- Producer's values

The Use Table at current and the previous year's prices contains the following value classes:

- Basic values
- Taxes on products (paid by the producers)
- Subsidies on products (paid to the producers)
- Producer's values
- Retail and wholesale trade margins at basic values
- Transport margins
- Taxes on products (collected by wholesale and retail traders)
- Subsidies on products (paid to wholesale and retail traders)
- Value Added Taxes, not refundable
- Investment Taxes or Sales Tax
- Purchaser's values

The constant price figures are compiled by deflating the balanced current price SUT by price indices at the product level. This results in integrated Laspeyres' volume indices and Paasche price indices for aggregates.

Deflation is from the supply side, except for exports. The balancing of the Supply Table and Use Table in constant prices is first carried out at the detailed product level in basic values. Integrated in

the deflation process is the constant price compilation for each of the value classes. Taxes on products, subsidies on products, VAT, trade and transport margins are compiled in constant prices for the detailed products by user categories, by applying tax rates and trade margins from the previous year. This method corresponds to the method recommended for trade margins in ESA95, paragraph 10.38 and for taxes and subsidies on products and VAT in paragraphs 10.50-10.52.

The compilation and balancing of the constant prices SUT lead to simultaneous adjustments of the current price SUT, which then will be balanced again. Further corrections of the price indices to be used, lead to additional adjustments in constant prices SUT until the final SUT in both current and constant prices are acceptable.

The level of details in the balanced SUT at constant prices is similar to the level of details at current prices, and the definitional relationships inherent in the current price SUT are also maintained in the constant price SUT. An integrated set of value, price and volume measures are compiled within the framework of detailed, annual SUT in current and constant, previous year's prices.

2.2. The "assembling file" called the "SAM catalogue".

Price indices for all products are registered in an "assembling file", called the "SAM catalogue", see chapter 4.

When all the alternative price indices, specified by products, have been systematised and registered in the "SAM catalogue", the price indices will be drawn from the file according to programmed selection criteria.

The catalogue will contain both price indices, implicit price indices, compiled from value- and volume indices, unit value price indices and as a result of each of the constant price compilation run, the automatically calculated input price indices.

"SAM-catalogues" for backwards time series give a very good overview of the availability of price indices for the different types of products. This also gives a good data source for evaluation of the time series for all the available price indices for one product and also for a group of products.

2.3. Overview of the constant price compilation process

Up to 3 different price indices can be used to deflate the corresponding current price figures for a product.

- Use table: Products to exports (FOB value), at purchaser's value.
- Supply table: Products from domestic production to domestic use, at basic or producer's values.
- Supply table: Products from imports (CIF value), at basic value.
-

In addition there is a final correction using consumer price indices to deflate goods (not services) for Household consumption at purchaser's value.

The file with "SAM catalogue" with all the available price indices specifies by products will during the deflation process be currently updated showing which price indices are selected for the different versions of the constant price compilation. The final file for each year should be kept to give a complete documentation of all alternative price indices and the price indices selected.

T2. Use table: Products to exports (FOB value). Constant price figures for exports at purchaser's values by the detailed product level are calculated by deflating with the corresponding price indices. Subsequently, constant price figures for exports at basic value are calculated by deducting VAT, trade and transport margins and product taxes in constant prices from purchaser's values and adding product

subsidies, all compiled in constant prices. VAT, trade and transport margins and product taxes and product subsidies are compiled in constant prices at detailed product level by applying tax rates and trade and transport margins from the previous year. If there are empty cells in the tax or margin matrices for the previous year, the values for the current year are used as substitutes.

T1. Supply table: Products from domestic production to domestic use (at basic values)

For each of the products supplied both to the domestic market and to exports, one combined index is used to deflate domestic supply of the product from the various industries. The price index used for all domestic supply of a product at basic value is compiled as a weighted average of the price index for export of the product, calculated at basic value and the price index for domestic production of the product supplied to domestic users, also at basic value. (The compilation can also start from producer's values).

T1. Supply table: Products from imports (CIF value) (at basic value)

Imports of products at basic values are deflated with the corresponding import price indices.

Balancing the Supply table and the Use tables at basic values

The balancing between the Supply Table and the Use Tables in constant prices is carried out at the detailed product level at basic values:

1. For each product, total domestic use at constant prices is decided as total domestic supply plus imports minus exports at constant prices.
2. For each product, constant price values for the various domestic uses are calculated by distributing total domestic use in constant prices proportionally with the domestic uses in current prices.
3. The result is that at constant prices, the supply and use of each product is balanced at basic values.

Calculating domestic use at purchaser's value

For domestic use, taxes on products, subsidies on products, trade margins, transport margins and VAT at constant prices have to be calculated, specified by products and users, as a supplement to the basic values in order to arrive at the purchaser's values in constant prices. Tax rates and trade margins from the previous year are used. If there are empty cells in the tax or margin matrices, the values from the current year are used as substitutes.

Consumer price indices for household consumption

Household consumption of goods is the only area, except for exports, where price indices are used for deflating purchaser's value directly. The constant price figures for goods to Household consumption are adjusted to reflect the change in the CPI for the goods in question. Following this, the current price basic values are adjusted, in order to retain the price indices in basic value. Finally, the trade margins in current prices are recalculated and the SUT in current prices simultaneously corrected and balanced.

Final corrections of SUT at constant prices

Corrections of the SUT can only be carried through by correcting current price values or by selecting other price indices from the SAM catalogue, not correcting the constant price figures directly. A detailed record of the price indices used will be kept currently updated. When changing the price indices to be used, a new constant price compilation has to be carried through. With the established compilation methodology and procedure a complete correction of SUT in constant prices, using new price indices, and the successive correction of SUT in current prices, should only take 5-10 minutes. During the checking and revision stage, several versions of the balanced SUT with corrected price indices should therefore be compiled.

Checking value added at constant prices

The volume and price developments should be reviewed for both production and intermediate consumption. Particular emphasis should be placed on industries where value added is small compared

to output and intermediate consumption. In such cases relatively small errors in the constant price estimates of output and intermediate consumption may result in an obviously incorrect value added at constant prices. Errors may be due to incorrect current values as well as incorrect price indices.

2.4. Shift effect because of price discrimination between different users

"Shift effect" because of price discrimination occurs when a homogenous product is sold at different prices to different users. Experience has shown that for the same product category quality differences will occur between domestically produced product supplied to the domestic market, the same product category supplied to the export market and the same product category imported. All differences in basic prices between imported products, products to the domestic market and products to exports are implicitly assumed to reflect differences in quality. Since there might be three different qualities of the same NA-CPA product in the three different markets, the methodology allows for using three different price indices for the same product category within the three different markets.

Problems related to price discrimination for the detailed products within the domestic market, where homogenous products are sold at different prices to different users, are assumed to be of little importance for transactions recorded in basic value. Basic values are more homogeneous than producer's and purchaser's values because taxes and subsidies related to products will often be differentiated according to who buys the products. Price discrimination is therefore not recorded for shift between transactions in basic values within the domestic market.

2.5. Shift effect because of differences in the rates for product taxes and product subsidies between different users.

Taxes or subsidies on products, which are differentiated according to users, are imposed on a number of products. For these products, the effect of the shift related to the different rates for product taxes (11-values) and product subsidies (12-values) are calculated. To balance the Supply Table and the Use Table in constant prices in all types of valuation, the differences between the constant price figure for product taxes and subsidies related to products in the Supply table and in the Use table are calculated as correction figures on the Supply side, entered as supply from Account 29900 "Imputed net gain at constant prices because of change in "basic rates".

<i>Note: Shift effect is only introduced for 11-and 12- values !</i>
--

2.6. Annual chaining

Based on the time series of SUT in both current and the previous years prices, chained Laspeyres volume indices and Paasche price indices can be compiled. Chaining should be compiled for detailed and aggregate series separately, in order to maintain the year-to-year growth rates from the original SUT at all levels of aggregation. Corrections should not be made to impose additivity between detailed series and aggregates.

3. PRICE INDICES AND OTHER DATA INPUT REQUIRED

3.1. Price indices required

For each of the NA-CPA products, 3 price indices are used where relevant:

Use table

- Exports (price indices, purchaser's values)

Supply table

- Domestic production for the domestic market (price indices, basic or producer's values)
- Imports (price indices, basic values).

The 3 price indices listed above are used to deflate the corresponding current price figures at the detailed product level. Price indices have to be recorded for all products in these three different markets. The main sources used for estimating commodities produced are producer prices on the domestic market and export prices estimated by the unit value approach for the foreign trade based on the customs declarations. The price indices can be proper price indices or implicit price indices compiled from value and volume indices, unit value price indices and also input price indices.

A special problem is associated with quality changes over time. Adjustments for the changes in quality of products should be made as far as possible, so that the "pure" price development is reflected by the price indices used for deflation. Changes in the quality of products over time should be recorded as changes in the volume component.

3.2. Price indices for Exports at purchaser's value and Imports at basic value

3.2.1 Exports and imports of goods

Price and volume indices for exports and imports of goods in the Norwegian National Accounts have in principle been fully integrated with the official price and volume indices estimated for the foreign trade

statistics. For exports and imports of goods, unit value price indices for ordinary products have for many years been based on the customs declarations. Through a variance analysis of the price fluctuations on the most detailed commodity level (i.e. HS extended by 2 extra digits for specific Norwegian purposes), price-homogenous commodities are identified. The unit-value indices for these commodities should in principle be acceptable. A price index for a commodity is based on a collection of prices on specimen products, i.e. price homogenous customs tariff commodities. Thus the price-homogenous "HS-8" commodities are interpreted as specimen products for NA-CPA products.

For imports and exports of commodities that have poor coverage of specimen products, special exports and imports price indices have been estimated. Some price indices are based on export prices collected for the Producer Price Index (PPI) and import prices collected for the Price Index of First hand domestic sales (PIF). PPI export prices for products are in use where they seem more reasonable than the official export price indices. This approach also means use of domestic and export price indices that are consistently reported by the companies.

For some products price information from the US BLS (Bureau of labour statistics) are used as well as their hedonic price indices. This is for data processing equipment and some types of machines, motors etc.

NOTE: The price index selected for constant price calculation of an imported product is also used for calculation of the constant price figure for Custom duty of the same product.

3.2.2. Exports and imports of services

For exports and imports of services, the price indices should reflect the actual prices paid for these services.

Imports and exports of services are generally not covered well by price statistics. Travel debit (Norwegian residents' consumption abroad) is deflated using a weighted average of CPI indices of the main destination countries, weighted by the distribution of Norwegian tourists visiting each country. Travel exports (foreign tourists' consumption in Norway) is deflated using a weighted average of domestic price indices (CPI) for the products consumed by them. The NNA has a special distribution of foreign tourist's consumption by product which is used for this purpose (and for our tourism satellite accounts). For exports of ocean freight services a price index produced by Statistics Norway is used for deflation. The index is constructed based on information from market reports combined with separately collected questionnaire. The aggregated price index is an aggregate of detailed indices based on stratification of the ocean going fleet into 15 strata. In most other cases the price index for domestic production is used also for imports and exports of services.

3.3. Price indices for Market producers

Price indices have to be calculated or estimated for all products supplied by the market producers. The price indices can be based on the PPI, CPI, unit value indices based on volume indicators and also for some services where no relevant price or volume information exists, input price indices.

Producer Price indices (PPI) is mainly based on questionnaires from surveys where the prices are defined at factory (ex works), i.e. sales price at the factory gate to the domestic market. The price index for a product can be registered for domestic production to domestic use at basic values or at producer's values. If the price indices are registered for producer's values, they will be automatically corrected to basic values during the deflation process.

During the calculation, the price index for a product from domestic production at basic value, is automatically calculated as the weighted average of the price index for the product at basic value to domestic use and the price index for the product at basic value to exports. The combined index for the product is used to deflate domestic supply of that product from the various industries supplying that product at basic value.

Similarly, the price index for a product from domestic production, which is registered at producer's value, is automatically calculated as the weighted average of the price index for the product at producer's value to domestic use and the price index for the product at producer's values to exports.

The combined index for the product is used to deflate domestic supply of that product from the various industries supplying the product.

Consumer price indices are acceptable price indices for service industries, supplying services to the households. The indices have to be corrected for change from the previous year in VAT rates. By registering the consumer prices for producer's values, the price indices will be automatically corrected to basic values.

Unit value indices

When the product specification is so detailed that the products can be regarded as homogeneous products, unit value indices can be used. Unit value indices should be acceptable for deflating some agricultural, forestry and fishing products and also mining products.

Input price indices have to be used for some of the business service industries, where no available price indices or good volume indicators exist. The IT solution is an automatic procedure for compiling the input price indices for the different industries after Paasche formula, by weighting price indices for

intermediate consumption and the wage indices for compensation of employees for the different industries. Detailed price indices are available for intermediate consumption for the different industries (automatically compiled during the deflation process). For the current year absolute figures for compensation of employees for each industry have to be registered and also a wage index calculated as change in per cent for compensation of employees per hour worked, see chapter 4.3.

3.4. Constant price compilation for Non-market producers

Input price indices as a weighted cost index

At current prices, the production of non-market activities (central and local government and NPISHs) is compiled from the input side by summing up the associated costs: intermediate consumption, compensation of employees and consumption of fixed capital. On the output side the government production comprises of products for government fees and government consumption. For the constant price calculation government consumption has of technical reasons been split between special products for consumption of fixed capital and products for government consumption (excl. consumption of fixed capital).

The compilation of non-market activities at constant prices is similarly conducted, from the input side. Input price indices are calculated after Paasche formula, automatically weighting price indices for intermediate consumption and wage indices calculated for compensation of employees per hour worked, see chapter 4.3.

The wage indices, calculated for the government employees should be adjusted for changes in quality of the labour force or the level of skill over time. The variables used could be type of job and educational background of the employees.

In Statistics Norway the constant price figures for Consumption of fixed capital is calculated by a PIM model, based on the price indices calculated during the deflation process for gross fixed capital formation for the relevant industry. Constant price figures for consumption of fixed capital for the Government are therefore posted directly on the output side of the Governments accounts (and automatically included in the total production), see chapter 4.4.

3.5. Deflating domestic use

To be able to balance the constant price figures for supply and use of all products at basic values, the constant price figure for each product at basic values is calculated as a residual. This total price index is used for deflating all domestic uses at basic prices (incl. Change in inventories). Constant price estimates at purchaser's value is found, adding in constant price estimates of trade margins and product taxes and subsidies. A specific adjustment is done for goods consumed by households. The use at purchaser's value is deflated using the CPI. In order to maintain the balance of supply and use at constant prices, there is an adjustment to the trade margins.

3.6. Deflation of trade margins, transport margins, product taxes and product subsidies

When the basic price values in the supply and use tables have been deflated and balanced, a constant price calculation is conducted for trade margins, taxes and subsidies on products and VAT, with the purpose of calculating purchaser's prices at constant prices.

The general method here is to use the percentages in the base year (i.e. previous year) – at the cell level in the supply and use tables – on the basic price values at constant prices. This corresponds to the

method recommended for trade margins in ESA95¹, paragraph 10.38 and for taxes and subsidies on products in paragraphs 10.50-10.52.

3.7. Balancing the Supply Table and the Use Table at basic values and compiling SUT in the different types of valuation.

Constant price values for the various domestic uses are calculated by distributing total domestic use of a detailed product in constant prices proportionally with the domestic uses in current prices, i.e. all domestic use of a product gets the same price index at basic values.

Note: This ensures that the supply and use of each product in constant prices will balance at basic values.

The constant price domestic uses in purchaser's value are calculated by applying tax rates and trade margins from the previous year to the product flow at basic prices. If there are empty cells in the tax or margin matrices, the values from the current year are used.

3.8. Constant price compilation of the Aggregation accounts

The calculation of input price indices and prices on products supplied from "Aggregation accounts" are computerised. Detailed input price indices are compiled automatically during the deflation process as weighted cost indices, see chapter 10.1.

3.9. Balancing the Aggregation accounts for Trade margins and Transport margins in constant prices.

Retail and wholesale trade margins (14R-value) in constant prices for year t are calculated in the Use table T2 by using the previous year's trade margin rates.

"Trade margin rates" from year t-1 is calculated in the Use table (T2) for Products distributed by Users, by compiling the trade margin rates (14R-values) from the base year t-1 in proportion to 10-values (basic values) from year t-1. We get as a result that the volume change for the basic trade margin is proportional to the volume change for the basic value of the product, Change in the trade margin percentages in current prices for a commodity supplied to a certain user, will by this result in a change in the price component and not in the volume component for the retail and wholesale trade industries production. If larger resources are required from the trade and transport industries to bring the goods to the final users, without any improvement in the quality from the users point of view, this will represent a productivity loss, which is allocated to the trade industry.

Final automatic corrections adjust the price change for products for "Household final consumption in purchaser's value (19-value) to the consumer price indices. On the basis of this, the trade margins in constant prices are automatically adjusted, normally reduced. There has also in many retail industries been deterioration in the service given to the customers due to greater competition, requiring reduction in overheads and costs.

The constant price figures for trade margins by products, in basic values, are transferred to the Supply table (T1) as supply from account 27500 Aggregation account for trade margins.

¹ "The European System of Accounts ESA 1995"

In the Supply table (T1), the constant price figures for trade margin by products, in basic values, are distributed between the main industries supplying the trade margin services in current prices (retail trade industry and wholesale industry and other industries supplying the trade margin services).

NOTE: *In the first stage of the compilation process, price indices have to be registered for all trade margin products. For the two main products "510100 Trade margin on wholesale trade" and "521100 Trade margin on retail trade" the constant prices figures will be automatically corrected during the compilation process balancing the "Aggregation accounts". This means that the production values at constant prices for the wholesale and retail trade margins are calculated from the Use Table, see chapter 10.4.*

Note: *If the main products for Trade margins have other codes than 510100 Trade margin on wholesale trade" and "521100 Trade margin on retail trade", the codes have to be changed in the data or in the IT program.*

"Transport margin rates"

Transport margins (14T-values) in constant prices for year t is calculated in the Use table T2 by using the previous year's transport margin rates.

The same methodology and compilation procedure is used for transport margins. The transport margins (14T-values) in constant prices for year t are calculated in the Use table T2 by using base year's transport margin rates.

Note: *The supply of transport margins at constant prices is not estimated separately, but aggregated up from the Use table, see chapter 10.5.*

3.10. Constant price compilation of Product taxes and Product subsidies.

Based on the tax matrices from the Supply and Use table in current prices for the previous year (t-1), a set of "basic-rates" is calculated for the Supply table and another set for the Use table.

Product taxes, product subsidies and VAT in the Use table (T2)

"Basic-rates" for all Products x Domestic User combinations are calculated by computing product taxes, product subsidies, VAT and Investment taxes (11-, 12-, 15-, 16-, 17- and 18-values) in relation to 10-values (basic values).

Product taxes, product subsidies in the Supply table (T1)

If the price indices are registered for basic values (10 values), the **"Basic-rates"** for all Supply x Product combinations are calculated by computing 11- and 12- values in relation to 10-values.

If the price indices are registered for producer's values (13-values), the **"Basic-rates"** for all Supply x Product combinations are calculated by computing 11- and 12- values in relation to 13-values.

3.11. Constant price compilation of Household final consumption at purchaser's values

Household final consumption is the only area, except exports, where price indices for purchaser's values (19-values) are used.

The constant price figures are adjusted to reflect the change in the CPI for the goods in question. The current price basic values are adjusted, in order to preserve the price indices in basic value. Finally, the trade margins in current prices are recalculated and the Supply and Use tables in current prices revised and balanced.

The structure of the constant price calculation system establishes the same trade-margin percentages as in the base year (i.e. previous year) for the commodity flow balances at the cell level.

The deflation process is conducted in an automated way within the framework of a computerised system. Manual checks of the results are conducted by comparisons with other statistical sources until the results are considered to be final. An automatic procedure has been designed, which automatically makes adjustments for changes in the trade margin percentages at current and constant prices of household consumption. The adjustments reflect the change in the CPI for the goods in question compared with the change in the used producer price indices, see chapter 12.

4. ORGANISATION OF REQUIRED DATA INPUT

4.1. Introduction

The coding system used is a countries national accounts adaptation of CPA (or CPC), called NA-CPA (or NA-CPC). For all NA-CPA products, all relevant price indices, unit value price indices and implicit price indices have to be transferred from Excel files or other data files to the format required for the constant price compilation. All indices are registered as price indices with the previous year =1000.

4.2. Price indices for imports, domestic production to the domestic market and to exports

The price indices should first be stored in a separate folder. All price indices from different files are brought together into one catalogue, the "SAM catalogue". In order to load the price indices into the "SAM catalogue", all the price index files have to be combined into one large file, called e.g. all_prices.dat. This gives the "SAM catalogue" with a listing of all relevant price indices for each product. The file name for the "SAM catalogue" should be Y---.sam. The first character in the file name should be the year the data refer to, e.g. Y=1 for 2001 and the file ending should be .sam (for the file type).

For each of the NA-CPA products where there are figures in current prices, at least one price index for domestic production to the domestic market, one import price index and one export price index have to be listed in the "SAM catalogue".

Up to 9 different price indices can be registered for each product, distributed by the following three main categories:

Category 1 Imports

Category 2 Domestic production to domestic market

Category 3 Exports.

Category 4 Household consumption

All indices have to be recorded with year t-1=1000 and without **decimal**. The "SAM catalogue" will not show if a price index for a product is derived from value- or volume indices.

The annual "SAM catalogue" should give a complete overview of all existing annual price information at detailed NA-CPA product level, available each year. For each NA-CPA product, there have to be at least one price index for domestic production to the domestic market and where it is relevant, one import price index and one export price index.

4.3. Wage indices for calculation of input price indices for different industries

For all industries where input prices are compiled, the following information has to be recorded in a separate database table:

- The code for the industry
- Compensation of employees per hour worked, change in per cent from previous year, specified by industry
- Compensation of employees, million NOK, specified by industry

It might be practical to register these data for all industries since compensation of employees also later is required as a component of value added

From each of the aggregation accounts, only one product is supplied. For the product from an "Aggregation account", an input price index will be calculated automatically, based on the prices calculated during the deflation process for the products delivered to the aggregation account registered in the Use table.

4.4. The structure of the "SAM catalogue"

The assembling file called the "SAM -catalogue" gives valuable information about all available price indices for each product and is an excellent tool for comparisons purposes. The "SAM catalogue" also gives an overview of the price indices used during the balancing process. When the different price indices for a specific NA-CPA product (e.g. imports) show large deviations from the traditionally chosen index, the price indices not usually used for a specific NA-CPA product, can be used for controlling/adjusting the traditionally chosen index.

Price indices for all products and wage indices are registered in the "SAM catalogue". As a result of each constant price compilation run, an updated "SAM catalogue, with the file name "all-prices.dat" will be automatically produced, containing price indices and as a result of each of the constant price compilation run, automatically calculated input price indices.

After the main revision of the Norwegian national account, "SAM-catalogues" with price indices directly estimated or indirectly estimated have been stored in files called "valgind-YYYY-endelig.txt" for each year from 1971 onwards.

EXPLANATION OF THE SHORT TEXT IN TABLE 1. THE "SAM catalogue" BELOW.

Category 1. Price indices used for import of commodities and custom duties at basic value (10-values):

IM_I Import price indices (unit value indices) based on the external trade statistics at CIF/basic value (10-value)

IM_U Imports price indices, other price indices for commodities and services at basic value (10-value)

Category 2. Price indices used for domestic production to the domestic market at basic value (10-value) or at producer's value (13-value)

PRLO Price indices for products at basic value (10-value) compiled as "Input price indices" for the main industry producing the products (automatic compilation based on compensation of employees per hour worked and price indices for intermediate consumption compiled during the constant price compilation process.

PR10 Price indices for products from domestic production to the domestic market at basic value (10-value).

PR13 Price indices for products from domestic production to the domestic market at producer's value (13-value).

KP13 Consumer price indices at producer's value (13-value). For some services, the relevant consumer price index is used as a price index for production. If the VAT rate has been changed

from the previous year, the price index has to be corrected for this change to be used as price index for the service.

Category 3. Price indices for exports (19-value):

EX_I Export price indices (unit value indices) according to the external trade statistics (19-value. FOB-value, Purchaser's value)

EX_U Export price indices, other price indices for commodities and services at FOB-value. Purchaser's value

Category 4. Price indices for household consumption (19-value):

KP19 Consumer price index at purchaser's value (19-value.).

Consumer price indices are used after the first stages of the deflation for correcting the constant price figures for household consumption of goods at purchaser's values (19-values).

THE SAM-catalogue has the following format:

Price indices (price relatives) showing the change from the year t-1 to the year t (t-1=1000)

Table 1. SAM-catalogue, Category 1. (Continue to Category 2)

A Position 1-3	B Position 8-13	C Position 17-20	D Position 23	E Position 26-29	F Position m23
<u>SAM</u> FILE NAME	<u>NA-CPA</u> THE CODE FOR THE PRODUCT	<u>IM I</u> IMPORTS Foreign trade <u>at 10-values</u> Unit value indices etc.	<u>U</u> Select- ion	<u>IM U</u> IMPORTS Goods, Services <u>at 10-values</u> Other price indices	<u>U</u> Select- ion
SAM	XXXXXX	Z1P _p ¹⁰	0/1	ZP _p ¹⁰	0/1
SAM	XXXXXX	Z1P _p ¹⁰	0/1		
SAM	XXXXXX			ZP _p ¹⁰	0/1

Table 1. Continue. SAM-catalogue, Category 2.

(continue to Category

3)

G Position 35-38	H Posit. 41	I Position 44-47	J Position 50	K Position 53-56	L Position 59	M Position 62-65	N Position 68
<u>PRLO</u> Production at <u>10-values</u> Input price indices compiled automatic	<u>U</u> Select- ion	<u>PR10</u> Production for domestic use <u>at 10-values</u> Producer price indices etc.	<u>U</u> Select- ion	<u>PR13</u> Production for domestic use <u>13-values</u> Producer price indices etc.	<u>U</u> Select- ion	<u>KP13</u> Production for domestic use <u>13-values</u> Consumer price indices	<u>U</u> Select- ion
		D1P _p ¹⁰	0/1				
				D1P _p ¹³	0/1		
D1P _p ^{10*}	0/1	D1P _p ¹⁰	0/1			KP	0/1

Table 1. Continue. SAM-catalogue Category 3 and Category 4.

O Position 71-74	P Position 77	Q Position 80-83	R Position 86	S Position 89-92	T Position 94
<u>KP19</u> Household consumption <u>19-values</u> Consumer price indices	<u>U</u> Selection	<u>EX I</u> EXPORTS Foreign trade <u>19-values</u> Unit value indices etc.	<u>U</u> Selection	<u>EX U</u> EXPORTS Goods, services <u>19-values</u> Other price Indices	<u>U</u> Selection
				Y _p ¹⁹	0/1
		Y1P _p ¹⁹	0/1		0/1
KP	0/1			Y _p ¹⁹	0/1

The price indices have to be written without decimal point, e.g. 1055 for the index 105,5, with the year $t-1 = 1000$.

The "SAM catalogue" can be established as an Excel file "Corrcards.xls. From the "SAM catalogue", for each NA-CPA product, one index has to be selected where it is relevant, for each of the three main categories: Products from imports, Products from domestic production to the domestic market and Products to exports.

The price indices, which are selected, have to be marked with 1 (shall be used) in the column U (for UTVALG = SELECTION) to the right for each index.

All the other indices should be marked with 0, (shall not be used) in the column U (for UTVALG = SELECTION) to the right for each index.

4.5. Consumption of fixed capital for central and local government in current and constant prices for calculation of input price indices for government

For each of the government production accounts the constant price figures for consumption of fixed capital are also used when compiling the price index. Consumption of fixed capital (CFC) for the central and local government, distributed by industries, has to be recorded as separate products. In the Norwegian case, CFC is calculated in both current and constant prices in a PIM model, after the first version of SUT has been compiled in current and constant prices.

The constant price CFC figures are entered directly in the constant price compilation of SUT as a final step.

The CFC in central and local government, distributed by industries, are recorded in the following format:

Filename	The code for the government industry	Producer's Value	Codes for the NA-products	Values (NOK million)
CAPSTANT1	24751	13	751061	
CAPSTANT1	24752	13	752061	
CAPSTANT1	24800	13	758061	
CAPSTANT1	24XXX	13	XXXXXX	
CAPSTANT1	25751	13	751081	
CAPSTANT1	25800	13	800081	

CAPSTANT1 shows that the data are posted in T1 as Supply of one CFC product from each government industry. The supply of each CFC product is distributed by the users in T2 in proportion to the current price CFC data.

5. CONSTANT PRICE COMPILATION, EXPLAINED BY EQUATIONS.

5.1. Schematic outline of the Supply Table in constant prices.

Figure 1. COMPLETE SUPPLY TABLE (T1) IN CONSTANT PRICES

Suppliers specified by detailed NA-CPA- products in all the different value classes											
T1	10- VALUE	11- VALUE	12- VALUE	13=10+ 11+12	14R- VALUE	14T- VALUE	15- VALUE	16- VALUE	17- VALUE	18- VALUE	
SUPPLY of PRODUCTS	Basic value	Taxes on products	Subsidies on products	Pro- du- cers\ value	Trade margin Basic value	Tran- sport margin	Product taxes paid by traders	Product subsidies paid to traders	VAT Non deducible.	Taxes on invest- ment	Total pro- duc- tion
Production Industries 22,23,24,25,26	Hf_{di}^{10}	Hf_{di}^{11}	Hf_{di}^{12}	Hf_{di}^{13}							Tf_{di}
Aggregation accounts 27XXX	Hf_{da}^{10}			Hf_{da}^{13}							Tf_{da}
27500, 27600				Hf_{da}^{13}	Hf_{da}^{14R}	Hf_{da}^{14T}	Hf_{da}^{15}	Hf_{da}^{16}			Tf_{da}
28XXX											Tf_{da}
29501 VAT									Hf_{da}^{17}		Tf_{da}
29502 Invtax										Hf_{da}^{18}	Tf_{da}
29505 Duty	Hf_{da}^{10}			Hf_{da}^{13}							
29506	Hf_{z1}^{10}	Hf_{z1}^{11}	Hf_{z1}^{12}	Hf_{z1}^{13}							Tf_{z1}
Taximp	Hf_{z2}^{10}	Hf_{z2}^{11}	Hf_{z2}^{12}	Hf_{z2}^{13}							Tf_{z2}
52XXX Imports											
SUM	Sf10'	Sf11'	Sf12'	Sf13'	Sf14R	Sf14T	Sf15'	Sf16'	Sf17'	Sf18'	Sf19'

NOTE: In the Supply table, shown in Figure 1, the rows and columns have been transposed compared with the format shown in table 15.1 in SNA 93. The format in Figure 1 confirms with the Matrix presentation given in table 2.5 in SNA 93 and with the simplified combined Supply and Use table, shown in Table 9.3 in ESA 95

NOTE: Figure1:

The last notation, which should have been p for products, is simplified by writing e.g. Hf_{di}^{10} for $Hf_{di,p}^{10}$. A value in constant prices is expressed by "f" attached to a formula.

The format of the Supply Table in constant prices is identical with the format of the Supply Table in current prices.

The Supply table T1 in constant prices can be illustrated by matrix Hf, defined by:

$$Hf = [hf_{i,p}^v], \quad \begin{array}{l} v \in \{1,2,\dots,a\} \\ i \in \{1,2,\dots,b\} \\ p \in \{1,2,\dots,c\} \end{array}$$

v represents *Value Classes* (Account type 10, 11, 12, 13, 14R, 14T, 15, 16, 17, 18)

i represent *Suppliers* (i= d+z)

d=Production and Aggregation accounts

⇒ di Production accounts, industries (Accounts from 22XXX to 26XXX)

⇒ da Aggregation accounts (Accounts from 27XXX to 29XXX)

z= Imports accounts (Accounts from 52000 to 52900)

⇒ z1 Imports, external trade (Account 52110)

⇒ z2 Imports other goods and services (Accounts from 52120-52XXX)

p represents *Products* (Accounts from 000001-999999).

Tf_d equals total Supply from a Production or Aggregation account at constant prices, labelled d, defined in T1 by:

$$Tf_d = \sum_{p=1}^c hf_{dp}^{13} + \sum_{p=1}^c hf_{dp}^{14R} + \sum_{p=1}^c hf_{dp}^{14T} + \sum_{p=1}^c hf_{dp}^{15} + \sum_{p=1}^c hf_{dp}^{16} + \sum_{p=1}^c hf_{dp}^{17} + \sum_{p=1}^c hf_{dp}^{18}, d \in (1,2,\dots,e)$$

Total Domestic Supply in constant prices: $Tf = \sum_{d=1}^e Tf_d$ $d \in (1,2,\dots,e)$

Tf_z equals Supply of Products from Imports at constant prices, defined in T1 by

$$Tf_z = \sum_{p=1}^c hf_{zp}^{13} \quad z \in (1,2,\dots,y)$$

Total Imports in constant prices: $Tf = \sum_{z=1}^y Tf_z$ $z \in (1,2,\dots,y)$

Sf is a row vector giving Total Domestic Supply and Imports in constant prices, specified by Products in the different value classes, defined by:

$$Sf_p^v = \sum_{d=1}^e hf_{dp}^v + \sum_{z=1}^y hf_{zp}^v$$

5.2. Schematic outline of the Use Table in constant prices.

Figure 2. COMPLETE USE TABLE (T2) in constant prices.

NA-CPA-PRODUCTS	INTERMEDIATE AND FINAL USERS						
	2XXXX Production accounts Intermediate cons, Value added		6X, 8X Final domestic use		51110	51XXX Exports Exports Goods Services	
10. Basic value	Nf_{di}^{10}	Nf_{da}^{10}	Nf_{s1}^{10}	Nf_{s2}^{10}	Nf_{y1}^{10}	Nf_{y2}^{10}	Sf^{10}
11. Taxes on products	Nf_{di}^{11}	Nf_{da}^{11}	Nf_{s1}^{11}	Nf_{s2}^{11}	Nf_{y1}^{11}	Nf_{y2}^{11}	Sf^{11}
12. Subsidies on prod.-	Nf_{di}^{12}	Nf_{da}^{12}	Nf_{s1}^{12}	Nf_{s2}^{12}	Nf_{y1}^{12}	Nf_{y2}^{12}	Sf^{12}
13. Producer's value = 10val. +11val. +12val.	Nf_{di}^{13}	Nf_{da}^{13}	Nf_{s1}^{13}	Nf_{s2}^{13}	Nf_{y1}^{13}	Nf_{y2}^{13}	Sf^{13}
14R. Retail and wholesale margins, Basic value	Nf_{di}^{14R}	Nf_{da}^{14R}	Nf_{s1}^{14R}	Nf_{s2}^{14R}	Nf_{y1}^{14R}		Sf^{14R}
14T. Transport margins	Nf_{di}^{14T}	Nf_{da}^{14T}	Nf_{s1}^{14T}	Nf_{s2}^{14T}	Nf_{y1}^{14T}		Sf^{14T}
15. Taxes on products, collected by traders	Nf_{di}^{15}	Nf_{da}^{15}	Nf_{s1}^{15}	Nf_{s2}^{15}	Nf_{y1}^{15}		Sf^{15}
16. Subsidies on products, paid to traders	Nf_{di}^{16}	Nf_{da}^{16}	Nf_{s1}^{16}	Nf_{s2}^{16}	Nf_{y1}^{16}		Sf^{16}
17. Value added tax	Nf_{di}^{17}	Nf_{da}^{17}	Nf_{s1}^{17}	Nf_{s2}^{17}	Nf_{y1}^{17}	Nf_{y2}^{17}	Sf^{17}
18. Tax on investment	Nf_{di}^{18}	Nf_{da}^{18}	Nf_{s1}^{18}	Nf_{s2}^{18}	Nf_{y1}^{18}		Sf^{18}
Intermediate input and final use at purchaser's values	Nf_{di}^{19}	Nf_{da}^{19}	Nf_{s1}^{19}	Nf_{s2}^{19}	Nf_{y1}^{19}	Nf_{y2}^{19}	Sf^{19}
Value added at producer's value or basic value	Bf_d'						
	Tf_d'		Tf_s'	Tf_y'			
	<i>Output at producer's or basic values</i>						

Note: Value added is not part of the Use table (T2), as T2 is stored in the database, but has to be calculated.

NOTE: In figure 2, the last notation, which should have been p for products, is simplified by writing e.g.

$Nf_{di, p10}$ like Nf_{di}^{10} .

The complete Use table (T2) without value added in constant prices (Bfd), is defined by the matrix Nf :

$$Nf = [nf_{p,j}^v], \quad \begin{matrix} v \in \{1,2,\dots,a\} \\ p \in \{1,2,\dots,c\} \\ j \in \{1,2,\dots,g\} \end{matrix}$$

v represents Value classes

p represents Products,

j represents Users = $d + s + y$

d represents Production- and Aggregation accounts;

di represents production accounts for industries,

da represents aggregation accounts

s represents final domestic use

s1 represents household final consumption expenditure (account 61XXX)

s2 represents final use excl. household consumption and exports

y represents Exports (account 51XXX);

y1 represents exports (external trade of goods) (account 51110),

y2 represents exports of other goods and services (accounts 51XXX excl. 51110)

The total of products in constant prices, as intermediate input into Production and Aggregation accounts (**d**), in purchaser's value (19-values), is expressed by:

$$Tf_d = \sum_{p=1}^c nf_{pd}^{19}, d \in (1, 2, \dots, e)$$

Value added in constant prices (Bf_d) (specified by production- and aggregation accounts) is calculated in the Use table T2, as:

$$.Bf'_d = [bf_d] = Tf_d - \sum_{p=1}^c nf_{pd}^{19} \quad d \in (1, 2, \dots, e)$$

Note: For the Aggregation accounts 27XXX and 28XXX, the Value added in constant prices, expressed by Bf_d, should always be zero, but the figures have to be checked!

Total domestic final use in constant prices T_{fs} is decided in T2 as sum final use in 19-values in constant prices.

$$Tf'_s = \sum_{p=1}^c nf_{ps}^{19}, s \in (1, 2, \dots, u)$$

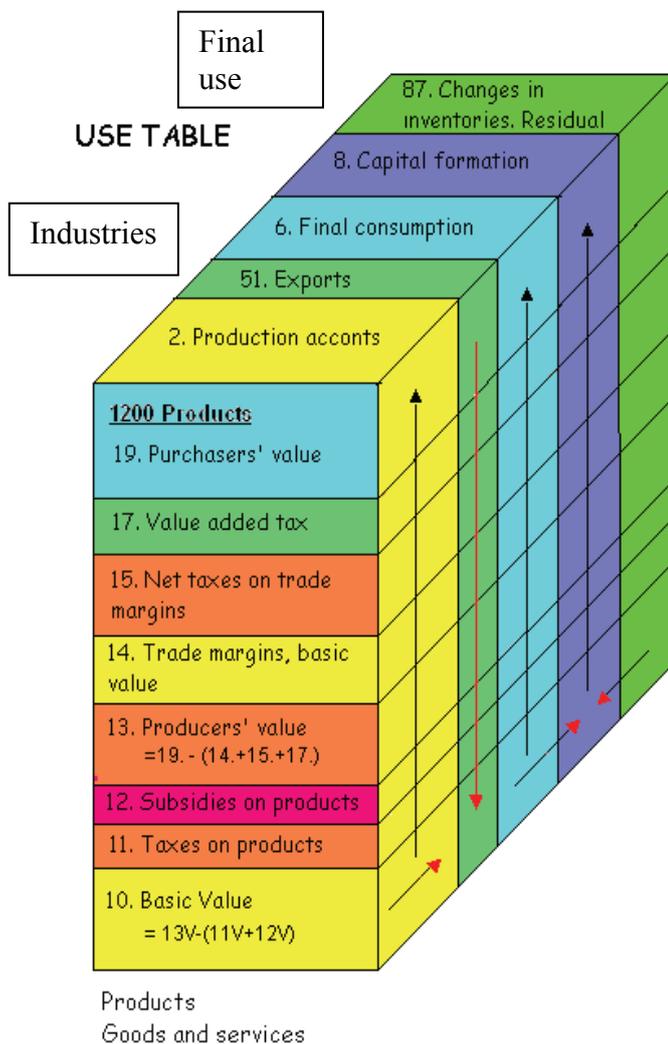
Total exports in constant prices T_{fy} is decided in T2 and is identical with sum exports in 19-values:

$$Tf'_y = \sum_{p=1}^c nf_{py}^{19}, y \in (1, 2, \dots, b)$$

Sf is a column vector, giving Total Use, aggregated over Users and classified by Products in the various value classes, defined as:

$$Sf = [sf_p^v] = \sum_{j=1}^g nf_{pj}^v, \quad \begin{matrix} v \in \{1, 2, \dots, a\} \\ p \in \{1, 2, \dots, c\} \end{matrix}$$

The Use Table in constant prices



THE COMPILATION STAGES FOR THE USE TABLE

Stage 1. EXPORTS, fob /purchaser's value are compiled at constant, previous year's prices

Stage 2-4. From EXPORTS, trade margins and other valuation matrices are deducted and Exports are compiled in basic values, at constant prices.

Stage 5-6 The Supply table, Domestic production and Imports at basic values are compiled at constant prices.

Stage 7. TOTAL USE BY PRODUCTS at basic values are fixed, identical with the compiled TOTAL SUPPLY BY PRODUCTS at basic values (Totals compiled in Supply table are transferred to Use table).

Stage 8. For each of the detailed products, the same price index is used for all domestic use of that product at basic value.

Stage 9. For domestic use by products, constant price figures are compiled for the different valuation matrices and added up to domestic use by products in purchaser's value **Stage13.** Finally: Consumer price indices are used to compile revised constant price figures for household final consumption of goods in purchaser's values.

Stage 14. After the constant price figures for household consumption in purchaser's values have been revised, follows revision of the valuation matrices and the constant price figures for household consumption in basic values.

Stage15. An interactive connection between the constant price SUT and the current price SUT, change the estimated trade margins so the current price figure for household consumption in purchaser's values is kept unchanged.

Stage16. The change of the trade margin matrix in current prices for products to household consumption, leads to a new interactive balancing of the Supply and Use table in current prices.

Stage17. The revision of the Trade margins in current prices, results in a revision of the production in the Retail and Wholesale industries. The SUT will be balanced with adjusted figures for change in inventories in both current and constant prices.

Stage18. Value added for all industries are calculated by double deflation,

Stage19. Gross domestic product at constant prices is calculated by adding net product taxes to gross value added at basic values minus correction for product subsidies.

6. USE TABLE. EXPORTS IN CONSTANT PRICES

6.1. Use Table (T2) Deflation of Exports at fob/purchaser's value

The first stage of the constant price calculation cover constant price figures for exports in the different types of valuation. Implicit price indices for exports in producer's value and basic value are also calculated. The different STAGES are also described on the previous page.

[STAGE 1] For exports of goods and services, the constant price figures $Nf_{p,y}^{19}$ are calculated by dividing the current price figures in purchaser's prices with a set of price indices (YP_p^{19}). Calculation of exports in constant prices $Nf_{p,y}^{19}$: can be expressed by:

$$Nf_{p,y}^{19} = [nf_{p,y}^{19}] = \begin{bmatrix} \frac{1}{YP_i^{19}} n_{1,1}^{19} & \cdot & \cdot & \frac{1}{YP_i^{19}} n_{1,b}^{19} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ \frac{1}{YP_c^{19}} n_{c,1}^{19} & \cdot & \cdot & \frac{1}{YP_c^{19}} n_{c,b}^{19} \end{bmatrix}$$

where YP_p^{19} is the selected price indices for exported goods and services and of the same dimension as the exports matrix in current prices ($N_{p,y}^{19}$).

p represents Products,

y represents Export from external trade (account 51110) and other exports of goods and services (account 51120-51999)

6.2. Use Table (T2) Deflation of Trade margins (basic value) and Transport margins on exports

[STAGE 2]. Trade margins at basic values, is calculated in constant prices for the year t by using the trade margin percentage, the "basic trade margin rates" ($V^{14R/19}$) from year t-1 in current prices. The "basic trade margin rates" are calculated in details for goods specified by the different export accounts.

Calculation of the "basic trade margin rates" $V_{p,y14R}^{19}$ on the basis of T2 from year t-1, can be expressed by:

$$[v_{p,y}^{14R/19}] = \begin{bmatrix} \frac{1}{n_{1,1}^{19}} n_{1,1}^{14R} & \cdot & \cdot & \frac{1}{n_{1,b}^{19}} n_{1,b}^{14R} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ \frac{1}{n_{c,1}^{19}} n_{c,1}^{14R} & \cdot & \cdot & \frac{1}{n_{c,b}^{19}} n_{c,b}^{14R} \end{bmatrix}$$

where $V_{p,y14R}^{19}$ calculated for year t-1 in current prices, is identical with $V_{p,y}^{14R/19}$ used as "basic trade margins rates" for calculation of the constant price trade margins for the year t.

The trade margin matrix (14R-values) in constant prices can be expressed by:

$$\mathbf{Nf}_{p,y}^{14R} = [nf_{p,y}^{14R}] = \begin{bmatrix} vf_{11}^{14R/19} nf_{11}^{19} & \cdot & \cdot & \cdot & vf_{1b}^{14R/19} nf_{1b}^{19} \\ & & & & \cdot \\ & & & & \cdot \\ & & & & \cdot \\ vf_{c1}^{14R/19} nf_{c1}^{19} & \cdot & \cdot & \cdot & vf_{cb}^{14R/19} n_{cb}^{19} \end{bmatrix}$$

where $\mathbf{Vf}_{p,y}^{14R/19}$ are "Basic trade margin rates" and of the same dimension as N.

Every element in matrices $\mathbf{Nf}_{p,y}^{19}$ is multiplied with the corresponding element in the matrix $\mathbf{Vf}_{p,y}^{14R/19}$.

The matrix for the transport margins (14T-values) is calculated in the same way as the trade margins matrix:

$$[v_{p,y}^{14T/19}] = \begin{bmatrix} \frac{1}{n_{1,1}^{19}} n_{1,1}^{14T} & \cdot & \cdot & \cdot & \frac{1}{n_{1,b}^{19}} n_{1,b}^{14T} \\ & & & & \cdot \\ & & & & \cdot \\ & & & & \cdot \\ \frac{1}{n_{c,1}^{19}} n_{c,1}^{14T} & \cdot & \cdot & \cdot & \frac{1}{n_{c,b}^{19}} n_{c,b}^{14T} \end{bmatrix}$$

and

$$[nf_{p,y}^{14T}] = \begin{bmatrix} vf_{11}^{14T/19} nf_{11}^{19} & \cdot & \cdot & \cdot & vf_{1b}^{14T/19} nf_{1b}^{19} \\ & & & & \cdot \\ & & & & \cdot \\ & & & & \cdot \\ vf_{c1}^{14T/19} nf_{c1}^{19} & \cdot & \cdot & \cdot & vf_{cb}^{14T/19} n_{cb}^{19} \end{bmatrix}$$

6.3. Use Table (T2) Deflation of Product taxes and Product subsidies related to exports.

[STAGE 3] The routines for constant price calculation of taxes and subsidies for exports are in general as for domestic use. Exports will normally have no VAT, but for some products, there might be product taxes or subsidies on exports.

Constant price calculation follows for product taxes (15-values) and product subsidies (16-values) associated to trade margins (14-values) and for product subsidies (12-values) and product taxes (11-value).

Product taxes attached to trade margins are calculated in T2 by using product taxes from year t-1, ($A^{15/19}$) multiplied with constant price figures for product flows in purchaser's value (19-value). "Basic rates" from year t-1 for product taxes attached to trade margins ($A^{15/19}$), is calculated in relation to 19-values.

Calculation of product taxes rates $\mathbf{Af}_{p,y}^{15/19}$ based on T2 in current prices from year t-1 is expressed by:

$$[A^{15/19}_{p,y}] = \begin{bmatrix} \frac{1}{n^{19}_{l,l}} n^{15}_{l,l} & \cdot & \cdot & \frac{1}{n^{19}_{l,b}} n^{15}_{l,b} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ \frac{1}{n^{19}_{c,l}} n^{15}_{c,l} & \cdot & \cdot & \frac{1}{n^{19}_{c,b}} n^{15}_{c,b} \end{bmatrix}$$

where $A_{p,y}^{15/19}$ calculated for year t-1 in current prices, is identical with $A_{p,y}^{15/19}$ that is the basic rates for calculation of constant price figures for product taxes in year t.

Constant price figures for the product taxes paid by traders on exports in 15-value, Nf_{py}^{15} is decided by:

$$Nf_{py}^{15} = [nf^{15}_{p,y}] = \begin{bmatrix} af^{15/19}_{l,l} nf^{19}_{l,l} & \cdot & \cdot & af^{15/19}_{l,b} nf^{19}_{l,b} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ af^{15/19}_{c,l} nf^{19}_{c,l} & \cdot & \cdot & af^{15/19}_{c,b} nf^{19}_{c,b} \end{bmatrix}$$

where $A_{p,y}^{15/19}$ is the "basic rates" and of the same dimension as N.

Each element in the matrix Nf^{19} is multiplied with the corresponding element in the matrix $A^{15/19}$.

Constant price figures for product subsidies (16-values) are calculated in the same way as for the product taxes.

$$[A^{16/19}_{p,y}] = \begin{bmatrix} \frac{1}{n^{19}_{l,l}} n^{16}_{l,l} & \cdot & \cdot & \frac{1}{n^{19}_{l,b}} n^{16}_{l,b} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ \frac{1}{n^{19}_{c,l}} n^{16}_{c,l} & \cdot & \cdot & \frac{1}{n^{19}_{c,b}} n^{16}_{c,b} \end{bmatrix}$$

$$[nf^{16}_{p,y}] = \begin{bmatrix} af^{16/19}_{l,l} nf^{19}_{l,l} & \cdot & \cdot & af^{16/19}_{l,b} nf^{19}_{l,b} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ af^{16/19}_{c,l} nf^{19}_{c,l} & \cdot & \cdot & af^{16/19}_{c,b} nf^{19}_{c,b} \end{bmatrix}$$

After having calculated trade margins (14R-values), transport margins (14T-values), product taxes related to trade margins (15-values) and product subsidies related to trade margins (16-values) in constant prices, constant price figures for exports in producer's value (13-values) will be calculated expressed by Nf_y^{13} .

$$Nf_y^{13} \text{ is calculated as: } Nf_y^{13} = Nf_y^{19} - Nf_y^{14R} - Nf_y^{14T} - Nf_y^{15} - Nf_y^{16}$$

Following this, also the constant price figures for the matrices for exports in 12-value, 11-values and 10-values are calculated.

The rates from year t-1 for product taxes and product subsidies (A^{11}) and (A^{12}) are calculated in relation to the purchaser's values (19-values).

Calculation of basic rates for product taxes $A_{p,y11}^{11/19}$ from the Use table (T2) in current prices from year t-1, is expressed by:

$$[A_{p,y}^{11/19}] = \begin{bmatrix} \frac{1}{n_{l,l}^{19}} n_{l,l}^{11} & \cdot & \cdot & \frac{1}{n_{l,b}^{19}} n_{l,b}^{11} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ \frac{1}{n_{c,l}^{19}} n_{c,l}^{11} & \cdot & \cdot & \frac{1}{n_{c,b}^{19}} n_{c,b}^{11} \end{bmatrix}$$

where $A_{p,y}^{11/19}$ calculated for SUT for the year **t-1 in current prices**, is identical with $A_{p,y}^{11/19}$ used for calculation of constant price figures for product taxes in the year t.

Constant price figures for the matrix for exports in 11-values:

$$N_{p,y}^{11} \text{ is expressed by } [nf_{p,y}^{11}] = \begin{bmatrix} af_{l,l}^{11/19} nf_{l,l}^{19} & \cdot & \cdot & af_{l,b}^{11/19} nf_{l,b}^{19} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ af_{c,l}^{11/19} nf_{c,l}^{19} & \cdot & \cdot & af_{c,b}^{11/19} nf_{c,b}^{19} \end{bmatrix}$$

where $A_{p,y}^{11/19}$ is basic rates for product taxes of the same dimension as N.

Every element in the matrix $N_{p,y}^{19}$ is multiplied with the same element in the matrix $A_{p,y}^{11/19}$.

Calculation of basic rates for product taxes $A_{p,y11}^{11/19}$ from the Use table (T2) in current prices from year t-1, is expressed by:

Basic rates for products subsidies $A_{p,y}^{12/19}$ (negative figures) and Constant price figures for the matrix for exports i 12-values $N_{p,y}^{12}$ (negative figure) is calculated as for product taxes.

By substituting 11 for 11-values with 12 for 12-values in the equations above, they will describe the calculation of product subsidies $N_{p,y}^{12}$.

Exports in constant prices, calculated in basic value (10-values) is expressed by:

$$N_y^{10} \text{ calculated as } Nf_y^{10} = Nf_y^{13} - Nf_y^{11} - Nf_y^{12} \quad ($$

6.4. Use Table (T2) Calculation of price indices for Exports in producer's values and basic values

[STAGE 4] Price indices for exports in 13-values and 10-values are used for the constant price calculation of domestic production, as described in chapter 7.3 and 7.4.

$N_{p,y}^{13}$ is sum of exports of goods at current prices in 13-values

$Nf_{p,y}^{13}$ is sum of exports of services at constant prices in 13-values

Price indices for exports of each of the products in 13-values, Yp_p^{13} is calculated as:

$$YP_p^{13} = \left(\frac{n_{p,y}^{13}}{nf_{p,y}^{13}} \right) \times 100$$

$N_{p,y}^{10}$ is sum of exports at current prices in 10-values.

$Nf_{p,y}^{10}$ is sum of exports at constant prices in 10-values.

Price indices for exports of each of the products in 10-values, YP_p^{10} is calculated as:

$$YP_p^{10} = \left(\frac{n_{p,y}^{10}}{nf_{p,y}^{10}} \right) \times 100$$

7. SUPPLY TABLE. DOMESTIC PRODUCTION AND IMPORTS IN CONSTANT PRICES

7.1. Supply Table (T1) Introduction

The next stages are the compilation of:

- Constant price figures for imports in basic value and custom duties, see chapter 7.2.
- Constant price figures for total supply of products from domestic production in basic value or in producer's value, see chapter 7.3 and 7.4.

For domestic production deflation can start either from basic values (10-values) or producer's values (13-values) depending on the type of price indices available.

The calculation of domestic supply of products in constant prices are done either for:

- the matrix with supply of products in basic values (10-values), expressed by Hf^{10}

OR:

- the matrix with supply of products in producer's value (13-values), expressed by Hf^{13} ;
- the matrix of product taxes and subsidies for products 12- and 11-values, expressed by Hf^{12} and Hf^{11} ;
- the matrix of products in basic values (10-values), expressed by Hf^{10} ;

7.2. Deflation of Imports and Custom duty in basic value

[STAGE 5] For other imports (other goods and services) (account 52XXX x 10XXXXXX) $Hf_{z,p}^{10}$, the constant price figures are calculated by dividing with price indices (ZP_p^{10}) for products from imports. Calculation of $Hf_{z,p}^{10}$ is expressed by:

$$[hf_{z,p}^{10}] = \begin{bmatrix} \frac{1}{ZP_1^{10}} h_{1,1}^{10} & \cdot & \cdot & \frac{1}{ZP_c^{10}} h_{1,c}^{10} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ \frac{1}{ZP_1^{10}} h_{e,1}^{10} & \cdot & \cdot & \frac{1}{ZP_c^{10}} H_{e,c}^{10} \end{bmatrix}$$

where ZP_p^{10} is the price indices for imports of goods and services and of the same dimension as H.

Every element in the matrix H is divided with the corresponding element in the matrix ZP.

NOTE: Figures for CUSTOM DUTY distributed by NA-CPA-products are taken from the External trade statistics. (account 29505 x 10XXXXXX). $Hf_{295052,p}^{10}$ is calculated in constant price by dividing with the same set of price indices (ZP_p^{10}) by products as used for the constant price compilation for the same products from imports.

Calculation of $Hf_{29505,p}$, is expressed by:

$$[hf_{29505,p}^{10}] = \left[\frac{1}{ZP_l^{10}} h_{29505,l}^{10} \quad \cdot \quad \cdot \quad \cdot \quad \frac{1}{ZP_c^{10}} h_{29505,c}^{10} \right]$$

where ZP_p^{10} is the price indices for imported products and of the same dimension as H.

$p = \text{products.}$

29505 = account for CUSTOM DUTY

Every element in the matrix H is divided with the corresponding element in the matrix ZP.

7.3. Deflation of Domestic production in basic value

[STAGE 6.1] For products where the selected price indices for domestic production to domestic use in the "SAM catalogue" are for basic values (DIP_p^{10}), the constant price calculation starts with 10-values. This will always be the case for those industries where input price indices are used and also for the "Aggregation accounts".

Domestic production in constant prices expressed by Hf_{dp}^{10} (Accounts 22XXX - 26XXX) is calculated by dividing the figures in current value in 10-value, with a set of price indices, marked with DP_p^{10} .

The price index for a product from domestic production in basic value (10-values) (DP_p^{10}) is calculated as a weighted average of the price index for the product from domestic production to domestic use DIP_p^{10} and the price index for the product to exports, all in basic value YP_p^{10} .

NOTE: To be able to calculate the weighted price index DP_p^{10} , the domestic production of each product, in current prices, is by an automatic compilation split between:

- **Domestic production of the product in basic value delivered to exports (without re-exports):**
 N_{py}^{10}
- **Domestic production of the product in basic value delivered to the domestic market: ($H_{dp}^{10} - N_{py}^{10}$)**

The automatic compilation is based on the following assumptions:

The first assumption is that all exports are preliminary supplied from domestic producers. If the export of a product is larger than total domestic production, the rest of the export must have been supplied from other sources (reduction of inventories or imports). In these cases, the assumption is that all domestic production of the products is for exports.

The following alternative equations are used for the weighted price index:

Alternative 1

For product P: Domestic production (H_{dp}^{10}) greater than exports $N_{p,y}^{10}$ (The normal case):

Domestic production (in 10-value) supplied to exports (without re-exports) N_{py}^{10}

Domestic production (in 10-value) supplied to the domestic market: $(H_{d,p}^{10} - N_{p,y}^{10})$

$$DP_p^{10} = \frac{h_{dp}^{10}}{\frac{h_{dp}^{10} - n_{p,y}^{10}}{DIP_p^{10}} + \frac{n_{p,y}^{10}}{YP_p^{10}}}$$

$H_{d,p}^{10}$ = total domestic production of the product p in basic value

$N_{p,y}^{10}$ = total exports of the product p in basic value

DIP_p^{10} = producer price index (calculated for basic value) for domestic supply to the domestic market in basic value

YP_p^{10} = export price index in basic value

Alternative 2

For product P: Domestic production $H_{d,p}^{10}$ less than exports $N_{p,y}^{10}$ (The special case):

$$DP_p^{10} = YP_p^{10}$$

Constant price compilation of domestic production $H_{d,p}^{10}$ can be expressed by:

$$[hf_{dp}^{10}] = \begin{bmatrix} \frac{1}{DP^{10}_l} h^{10}_{l,l} & \dots & \frac{1}{DP^{10}_c} h^{10}_{l,c} \\ \vdots & \ddots & \vdots \\ \frac{1}{DP^{10}_l} h^{10}_{e,l} & \dots & \frac{1}{DP^{10}_p} H^{10}_{e,c} \end{bmatrix}$$

DP is calculated as the average price index for domestic produced products and of the same dimension as H. The elements in the matrix H in current prices are divided with the corresponding elements in the matrix DP.

7.4. Deflation of Domestic production from producer's value

[STAGE 6.2] For products where the selected price indices for domestic production to domestic use in the "SAM catalogue" are for producer's values (DIP_p^{13}), the constant price calculation start with 13-values.

Domestic production in constant prices expressed by Hf_{dp}^{13} (Accounts 22XXX - 26XXX) is calculated by dividing the figures in current value in 13-value, with a set of price indices, marked with DP_p^{13} . The price index DP_p^{13} has to be compiled for each product supplied from domestic production (Account 22XXX - 26XXX) in producer's value (13-values).

The price index for a product from domestic production in producer's value (13-values) (DP_p^{13}) is calculated as a weighted average of the price index for the product from domestic production to domestic use DIP_p^{13} and the price index for the product to exports, all in producer's value YP_p^{13} . Calculation of price indices for exports in 13-values (YP_p^{13}), is described in chapter 6.5.

Except for the use at producer's value, the calculation is the same as for basic value.

7.5. Constant price figures for Product taxes and Product subsidies (11- and 12-values)

To be able to balance T1 and T2, constant price figures have to be compiled in 10-values for all products. For products where the selected price indices in the "SAM catalogue" are for basic values, the constant price figures are compiled directly in basic values.

For the products where constant price figures first are calculated for 13-values, constant price figures for 11-values (product taxes) and 12-values (subsidies) have to be calculated first to get 10-values for these products.

Constant prices for 11- and 12-values are calculated from 13-values. Product taxes and subsidies in constant prices are calculated in T1 by multiplying the "basic rates" from year t-1 for product taxes ($A^{11/13}$), and for product subsidies ($A^{12/13}$) with the Constant price figures for supply of products in producer's value (13-values).

Calculation of basic rates for product taxes $A_{d,p}^{11/13}$, based on T1 in current prices from year t-1, is expressed by:

$$[A_{d,p}^{11/13}] = \begin{bmatrix} \frac{1}{h_{i,l}^{13}} h_{i,l}^{11} & \cdot & \cdot & \frac{1}{h_{l,c}^{13}} h_{l,c}^{11} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ \frac{1}{h_{e,l}^{13}} h_{e,l}^{11} & \cdot & \cdot & \frac{1}{h_{e,c}^{13}} h_{e,c}^{11} \end{bmatrix}$$

where $A_{d,p}^{11/13}$ calculated for t-1 in current prices, is identical with $A_{d,p}^{11/13}$, which is the basic rates, used for calculation of constant price figures for product taxes for the year t.

REMEMBER: Calculation of 12- and 11- values will only be done at this stage for the products where the constant price figures for 13-values have been calculated first, i.e. for those products where 13-values are selected from the "SAM catalogue". (For products where 10-values are selected, the constant price figures are already calculated. This directly calculated constant price figures in 10-values will be kept.)

$$H_{d,p}^{11} \text{ is calculated as: } Hf^{11} = [hf_{dp}^{11}] = \begin{bmatrix} a_{1l}^{11/13} hf_{1l}^{13} & \cdot & \cdot & a_{lc}^{11/13} hf_{lc}^{13} \\ \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot \\ a_{el}^{11/13} hf_{el}^{13} & \cdot & \cdot & a_{ec}^{11/13} hf_{ec}^{13} \end{bmatrix}$$

where A is the product tax matrix rates from year t-1, with the same dimension as H. Every element in the matrix $H_{d,p}^{11}$ is multiplied with the corresponding element in the matrix $A_{d,p}^{11/13}$.

The "Basic rate" for product subsidies $A_{d,p}^{12/13}$ (negative figures) and Constant price figures for the matrix for domestic supply in 12-values $H_{d,p}^{12}$ (negative figures) are calculated in the same way as for product taxes.

where A is the product subsidy matrix rates from year t-1 and of the same dimension as H.

$$Hf^{10} \text{ is calculated as the difference: } Hf^{10} = Hf^{13} - Hf^{11} - Hf^{12}$$

8. BALANCING T1 AND T2 IN BASIC VALUE IN CONSTANT PRICES

8.1. Balancing Supply and Use in basic values

[STAGE 7] From the Supply table T1 in constant prices, , total supply of a product p, expressed in basic value (10-value, is shown as: Sf_p^{10}

Sf^{10} is a row vector, calculated as total supply in constant prices, specified by products and calculated in basic value (10-value).

Row vector Sf^{10} in the Supply table (T1) is identical to column vector Sf^{10} in the Use table (T2).

$$N_p = D_p : N_{p,y}$$

D_p is a matrix, expressing domestic use of products p as intermediate input to the industry and aggregation accounts (d) and to the domestic final use accounts (s).

$N_{p,y}$ is a matrix, expressing supply of products (p) to exports (y).

8.2. Compiling constant price figures for the different domestic use in basic values

[STAGE 8] NOTE: In T2, total domestic use of a product in constant prices in 10-values is calculated as the difference between total supply of the product in constant prices and exports of the product in constant prices.

For every product, this can be expressed by:

$$\sum_{d+s=l}^{e+\bar{U}} df_{p,d+s}^{10} = Sf_p^{10} - \sum_{y=l}^b nf_{py}^{10}$$

NOTE: To decide the constant price figures for the different domestic use of a product, the total domestic use of the product calculated in constant prices Df_p^{10} , is distributed between the different domestic users in the same proportion as the domestic use of the product in current prices.

Constant price figures for the domestic use of the product p to the Users d+s, in basic values (10-values) is calculated as :

$$df_{p,d+s}^{10} = d_{p,d+s}^{10} \times \frac{\sum_{d+s=l}^{e+\bar{U}} df_{p,d+s}^{10}}{\sum_{d+s=l}^{e+\bar{U}} d_{p,d+s}^{10}}$$

This implies that in basic value (10-value), the same price index is used to deflate all domestic use of a product, inclusive change in inventories of that product !

When the basic price values in the SUT have been deflated and balanced, a constant price calculation is conducted for trade and transport margins, product taxes and subsidies and VAT, to be able to calculate purchaser's prices at constant prices.

9. COMPILING THE COMPLETE DOMESTIC USE TABLE IN ALL TYPES OF VALUATION IN CONSTANT PRICES

9.1. Domestic Use, Constant price figures for Trade and Transport margins

[STAGE 9.1] Basic value of trade margins in constant prices in the year t is calculated in the Use table (T2) by using the –“Trade margin rates” ($V^{14/10}$) from year t-1, computed for all products by category of use.

Note: Trade margins will normally not appear for services.

Calculation of “Trade margin rates” $V_{p,j}^{14R/10}$ from T2 in current prices from the year t-1, is expressed by:

$$[V_{p,d+s}^{14R/10}] = \begin{bmatrix} \frac{1}{d_{l,l}^{10}} d_{l,l}^{14R} & \cdot & \cdot & \frac{1}{d_{l,d+s}^{10}} d_{l,d+s}^{14R} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ \frac{1}{d_{p,l}^{10}} d_{p,l}^{14R} & \cdot & \cdot & \frac{1}{d_{p,d+s}^{10}} d_{p,d+s}^{14R} \end{bmatrix}$$

where $V_{p,y}^{14R/10}$ calculated for t-1 in current prices, is identical with the “Trade margin rates” $V_{p,y}^{14R/10}$, used for the calculation of Constant price figures for Trade margins in the year t.

p represents Products,

d+s represents Domestic users

Constant price figures for the trade margin matrix, 14R-values, $Df_{p,d+s}^{14R}$ is calculated as :

$$Df^{14R} = [df_{p,d+s}^{14R}] = \begin{bmatrix} v_{l,l}^{14R/10} df_{l,l}^{10} & \cdot & \cdot & v_{l,d+s}^{14R/10} df_{l,d+s}^{10} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ v_{p,l}^{14R/10} df_{p,l}^{10} & \cdot & \cdot & v_{p,d+s}^{14R/10} df_{p,d+s}^{10} \end{bmatrix})$$

where V is Trade margin rates and of the same dimension as D.

Every element in the matrix D is multiplied with the corresponding element in the matrix V

p represents Products,

d+s represent Domestic users

For every element in the trade margin matrix, the result is that the volume change for the trade margins is the same as the volume change for the elements in basic value.

Constant price figures for transport margin (14T-values) are calculated in the same way as the trade margins.

$$Df^{14T} = [df^{14T}_{p,d+s}] = \begin{bmatrix} v_{l,l}^{14T/10} df_{l,l}^{10} & \cdot & \cdot & v_{l,d+s}^{14T/10} df_{l,d+s}^{10} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ v_{p,l}^{14T/10} df_{p,l}^{10} & \cdot & \cdot & v_{p,d+s}^{14T/10} df_{p,d+s}^{10} \end{bmatrix}$$

9.2. Domestic use. Constant price figures for product taxes, product subsidies and VAT.

[STAGE 9.2] When the basic price values in the SUT have been deflated and balanced, a constant price calculation is conducted for trade margins, product taxes, product subsidies and VAT, to be able to calculate purchaser's values at constant prices.

Constant price figures for product taxes and product subsidies are calculated in the User table in T2 by multiplying "basic rates" from year t-1 for product taxes ($A^{11/10}$) and for product subsidies ($A^{12/10}$) with the constant price figures for product flows, calculated in basic values (10-value).

Calculation of basic rates for product taxes $A_{p,11}^{11/10}$ on the basis of T2 in current prices from year t-1, is expressed by:

$$[A_{p,d+s}^{11/10}] = \begin{bmatrix} \frac{1}{d_{l,l}^{10}} d_{l,l}^{11} & \cdot & \cdot & \frac{1}{d_{l,d+s}^{10}} d_{l,d+s}^{11} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ \frac{1}{d_{p,l}^{10}} d_{p,l}^{11} & \cdot & \cdot & \frac{1}{d_{p,d+s}^{10}} d_{p,d+s}^{11} \end{bmatrix} \quad ($$

where $A_{p,y}^{11/10}$ calculated for **t-1 in current prices**, is identical with $A_{p,y}^{11/10}$ which are the "basic rates" used for Calculation of constant price figures for product taxes in year t.

p represents Products,

d+s represents Domestic users

Constant price figures for the product tax matrix in 11-values, $Df_{p,d+s}^{11}$, is calculated as:

$$Df^{11} = [df_{p,d+s}^{11}] = \begin{bmatrix} a_{l,l}^{11/10} df_{l,l}^{10} & \cdot & \cdot & a_{l,d+s}^{11/10} df_{l,d+s}^{10} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ a_{p,l}^{11/10} df_{p,l}^{10} & \cdot & \cdot & a_{p,d+s}^{11/10} df_{p,d+s}^{10} \end{bmatrix} \quad ($$

where $A_{p,d+s}^{11/10}$ is basic rates for product taxes and of the same dimension as D.

Every element in the matrix $Df_{p,d+s}^{11}$ is multiplied with the corresponding element in the matrix $A_{p,d+s}^{11/10}$.

Basic rates for product subsidies $Af_{p,d+s}^{12/10}$ (negative figures) and constant price figures for the matrix $Df_{p,d+s}^{12}$ (negative figures) are calculated in the same way as the product taxes. By replacing 11 for 11-values with 12 for 12-values in Equation 49 and Equation 50 above, we get **Equations 51** and **Equation 52**, expressing the calculation of the product subsidy matrix in 12-values, $Df_{p,d+s}^{12}$.

Domestic use at producer's value, in constant prices, Df^{13} is calculated as:

$$Df^{13} = Df^{10} + Df^{11} + Df^{12}$$

"Basic rates" from year t-1 for product taxes and product subsidies related to trade margins $Af_{p,d+s}^{15/10}$ and $Af_{p,d+s}^{16/10}$, are also calculated in relation to the 10-values. This is also the case for value added tax and investments tax.

Basic rates for product taxes $Af_{p,d+s}^{15/10}$ related to trade margins and constant price figures for the matrix $Df_{p,d+s}^{15}$ are calculated as for product taxes $Af_{p,d+s}^{11/10}$. By replacing 11 for 11-values with 15 for 15-values in Equation 49 and Equation 50 above, we get **Equations 54** and **Equation 55**, expressing the calculation of the product taxes related to trade margins in 15-values, $Df_{p,d+s}^{15}$.

Basic rates for product subsidies $Af_{p,d+s}^{16/10}$ related to trade margins (negative figures), and constant price figures for the matrix $Df_{p,d+s}^{16}$ is calculated in the same way as for product taxes $Af_{p,d+s}^{11/10}$. By replacing 11 for 11-values with 16 for 16-values in Equation 49 and Equation 50 above, we get **Equations 56** and **Equation 57**, expressing the calculation of the product subsidies related to trade margins in 16-values, $Df_{p,d+s}^{16}$.

Basic rates for value added tax ($A2^{17}$) and constant price figures for the matrix $Df_{p,d+s}^{17}$ are calculated in the same way as for product taxes. By replacing 11 for 11-values with 17 for 17-values in Equation 49 and Equation 50 above, we get **Equations 58** and **Equation 59**, expressing the calculation of the VAT matrix in 17-values, $Df_{p,d+s}^{17}$.

Basic rates for investments tax ($A2^{18}$) and constant price figures for the matrix $Df_{p,d+s}^{18}$ are calculated in the same way as for product taxes. By replacing 11 for 11-values with 18 for 18-values in Equation 49 and Equation 50 above, we get **Equations 60** and **Equation 61**, expressing the calculation of the $Df_{p,d+s}^{18}$.

Domestic use at purchaser's value, in constant prices, Df^{19} is compiled as:

$$Df^{19} = Df^{13} + Df^{14R} + Df^{14T} + Df^{15} + Df^{16} + Df^{17} + Df^{18}$$

Sf_p^{11} , Sf_p^{12} , Sf_p^{14R} , Sf_p^{14T} , Sf_p^{15} , Sf_p^{16} , Sf_p^{17} , Sf_p^{18} are decided as the row totals in T2, see chapter 5.2, figure 2. The row totals in T2 are transferred to T1 to decide the column totals in T1, see chapter 5.1, figure 1.

10. BALANCING THE CONSTANT PRICE FIGURES FOR THE "AGGREGATION ACCOUNTS"

10.1. Balancing aggregation accounts 27015 - 27292 and 28111 - 28990 in constant prices.

[STAGE 10]. Each of the "Aggregation accounts " will receive the detailed products allocated to the accounts, but by an automatic procedure only supply one "Aggregation product". As an example account 27015 will only supply the product 000015.

The accounts for undistributed intermediate consumption 27015 to 27299 will supply products with the codes 000015-000299 (products for intermediate consumption)

The accounts for capital formation by type 28111 to 28990 will supply products with the codes 008111 to 008990 (capital types for GFCF)

During the automatic deflation process, constant price figures are calculated for the intermediate input to the aggregation accounts in the Use table (T2). The total constant price figure for input is aggregated and transferred to the Supply table T1 as production in 13- values in constant prices, expressed by:

$$Hf_{ds,ps}^{13} = \sum_{p=1}^n df_{p,ds}^{19}$$

ps represents products from the aggregation accounts (000015 - 000299 or 008111 - 008990)

p represents ordinary products

ds represents Aggregation accounts (27015 - 27299 or 28111 - 28990)

The supply of each aggregation product is equal to total use in T2.

There are no exports or import of these products.

To decide constant price figures for the different domestic uses of an "aggregation" product, total domestic use compiled in constant prices Df_{ps}^{13} , is distributed in proportion to the domestic use of the product in current prices.

Constant price figures for domestic use of products *ps* to the users, *d+s*, in 13-values, is decided as:

$$df_{ps,d+s}^{13} = d_{ps,d+s}^{13} \times \frac{\sum_{d+s=1}^{e+\bar{U}} df_{ps,d+s}^{13}}{\sum_{d+s=1}^{e+\bar{U}} d_{ps,d+s}^{13}}$$

(2)

ps represents products from aggregation accounts (000015 - 000299 or 008111 - 008990)

d+s represents domestic users (27015 - 27292 or 28111 - 28990)

10-values are identical to 13-values. Finally 17-and 18-values are calculated with the rates from year t-1 For these accounts 19-values are calculated as the total of the 13-, 17- and 18-values.

10.2. Products with the code 009100 - 009990 (Transactions in used capital goods):

These products exist only in the Use tale T2 as products delivered to the accounts for capital investment and to exports.

Price indices for these products are assumed to be the same as the price indices for similar new capital (008111- 008990) products. They may be registered in the "SAM catalogue", but it is more convenient to

use the "cost indices catalogue", see the Users' guide. The constant price figures have to be compiled on the Users side because the total on the users side cannot be transferred from the Supply side as for other products.

Constant price figures for the use of these products is decided as:

$$df_{ps,s}^{13} = \frac{d_{ps,s}^{13}}{dp_{ps}^{13}}$$

s represents users (51xxx, 61xxx and 82000 to 87999)

ps represents aggregation products (009xxx)

dp represents price indices for the aggregation products

10-and 19-values are identical with 13-values. There are no product taxes or margins on these products.

10.3. Balancing the technical accounts 27500 Trade margins in constant prices

The trade margins at basic values (14R-values), product taxes collected by the traders (15-values) and product subsidies paid to the traders (16-values) are calculated in constant prices in the Use table (T2), specified by products and users, see chapter 9.

These values Sf_p^{14R} , Sf_p^{15} , Sf_p^{16} are aggregated by users, but specified by products, and transferred to T1 with the supplier code 27500.

Sf_p^{14R} is identical with the column totals in T1 and also identical with the supply in basic value (10-values) from the aggregation account for trade margins $Hf_{27500,p}^{14R}$ (27500 x 14RXXXXXX).

Sf_p^{15} is identical with the column totals in T1 and also identical with the product taxes (15-values) paid by the trade industry allocated from the aggregation account for trade margins $Hf_{27500,p}^{15}$ (27500 x 15XXXXXX).

Sf_p^{16} is identical with the column totals in T1 and also identical with the product subsidies (16-values) paid to the trade industry allocated to the aggregation account for trade margins $Hf_{27600,p}^{16}$ (27600 x 16XXXXXX).

In T2 the account 27500 receives the following products:

Example from the Norwegian NA:

510100 Trade margin on wholesale trade services

521100 Trade margin on retail trade services

Example from another country:

511000 Trade margin on wholesale trade services

521000 Trade margin on retail trade services

Example from another country:

506000 Trade margin on motor vehicles

510000 Trade margin on wholesale trade services

528000 Trade margin on retail trade services, except motor vehicles

Aggregation account 27500 is balanced in constant prices by an automatic adjustment of 27500 in T2, to ensure that the sum of 27500 at basic values (10-values) in T2 is equal to the sum of Trade margins (14R-values) in T1. This is done by proportional adjustment of the main trade margin products delivered to account 27500, as registered in the software for each country.

The account 27500 might also receive other products as in the Norwegian case:

401035 Sale of electrical energy to the household

401036 Sale of electrical energy to other industries

501000 Trade margin on motor vehicles

505000 Trade margin on fuel

These products are not changed during this balancing process in constant prices

The sum of 11-values in T2 is made equal to the sum of 11-values in T1, by proportional adjustment.

The same is done for 12-values. The 13- and 19-values are calculated by summation.

In T1:

Example from the Norwegian NA:

The constant price figures for the supply from industry 23510 of the wholesale margin product 510100 and from the industry 23521 of the retail trade margin product 521100 in 10-values are corrected and set equal to the use of the same in account 27500 in T2. 11-values and 12-values are added in order to get 13-values.

10.4. Balancing the technical accounts 27600 Transport margins in constant prices

In the Norwegian case, the aggregation account for transport margins only covers transport of electricity and transport of oil and gas by pipelines. This two different transport margins are balanced separately:

Transport of electricity

The transport margin for electricity in constant prices is balanced in a similar way as for trade margins. The starting point is 14T-value on the electricity products 40101x in T2. These are summed by products and transferred to T1 with the supplier code 27600. Account 27600 is balanced by automatic adjusting the use of the product 401040 in 27600 in T2, to ensure that the sum of 10 values in T2 is equal to the sum of the 14T-values in T1. The supply of the product 401040 "Rent of transmission of electricity" from the supplying industry in T1 in 10-value, is set equal to the use of the same product in 27600 in T2.

Transport of oil and gas by pipeline

This is balanced in a different way than electricity, to keep the constant price figure for the transport margins from the supply side, which is based on a tonkm calculation.

The starting point is the constant price value delivered by the pipeline industry as product 603013 "Transport margins for oil" and product 603014 "Transport margins for gas". In the Use table (T2) these two products are delivered to the aggregation account 27600.

In T1, the transport margin (14T-values) for oil and gas (111010 Crude oil and 111020 Natural gas) supplied by account 27600 is set equal to the value of the pipeline services delivered to 27600.

14T-values for oil and gas in T2 are set equal to the value in T1. For gas the entire transport margin is related to exports. For oil, the transport margin is distributed proportionally between exports and use in refineries. Purchaser's values (19-values) for oil and gas in T2 are calculated by adding 10-values and 14T-values.

11. COMPILING THE COMPLETE SUPPLY TABLE IN CONSTANT PRICES

11.1. Supply Table, Constant price figures for Product taxes, Product subsidies and for Purchaser's value.

[STAGE 11.1] For the products where the constant price compilation have started with basic values (10-values), constant price figures will be compiled for Product taxes (11-values) and Product subsidies (12-values) in this stage to complete T1 in all types of valuation in constant prices. The 11-values and 12-values in constant prices are calculated in T1 by using the "basic rates" from year t-1.

The "basic rates" for Product taxes ($A^{11/10}$) and for product subsidies ($A^{12/10}$), are multiplied with the constant price figures for the matrix for suppliers by products in basic values (10-values).

The calculation of the product tax matrix (11- values) in constant prices, is expressed by Hf_{dp}^{11} :

$$Hf^{11/10} = [hf_{dp}^{11/10}] = \begin{bmatrix} a_{11}^{11/10} hf_{11}^{10} & \cdot & \cdot & a_{1p}^{11/10} hf_{1p}^{10} \\ & \cdot & \cdot & \cdot \\ & \cdot & \cdot & \cdot \\ a_{d1}^{11/10} hf_{d1}^{10} & \cdot & \cdot & a_{dp}^{11/10} h_{dp}^{10} \end{bmatrix}$$

A is the "basic rates" and of the same dimension as H.

Every element in the matrix H is multiplied with the corresponding element in the matrix A.

Basic rates for product subsidies ($A^{12/10}$) (negative figure) and constant price figures for the matrix Hf_{dp}^{12} (negative figures) are calculated in the same way as the product taxes. By replacing 11 for 12-values in the equations above, we get equations expressing the calculation of the product subsidy matrix in 12-values, Hf_{dp}^{12} .

Hf^{13} is calculated as:
$$Hf^{13} = Hf^{10} + Hf^{11} + Hf^{12}$$

11.2. Supply Table, Constant price figures for Import taxes

[STAGE 11.2] Constant price figures for taxes on imports is calculated in T1 by multiplying "basic rates" from year t-1 for import taxes ($A_{29506,p}^{11/10}$), with the Constant price figures for Imports ($Hf_{z,p}^{10}$) plus Custom duty ($Hf_{29505,p}^{10}$) in basic value (10-values).

Calculation of "basic rates" for import taxes $A_{29506,p}^{11/10}$, based on T1 in current prices from year t-1, can be expressed by:

$$[A_{29506,p}^{11/10}] = \frac{I}{\sum_{z=1}^b h_{z,p}^{10} + h_{29505,p}^{10}} h_{29506,p}^{11}$$

where $A_{29506,p}^{11/10}$, calculated for t-1 in current prices, is identical with $A_{29506,p}^{11/10}$, which is the "basic rates" to be used for the calculation of constant price figures for taxes on imports in year t.

29506 represents supplier of import tax

Calculation of import tax in constant prices can expressed by $Hf_{29506,p}^{11/10}$ as:

$$Hf_{29506,p}^{11} = \left[\sum_{z=1}^b hf_{z,p}^{10} + hf_{29505,p}^{10} \right] af_{29506,p}^{11/10}$$

where $Af_{29506,p}^{11/10}$ is import tax and of the same dimension as $Hf_{29506,p}^{11}$

11.3. Balancing constant price figures for product taxes (11-values) and product subsidies 12-values) as calculated in T1 and T2].

[STAGE 12.1. The constant price figures for Sf_p^{11} and Sf_p^{12} distributed by products in T2, can be different from Sf_p^{11} , Sf_p^{12} distributed by products) in T1.

Basic values are more homogeneous than producer's and purchaser's values because taxes and subsidies related to products will for most products be differentiated according to who buys the products. Taxes or subsidies on products, which are differentiated according to users, are imposed on a number of products.

To balance the Supply Table and the Use table in constant prices in all types of valuation, the differences between the constant price figures compiled for product taxes (Sf_p^{11}) distributed by products in the Supply table and in the Use table are calculated as correction figures on the Supply side as supply from Account 29900 "Imputed net gain at constant prices because of change in "basic rates".

The differences compiled between the constant price figure for product subsidies (Sf_p^{12}) distributed by products in the Supply table and in the Use table are also calculated as correction figures on the Supply side allocated to Account 29900 "Imputed net gain at constant prices because of change in "basic rates". The supply in T1 from account 29900 to the 11-values (taxes on products) and 12- values (subsidies on products) expressed by $H_{29900,p}^v$, is calculated as:

$$hf_{29900,p}^v \equiv Sf(T2)_p^v - Sf(T1)_p^v$$

(T2) represents the row total S, calculated in T2

(T1) represents the column total S, calculated in T1.

v represents 11- and 12- values

NOTE: The shift effect in account 29900 is only recorded for taxes on products as 11-values and subsidies on products as 12-values

11.4. Transferring constant price figures for trade and transport margins and related taxes and VAT calculated in T2 to T1.

[STAGE 12.2]. The constant price figures for Sf_p^{14R} , Sf_p^{14T} , Sf_p^{15} , Sf_p^{16} , Sf_p^{17} and Sf_p^{18} , calculated as row totals (distributed by products) in T2, are transferred to column totals (also distributed by products) in T1, and determine

the constant price figures for the 14R-values, 14T-values, 15-values, 16-values, 17-values and 18-values distributed by products in T1.

Sf_p^{14R} : Sum Trade margins in constant prices, calculated in T2, gives total constant price figures for total supply of trade margins in T1, calculated in 14R-values (Sf_p^{14R}), specified by products.

Sf_p^{14R} decided as the column total in T1, specified by products, also decide the supply from the Aggregation accounts, specified by products, as trade margins in constant prices:

$Hf_{27500,p}^{14R}$ (27500 x 14RXXXXXX).

Sf_p^{14T}: Sum Transport margin in constant prices, calculated in T2, gives total constant price figures for total supply of transport margins in T1, calculated in 14T-values (Sf_p^{14T}), specified by products.

Sf_p^{14T} decided as the column total in T1, specified by products, also decide the total supply from Aggregation account, specified by products, as transport margins in constant prices:

Hf_{27600,p}^{14T} (27600 x 14TXXXXXX).

Sf_p¹⁵: Sum product taxes related to trade margins in constant prices, calculated in T2, gives for every product, sum constant price figures for 15-values (Sf_p¹⁵).

Sf_p¹⁵ decided as the column total in T1 and also as supply from the Aggregation accounts like column totals in T1 and also as total supply from the Aggregation account for taxes related to trade margins:

Hf_{27500,p}¹⁵ (27500 x 15XXXXXX).

Sf_p¹⁶: Sum subsidies related to trade margins in constant prices, calculated in T2, gives for every product sum Constant price figures for 16-values (Sf_p¹⁶).

Sf_p¹⁶ is decided as the column totals in T1 and also as total supply from the Aggregation account for subsidies related to trade margins Hf_{27500,p}¹⁶ (27500 x 16XXXXXX).

Sf_p¹⁷: Sum value added tax (VAT) in constant prices, calculated in T2, gives for products Constant price figures for 17-values (Sf_p¹⁷).

Sf_p¹⁷ is decided as the column totals in T1 and also as supply from the Aggregation accounts from not industry distributed taxes Hf_{29501,p}¹⁷ (29501 x 17XXXXXX).

Sf_p¹⁸: Sum investment tax (Norwegian case) in constant prices, calculated in T2, gives for products Constant price figures for 18-values (Sf_p¹⁸).

Sf_p¹⁸ is decided as the column totals in T1 and also as supply from the Aggregation accounts for investment tax Hf_{29502,p}¹⁸ (29502 x 18XXXXXX).

12. CORRECTION OF HOUSEHOLD CONSUMPTION WITH THE CONSUMER PRICE INDICES

12.1 Correction in constant prices

(STAGE 13 - 17)

Household consumption of goods is the only area, except exports, where price indices are inserted in the final stages of the compilation for deflating purchaser's value directly. When the Use table (T2) has been compiled in all types of valuation, inclusive 19-values, an automatic correction is carried through for the constant price figures for Household consumption in 19-values to reflect the change in CPI for goods compared with change in the already used price indices. Following this, the current price basic values are adjusted, in order to preserve the price indices in basic value. Finally, the trade margins in current prices are recalculated and the SUT in current prices simultaneously corrected and balanced.

Constant price figures for products (goods) supplied to Household consumption, calculated in purchaser's values (19-values), $Nf^{(19x61)}$ is revised by deflating the values in current prices with price

$$Nf^{19*} = [nf_{p,y}^{19*}] = \begin{bmatrix} \frac{1}{KP_{i,1}^{19}} n_{i,1}^{19} & \dots & \frac{1}{KP_{i,b}^{19}} n_{i,b}^{19} \\ \dots & \dots & \dots \\ \frac{1}{KP_{c,1}^{19}} n_{c,1}^{19} & \dots & \frac{1}{KP_{c,b}^{19}} n_{c,b}^{19} \end{bmatrix}$$

indices from the consumer price index series (KP_p). The revised constant price figures $Nf^{(19x61)*}$ are calculated by dividing with a set of price indices (KP_p), specified for certain products (goods) supplied to Household consumption.

Calculation of $Nf^{(19x61)*}$ can expressed by:

where KP_p^{19} is the price indices for products to Household consumption.

p represents Products, but only for goods (product no 011111-366377)

y represents Household consumption (account 61011- account 61992)

The change of 19-values in constant prices $Nf^{(19x61)}$ for Household consumption, is used to adjust $Nf^{(\hat{A}x61)}$, $\hat{A} = 18-, 17-, 16-, 15-, 14R-$ and $14T-$ values in the same proportion.

$$Nf^{\hat{e}*} = [nf_{p,y}^{\hat{e}*}] = \left(\frac{nf_{p,y}^{19*}}{nf_{p,y}^{19}} \right) x nf_{p,y}^{\hat{e}}$$

where $Nf^{(\hat{A}x61)*}$ is the new, changed matrices

13-values are calculated as follows:

$$Nf^{13*} = Nf^{19*} - Nf^{18*} - Nf^{17*} - Nf^{16*} - Nf^{15*} - Nf^{14T*} - Nf^{14R*}$$

The corrections in constant price figures for $Nf^{(13x61)}$, gives the same percentage corrections in $Nf^{(0x61)}$ $\emptyset = 12-, 11-$ values.

$$Nf^{\hat{u}*} = [nf_{p,j}^{\hat{u}*}] = \left(\frac{nf_{p,j}^{13*}}{nf_{p,j}^{13}} \right) x nf_{p,j}^{\hat{u}}$$

where Nf^{0*} is the new, changed matrices.

To balance the Supply Table and the Use Table in constant prices in all types of valuation, the differences between the revised constant price figure for product taxes and subsidies related to products in the Supply table and in the Use table are calculated as correction to the figures on the Supply side allocated to Account 29900 "Imputed net gain at constant prices because of change in "basic rates". 10-values are identical to 13 – 11 – 12 values!

12.2. Correction in current prices

Note: The earlier accepted figures for Final household consumption in current prices in 19-values $N^{(19x61)}$, will not be changed

The figures for household consumption in constant prices in basic values (10-values) have been revised. To retain the price indices used for the constant price compilation, the figures for household consumption in current prices in basic values (10-values) are revised as follows:

$$N^{10*} = [n_{py}^{10*}] = \left(\frac{nf_{py}^{10*}}{nf_{py}^{10}} \right) \times n_{py}^{10}$$

The total figures for product taxes (11-values) and product subsidies (12- values) in current prices are fixed.

To avoid correcting other items than household consumption, the 11- and 12- values are not changed in current prices. Revised $N^{(10x61)}$ (10-values) will therefore result in the same revision of $N^{(13x61)}$ (13-values)

$$N^{13*} = N^{10*} + N^{11} + N^{12}$$

Revised figures for household consumption in current prices in 13-values, will by the new balancing in current prices, give new figures for change in inventories in 13-values and also in 10 - and 19-values. This revision of change in inventories will only occur for goods and should be acceptable.

To keep the 19-values constant in current prices, the corrections of 13-values in current prices give the opposite correction of the correction of the 14R-values!

Revised trade margins (14R-value) in current prices give a corresponding correction in T1 in current prices for production of trade margins (27500 x 14RXXXXXX). A difference arises as "change in inventories" between sum trade margins from the account 27500 (sum 14R-values) and production supplied from retail and wholesale trade to account 27500. This difference has to be removed.

To avoid a complete new balancing process for all the valuation matrices, the 15-, 16-, 17- and 18-values in current prices are not changed.

$$\text{Revised figures for } N^{(14Rx61)} * N^{14R*} = N^{19} - N^{18} - N^{17} - N^{16} - N^{15} - N^{14T} - N^{13*}$$

Remember: The earlier accepted figures for Final household consumption in current prices in 19-values $N^{(19x61)}$, have not been changed !

13. BALANCING THE CONSTANT PRICE FIGURES FOR THE CONSUMPTION OF FIXED CAPITAL FOR THE GOVERNMENT

Consumption of fixed capital (CFC) for the central and local government, distributed by industries are is recorded as separate products. The constant price CFC figures are entered directly in the constant price compilation of SUT as a final step, see chapter 4.4 for the format for the CAPSTANT1-file.

To decide constant price figures for the different domestic users, which are the government consumption accounts, total domestic use compiled in constant prices Df_{ps}^{13} , is distributed in proportion to the domestic use of the consumption of fixed capital products in current prices.

This is expressed by: Constant price figures for domestic use of the products ps to the users, d+s, in 13-values, decided as:

$$df_{ps,d+s}^{13} = d_{ps,d+s}^{13} \times \frac{\sum_{d+s=1}^{e+\tilde{U}} df_{ps,d+s}^{13}}{\sum_{d+s=1}^{e+\tilde{U}} d_{ps,d+s}^{13}}$$

ps represents Consumption of fixed capital (CFC) accounts (XXX061-XXX081)
d+s represents government consumption accounts (account 64XXX and 65XXX)

For consumption of fixed capital (CFC), 10-values are identical to 13-values and 19 values

PART III. SUT/IOT

1. Main objective

1.1. Supply and Use Tables in Current and Constant Prices

Part I. “SUT/CURRENT” gives a description of the methodology for establishing, balancing and interactive correction and annually updating of detailed Supply and Use Tables (SUT) in current prices.

Part II. “SUT/CONSTANT” gives a description of the integrated process for converting to SUT in constant, previous year’s prices and the final balancing of SUT in current prices. Integrated in the final balancing is a correction of total Value Added Tax (VAT) from theoretical value to time adjusted book value.

Part III. “SUT/IOT” gives a description of transformation of the detailed SUT to international requirements for reporting SUT and IOT at different level of aggregation:

- Chapter 3 gives a description of the transformation to a modified SUT version, called SUT_MOD_I, required as a data base for Model building in Statistics Norway.
- Chapter 4 gives a description of the transformation to the SUT_MOD_II format, required for international reporting of SUT, cfr. SNA93 table 15.1 and 15.2 and ESA95 table 15 and 16.
- Chapter 5 gives a description of the transformation to the SUT_MOD_III format, required as a database for compiling Input-Output Tables (IOT).
- Chapter 6, 7 and 8 give a description of the transformation to Input-Output Tables (IOT) at different level of aggregation and for reporting of IOT, cfr. ESA95, table 17, 18 and 19.

Figure 1. Simplified illustration of Supply Tables and Use Tables.

T1 Supply Table		T2 Use Table						
Basic	Value	Industry 1.....m	Capital formation by type	Ex- ports	Final uses			
	Products 1.....n				Final consumption Households, Govern, NPISHs	Capital formation by industry	Changes in Inventories	
Industry 1	H^{10}_{dp}	Products 1	N^{10}_{pd}	N^{10}_{pd}	N^{10}_{ps}	N^{10}_{ps}	N^{10}_{ps}	N^{10}_{ps}
2		2						
·		P						
M.	H^{10}_{zp}	Net product taxes, VAT	N^{19}_{pd}	N^{19}_{pd}	N^{19}_{ps}	N^{19}_{ps}	N^{19}_{ps}	N^{19}_{ps}
Imports		Interm. Final consumption at purchasers' value						
		Value added at basic value	B^{10}_d					
Total	S	Output and final consumption	T^{10}_d	T^{10}_d	T^{10}_s	T^{10}_s	T^{10}_s	T^{10}_s

1.2. Methodology for transformation to Input-Output Tables.

The methodology for the transformation to IOT is based on the main assumption that each of the detailed products has its own specific sales structure, “*the fixed product sales structure*”. The Supply Table (Suppliers x Products) and the Use Table (Products x Users) at basic values are by a computer routine converted to an Input-Output Table (IOT) by distributing the supply and use of the detailed products. For *each product*, detailed tables will show domestic use of the product and exports linked directly to the domestic supplying industries for the product and to imports of the product.

The first assumption is that export of all the detailed products is primarily supplied by domestic industries. Distribution of exports of *a product* by supplying domestic industries at basic value is assumed ***proportional with the production of the product by the supplying industry (industries) at basic value.*** Exceptions are transactions between different Users as purchases/sales of fixed assets and products imported for re-export, which requires a special treatment.

The second assumption is that imports and the remaining part of domestic production of the product at basic value are distributed proportional with the different domestic use of the product (intermediate consumption, final consumption, capital formation, changes in inventories) at basic value.

The automatic split between use of products supplied from domestic production and from imports is carried out at the detailed product level assuming constant import ratios along the row for intermediate and final domestic use. This means that the same import share applies to all domestic use categories of *a product*, and that all industries that supply *a product*, have the same market share for all types of use of *that product*.

This methodology requires a detailed product classification. Special codes should be introduced for certain domestic produced products designed only for exports and for imported products which are used different from the similar domestic produced products.

The result is:

- ***“Industry by Industry Matrix” and “Industry by Final Use Matrix” with product information showing the domestic users and exports.***
- ***“Import Matrix” with product information showing domestic users and for some products re-export.***

In the SUT, imports are specified by products. In the I-O Tables, imports are encoded from the NA-product classification to the NA-industry classification which means the main producer as used for domestic production.

For analytical use, imports can also be split between competitive and complementary imports. For competitive imports, the NA-industry classification used for domestic production should be used. For complementary imports of special products as for direct purchases abroad by resident households, a special product classification might be used.

The assumption followed by this methodology that each of the products has its own specific sales structure, is the type of IOT that does neither require technology assumptions, nor can result in a matrix with negatives. As a consequence the IOT can be compiled with a minimum of data manipulation of the SUT. This was the method generally used to construct IOT before the 1968 SNA technology terminology was introduced, and this is still a method used in those countries where IOT are compiled on a current basis. In addition to the Norwegian IOT methodology as described in this document, the Dutch symmetric tables are derived directly from a rectangular system with about 800 product groups and the Danish from a system with more than 2500 product groups.

An Industry by Industry Table based only on the simple assumption that each industry has its own specific sales structure, could result in negative elements as for a Product by Product Table based on a product technology. Many of the objections raised against the Product by Product Table are therefore also valid for the assumption that each industry has its own specific sales structure.

Figure 2. Illustration of Input-Output Table for domestic output and for imports at basic values

	Use					Total
	Recipient	Final use				
Supplier	Industry 1 ...M	Final consumption expenditure. Households, Government NPISHs	Gross fixed capital formation, valuables	Changes in inventories	Exports	
Industry: 1 2	X_{dd}^{10}	X_{ds}^{10}	X_{ds}^{10}	X_{ds}^{10}	X_{ds}^{10}	S^{10}
Imports Competitive imp. 1 2	X_{zd}^{10}	X_{zs}^{10}	X_{zs}^{10}	X_{zs}^{10}	X_{zs}^{10}	S^{10}
Complementary imp 1 2	X_{zd}^{10}	X_{zs}^{10}	X_{zs}^{10}	X_{zs}^{10}	X_{zs}^{10}	S^{10}
Taxes less subsidies on products	T_d	T_s	T_s			S
Total intermediate and final consumption at purchasers' value	I_d	I_s	I_s	I_s	I_s	S
Value added at basic value	B_d^{10}					
Output and final consumption at basic value	T_d^{10}	T_s	T_s	T_s	T_s	T_s

Figure 2 illustrates a simplified IOT, at basic values, and this is also the type of valuation required by Eurostat and other users. Intermediate and final consumption are recorded at purchasers' value.

Note that the complete Supply Tables and Use Tables are prepared in all the different types of valuation. The IOT could therefore also have been compiled in purchasers' value or producers' value, but these alternatives are not included in the described methodology.

Comparable IOT at current prices can be produced by an automatic procedure as soon as SUT are compiled in current prices. With the same format and details used for compiling the SUT in constant prices, comparable IOT in constant (previous years) prices can also be compiled from the SUT in constant prices.

1.3. International reporting requirement

According to the present data delivery programme to Eurostat, all the 30 EEA countries (27 EU countries, Iceland, Lichtenstein and Norway) have to provide the following tables in a fixed Excel format (with a delay of 36 months) to Eurostat.

Annually: (with a delay of 36 months)

Supply Tables and Use Tables at current prices and previous year's constant prices. (60 NACE industries and 60 CPA products)

Table 15. Supply Table at basic values, including a transformation into purchaser's values.
Table 16. Use Table at purchasers' values

Every five years: 1995, 2000, 2005 etc.:

Input-output tables at current prices (60 NACE branches or 60 CPA products), specified by:

Table 17. Input-Output Table at basic values, Table 18. Input-Output Table for domestic output at basic values, Table 19. Input-Output table for imports at basic values.

Other countries should also prepare comparable Supply Table, Use Table and the Input Output Table in Excel format for reporting to UN and other international organisations.

2. Overview of corrections from the SUT format to the format required for international Supply Table, Use Table and IOT.

2.1. Change of units used in the SUT accounts

NOTE:

In the Norwegian NA/SUT, the units are Mill NOK. The units of Mill NOK in The Supply Tables and Use Tables are automatic changed in SUT to 1000 NOK before the compilation of the different SUT-MOD versions to reduce the problem with rounding of small figures.

Mill NOK is used when compiling the international tables 15. Supply Table and 16. Use Table.

1000 NOK is used when converting from SUT to IOT-T4 and IOT-T5.

Mill NOK is used when compiling the international tables IOT-T6.

2.2. Overview of the different stages of the corrections from the established SUT format to the format required for international Supply Table, Use Table and IOT.

<p>Start with SUT, <u>Mill NAC</u> <i>Point of departure:</i></p>	<p><u>Supply Table, current prices.</u></p>	<p><u>Use Table, current prices</u></p>
<p>SUT_MOD_I <u>in 1000 NAC</u> Database for Econometric models with corrected Supply Table (T1) and Use Table (T2)</p>	<p><u>Supply Table, corrected without 27001-27299 accounts</u></p> <p>The Aggregation accounts <u>27001-27299</u> for “Undistributed intermediate consumption” are removed in the modified SUT version, SUT_MOD_I, see chapter 3.2.</p>	<p><u>Use Table, corrected without 27001-27299 accounts</u></p>
<p>SUT_MOD_II <u>In 1000 NAC</u> Database for compiling Supply Tables and Use Tables in Excel format to International organisations.</p>	<p><u>Supply Table</u> <u>Custom duty transferred from 10-value to 11-value.</u></p> <p>Supply from 29505 Custom Duty distributed by products, is moved from 10-value to a new type of valuation: 11CD-value, with unchanged distribution by products.</p> <p>The 11CD-values distributed by products are finally added to the ordinary 11-values distributed by products, see chapter 4.2.</p> <p><u>Without 28XXX accounts:</u></p> <p>The Aggregation accounts for “Capital formation by type of fixed asset” are removed in the modified SUT version called SUT_MOD_II, see chapter 4.3.</p>	<p><u>Use Table</u> <u>Custom duty transferred from 10-value to 11-value</u></p> <p>The distribution of Custom Duty as 11 CD-values by products is fixed the same as the distribution of Custom Duty by products in the Supply table.</p> <p>The Custom Duty as 11 CD-values, by products is distributed by users (inclusive change in inventories) in the same proportion as the 10-values for the same products. The 10-values by products are reduced with the value of the Custom Duty distributed by products. Finally the 11CD values are added to the ordinary 11-values.</p> <p><u>Without 28XXX accounts</u></p> <p><u>Without 29507 account and</u></p>

	<p><u>Without 29507 account and product 000970 Correction of VAT:</u></p> <p>The one negative figure of supply from account 29507 of product 000970 is distributed by products in proportion to the VAT figure already allocated to the different products from account 29501. The VAT figures from account 29501 distributed by products are corrected and usually reduced, see chapter 4.4. .</p>	<p><u>product 000970 Correction of VAT:</u></p> <p>The one negative figure of product 000970 delivered as negative change of inventories to account 87970 is distributed by products and users according to the VAT figures (17-values). Reduced VAT figures (17-values) give larger producers' values (13-values) and basic values (10-values) for all goods and services with VAT. The corrections are balanced against accounts 87000 and 87400 and will normally give a reduction in change in inventories for goods and negative figures for services.</p>
<p>Table 15. Supply Table and Table 16. Use Table in Excel format. <u>Mill NAC.</u></p>	<p><u>Supply Table. ESA 95, table 15</u> Encoded and aggregated to 60 industries, Intra EU cif imports, Extra EU cif imports and 60 products.</p>	<p><u>Use Table. ESA 95. table 16</u> Encoded and aggregated to 60 industries, 60 products and totals for types of final use.</p>
<p>SUT_MOD_III <u>In 1000 NAC</u></p> <p>Database for compiling Input-Output Tables at different level of aggregation</p> <p>A report will list the corrected Supply Table (T1) and the corrected Use Table (T2) (Excel Table is NOT required)</p>	<p><u>Supply Table</u> <u>Without 27500, 27600 accounts:</u></p> <p>The special Aggregation accounts for "Trade Margins" and for "Transport margins" are removed in the modified SUT version called SUT_MOD_III, see chapter 5.2, 5.3.</p> <p><u>Products without Suppliers</u></p> <p>Products without supplier in the Supply Table are allocated to fictive suppliers with positive and negative figures before the balancing between the Supply Table and the Use Table. Positive values for a product is supplied from a fictive supplier with a code ending with [1]. Negative values for a product is supplied from a</p>	<p><u>Use Table</u> <u>Without 27500 and 27600 accounts:</u> <u>Without 14R-values, 14T-values, 15-values</u></p> <p><u>15-values and 16-values are already included in the 11-values and 12-values for trade services supplied to the 27500 account.</u></p> <p><u>Products without Suppliers</u></p> <p>No change in the Use Table for products without any supplier.</p> <p>The same types of values (10-values, 13-values) have to be used in the Supply and the Use Table.</p>

	fictive supplier with a code ending with [2] Total supply from each fictive supplier is zero.	
IOT-T4 Input-Output Table with product flows <u><i>In 1000 NAC.</i></u> <u><i>Mill NAC</i></u> Reports	Methodology for converting from SUT to IOT with product flows Domestic use of the products (intermediate consumption, capital formation, changes in inventories) and export at basic value are linked directly to domestic suppliers (industries) and imports at basic value. The import matrix can be split between Competitive imports and Complementary imports. see chapter 6.2. IOT-T4 illustrates the detailed Input-Output Table with product flows, see chapter 6.3.	
IOT-T5 Input-Output Table at a detailed level <u><i>In 1000 NAC</i></u> Reports	IOT aggregated over product flows The next stage is aggregating over the product flows and constructing IOT –T5 without showing the product flows, see chapter 7.1 and IOT-T5 illustrated in figure 16. Competitive imports by products are encoded to the Industry classification used for domestic industries.	
IOT-T6 Input-Output Table for <u><i>In 1000 NAC</i></u> Encode catalogues. Excel Tables for international reporting <u><i>Mill NAC</i></u>	IOT at aggregated level Encoding lists are prepared for aggregating from the detailed classification used for Suppliers and Users in the SUT compilation to different user’s requirement for classification and for the 60 by 60 Industry requirements for reporting to Eurostat and other international organisations, see chapter 8.1. <u>IOT Table ESA 95, table 17, table 18, table 19</u> Encoded and aggregated to 60 industries, 60 groups of imports and aggregated final use, example of encode lists for NNA, chapter 8.1.	

3. From SUT to SUT_MOD_I

3.1. SUT_MOD_I, a database for Econometric Models

For reporting Supply and Use Tables to Eurostat and other International organizations the special Aggregation accounts for Undistributed intermediate consumption are removed in this modified SUT version called SUT_MOD_I. SUT_MOD_I is the database for the Econometric models in Statistics Norway.

Supply and Use Table (SUT)

- **The Supply Table is named H.**
- **The Use Table without value added is named N**
- **The Use Table without value added and change in inventories is named M**

SUT_MOD_I:

- **The Supply Table is named H_I.**
- **The Use Table without value added, is named N_I**
- **The Use Table without value added and change in inventories, is named M_I**

SUT_MOD_I will have the same framework as the SUT with Supply Table (T1), Use Table (T2) and specification of Value added (T3), but with the” Aggregation accounts for undistributed intermediate consumption” supplying constructed “Aggregation products” removed.

- The Aggregation accounts 27500 and 27600 are not removed at this stage to be able to identify Trade and Transport margins as separate matrices in the Use Table.
- The Aggregation accounts 281XX, 282XX, 283XX are not removed at this stage to be able to identify both capital formation by type and capital formation by industry as separate matrices in the Use Table.

3.2. Removing the “Aggregation accounts for undistributed intermediate consumption”.

In the Supply Table, each of the “Aggregation accounts”, account type 27015-27299, supplies only one constructed “Aggregation product” (products 000015-000299), which is used as intermediate input by different industries. Different relevant NA-CPA-products (NA-CPC products) are allocated as input to these” Aggregation accounts” in the Use Table, se example from chapter 2.6.2.

In the following example, the Use Table (T2 at the left) specifies different NA-CPA products (NA-CPC products) delivered to the “Aggregation accounts (Account 27020) with a total like 998 at purchasers’ value.

<i>Aggregation account 27020 Office equipment, cleaning material</i>											
The Use Table (T2)									The Supply Table (T1)		
Product:10v. 11v. 12v. 13v. 14Rv. 14Tv. 15v. 16v.									19 v.	Product:	13-value
222212	400	-	-	400	20	-	-	-	420	000020	998
245132	500	-	-	450	30	-	-	-	480		
Xxxxxx	98	-	-	98	-	-	-	-	98		
Total	948	-	-	948	50	-	-	-	998	Total	998

The input of ordinary products to the “Aggregation Account” at Purchaser’s values (19-values at the left) is composed of Producer’s values and if relevant: Trade margins and Product taxes related to Trade margins and also if relevant Transport margins: i.e. : $M^{19} = M^{13} + M^{14R} + M^{14T} + M^{15} - M^{16}$

The Supply Table (T1 at the right) shows that the Aggregation Account (dt)” with code 27020 supply the product 000020 (pt) with a total value as 998 at producers’ value (13-value).

The Use Table (T2 at the left) shows that the purchasers’ value (19-value) 998 calculated as sum of ordinary products (p) delivered to “the Aggregation Account 27020 (d)” is identical with the producers’ value (13-value) of the aggregation product 000020 (pt) supplied from “the Aggregation account 27020”.

NOTE: VAT (17-values) is not calculated for products delivered as input to the 27-accounts, because the VAT rates are dependent on the type of industry finally receiving the products.

In the Use Table (T2), each of the Aggregation products (ps) is further delivered as intermediate input to different production accounts. VAT is added to the “Aggregation products” recorded in producers’

value when calculated in the Use table (T2) dependent on the VAT rules for the industry which is the final user, see the example below for the “Aggregation product” 000020:

Example. T2. Use of Aggregation product 000020 “Office equipment, cleaning material”:

<u>PRODUCT</u> <u>code</u>	<u>USER</u> <u>code</u>	<u>10-</u> <u>VALUE</u>			<u>13-</u> <u>VALUE</u>		<u>17-</u> <u>VALUE</u>	<u>19-</u> <u>VALUE</u>
000020	23010	40			40		10	50
000020	23151	50			50			50
000020	23211	70			70		30	100
000020	24010	10			10			10
000020	25010	10			10			10
000020
TOTAL		998			998		40	1038

Calculating the modified working table “SUT_MOD_I” from SUT:

The “Aggregation Accounts” is removed and each “Aggregation product” previously supplied by the 27-accounts is substituted by the ordinary products supplied by different domestic industries and from Imports to the final users.

Stage 1. The Supply Table (T1).

All values for deliveries from the accounts 27015 to 27299 (dt) of the aggregation products 000015 to 000299 (pt) are removed.

$H_{dt,pt}^v = 0$ for all the values ($v = 13$)

dt represents “Aggregation accounts” (27015 to 27299)

pt represents “Aggregation products” (000015 to 000299) supplied from the Aggregation accounts.

Stage 2. The Use table (T2).

All the production accounts (d) which have received an “Aggregation product” (pt) at 19-value will in its place receive a proportional share of all the ordinary products (p’) which were delivered to the relevant “Aggregation Account” (dt). This means that all the ordinary products (p’) delivered to account type 27015 to 27299 “Aggregation accounts for office equipment etc. (dt)” at 19-value are distributed proportionally to the ordinary production accounts (d) which are users of the “Aggregation products” (pt). The same correction is done for the 18-values and the 17-values.

$$M_{p',d}^{19} = M_{pt,d}^{19} \times \frac{M_{p',dt}^{19}}{\sum_{p'=1}^n M_{p',dt}^{19}}$$

$$M_{p',d}^{18} = M_{pt,d}^{18} \times \frac{M_{p',dt}^{18}}{\sum_{p'=1}^n M_{p',dt}^{18}}$$

$$M_{p',d}^{17} = M_{pt,d}^{17} \times \frac{M_{p',dt}^{17}}{\sum_{p'=1}^n M_{p',dt}^{17}}$$

p’ represents ordinary products delivered to the Aggregation accounts (27015 to 27299)

d represents Domestic production accounts (22000 to 26999)

dt represents “Aggregation accounts” (27015 to 27299)

pt represents “Aggregation products” (000015 to 000299) supplied from the Aggregation accounts

These equations give the 19-, 18- and 17-values of ordinary products (p') to be distributed to the different Domestic production accounts (d).

Stage 3.

For each of the ordinary products (p') supplied to a domestic production accounts (d), the following difference: 19-values minus 18-values minus 17-values are calculated as:

$$M_I^{Diff}_{p',d} = M_I^{19}_{p',d} - M_I^{18}_{p',d} - M_I^{17}_{p',d}$$

We also know that: $M_I^{Diff}_{p',d} = M_I^{13}_{p',d} + M_I^{14R}_{p',d} + M_I^{14T}_{p',d} + M_I^{15}_{p',d} + M_I^{16}_{p',d}$

From the example for 27020, new values have to be calculated for $M_I^{16}_{p',d}$, $M_I^{15}_{p',d}$, $M_I^{14R}_{p',d}$, $M_I^{14T}_{p',d}$, $M_I^{13}_{p',d}$ in proportion to the previous values for ordinary products (p') delivered as input to an Aggregation account (dt).

These differences are used to calculate by proportional distribution the 16v, 15v, 14Rv, 14Tv, 13v, where relevant, for each of the ordinary products (p').

$M^{13}_{pt,d}$ is used to distribute 11-val., 12val., 14R val., 14T.val., 15 val. as showed in the example below for M^{14R} :

$$M^{14R}_{p',d} = M^{14R}_{p',dt} \times \frac{M^{13}_{pt,d}}{\sum_{d=1}^n M^{13}_{pt,d}}$$

In T1: $H^v_{p',d}$ is recalculated once more for the values v = 17 and v = 18

In T2: New values are calculated for $M^{12}_{p',d}$, $M^{11}_{p',d}$ and $M^{10}_{p',d}$.

Note: All supplies (pt) from the 27-accounts (dt) are removed from the Supply Table (T1) and all use of (pt) is removed from the Use Table (T2). Since all use by the 27-accounts (except for the accounts 27500, 27600) is removed, the reallocation of the use of the Aggregation accounts (dt) to ordinary Users accounts (d) means no use should be lost or gained. Change in inventories (87XXX accounts) are recalculated as the difference between T2 and T1, but should not be changed.

Figure 7. SUT_MOD_I. Supply Table (T1)
Suppliers x Products without 27001-27299 aggregation accounts

T1 SUPPLY OF PRODUCTS	Basic value <u>10-value</u> =13-value -11-value +12-value	Taxes on products <u>11-value</u> Subsidies on products <u>12-value</u>	Produce r. value <u>13-value</u> = 10- value + 11-value - 12- value	Retail and wholesale trademarg Basic value <u>14R-value.</u> Transport margins <u>14T-value</u>	Taxes on products collected by traders <u>15-value</u>	Subsidies on products paid to traders <u>16-value</u>	Value added tax. None deduct. One book value correction <u>17-values</u>	Sales tax or Special tax on invest- ment <u>18-value</u>	Total
	<i>Products</i> <i>p,p,p,p,p</i>	<i>Products</i> <i>p,p,p,p,p</i>	<i>Products</i> <i>p,p,p,p,p</i>	<i>Products</i> <i>p,p,p,p,p</i>	<i>Products</i> <i>p,p,p,p,p</i>	<i>Products</i> <i>p,p,p,p,p</i>	<i>Products</i> <i>p,p,p,p,p</i>	<i>Products</i> <i>p,p,p,p,p</i>	<i>Products</i> <i>p,p,p,p,p</i>
Domestic production 22, 23, 24, 25, 26- accounts	$H^{10}_{d,p}$	$H^{11}_{d,p}$ $-H^{12}_{d,p}$	$H^{13}_{d,p}$						$T_{d,p}$
Retail, Wholes. trade margins 27500				$H^{14R}_{27500,p}$	$H^{15}_{27500,p}$	$-H^{16}_{27500,p}$			$T_{27500,p}$
Transport margins 27600				$H^{14T}_{27600,p}$					$T_{27600,p}$
Types of fixed assets 28111-			$H^{13}_{d,p}$						$T_{d,p}$
VAT 29501 Investment tax 29502							$H^{17}_{29501,p}$	$H^{18}_{29502,p}$	$T_{29501,p}$ $T_{29502,p}$
Custom duties 29505	$H^{10}_{29505,p}$		$H^{13}_{29505,p}$						$T_{29505,p}$
Product tax Import 29506		$H^{11}_{29506,p}$	$H^{13}_{29506,p}$						$T_{29506,p}$
One correction figure to VAT book value 29507							$-H^{17}_{29507,000970}$		$-T_{29507,00970}$
Imports 52XXX	$H^{10}_{z,p}$		$H^{13}_{z,p}$						$T_{z,p}$
Total	$S^{10}_{.p}$	$S^{11}_{.p}$ $S^{12}_{.p}$	$S^{13}_{.p}$	$S^{14R}_{.p}$ $S^{14T}_{.p}$	$S^{15}_{.p}$	$S^{16}_{.p}$	$S^{17}_{.p}$	$S^{18}_{.p}$	$T_{.p}$

Figure 8. SUT_MOD_I. Use Table (T2)

Products x Users, without 27001-27299 aggregation accounts

T2 PRODUCTS <i>BY VALUE</i> CLASSES	Inter- mediate consumption by Industries 22, 23, 24, 25, 26- accounts	Trade- Transp. margin 27500 27600	Types of fixed assets 28111- 28990	Exp- ports	Final domes- tic users 61-69- 82-86	Change in inventories 87000, 87400, 87920, 87930, 87940 Correction VAT 87970	Total
10. Basic v.	$N_{p,d}^{10}$	$N_{p,ds}^{10}$	$N_{p,ds}^{10}$	$N_{p,s}^{10}$	$N_{p,s}^{10}$	$N_{p,s}^{10}$	S_p^{10}
11. Taxes on products	$N_{p,d}^{11}$	$N_{p,d}^{11}$	$N_{p,d}^{11}$	$N_{p,s}^{11}$	$N_{p,s}^{11}$		S_p^{11}
12. Subsidies on products	$N_{p,d}^{12}$	$N_{p,d}^{12}$	$N_{p,d}^{12}$	$N_{p,s}^{12}$	$N_{p,s}^{12}$		S_p^{12}
13. Producers value	$N_{p,d}^{13}$	$N_{p,d}^{13}$	$N_{p,d}^{13}$	$N_{p,s}^{13}$	$N_{p,s}^{13}$	$N_{p,s}^{10}$	S_p^{13}
14R. Retail wholesale margins, Basic values	$N_{p,d}^{14R}$	—	—	$N_{p,s}^{14R}$	$N_{p,s}^{14R}$		S_p^{14R}
14T. Transp. margins	$N_{p,d}^{14T}$	—	—	$N_{p,s}^{14T}$	$N_{p,s}^{14T}$		S_p^{14T}
15. Taxes products, by traders	$N_{p,d}^{15}$	—	—	?	$N_{p,s}^{15}$		S_p^{15}
16. Subsidies products, to traders	$N_{p,d}^{16}$	—	—	?	$N_{p,s}^{16}$		S_p^{16}
17. VAT Non deductible <i>Correction for diff to time adjusted book value value for VAT</i>	$N_{p,d}^{17}$	—	—	?	$N_{p,s}^{17}$	$-N_{000970,87970}^{17}$	S_p^{17} - S_{000970}^{17}
18. Tax on investment or Sales tax	$N_{p,d}^{18}$	—	—	—	$N_{p,s}^{18}$		S_p^{18}
19. Purchasers' value	$N_{p,d}^{19}$	$N_{p,d}^{19}$	$N_{p,d}^{19}$	$N_{p,s}^{19}$	$N_{p,s}^{19}$	$N_{p,s}^{10}$	S_p^{19}
31. Value added	B_d	$B_d=0$	$B_d=0$				
TOTAL	T_d	T_d	T_d	T_s	T_s	T_s	T_s

4. From SUT_MOD_I to SUT- MOD-II.

4.1. The database for preparing Supply Tables and Use Tables for reporting to International Organizations

For compiling Supply and Use Tables for reporting SUT to Eurostat and other International organizations, some modifications are required and the special “Aggregation accounts for Capital formation by types of fixed assets, account types 28XXX have to be removed in this modified SUT version called SUT_MOD_II.

SUT MOD II:

- **The Supply Table is named H_II.**
- **The Use Table without value added, is named N_II**
- **The Use Table without value added and change in inventories, is named M_II**

After the derivation, $H_{II} = H_I$ except for account 29505 and for the accounts: 28XXX, and the recording of VAT.

4.2. Changing the recording of “Account 29505 for Custom duty at basic value”

Supply Table.

Supply of products from account 29505 Custom duty at 10-values is moved to a new type of valuation as Supply of products from account 29505 at 11CD-values, with the same distribution by products.

Finally the Supply of products from account 29505 at 11CD-values is changed to supply at 11-values. *Supply of products from account 29505 Custom Duty: 10-value = 0 and 11-value =13-value.*

Use Table

In the Use Table, the 10-values, distributed by products, are reduced with the value of the Custom Duty distributed by products, known from the Supply Table. The 10-values for Custom Duty are converted to 11CD-values.

Custom Duty as 11CD –values, distributed by products are distributed by users in the same proportion as the 10-values for the same products in the Use Table. Custom duty as 11CD-values is also distributed to Exports and Change in inventories.

After the distribution of 11CD-values by products and users in the Use Table, the 11CD-values are added to the ordinary 11-values distributed by products and users. 11CD-values in the Supply Table are also aggregated to the 11-values.

In Figure 11 “Supply Table for international reporting”, Custom Duties are included in the column for “Taxes less subsidies on products.”

4.3. Removing the “Aggregation accounts for Capital formation by types of fixed asset”.

In the Supply Table, each of the “Aggregation accounts for capital formation by type fixed asset”, account type 28XXX, supplies only one fictional “Aggregated capital formation product” with the product codes 008XXX at producers’ value. These products are delivered to the accounts for Capital formation by industry, see example from chapter 2.6.3. “Capital formation by type of fixed assets”.

Different relevant ordinary products as capital goods (p') are allocated as input to the 28-accounts at purchasers' value (19-value).

Stage 1. The Supply Table (T1).

In the Supply Table (T1): all the values for deliveries from the accounts 28XXX (zs) of the aggregation products 008XX (ps) are removed.

$H_{zs, ps}^v = 0$ for all the values ($v = 13$)

zs represents "Aggregation accounts for capital formation by type" (28XXX)

pt represents "Aggregation products" (000015 to 000299) supplied from the Aggregation accounts

Stage 2. The Use Table (T2).

All the "Capital formation by industry accounts" (s) (82XXX, 83XXX, 84XXX, 85XXX, 86XXX) which were receiving a "Capital formation by type product" (pt) at 19-value will in its place receive a proportional share of the ordinary products for capital goods (p') which were delivered to the relevant "Aggregation Account"(dt) (28XXX Accounts).

$$M_{p',s} II_{p',s}^{19} = M_{pt,s} I_{pt,s}^{19} \times \frac{M_{p',dt} I_{p',dt}^{19}}{\sum_{p'=1}^n M_{p',dt} I_{p',dt}^{19}}$$

$$M_{p',s} II_{p',s}^{18} = M_{pt,s} I_{pt,s}^{18} \times \frac{M_{p',dt} I_{p',dt}^{19}}{\sum_{p'=1}^n M_{p',dt} I_{p',dt}^{19}}$$

$$M_{p',s} II_{p',s}^{17} = M_{pt,s} I_{pt,s}^{17} \times \frac{M_{p',dt} I_{p',dt}^{19}}{\sum_{p'=1}^n M_{p',dt} I_{p',dt}^{19}}$$

p' represents ordinary products delivered to Aggregation accounts for Capital formation by type (28XXX)

s represents Capital formation by industry accounts (82000 to 86999)

dt represents "Aggregation accounts for capital formation by type" (28XXX)

pt represents "Capital formation by type products (008XXX)" supplied from Aggregation accounts

By these equations, the 19-, 18- and 17-values of ordinary products (p') are distributed to the different Capital formation accounts (s).

Stage 3.

For each of the ordinary products (p'), the value of 19-values minus 18-values minus 17-values delivered to a Capital formation accounts (s) are calculated as:

$$M_{p',s} II_{p',s}^{Diff} = M_{p',s} II_{p',s}^{19} - M_{p',s} II_{p',s}^{18} - M_{p',s} II_{p',s}^{17}$$

$$M_{p',s} II_{p',s}^{Diff} = M_{p',s} II_{p',s}^{13} + M_{p',s} II_{p',s}^{14} + M_{p',s} II_{p',s}^{15} + M_{p',s} II_{p',s}^{16}$$

In the new Use Table (T2), revised values are calculated for $M_{p',s} II_{p',s}^{16}$, $M_{p',s} II_{p',s}^{15}$, $M_{p',s} II_{p',s}^{14R}$, $M_{p',s} II_{p',s}^{13}$

The methodology is similar to the methodology explained in chapter 3.2 for removing the “Aggregation accounts” 27015-27299. The result is implemented in SUT_MOD_II where the accounts 28XXX are removed.

$M_{pt,s}^{13}$ is used to distribute 11-val., 12-val., 14R-val., 14T--val., 15-val., and 16-values as shown in the example below for M^{14R} :

$$M_{p',s}^{14R} = M_{p',dt}^{14R} \times \frac{M_{pt,s}^{13}}{\sum_{d=1}^n M_{pt,s}^{13}}$$

- In T1: $H_{p,s}^v$ is recalculated once more for the values $v = 17$ and $v = 18$
- In T2: New values are calculated for M_{ps}^{12} , M_{ps}^{11} and M_{ps}^{10} .

Note: All supplies from the Aggregation accounts, 28-accounts (dt) of Capital formation by type (pt) have been removed from the Supply Table (T1) and all use of Capital formation by type (pt) is removed from the Use Table (T2). All use by the 28-accounts is deleted and products (p') reallocated directly to Capital formation by industry, 8382-86 accounts (s). No use should be lost or gained. Change in inventories (87XXX accounts) are recalculated as difference between T2 and T1, but should not be changed.

4.4. Proportional distribution of the correction of VAT for International reporting

After the Supply and Use Tables have been compiled and finalised in both current and constant prices, a final correction of the theoretical calculated figure for 17-value (VAT) are introduced for both current and constant price SUT, see PART II. SUT/Constant.

The theoretical figures for VAT are corrected to time adjusted book values.

In the Supply Table, the difference between “Time adjusted book values for VAT” and the “Theoretical calculated VAT” is recorded as one figure, normally negative registered as supply from account 29507 of product 000970. In the Use Table, product 000970 is balanced against account 87970 as showed below:

Supply Industry Product	Use Product User	Residual
CORRT1 29507 000970 - XXXXX	CORRT2 000970 87970	- XXXXX

For international reporting of Supply Tables, Use Tables and Input-Output Tables, account 29507 has to be removed. The correction figure for VAT from account 29507 is spread as a correction of all 17-values distributed by products and users in the Use Table.

THE SUPPLY TABLE: The one (usually) negative figure of supply from account 29507 of product 000970 “Correction of VAT” is distributed by products in proportion to the VAT figure (17-values) already allocated to the different products from account 29501. The result is that the VAT figures from a fictional account 29501 distributed by products are corrected and reduced. The fictive account 29507 and product 000970 are removed.

THE USE TABLE: The one negative figure of product 000970 delivered as negative change of inventories to account 87970 is distributed by products and users according to the VAT figures (17-values). The fictive product 000970 to account 87970 are removed.

Note: This correction is after accounts 270XX and 28XXX have been removed.

With unchanged values in purchasers' values, the changed, normally reduced figures for VAT will result in higher figures for use of products at producers' values (13-values) ($N^{13(BV)}_{p,d}$ $N^{13(BV)}_{p,s}$). The correction is balanced against negative change in inventories accounts 87XXX. The correction might give negative figures for change in inventories for services, accounts 87400 where no changes were recorded before the correction.

Figure 9. SUT_MOD_II. Supply Table (T1)

Suppliers x Products, without 27001-272999 and 28-accounts

T1 SUPPLY OF PRODUCTS	Basic value 10 value =13-value -11-value +12-value	Custom Duty transferred from 10 value to 11CD-value	Taxes on products 11-value Subsidies on products 12-value	Produc. value 13-val. = 10-value + 11-value - 12-value	Retail and wholesale trademarg Basic value 14R-value. Transport margins 14T-value	Taxes on products collected by traders 15-value	Subsidies on products paid to traders 16-value	VAT Non deduct. able Corrected to time adjusted book values 17-values	Sales tax or Special tax on investment 18-value	Total production
	<i>Prod. p,p,p</i>	<i>Product p,p,p,p</i>	<i>Product p,p,p,p</i>	<i>Product p,p,p,p</i>	<i>Product p,p,p,p</i>	<i>Product p,p,p,p</i>	<i>Product p,p,p,p</i>	<i>Product p,p,p,p</i>	<i>Product p,p,p,p</i>	<i>Product p,p,p,p</i>
Domestic production 22, 23, 24, 25, 26-accounts	$H^{10}_{d,p}$		$H^{11}_{d,p}$ $-H^{12}_{d,p}$	$H^{13}_{d,p}$						$T_{d,p}$
Retail, Whols. trade margins 27500					$H^{14R}_{27500,p}$	$H^{15}_{27500,p}$	$-H^{16}_{27500,p}$			$T_{27500,p}$
Transport margins 27600					$H^{14T}_{27600,p}$					T_{27600p}
VAT 29501 corrected to Book Value. Investment tax 29502								$H^{17BV}_{29501,p}$	$H^{18}_{29502,p}$	$T_{29501,p}$ $-T_{29507,p}$ T_{29502}
Custom duties 29505		$H^{11CD}_{29505,p}$		$H^{13}_{29505,p}$						$T_{29505,p}$
Product tax Import 29506			$H^{11}_{29506,p}$	$H^{13}_{29506,p}$						$T_{29506,p}$
Imports 52XXX	$H^{10}_{z,p}$			$H^{13}_{z,p}$						$T_{z,p}$
Total	$S^{10}_{.p}$	$S^{11CD}_{29505,p}$	$S^{11}_{.p}$ $S^{12}_{.p}$	$S^{13}_{.p}$	$S^{14R}_{.p}$ $S^{14T}_{.p}$	$S^{15}_{.p}$	$S^{16}_{.p}$	$S^{17}_{.p}$	$S^{18}_{.p}$	$T_{.p}$

The revised Supply Table as illustrated in Figure 9 above and the revised Use Table as illustrated in Figure 10 are the starting point for preparing the Supply Table and the Use Table for international reporting as illustrated in Figure 11.

Note: Trade margin at basic value and product taxes and subsidies related to trade margins (H^{14R} , H^{15} , H^{16} -values) are also included as production of retail and wholesale services from retail and wholesale traders and other industries producing this services (H^{10} , H^{11} , H^{12} -values).

Figure 10. SUT_MOD_II. Use Table (T2) Products x Users, without 27001-27299 and 28-accounts

T2 PRODUCTS <i>BY VALUE</i> <i>CLASSES</i>	Inter- mediate consum. by Industries 22, 23, 24, 25, 26- accounts	Trade- Transp. margin 27500 27600	Exports	Final domestic users 61-69- 82-86	Change in inventories 87000, 87400, 87920,87930, 87940. (Corrected because the correction of VAT is transferred from account 87970)	Total
10. Basic v. exclusive of Custom duty	$N^{10(BV)}_{p,d}$	$N^{10(BV)}_{p,ds}$	$N^{10(BV)}_{p,s}$	$N^{10(BV)}_{p,s}$	$N^{10(BV)}_{p,s}$	$S^{10(BV)}_p$
11CD Cust. d	$N^{11CD}_{p,d}$	$N^{11CD}_{p,d}$	$N^{11CD}_{p,s}$	$N^{11CD}_{p,s}$	$N^{11CD}_{p,s}$	S^{11CD}_p
11. Taxes on products	$N^{11}_{p,d}$	$N^{11}_{p,d}$	$N^{11}_{p,s}$	$N^{11}_{p,s}$		S^{11}_p
12. Subsidies on products	$N^{12}_{p,d}$	$N^{12}_{p,d}$	$N^{12}_{p,s}$	$N^{12}_{p,s}$		S^{12}_p
13. Producers' value	$N^{13(BV)}_{p,d}$	$N^{13(BV)}_{p,d}$	$N^{13(BV)}_{p,s}$	$N^{13(BV)}_{p,s}$	$N^{13(BV)}_{p,s}$	$S^{13(BV)}_p$
14R. Retail wholesale margins, Basic values	$N^{14R}_{p,d}$	—	$N^{14R}_{p,s}$	$N^{14R}_{p,s}$		S^{14R}_p
14T. Transp. margins	$N^{14T}_{p,d}$	—	$N^{14T}_{p,s}$	$N^{14T}_{p,s}$		S^{14T}_p
15. Taxes products, by traders	$N^{15}_{p,d}$	—	-	$N^{15}_{p,s}$		S^{15}_p
16. Subsidies products, to traders	$N^{16}_{p,d}$	—	-	$N^{16}_{p,s}$		S^{16}_p
17. VAT Non deductable corrected to time adjusted book value value	$N^{17acc}_{p,d}$	—	-	$N^{17acc}_{p,s}$		S^{17acc}_p
18. Sales tax or Tax on investment	$N^{18}_{p,d}$	—	—	$N^{18}_{p,s}$		S^{18}_p
19. Purchasers' Value	$N^{19}_{p,d}$	$N^{19}_{p,d}$	$N^{19}_{p,s}$	$N^{19}_{p,s}$	$N^{10}_{p,s}$	S^{19}_p
31. Value added	B_d	$B_d=0$				
TOTAL	T_d	T_d	T_s	T_s	T_s	T_s

4.5. Illustration of the Supply and the Use Tables for International reporting

Figure 11. Supply Table at basic prices, including a transformation into purchasers' prices. Mill. NAC, cfr. SNA93, table 15.1 and ESA95. table 15 NAC, Mill Euro for countries of the Eurozone.									
OUTPUT OF INDUSTRIES			IMPORTS		VALUATION				
PRODUCTS specified by 60 CPA groups at basic prices	22XXX + 24XXX + 25XXX +, 26XXX Accounts specified by 60 industries	Total Domestic Supply at basic prices	I	E	Import cif	Total Supply at Basic prices	Trade and Transport margins	Taxes less subsidies on products	Total Supply at purchasers' prices
	01	95	T						
Column: x	1	59	60		63	64	65	66	67
P ₀₁	H ¹⁰ _{01,01}	H ¹⁰ _{60,01}	H ¹⁰ ₀₁		H ¹⁰ _{Z,01}	S ¹⁰ ₀₁	H ^{14R} ₁ +H ^{14T}	H ¹¹ ₁ -H ¹² ₁ H ¹⁵ -H ¹⁶ H ^{17BV} ₁ H ¹⁸ ₁	S ¹⁹ ₀₁
P _p	H ¹⁰ _{01,p}	H ¹⁰ _{60,p}	H ¹⁰ _p		H ¹⁰ _{Z,p}	S ¹⁰ _p	H ^{14R} _p +H ^{14T} _{.p}	H ¹¹ _p -H ¹² _p H ¹⁵ -H ¹⁶ H ^{17BV} _p H ¹⁸ _p	S ¹⁹ _p
Wholesale, Retail trade, Trans marg prod taxes, prod subs.	H ¹⁰ _{01,p}	H ¹⁰ _{60,p}	H ¹⁰ _p		H ¹⁰ _{Z,p}	S ¹⁰ _p	- Sum (H ^{14R} +H ^{14T})	- Sum (H ¹¹ -H ¹² +H ¹⁵ -H ¹⁶)	
P ₆₀	H ¹⁰ _{01,60}	H ¹⁰ _{60,60}	H ¹⁰ ₆₀		H ¹⁰ _{Z,60}	S ¹⁰ ₆₀	H ^{14R} ₆₀₊ H ^{14T} _{.60}	H ¹¹ ₆₀ -H ¹² ₆₀ H ¹⁵ -H ¹⁶ H ^{17BV} ₆₀ +H ¹⁸ ₆₀	60
Total	T¹⁰_{01.}	T¹⁰₆₀	T¹⁰_d		T¹⁰_{Z.}	S¹⁰_d			S¹⁹_d
Cif/fob corr					XXXX				
Direct purch abroad by residents					H ¹⁰ _Z	H ¹⁰ _Z			H ¹⁹ _Z
Total of which	T¹⁰_{01.}	T¹⁰₆₀	T¹⁰_d		T¹⁰_Z	S¹⁰_{Z.}			S¹⁹_{Z.}
Market output	T ¹⁰ ₂₃₀₀₁	T ¹⁰ ₂₃₀₆₀	T ¹⁰ ₂₃						
Own final use	T ¹⁰ ₂₂₀₀₁	T ¹⁰ ₂₂₀₆₀	T ¹⁰ ₂₂						
Other non market out	T ¹⁰ ₂₄₀₀₁ T ¹⁰ ₂₅₀₀₁ T ¹⁰ ₂₆₀₀₁	T ¹⁰ ₂₄₀₆₀ T ¹⁰ ₂₅₀₆₀ T ¹⁰ ₂₆₀₆₀	T ¹⁰ ₂₄ T ¹⁰ ₂₅ T ¹⁰ ₂₆						

The Supply Table is encoded and aggregated to 60 industries, to one column for imports and to 60 products. Trade margins have to be shown as in figure 10, but also deducted. The data in 1000 NAC are converted to Mill NAC with three decimals.

Figure 12. Use table at purchasers' prices,
cfr. SNA93, table 15.2, ESA95. table 16. Mill NAC, Mill Euro for countries of the Eurozone.

		Intermediate input to 60 industries	Final uses at purchasers' prices									Total use at purchasers' prices
		22XXX + 24XXX + 25XXX +, 26XXX Accounts specified by 60 industries	TOTAL	Final consumption expenditure by Households	Final consumption expenditure by NPISHS	Final consumption expenditure by Government	Final consumption expenditure	Gross fixed capital formation	Change in inventories and valuables	Gross capital formation	Exports	
PRODUCT	01											
By 60 CPA	02											
GROUPS	03	N ¹⁹ _{p,d}	N ¹⁹ _{p,d}	N ¹⁹ _{p,s}	N ¹⁹ _{p,s}	N ¹⁹ _{p,s}	N ¹⁹ _{p,s}	N ¹⁹ _{p,s}	N ¹⁹ _{p,s}	N ¹⁹ _{p,s}	N ¹⁰ _{p,s}	S ¹⁹ _p
	95											
Cif/ fob adjustments on exports											N ¹⁰ _{p,s}	
Direct purchases abroad by residents											N ¹⁰ _{p,s}	
Purchases on the domestic territory by non-residents											N ¹⁰ _{p,s}	
Total intermediate consumption and final use at purchasers' prices		N ¹⁹ _d	N ¹⁹ _d	N ¹⁹ _{,s}	N ¹⁹ _{,s}	N ¹⁹ _{,s}	N ¹⁹ _{,s}	N ¹⁹ _{,s}	N ¹⁹ _{,s}	N ¹⁹ _{,s}	N ¹	S ¹⁹ _p
Compensation of employees		I _{kd}	I _{kd}									I _k
Other net taxes on production		I _{kd}	I _{kd}									I _k
Consumption of fixed capital		I _{kd}	I _{kd}									I _k
Operating surplus, net		D _d	D _d									I _k
(Operating surplus, gross)												
Value added at basic prices		B _d	B _d									B
Output at basic prices		T _d	T _d									T

The Use Table has to be encoded and aggregated to 60 industries, 60 products and aggregated final use.

The data in 1000 NAC are converted to Mill NAC with three decimals.

5. From SUT_MOD_II to SUT_MOD_III

5.1. SUT_MOD_III, a database for compiling IOT to International Organisations.

Chapter 3 and 4 were giving an explanation of how the Aggregation accounts for “Undistributed intermediate consumption” and the Aggregation accounts for “Capital formation by type” have been removed in the modified SUT versions, called SUT_MOD_I and SUT_MOD_II.

For compiling Input-Output Tables at different level of aggregation and for compiling and reporting IOT to International organizations also the special Aggregation accounts for trade margins (27500) and for transport margins (27600) are removed in this modified SUT version called SUT_MOD_III.

Note: Figures for trade margins are included in the Supply Table as flows of trade services from the retail and wholesale industries and other industries supplying trade services as ordinary products in 10-values and with associated 11- values and 12-values. The same is the case for transport margins. The double accounting (supplied from account 27500 and 27600) are included and corrected by deducting the total figures for 14R, 14T, 15- and 16-values in the rows where trade and transport margins and related product taxes and product subsidies have been calculated.

By removing the double accounting for trade and transport services we have the following relation: $H_{III} = H_{II}$, except for supply of trade margins from account 27500 and transport margins from account 27600, which means without the double accounting with 14R-values, 14T-values, 15-values and 16-values.

$M_{III} = M_{II}$, except for the matrixes 14R for trade margins, 14T for transport margins, 15-values for product taxes and 16-values for product subsidies, all distributed by products and users.

5.2. Removing account 27500, “Aggregation account for Trade margins”

Stage 1. From the Supply Table (T1).

Account 27500 “Retail and wholesale trade margins” is removed as supply from T1.

$H_{III}^{14R}_{dt,p} = 0$, which means without account 27500 (dt) and ordinary products in 14R-values.

Stage 2. From the Use table (T2).

The production accounts and final use accounts which have received Trade Margins for wholesale and retail trade as 14 R-values, will instead receive directly a proportional share of the ordinary trade service products supplied to the 27500 account.

$$M_{III}^{14R}_{p',d} = 0$$

- p' represents ordinary products.
- d represents Domestic production and Final use accounts.

Retail and wholesale trade margin service products delivered to the aggregation account 27500 are redistributed and allocated directly to intermediate use for the Domestic production accounts and for final use:

$$M_III^{10}_{pt,d} = M_II^{14R}_{p',d} \times \frac{M_II^{10}_{pt,dt}}{\sum_{pt=1}^n M_II^{10}_{pt,dt}}$$

- **p'** represents ordinary products.
- **pt** represents "only retail and wholesale trade service products" delivered to accounts 27500.
- **dt** represents "Aggregation account for Trade margins" (account 27500)
- **d** represents Domestic production and Final use accounts.

Taxes on products, related to Trade margin services (recorded as 15-values) are redistributed as:

$$M_III^{11}_{pt,d} = M_II^{15}_{p',d} \times \frac{M_II^{11}_{pt,dt}}{\sum_{pt=1}^n M_II^{11}_{pt,dt}}$$

Subsidies on products, related to Trade margin services (recorded as 16-values) are redistributed as:

$$M_III^{12}_{pt,d} = M_II^{16}_{p',d} \times \frac{M_II^{12}_{pt,dt}}{\sum_{pt=1}^n M_II^{12}_{pt,dt}}$$

In SUT_MOD_III, the result is that the flows from account 27500 as 14R-values, 15-values and 16-values are removed.

The total figures for product taxes (11-values) and product subsidies (12-values) have been unchanged.

The distribution of product taxes (11-values) and product subsidies (12-values) in the Supply Table are unchanged.

The distribution of product taxes (11-values) and product subsidies (12-values) in the Use Table are redistributed in proportion to the trade margin services to intermediate and final use.

5.3. Removing account 27600, "Aggregation account for Transport margins "

Stage 1. From the Supply Table (T1)

"Transport Margins" are removed as supply from T1

$H_III^{14T}_{dt,p'} = 0$, which means without account 27600 (dt) and ordinary products in 14T-values.

Stage 2. From the Use table (T2).

$M_III = M_II$, except for use of transport margins by accounts 27600, which means without the double accounting for transport services. All the production accounts which have received transport margins as 14T-value will instead receive a proportional share of all the ordinary products for transport margin services which were delivered to the 27600 Account.

Transport margin service products delivered to the aggregation account 27600 are redistributed and allocated directly to intermediate and final use:

$$M_{-III}^{14T}_{p',d} = 0$$

$$M_{-III}^{10}_{pt,d} = M_{-II}^{14T}_{p',d} \times \frac{M_{-II}^{10}_{pt,dt}}{\sum_{pt=1}^n M_{-II}^{10}_{pt,dt}}$$

p' represents ordinary transport service products.

- **pt** represents "Transport margin services"
- **dt** represents "Aggregation accounts for Transport margins" (27600)
- **d** represents Domestic production and Final use accounts

The result is implemented in MOD-SUT-III and the matrix with flows from account 27600 to 14T-values are deleted.

For transport margins: 10-values =13-values. 11-values and 12-values are equal to zero.

According to ESA 1995, the transport margins are only part of the purchasers' value if the purchaser has to pay for them separately. If the seller pays for the transportation and does not invoice it to the buyer separately, these transportation costs should be shown as part of the intermediate consumption of the seller. All other types of transport margins are included with retail and wholesale margins.

For all products where we find 14R, 15-values and 15 values, we have the following MOD-III result: In the Use Table, the residual trade margin products 14R values are distributed as 10-value, the residual 15-value as 11-value and the 16-value as 12 value supplied from the trade margin products to the different users.

T2 Use Table For all other products XXXXXX	All users XXXX	10- value X	11- value X	12- val- ue X	13- value X	14R- value 0	15- val- ue 0	16- val ue 0	17- val ue X	19- val ue X
Trade margin services 14R-v and related tax,subs. 15v,16v are deleted. The 14R=10v and 15=11v for in NNA: Products as										
510100. 521100)		X	X	X	X					X
602429, 611027		X	X	X	X					X
634019, 634029		X	X	X	X					X
Total use		X	X	X	X					X

5.4. Dealing with Products without Suppliers

Products without any supplier in the Supply Table (i.e. transactions directly between different users) are allocated to fictive suppliers with positive and negative figures before the balancing between the Supply Table (T1) and the Use Table (T2).

Positive values for a product are supplied from a fictive 29-account with a code ending with [1].

Negative values for a product is supplied from a corresponding fictive account with a code ending with [2] The total supply from each pair of fictive suppliers is zero.

Examples from NNA 2004:*Foreign tourists' consumption in Norway*

The same types of values 10v, 13v, have to be used in the Supply and the Use Table.

<u>Supply Table</u>	<u>Use Table</u>
<p data-bbox="263 376 694 409"><u>Treating Products without Suppliers</u></p> <p data-bbox="263 427 821 593">Products without any supplier in the Supply Table are automatically allocated to fictive suppliers with positive and negative figures before the balancing between the Supply Table and the Use Table</p> <ul data-bbox="236 616 837 851" style="list-style-type: none"> • Positive values for a product is supplied from a fictive supplier with a code ending with [1]. • Negative values for a product is supplied from a fictive supplier with a code ending with [2]. • The total supply from each fictive supplier will be zero. <p data-bbox="263 918 790 981">Codes in the interval 29611 29701 are created automatically for positive figures.</p> <p data-bbox="263 1003 798 1066">Codes in the interval 29612 29702 are created automatically for negative figures.</p> <p data-bbox="263 1131 606 1164">Examples from NNA 2004:</p> <p data-bbox="263 1182 750 1216"><i>Foreign tourists consumption in Norway</i></p> <p data-bbox="263 1232 646 1310">Supply:29611 005076 +XXX 29612 005076 - XXX</p> <p data-bbox="263 1377 646 1456">Supply:29621 005076 +XXX 29622 005076 - XXX</p> <p data-bbox="263 1523 646 1601">Supply:29631 005076 +XXX 29632 005076 - XXX</p> <p data-bbox="263 1668 686 1702"><i>Sale and purchases of used capital.</i></p> <p data-bbox="263 1724 646 1803">Supply: 29701 009100 + XXX 29702 009100 - XXX</p> <p data-bbox="263 1870 805 1937">In the Norwegian NA this would give approx. 30 new fictive suppliers.</p>	<p data-bbox="941 376 1316 443">No change in the Use Table for products without any supplier.</p> <p data-bbox="941 459 1388 560">The same types of values 10v, 13v, have to be used in the Supply and the Use Table.</p> <p data-bbox="941 1478 1284 1512">Examples from NNA 2004:</p> <p data-bbox="941 1534 1332 1601"><i>Foreign tourist's consumption in Norway.</i></p> <p data-bbox="941 1612 1284 1691">Use: 005076 51220 + XXX 005076 69192 - XXX</p> <p data-bbox="941 1758 1364 1792"><i>Sale and purchases of used capital.</i></p> <p data-bbox="941 1803 1284 1892">Use: 009100 82704 +XXX 009100 83iii - XXX</p>

Figure 13. SUT_MOD_III. Supply Table (T1)
Suppliers x Products, without 27 and 28-accounts

T1 SUPPLY OF PRODUCTS	Basic value <u>10 value</u> =13-value - 11-value minus Custom Duty +12- value	Custom Duty 11-CD value	Taxes on products <u>11- value</u> Subsidies on products <u>12- value</u>	Product value <u>13- value</u> = 10-value + 11-value - 12-value	VAT Non deduct. able Corrected to time adjusted book values <u>17-values</u>	Sales tax or Special tax on invest- ment <u>18-value</u>	Total production
	<i>Products</i>	<i>Products</i>	<i>Products</i>	<i>Products</i>	<i>Products</i>	<i>Products</i>	<i>Products</i>
Domestic production 22, 23, 24, 25, 26-accounts	$H^{10}_{d,p}$		$H^{11}_{d,p}$ $-H^{12}_{d,p}$	$H^{13}_{d,p}$			$T_{d,p}$
VAT 29501 corrected to Book Value. Investment tax 29502					$H^{17BV}_{29501,p}$	$H^{18}_{29502,p}$	$T_{29501,p}$ $T_{29502,p}$
Custom duties 29505		$H^{11CD}_{29505,p}$		$H^{13}_{29505,p}$			$T_{29505,p}$
Product tax on import 29506			$H^{11}_{29506,p}$	$H^{13}_{29506,p}$			$T_{29506,p}$
Fictive industries 29XXX	$H^{10}_{f,p}$ $- H^{10}_{f,p}$			$H^{13}_{f,p}$ $- H^{13}_{f,p}$			$H^{13}_{f,p}$ $-H^{13}_{f,p}$
Imports 52XXX	$H^{10}_{z,p}$			$H^{13}_{z,p}$			$T_{z,p}$
Total	$S^{10}_{.p}$	$S^{11CD}_{.p}$	$S^{11}_{.p}$ $S^{12}_{.p}$	$S^{13}_{.p}$	$S^{17}_{.p}$	$S^{18}_{.p}$	$T_{.p}$

Note: Domestic production and import at basic value (10-value) and producers value (13-value). Custom duty from account 29505 has been moved from basic value (10-value) to product taxes (11CD-value).

All types of product taxes and product subsidies are supplied from the 29 accounts.

Fictive industries in the Supply Table are introduced to be able to balance supply and use of products where we find no suppliers because the transactions are between different domestic users or export in the Use Table.

**Figure 14. SUT_MOD_III. Use Table (T2)
Products x Users, without 27- and 28-accounts**

T2 PRODUCTS <i>BY VALUE</i> CLASSES	Inter-mediate consumption by Industries 22, 23, 24, 25, 26-accounts	Exports	Final domestic users 61-69-82-86	Change in inventories 87000, 87400, 87920,87930, 87940	Total
10. Basic v. Minus Custom Duty	$N_{p,d}^{10}$	$N_{p,s}^{10}$	$N_{p,s}^{10}$	$N_{p,s}^{10}$	S_p^{10}
11CD Custom Duty	$N_{p,d}^{11CD}$	$N_{p,s}^{11CD}$	$N_{p,s}^{11CD}$		S_p^{11CD}
11. Taxes on products	$N_{p,d}^{11}$	$N_{p,s}^{11}$	$N_{p,s}^{11}$		S_p^{11}
12Subsidies on products	$N_{p,d}^{12}$	$N_{p,s}^{12}$	$N_{p,s}^{12}$		S_p^{12}
13.Producers value	$N_{p,d}^{13}$	$N_{p,s}^{13}$	$N_{p,s}^{13}$	$N_{p,s}^{13}$	S_p^{13}
17. VAT Non deductible corrected to book value	$N_{p,d}^{17BV}$	-	$N_{p,s}^{17BV}$		S_p^{17BV}
18. Sales tax or Tax on investment	$N_{p,d}^{18}$	-	$N_{p,s}^{18}$		S_p^{18}
19. Purchasers' value	$N_{p,d}^{19}$	$N_{p,s}^{19}$	$N_{p,s}^{19}$	$N_{p,s}^{10}$	S_p^{19}
31. Value added	B_d				
TOTAL	T_d	T_s	T_s	T_s	T_s

6. From SUT_MOD_III to Input-Output Table IOT-T4 with product flows

6.1. The point of departure

The data base for computing the detailed IOT with included product information is the balanced Supply and Use Tables (SUT) in SUT_MOD_III, from figure 13 and 14.

The Supply Table (T1) shows that a NA-product at basic value can be supplied both by several domestic industries and from imports. Total figures for Taxes on products and Subsidies on products are distributed by 29-accounts and by products.

Correspondingly the Use Table (T2) shows that the particular NA-product is distributed to various domestic uses and to exports in basic value. Detailed figures for Taxes on products and Subsidies on products are distributed by products and users to be able to compile the Use Table in purchasers' value.

Fictive suppliers are introduced to be able to balance transactions without suppliers.

6.2. Split of Imports between Competitive and Complementary Imports.

In the Supply Table, (T1) domestic supply is specified by type of supplier (industry groups) and by products, while imports appear as a few rows (as imports c.i.f. from External Trade statistics, imports of other goods, imports of services), specified by products.

Under the computer run from SUT_MOD_III to IOT-T4, account type 52 Imports can be split into the two main categories:

Account type 53, Imports of competitive products, specified by NA-products.

Account type 54, Imports of complementary products, specified by NA-products.

Competitive imports are defined as imports of those products which are also produced by the domestic economy. Complementary imports are defined as imports of those products which are not produced in the country or for which the production is very small. The limit for Complementary imports has been set to products where only up to 5 % of the supply is from domestic production. Alternative percentages might be used.

A special encode list has to be prepared for encoding from the product codes used for imports in the Supply Table to the industry codes used for domestic production in the relevant country.

For “Competitive imports” the codes used for specification by imported product are encoded from product codes to industry codes and aggregated to same main industry classification (NA-NACE or NA-ISIC) as for the domestic production.

For “Complementary imports” a product classification for special products, as or preferably an industry classification should be used for aggregating to the same industry level as for “Competitive imports”.

6.3. Detailed Input-Output Table with the product flows at basic value.

The methodology for the transformation to IOT is based on the main assumption that each of the detailed products has its own specific sales structure, “*the fixed product sales structure*”. The Supply Table (Suppliers x Products) and the Use Table (Products x Users) at basic values are converted to an Input-Output Table (IOT) by distributing the supply and use of the detailed products. For *each product*, detailed tables will show domestic use of the product and exports linked directly to the domestic supplying industries for the product and to imports of the product.

The first assumption is that export of all the detailed products is primarily supplied by domestic industries. Distribution of exports of *a product* by supplying domestic industries at basic value is assumed *proportional with the production of the product by the supplying industry (industries) at basic value*. Exceptions are transactions between different Users as purchases/sales of fixed assets and products imported for re-export, which require special treatment.

The second assumption is that imports and the remaining part of domestic production of the product at basic value are distributed proportionally with the different domestic uses of the product (intermediate consumption, final consumption, capital formation, changes in inventories) at basic value.

The automatic split between use of products supplied from domestic production and from imports is carried out at the detailed product level assuming constant import ratios along the row for intermediate and final domestic use. This means that the same import share applies to all domestic use categories of

a product, and that all industries that supply *a product*, have the same market share for all types of use of *that product*.

This methodology requires a detailed product classification. Special codes should be introduced for certain imported products which are used different from the similar domestic produced products.

The result is:

- “Industry by Industry Matrix” and “Industry by Final Use Matrix” with product information showing the domestic users and exports.
- “Import Matrix” with product information showing domestic users and for some products re-export.

In the SUT, imports are specified by products. In the I-O Tables, imports are encoded from the NA-product classification to the NA-industry classification, the main producer as used for domestic production.

For analytical use, imports can also be split between competitive and complementary imports. For competitive imports, the NA-industry classification used for domestic production should be used. For complementary imports of special products as for direct purchases abroad by resident households, a special product classification might be used.

Figure 15. SUT_MOD_III. Supply Table (T1). Suppliers x Products at basic value

T1 SUPPLY OF PRODUCTS	Basic value	Taxes on products incl Custom duty	VAT Non deduct. able Corrected to time adjusted book values 17- values	Sales tax or Special tax on invest-ment	Total
	<u>10-value</u>	<u>11-value</u> Subsidies on products <u>12- value</u>		<u>18-value</u>	
	<i>Products</i>	<i>Products</i>	<i>Products</i>	<i>Products</i>	<i>Products</i>
22, 23, 24, 25, 26- accounts. Domestic production	$H^{10}_{d,p}$	—	—		$T_{d,p}$
29501 VAT corrected to Book Value incl . Investment tax			$H^{17BV}_{29501,p}$	$H^{18}_{29502,p}$	$T_{29501,p}$ $T_{29502,p}$
Product taxes on Domestic production 29XXX		$H^{11}_{d,p}$ $-H^{12}_{d,p}$			$T_{29505,p}$
Product tax on import 29506		$H^{11}_{29506,p}$			$T_{29506,p}$
Fictive industries 29XXX	$H^{10}_{f,p}$ $-H^{10}_{f,p}$				$H^{13}_{f,p}$ $-H^{13}_{f,p}$
Imports 52XXX	$H^{10}_{z,p}$				$T_{z,p}$
Total	$S^{10}_{.p}$	$S^{11}_{.p}$ $S^{12}_{.p}$	$S^{17}_{.p}$	$S^{18}_{.p}$	$T_{.p}$

Note: Domestic production and import at basic value (10-value) and taxes and subsidies on products (11, 12-value). Custom duty from account 29505 has been moved from basic value (10-value) to product taxes (11-value).

All types of product taxes and product subsidies are supplied from the 29 accounts. Fictive industries in the Supply Table are introduced to be able to balance supply and use of products where we find no suppliers because the transactions are between different domestic users or export in the Use Table.

The calculation consists of to main stages:

Stage 1.

For each of the detailed products, it is assumed that export of the product primarily is supplied by domestic industries. Distribution of exports of the product by supplying industries, are assumed proportional with the different industries supply of the product (at basic values).

If total domestic supply is lower than total exports, the remainder is supplied from inventories (if change in inventories is negative) and finally the rest from imports (re-exports).

Stage 2.

The different domestic uses of the product are then subsequently distributed to suppliers in proportion with imports and the remaining part of domestic production. This means that the same import share applies to all domestic use categories of a product, and that all industries that supply a product, have the same market share in all types of use of that product.

The calculation in more detail:

As an intermediate stage, imports (52XXX) are changed to 53XXX (Competitive) or 54XXX (complementary).

Then, for each product which is supplied by exactly one supplier, and used by exactly one user, the IO is set to be one item for that combination, regardless of other considerations.

In the next intermediate stage, negative changes in inventories are “removed” by increasing all supplies of that product by the same proportion.

After having made split between competitive and non- competitive imports, as explained in chapter 6.2, we know the figures for the row sums and column sums of the Industry by Industry matrix form as illustrated in Figure 14. The next stage is to fill in the cells of the Industry by Industry Matrix.

- 1. The supply from imports (account 53 and 54) at basic value (10-values) is added together as a sum called “TOTAL IMPORTS”.
- 2. The supply from domestic industries at basic value (10-value) is added together as a sum called “DOMESTIC PRODUCTION”.
- 3. The value of exports is added together as a sum called “TOTAL EXPORTS”.
- 4. The domestic intermediate and final use are added together as a sum called “DOMESTIC USE”.

Next stage is to distribute supply of each NA-product from “DOMESTIC PRODUCTION” and “TOTAL IMPORTS” to “TOTAL EXPORTS” and “DOMESTIC USE”. The assumptions used to convert the product flows into an IOT are as follows:

For each NA-product “TOTAL EXPORTS” are supplied primarily from “DOMESTIC PRODUCTION”.

1. If there are not enough “DOMESTIC PRODUCTION”, the rest of “TOTAL EXPORTS” have to be supplied from a reduction in inventories (if change in inventories is negative) or from “TOTAL IMPORTS”). In the normal case, where domestic production is higher than exports, we get:

$$N_{-III}^{10}_{d,p,x} = N_{-III}^{10}_{p,x} \times \frac{H_{-III}^{10}_{d,p}}{\sum_d H_{-III}^{10}_{d,p}}$$

- N_{III}^{10} represents Use in basic value, from SUT_MOD_III (T2)
- H_{III}^{10} represents Supply in basic value, from SUT_MOD_III (T1)
- p represents Products.
- d represents Domestic production accounts (22000 to 26999)
- x represents Exports

2. For each NA-product, we assume a constant market share assumption. The various “DOMESTIC USE” are allocated from all suppliers in proportion to the supply from “DOMESTIC PRODUCTION” (excl. flows to “TOTAL EXPORTS”) and from “TOTAL IMPORTS”.

$$N_{III}^{10}_{d\&z,d\&s,p} = N_{III}^{10}_{d\&s,p} \times \frac{HD_{III}^{10}_{d\&z,p}}{\sum_{d\&z} HD_{III}^{10}_{d\&z,p}}$$

- N^{10} represents Use in basic value, from SUT_MOD_III (T2)
- HD^{10} represents supply to domestic users (i.e. excluding supply to exports)
- p represents Products.
- d represents Domestic production accounts (22000 to 26999)
- s represents Domestic Final Users
- z represents Imports

The IOT-T4 is specifying Suppliers and Users in basic value (10-value). In addition, all the 29-accounts for product taxes, product subsidies and VAT specified by Users are kept. This is to achieve total Use in purchasers’ value 19-value, see IOT-T4. figure 15.

Example:

Suppliers (T1) are identical in SUT_MOD_III (T1) and IOT-T4, except for account 52 which has been separated into account 53 and account 54.

Users are identical in SUT_MOD_III (T2) and IOT-T4

Value added T3 is unchanged, giving Gross domestic product distributed by Components of value added and by Production accounts at basic value.

The following simplified example illustrates the procedure for converting from SUT_MOD_III to T4

Supply Table (T1) Suppliers x Products at Basic value

Supply	Product no			Total
	A	B	C	
Industry no. I	100	190	10	300
Import, Competitive	100	200		300
Import, Complementary			200	200
Total Supply	200	390	210	800

Use Table (T2) Products x Users at Basic value

Product No	Domestic use Industry no. j	Domestic final use no.k	Change in inventories	Exports	Total
A	30	120		50	200
B	50		140	200	390
C	300	100	-190		210
Product taxes - product subsidies	5	0	0	0	5
Intermediate/final use, purchasers'v	385	220	-50	250	805
Value added	15	-	-	-	15
Total	400	220	- 50	250	820

Converting Product A

From the Supply Table, the supply of product A is extracted:

Domestic prod.:	Industry no. i	= 100
Total imports:	Imports. Comp	= 100
	<u>Total supply</u>	<u>= 200</u>

From the Use Table, the use of product A is extracted:

Domestic uses:	Domestic use industry no. j	= 30
	Domestic final use no. k	= 120
Exports:	<u>Exports</u>	<u>= 50</u>
	<u>Total uses</u>	<u>= 200</u>

The various uses of domestic production and imports of product A are estimated as follows:

1. Use of domestic production (=100):

- 50 to exports
- : 10 to domestic use industry no. j
- : 40 to domestic final use no. k

2. Use of total imports,

- imports comp (=100):
- : 20 to domestic use industry no j
- : 80 to domestic final use no. k

Result: IO format for product A:

Supply of product A	Use of product A			
	Domestic use industry j	Domestic final use k	Exports	Total use
Industry no.i	10	40	50	100
Imports, competitive	20	80		100
Total supply	30	120	50	200

Converting Product B

From the Supply Table, the supply of product B is extracted:

Domestic production:	Industry no. i	= 190
Total imports:	Imports, competitive	= 200
	<u>Total supply</u>	<u>= 390</u>

From the Use Table, the use of product B is extracted:

Domestic use:	Domestic use industry no. j	= 50
Exports:	Exports	= 200
Changes in inventories:	Inventories	= 140
	<u>Total use</u>	<u>= 390</u>

The various uses of domestic production and imports of product B are estimated as follows:

- 1. Use of domestic production (=190):
: 190 to exports
- 2. Use of total imports,
imports, comp (= 200):
: 10 to exports (re-exports)
: 95 to domestic use industry no. j
: 95 to changes in inventories

Result: IO format for product B:

Supply of product B	Use of product B			
	Domestic use j	Exports	Change in inventories	Total use
Industry no.i		190		190
Imports, competitive	50	10	140	200
Total supply	50	200	140	390

In these two examples we have illustrated that to replace the product flows (for product A and B), positive flows have to be created from the different suppliers of these products to the different users of the same products.

Product C is an example with negative change in inventories:

For NA-products where negative figures - “minus quantities” for changes in inventories or other type of use appear in the Use Table, a special estimation procedure is introduced to estimate the industry by industry flows as illustrated for product C in the following example.

Positive NA-product flow(s) from the domestic producing industry and/or imports to the different users, are constructed and corresponding negative flow(s) from the same suppliers to Change in inventories.

Converting Product C

From T1, the supplies of product C are extracted:

Domestic prod.:	Industry no. I	= 10
Total imports:	Imports, complementary	= 200
<u>Total supply</u>		<u>= 210</u>

From T 2, the use of product C is extracted:

Domestic uses:	Domestic use no. j	= 300
	Domestic final use no. k	= 100
Changes in inventories:	Inventories	= -190
	<u>Total uses</u>	<u>= 210</u>

The various uses of corrected figures for domestic production and imports are estimated as follows:

- 1. Use of domestic production = 19: (corrected 10+9=19)

: 14 to domestic use industry no. j

: 5 to domestic final use no. k

Draw on inventories (= 9):

: - 9 from changes in inventories

- 2. Use of total imports,

- Imports, complementary (= 200): (corrected 200+181=381)

: 286 to domestic use no. j

: 95 to domestic use no. k

Draw on change in inventories:

: -181 from changes in inventories

Result: IO format for product C:

Supply of product C	Use of product C					
	Supply	Corrected supply	Domestic use j	Domestic use k	Change in inventories	Total use
Industry no.i	10	19	14	5	- 9	10
Imports, complementary	200	381	286	95	- 181	200
Total supply	210	400	300	100	- 190	210

Converting Product D

Product D is an example where exports are larger than domestic production and with negative change in Inventories.

From the Supply Table , the supply of product D is extracted:

Domestic prod.:	Industry no. i	= 100
Total imports:	Imports, competitive	= 200
	<u>Total supply</u>	<u>= 300</u>

From the Use Table, the use of product D is extracted:

Domestic use:	Domestic use no. j	= 150
Exports:	Exports	= 200
Changes in inventories:	Inventories	= -50
	<u>Total use</u>	<u>= 300</u>

The uses of the corrected figures for domestic production and imports are estimated as follows:

- 1. Use of domestic production = 100: (corrected 100+17=117)
 - : 117 to exports
 - : 0 to domestic use no. j
 Draw on inventories (= 17):
 - : - 17 from changes in inventories
- 2. Use of total imports = 200: (corrected 200+33=233)
 - Imports, comp (= 233):
 - : 83 to exports
 - 150 to domestic use no. j
 - Draw on change in inventories:
 - : -33 from changes in inventories

Result: IO format for product D:

Supply of product D	Use of product D					
	Supply	Corrected supply	Domestic use j	Exports	Change in inventories	Total use
Industry no.i	100	117	0	117	- 17	100
Imports, competitive	200	233	150	83	- 33	200
Total supply	300	350	150	200	- 50	300

During the computer run “T4 from SUT_MOD_III, ” a disaggregated version IOT_T4 is compiled, showing the link between the suppliers and users for each of the NA-products (A, B, C,D) in figure 15.

Figure 16A. IOT-T4 Industry by Industry Table with Product Flows at basic value

<u>Supply</u>	<u>Use</u>				
	<u>Domestic use industry i</u>	<u>Final use k</u>	<u>Exports</u>	<u>Change in inventories</u>	<u>Total</u>
Domestic Industries <u>Industry i</u>					
<u>Product A</u>	<u>10</u>	<u>40</u>	<u>50</u>		<u>100</u>
<u>Product B</u>			<u>190</u>		<u>190</u>
<u>Product C</u>	<u>14</u>	<u>5</u>		<u>-9</u>	<u>10</u>
<u>Product D</u>	<u>0</u>	<u>0</u>	<u>117</u>	<u>-17</u>	<u>100</u>
<u>Product A,B,C,D</u>	<u>24</u>	<u>45</u>	<u>357</u>	<u>-26</u>	<u>400</u>
Imports, competitive					
<u>Product A</u>	<u>20</u>	<u>80</u>			<u>100</u>
<u>Product B</u>	<u>50</u>		<u>10</u>	<u>140</u>	<u>200</u>
<u>Product D</u>	<u>150</u>	<u>-</u>	<u>83</u>	<u>-33</u>	<u>200</u>
<u>Product A,B,D</u>	<u>220</u>	<u>80</u>	<u>93</u>	<u>107</u>	<u>500</u>
Imports, complementary					
<u>Product C</u>	<u>286</u>	<u>95</u>		<u>-181</u>	<u>200</u>
TOTAL	<u>530</u>	<u>220</u>	<u>450</u>	<u>-100</u>	<u>1100</u>
Taxes less subsidies on products	<u>5</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>5</u>
<u>Total intermediate and final consumption at purchasers' values</u>	<u>535</u>	<u>220</u>	<u>450</u>	<u>-100</u>	<u>1105</u>
<u>Value added (T3)</u>	<u>15</u>				<u>15</u>
(Components of value added)					
<u>Supply at basic values</u>	<u>550</u>	<u>220</u>	<u>450</u>	<u>-100</u>	<u>1120</u>

NOTE: Value added should be unchanged through the whole process

7. Deriving IOT-T5 from IOT-T4

7.1 Detailed Input-Output Tables without product flows

The next stage is aggregating over the product flows and constructing IOT –T5 as illustrated below without showing the product flows as illustrated for IOT-T4.

Illustration of IOT-T5. Industry by Industry Table without Product Flow at basic values

<u>Supply</u>	<u>Use</u>				
	<u>Domestic use</u>		<u>Exports</u>	<u>Change in inventories</u>	<u>Total</u>
Domestic Industries, <u>Industry i</u>					
<u>Product A,B,C,D</u>	<u>24</u>	<u>45</u>	<u>357</u>	<u>-26</u>	<u>400</u>

Imports, competitive					
<u>Product A,B</u>	<u>220</u>	<u>80</u>	<u>93</u>	<u>107</u>	<u>500</u>
Imports, complementary	<u>286</u>	<u>95</u>		<u>-181</u>	<u>200</u>
<u>Product C</u>					
TOTAL	530	220	450	-100	1100
Taxes less subsidies on products	<u>5</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>5</u>
Total intermediate and final consumption at purchasers' prices	<u>535</u>	<u>220</u>	<u>450</u>	<u>-100</u>	<u>1105</u>
Value added (T3)	<u>15</u>				<u>15</u>
(Components of value added)					
Total output at basic prices	<u>550</u>	<u>220</u>	<u>450</u>	<u>-100</u>	<u>1120</u>

The IOT shows a row which distributes output to either intermediate-use or final-use. Correspondingly, for each producing industry 2XXX there is a column which specifies the composition of intermediate inputs provided by domestic industries and by imports (divided between competitive and complementary imports), along with the relevant customs duty, taxes, and value-added. Similarly, for each category of final demand there is a column which gives the detail composition of final commodities, again, supplied by domestic industries and by imports (Divided between competitive and complementary imports), along with the relevant customs duty, taxes, and value-added.

Figure 16.B. IOT-T5 Illustration of an detailed input-output table for domestic output and for imports. At basic values

Supplier	Users					
	Production accounts 22XXX + 23XXX + 24XXX + 25XXX + 26XXX	Ex-ports 51XXX	Final consumption expenditure 61XXX, 64XXX, 65XXX, 66XXX	Capital formation by industry 82XXX, 83XXX, 84XXX, 85XXX, 86XXX	Change s in Inventories 87XXX	T O T A L
Production Accounts:						
2X-NA-NACE (or NA-ISIC):						
22XXX + 23XXX +						
24XXX + 25XXX + 26XXX						
Imports:						
53 Competitive NA-NACE						
54 Complementary NA-NACE						
Total intermediate and final consumption at basic value						
Taxes less subsidies,products						
29501 Corrected VAT, 17-value						
+29502 Invest.levy or Sales tax, 18-value						
+29503 Product taxes, 11-value for Domestic production						
- 29504 Product subsidies, 12-value for Domestic production						

+ 29505 Custom duty on imports, 11 value						
+ 29506 Product taxes on imports 11-value						
Intermediate and final consumption at purchasers' value						
Components of value added at basic value :						
Compensation of employees						
Other taxes on production						
Other subsidies production						
Consumption of fixed capital						
Operating surplus/Mixed income at basic value						
Value added at basic values						
Output and final consumption at basic value						

IOT-T5 is an IOT table at the most detailed level, but aggregated over product flows. Value added (T3) is unchanged, but changes for account 29503 and 29504.

In IOT-T5, imports are given a supplier code starting with 53 or 54, followed by the 6-digit product code. The aggregation to the the NA-industry classification used for domestic production, takes place in the derivation of the aggregated IO-table, called IOT-T6.

8. Deriving IOT-T6 from IOT-T5

8.1 Catalogues for encoding to aggregated Input-Output Tables

Input- Output tables can be produced at different levels of aggregation in response to the requirements of different users and the purposes of their analysis. This includes classification of imports which is made flexible regarding classification of competitive and complementary imports at different level of aggregation.

For compiling different versions of IOT-T6, different set of encoding catalogues have to be established for the Industries and Types of Final use, see chapter 9. Encoding and aggregating of classification for industries must be identical for Suppliers and Users and should be identical for account types 22, 23, 24, 25 and 26 and 82, 83, 84, 85 and 86.

8.2 Input-Output Tables for international reporting

Figure 17. Simplified example of ESA IOT

Table 17. Input-output table at basic prices Mill. NAC. Mill Euro for countries of the Eurozone.

Products (CPA)	Industries	Final consumption expenditure by households	Final consumption expenditure by NPISH	Final consumption expenditure by Government	Gross fixed capital formation	Change Inventories	Gross capital formation	Exports	Final use	Total output at basic values
Homogeneous Branches or Industries	(22+23 +24 +25 +26) 01-60	61000	66000	65000	82, 83, 84, 85, 86000	87XXX		51000		Total use
Industries Sum of Domestic and Imports by 01-60										
Total										
Taxes less subsidies on products										
Total intermediate and final consumption at purchasers' value										
Compensation of employees										
Other net taxes on production										
Consumption of fixed capital										
Operating surplus, net										
Operating surplus, gross										
Value added at basic prices										
Output and final consumption at basic prices										

Note: Table 17 includes the data in the following Table 18 and Table 19.

Figure 18. Simplified example of ESA IOT

Table 18. Input-output table for domestic output at basic prices. Mill NAC

Products (CPA) or Homogeneous Branches Industries	Industries (22+23+24+25+26) 01-60	Final consumption expenditure by households 61000	Final consumption expenditure by NPISH S 66000	Final consumption expenditure by Government 64000 65000	Gross fixed capital formation 82, 83, 84, 85, 86000	Change Inventories 87XXX	Gross capital formation	Exports 51000	Final use	Total output at basic values Total use
Industries specified by 01-60										
Use of imported products, cif										
Taxes less subsidies on products										
Total intermediate and final consumption at purchasers' value										
Compensation of employees										
Other net taxes on production										
Consumption of fixed capital										
Operating surplus, net										
Operating surplus, gross										
Value added at basic prices										
Output and final consumption at basic prices										

Figure 19. Simplified example of ESA IOT.

Table 19. Input-output table for imports at basic prices. Mill NAC

Products or Homogeneous Branches (Industries) CPA	Industries (22+23+24+25+26) 01-60	Final consumption expenditure by households 61000	Final consumption expenditure by NPISH 66000	Final consumption expenditure by Government 64000 65000	Gross fixed capital formation 82,83,84,85,86000	Change Inventories 87XXX	Gross capital formation	Exports 51000	Final use	Total output at basic values Total use
Products specified by 01-60										
Total										

9. Classification required for reporting to International organisations

Each country should compile Supply Tables, Use Tables and Input Output Tables using a classification suitable for analysing the countries economy.

The countries own working classification should also be so detailed that it easily can be aggregated to the classification required for international reporting.

Each country has to prepare a set of aggregation (encoding) catalogues, grouping the national classification into the international groups. Encoding catalogues have to be established for suppliers, users and products.

Encoding and aggregating of grouping standards for industries must be identical for suppliers and users and should be identical for account types 22, 23, 24, 25 and 26 and 82, 83, 84, 85 and 86.

There should be established some permanent encoding catalogues:

1. Encoding catalogue for T1 and T2 for SUT_MOD_I. (Optional, used in Norway for quarterly national accounts and for the Research Department.)
2. Encoding catalogue for SUT-MOD II to be used for compiling Eurostat Table 15 Supply and 16 Use for current and constant prices.
3. Encoding catalogue for IOT-T6 to be used for compiling Eurostat Table 17, 18, 19 for Input Output Tables

The table below shows an extract of the encoding from the Norwegian codes to the level of aggregation for international reporting.

Missing users and industries may have to be included to get complete A60 by A60 matrix.

Supply (T1)	
23010	22010 22015 23010 23014
23020	23020 23024
23050	22051 23051 23052
23100	23100
23110	23111 23112
23130	23130
23140	23140

..... Final use (T2)

27FIS	23654 23659
51000	51130 51210 51220 51230 51110 51120 69A11 69A12 69A13 69A14 69A15 69A16
61000	61A11 61A12 61A13 61A14 61A15 61A16 61A17 61A18 61A19 61A21 61A22 61B11 64000 64A11 64A12 64A13 64A14 64A15 64A16 64A17 64B21 64B22 64B23 64B24 64B25
65A11	65A13 65A17 65C32 65D41 65D45 65D49 65E51 65E52 65E56 65F62 65G72 65G73 65G74 65H81 65H82 65H84 65H86 65I91 65I92 65I95 65I96 65I98 65J01 65J02 65J04 65J06 65J07 65J09 65F61
66000	66F00 66I40 66J00 66L41 66L70
83010	82010 82015 83010 83014
83020	83020 83024
83050	82051 83051 83052
83100	83100
83110	83111 83112
83130	83130

83140 83140

Alternative : Only one account for Fixed capital formation:

83000 82010 82015 83010 8301483020 83024 82051 83051 83052 83100 83111 83112 83130 3140
and
87000 87000 87400 87910 87920 87930 87940

Income components:

Wages and salaries: 91100 31111 31112 31121 31122 31123 31124
Other taxes and subsidies on production 91200 31220 31320
Operating surplus: 91910 31910
Consumption of fixed capital: 92000 38000

10. SUT and IOT at constant prices

By the same procedure as for current prices, the different versions of SUT_MOD_I, SUT_MOD_II, SUT_MOD_III and IOT-T4, IOT-T5 and IOT-T6 can be compiled in constant prices.

11. Inverse matrices. Industry by Industry

Traditionally input-output models are based on a standard assumptions that deliveries from other industries to intermediate consumption of the industry we look at, are proportional to total output of the industry. Further we assume that these input-output coefficients are constant, independent of the changes of output we are analysing. We also assume that the changes of final use are exogenous.

A change in final use of an industry will then lead to an increase of the output of those industries that are supplying intermediate consumption to this industry. An output increase like this will further create a demand of goods and services from other industries, and so forth. This is what we call a multiplier effect. Altogether the total increase of the demand for goods and services can be calculated from the inverse matrix.

The inverse matrix is calculated by solving the following input-output model:

$$x = H \bullet x + E \Rightarrow x = (I - H)^{-1} \bullet E.$$

x is a vector for output by industries,

H is a matrix of input-output coefficients for intermediate consumption,

I is the identity matrix (a matrix that has 1 along the diagonal and 0 elsewhere)

E is a matrix of final use deliveries.

The inverse matrix then becomes $(I-H)^{-1}$.

One has to be attentive that the multiplier effects described here are limited by the assumption that all increases in final use are exogenous. In a more complete model for the whole economy, this increase in output of the industry would result in an increase in income, which would again result in an increase of consumption, capital formation etc. These increases would also give multiplier effects, and the total effects might be larger than what is calculated here.

ANNEX 1. CLASSIFICATION STANDARD FOR SUPPLY AND USE TABLES

An extract of the classification used in the Norwegian National Accounts (NNA) related to NACE rev. 1.

NNA with backwards time series will be published according to NACE rev. 2 from the year 2011.

Account type 1. Value classes used for the product flows in the SUT

- 10 Basic Value
- 11 Taxes on Products
- 12 Subsidies on Products (with a negative sign)
- 13 Producer's Value = 10 v. + 11 v. + 12 v.
- 14R Trade Margins, Basic Value
- 14T Transport Margins
- 15 Taxes on Product related to Trade Margins (paid by the traders)
- 16 Subsidies on Product related to Trade Margins (paid to the traders) (with a negative sign)
- 17 Non-deductible Value Added Tax (with a total correction for the difference between time adjusted book value for VAT and theoretical compiled VAT)
- 18 Investment Levy or Sales tax (Only if relevant)
- 19 Purchaser's Value = 13 v. + 14R v. + 14T v. + 15v. + 16v. + 17v. + 18v.

Account type 2. Production and aggregation accounts

22-26 Production accounts for different groups:

- 22XXX Production for own final use
- 23XXX Market producers
- 24XXX Central government services
- 25XXX Local government services
- 26XXX Non profit institutions serving households (NPISH)

All countries should decide the number of industries and products to be used relevant for their countries economy. In the Norwegian National Accounts (NNA), about 200 industries and 1420 products are used in the SUT framework. The detailed industry classification codes with 3 digits and the detailed product classification codes with 6 digits codes are not shown here,

In the following are the 22- accounts and some of the 23 accounts from the NNA, based on NACE rev. 1.

22xxx Production for own final use

- 22010 Agriculture
- 22015 Hunting, trapping and game propagation including related service a
- 22051 Fishing
- 22452 General construction of buildings etc.
- 22454 Building installation and completion
- 22704 Dwelling service production, for own final use
- 22705 Dwelling service production, housing co-operative
- 22950 Paid domestic services for private households

23xxx Market producers

Example of 23XXX production accounts:

- 23010 Agriculture
- 23014 Agricultural and animal husbandry service activities, except veter

23020	Forestry and logging
23024	Forestry, related service activities
23051	Fishing
23052	Operation of fish hatcheries and fish farms
23100	Mining of coal and lignite; extraction of peat
23111	Extraction of crude petroleum and natural gas
23112	Service activities incidental to oil and gas extraction excluding
23130	Mining of metal ores
23140	Other mining and quarrying
23151	Production, processing and preserving of meat and meat products
23152	Processing and preserving of fish and fish products
23153	Processing and preserving of fruit and vegetables
23154	Manufacture of vegetable and animal oils and fats
23155	Manufacture of dairy products
23156	Manufacture of grain mill products, starches and starch products
23157	Manufacture of prepared animal feeds
23158	Manufacture of other food products
23159	Manufacture of beverages
23160	Manufacture of tobacco products
23170	Manufacture of textiles
23180	Manufacture of wearing apparel; dressing and dyeing of fur
23190	Tanning and dressing of leather; manufacture of luggage, handbags,
23201	Sawmilling of wood, impregnation of wood
23XXX	

NOTE: For technical reasons, all industries identified as 22XXX, 24XXX, 25XXX and 26XXX accounts have also to be included in the catalogue as 23XXX accounts.

27XXX Aggregation accounts

Example of useful 27XXX accounts:

27015	Business traveling, business entertainment, and catering services
27017	Catering services for internal canteens etc.
27020	Offices equipment, cleaning material
27022	Food used in institution, ships, etc.
27025	Government fees
27032	Hotell services, personal tours, travel expenses, etc
27033	Hotell services, domestic personal tours
27xxx	

Required 27 accounts:

27500	Retail and wholesale trade margins
27600	Transport margins

Types of fixed assets

28111	Detached houses, Houses with two dwelling units, Row- and terraced
28XXX	
28 xxx	Vans, lorries, cranes, special purpose vehicles etc.
28610	Change in breeding stock, dairy cattle and the like
28650	Change in stock of fruit trees

Technical accounts for product taxes, product subsidies and correction accounts etc.

Required 27 accounts:

29501	Collection of value added tax
29502	Collection of investment levy on fixed capital formation (NOT required)
29503	Collection of taxes on products
29504	Payment of product subsidies
29505	Collection of customs duties
29506	Collection of taxes on imports
29507	Correction of value added tax (difference between time adjusted book value and theoretical value)
29900	Imputed net gain at constant prices for product taxes and product subsidies (only for SUT in constant prices)

Account type 3. Components of value added

Required 31 accounts:

31000	Value added
31111	Wages and salaries in cash
31112	Wages and salaries in kind
31XXX	
31211	Taxes on products (From 29503)
31212	Taxes on imports (From 29506)
31220	Other taxes on production
31250	Customs duty (From 29505)
31270	Value added tax (From 29501 and 29507)
31280	Investment levy (From 29502)
31310	Subsidies on products (From 29504)
31320	Other subsidies on production
31900	Gross operating surplus
Or	
31910	Operating surplus
38000	Consumption of fixed capital

Account type 5. Exports and imports

Exports

51110	Goods as recorded in external trade statistics
51120	Ships, drilling and modules
51130	Goods not recorded in external trade statistic
51220	Foreign tourists in Norway
51230	Other services

Imports

52110	Goods as recorded in external trade statistics
52120	Ships, drilling and modules
52130	Goods not recorded in external trade statistic
52230	Other services

Account type 6. Final consumption expenditure

61XXX	Resident household final consumption expenditure (not tourism) (COICOP)
64XXX	Central government services (COFOG)
65XXX	Local government services (COFOG)
66XXX	NPISH (COPNI)

- 68XXX Tourism final consumption expenditure by Residents (COICOP)
- 69XXX Tourism final consumption by Non-residents (COICOP)

Account type 8. Capital formation accounts (with the same industry grouping as for the Production accounts)

- 82XXX Production for own final use
- 83XXX Market producers
- 84XXX Central government services
- 85XXX Local government services
- 86XXX Non profit institutions serving households (NPISH)

87XXX Change in inventory, work in progress, residuals

Required 87 accounts:

- 87000 Residual, goods, change in inventory
- 87400 Residual, services
- 879XX Work in progress
- 87930 Change in inventories, livestock, and timber
- 87940 Change in inventories, growth in planted forest
- 87970 Correction of VAT

ANNEX 2. ACCOUNT TYPES USED FOR DETAILED IOT-T4 AND IOT-T5

Account type 2. Production accounts

- 22XXX **Own final use**
- 23XXX **Market producers**
- 24XXX **Central government services**
- 25XXX **Local government services**
- 26XXX **NPISH**

VAT, Product taxes, Product subsidies etc.

- 29501 Collection of value added tax, corrected figure
- 29502 Collection of investment levy on fixed capital formation
- 29503 Collection of taxes on products incl custom duty
- 29504 Payment of product subsidies
- 29900 Imputed net gain at constant prices for product taxes and product subsidies from price discrimination (only for IOT at constant prices)

Account type 3. Components of value added

- 31000 Value added
- 31100 Compensation of employees
- 31XXX
- 31900 Operating surplus

Account type 5. Exports and imports

Exports

- 51110 Goods as recorded in external trade statistics
- 51120 Ships, drilling and modules
- 51130 Goods not recorded in external trade statistic

51XXX	
51230	Other services
Imports, competitive imports	
53110	Goods as recorded in external trade statistics
53120	Ships, drilling and modules
53130	Goods not recorded in external trade statistic
53xxx	
53230	Other services
Imports, complementary imports	
54110	Goods as recorded in external trade statistics
54120	Ships, drilling and modules
54130	Goods not recorded in external trade statistic
54xxx	
54230	Other services

Account type 6. Final consumption expenditure

61XXX	Resident household final consumption expenditure (not tourism)
64XXX	Central government services
65XXX	Local government services
66XXX	NPISH
68XXX	Tourism final consumption expenditure by Residents
69XXX	Tourism final consumption by Non-residents

Account type 8. Capital formation accounts

82XXX	Own final use
83XXX	Market producers
84XXX	Central government services
85XXX	Local government services
86XXX	NPISH
87XXX	Change in inventory, work in progress, residuals
87000	Residual, goods, change in inventory
87400	Residual, services
879XX	Work in progress,

Eurostat has provided an Excel workbook with sheets for all the five tables in three working languages as template for the transmission (“questionnaire”). The data should be provided in Mio. Euro with 3 decimal places. The received data will also mainly be treated in this format by Eurostat, i.e. for checks for completeness and consistency, aggregation of countries etc.

REFERENCES:

- “Eurostat Manual of Supply, Use and Input-output Tables”,
- *eurostat* Methodologies and Working papers. 2008 edition.