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Compilation of Supply and Use Tables and Input-Output Tables in Bulgaria

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Abstract

Apart from the pure analytical potentiality the compilation of SUT has an important role in ensuring the consistency and overall quality of the National Accounts. It is therefore recommended that the SUT be compiled as an integrated part of calculating the National Accounts.

The recent developments in the Bulgarian Supply and Use tables have been concentrated on its full integration with the whole system of National Accounts in accordance with the methodology of ESA 95.

The present paper describes the newly implemented general framework of Supply and Use tables for Bulgaria in perspective to reach full methodological compliance with ESA 95. The detailed structure of the Supply and Use tables integrates the relevant modules of the national accounts system describing the behavior of the economic entities - classified in accordance to its main production activity and also in accordance to its institutional belonging.

An important part within the newly implemented system is related to the calculation of the tables at constant prices. The paper describes the organization of the data inputs and established procedures for recalculations of the commodity flows in constant prices.

The specific cases with the relevant importance of national circumstances – such as treatment of goods for processing and processing services, own account production of agricultural households, national transport services related to the imports and exports of goods – are also described.

1. Historical overview

The compilation of Input-Output tables in Bulgaria has more than 45 years of tradition. The first Input-Output table has been compiled in 1960 and till 1989 the general framework of the tables has been subordinated to the methodological principles of Material Product System (MPS), applied in the conditions of centrally planned economy. During this period the first introduction of the System of National Accounts (SNA) in the statistical practice was in 1980. As a result of joint work with the Statistics Finland the UN F-20 approach for transformation of the macro-indicators of MPS to SNA methodological platform was established on the basis of the Input-Output framework.

The real implementation of National Accounts methodology started in 1990 - 1991 and the first Supply and Use tables (SUT) for Bulgaria for 1991, 1992 and 1993 were published in 1996. During the transition period the general frame of the Supply and Use tables was improved in compliance with the revised methodology of SNA'93 and definitions, concepts and accounting rules of European System of Accounts 1995 (ESA'95). For the national accounts development process the intensive relationships with the institutions of the European statistical system was important. Since 1996 Bulgarian

national accountants participated in several multinational projects and programs for adoption of specific areas of national accounts methodology. Also as a result of multinational co-operation at the European level, the improvements in the area of basic statistics as a whole, the introduction of new surveys and the implementation of new methodological approaches in business statistics and socio-demographic statistics play an important role in the process of harmonization of national accounts practice.

Presently the SUTs for Bulgaria are compiled annually at current and constant prices following the methodological principles of ESA'95. The compilation process is based on the newly established infrastructure and framework organized within the SNA-NT application software implemented in practice in 2004 as a result of the two years bilateral co-operation with Statistics Norway.

2. Main features of the SUT system

The implemented in 2004 SUT's compilation system within SNA-NT software ensures important features for the harmonization of the whole national accounts system with the international standards. Also the flexibility of the system gives opportunities for proper and systematic adoption of further changes in the methodology and the infrastructure of the SNA.

The SUT framework is constructed as an integrated part of the whole system of non-financial national accounts. It identifies all types of producers and consumers as regards their market behavior, main economic activity and institutional belonging and presents the commodity flow through economic activity groups as well as types of institutional units. The tables are based on the same ESA95 concepts and definitions, the same general rules for treatment of transactions as elsewhere in the System. As regards the GDP measurement, the structure of SUTs integrates in a best way the tree approaches for GDP calculation based on Goods and Services accounts, Production accounts and Generation of Income accounts.

The compilation process of SUTs is based on the detailed commodity level with the targets related to the proper application of the systematic approach for valuation of the commodity flows and its more precise re-calculation at constant prices.

The SNA-NT application software is a precisely defined, documented and efficient set-up with respect to routines for compiling SUT at current and constant prices on the international guidelines of the ESA 95, which helps to improve the organization of data flows in the frame of SUT as an integrated part of the system of non-financial national accounts.

2.1. Basic framework of Supply and Use tables

The basic framework of Supply and Use tables is identical with the recommendations and methodological descriptions in the ESA'95 and the Eurostat's manual for compilation of Supply and Use tables.

2.1.1. Supply table

The supply table shows at a detailed level the resource of goods and services – imported and produced by resident units classified into branches, according to their principal activity.

CUP		Year 2001		Table 15: Supply table										BULGARIA		Min. NAC	
		INDUSTRIES (NACE)		OUTPUT OF INDUSTRIES (NACE)							Total	Imports cif	Total supply at basic prices	Trade and transport margins	Taxes less subsidies on products	Total supply at purchasers' prices	
Code	PRODUCTS (CPA)	A+B	C+D+E	F	G+H+I	J+K	L to P										
No		1	2	3	4	5	6	7	10	11	12	13	14				
1	A+B Products of agriculture, forestry, fisheries and aquacult	6 053	48	5	65	1	0	6 173	222	6 395	604	260	7 259				
2	C+D+E Products from mining and quarrying, manufactured prod	1 392	21 088	68	286	21	14	22 869	11 977	34 846	4 470	3 151	42 467				
3	F Construction work	7	154	3 174	147	17	9	3 508	109	3 617	0	121	3 737				
4	G+H+I Wholesale and retail trade, repair services, hotel and re	26	876	84	12 453	42	12	13 492	1 767	15 259	- 5 074	508	10 693				
5	J+K Financial intermediation services, real estate, renting ar	5	99	27	332	6 858	38	7 358	623	7 980	0	61	8 041				
6	L to P Other services	0	1	7	5	1	6 791	6 805	38	6 843	0	79	6 923				
7	Total	7483	22266	3365	13287	6939	6864	60 205	14 735	74 940	0	4 180	79 120				
8	Cif/ fob adjustments on imports	0	0	0	0	0	0	0	1 080	1 080	0	0	1 080				
9	Direct purchases abroad by residents	0	0	0	0	0	0	0	1 229	1 229	0	0	1 229				
10	Total	7483	22266	3365	13287	6939	6864	60 205	15 965	67 271	0	4 180	80 349				
11	Total of which:																
12	- Market output	5 657	22 265	3 280	13 203	3 558	1 636	49 599									
13	- Non-market output for own final use	1 807	0	85	0	3 282	0	5 174									
14	- Other non-market output	18	2	0	84	99	5 228	5 431									

The domestic part of the total resources in Supply table – the Production matrix - has a rectangular “commodity by industry” form. Each row presents all branches as producers of a certain commodity and each column shows the whole range of goods and services, produced by economic units, classified into a given branch. The main diagonal identifies the production as a result of the principal activity of the production units, according to which they are classified by branches.

As an integrated part of the whole Supply table, the production matrix contains sub-matrices indicating the elements of gross output valued at basic prices:

- Sales of domestically produced goods and services at basic prices;
- Own account acquisition of fixed capital;
- Changes in stocks of finished goods;
- Changes in work-in-progress.

The imported part of the total supply is presented in separate column with the adjustment items: for the transformation of the total import from c.i.f. to f.o.b. value and for residents' consumption in the rest of the world.

In order to ensure consistency between the total supply and the total use at purchasers' prices, the Supply table includes a valuation part with two additional columns:

- Trade and transport margins, allocated by commodity groups;
- Taxes on products, less subsidies on products, allocated by commodity groups.

2.1.2. Use table

The Use table has the same structure of commodities and branches as it is defined in the Supply table. It shows the consumption of goods and services by all economic units –

within the production system and among final demand categories. The following sub-matrices are distinguished:

- Matrix of intermediate consumption, it shows the use of total resource of goods and services as intermediate inputs by branches at the same level of details as of the Supply table;
- Matrix of final consumption, it shows the distribution of total resource of goods and services among final demand categories: individual consumption of households; expenditure of general government for individual and collective consumption; gross fixed capital formation; changes in inventories and exports.
- Matrix of primary inputs, it indicates the value added elements by branches: compensation of employees, other net taxes on production, consumption of fixed capital, operating surplus and mixed income.

CUP		Year 2001		Table 16: Use table at purchasers' prices, min NAC											BULGARIA			
Code	INDUSTRIES (NACE) PRODUCTS (CPA)	INPUT OF INDUSTRIES (NACE)						FINAL USES										
		A+B	C+D+E	F	G+H+I	J+K	L to P	Total	FC Exp by HHs	FC Exp by NPISHs	FC Exp by Gov	FC Exp total	GFCF	Changes in stocks	GCF	Exports	Final uses at purchasers' prices	Total use at purchasers' prices
No		1	2	3	4	5	6	1	2	3	4	5	6	8	9	12	13	14
1	A+B	2 578	1 300	33	541	0	59	4 511	2 157	0	18	2 175	195	- 61	134	439	2 748	7 259
2	C+D+E	1 076	11 867	1 443	3 133	401	1 665	19 585	11 301	0	184	11 484	3 396	426	3 823	7 575	22 882	42 467
3	F	53	292	308	285	308	158	1 404	103	0	0	103	2 047	30	2 077	154	2 333	3 737
4	G+H+I	143	1 284	162	2 221	174	343	4 327	3 430	0	55	3 485	0	0	0	2 882	6 366	10 693
5	J+K	74	727	203	1 108	1 345	315	3 771	3 680	0	76	3 756	196	8	204	311	4 270	8 041
6	L to P	26	42	14	128	28	389	626	1 039	173	4 892	6 104	0	0	0	192	6 296	6 923
61	Total	3950	15512	2162	7416	2256	2928	34 223	21 710	173	5 224	27 107	5 834	403	6 237	11 553	44 897	79 120
62	Cif fob adjustments on exports	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 080	0	0
63	Direct purchases abroad by residents	0	0	0	0	0	0	0	1 229	0	0	1 229	0	0	0	0	1 229	1 229
64	Purchases on the domestic territory by non-residents	0	0	0	0	0	0	0	- 2 547	0	0	- 2 547	0	0	0	0	2 547	0
65	Total intermediate consumption/final use at purchasers' prices	3950	15512	2162	7416	2256	2928	34 223	20 292	173	5 224	25 689	5 834	403	6 237	14 200	46 126	80 349
66	Compensation of employees	287	3 406	509	2 177	847	3 155	10 381										
67	Other net taxes on production	1	50	5	49	- 3	- 466	- 365										
68	Consumption of fixed capital	78	1 211	78	924	540	541	3 372										
69	Operating surplus, net	3 167	2 089	611	2 722	3 299	707	12 594										
70	Value added at basic prices	3533	6755	1203	5872	4683	3936	25 982										
71	Output at basic prices	7483	22266	3365	13287	6939	6864	60 205										

2.2. Classification standards

The frame of Supply and Use tables is structured on the basis of national classifications fully compatible with the European classification standards:

- National Classification of Economic Activities 2001, corresponding to NACE Rev.1;
- National Product Classification by Activity 2001, corresponding to CPA;
- ESA'95 classification of Institutional sectors;
- National Nomenclature of Industrial Products (PRODCOM) 2001;
- Customs nomenclature for external trade, corresponding to CN and HS customs classification;
- Product Nomenclature of Agriculture, Forestry and Fishing (PRODAGRO) 2001;
- Classification of Individual Consumption by Purpose – COICOP;
- Classification of the expenditures of General Government for individual and collective consumption - COFOG;
- Classification of the expenditures of NPISHs for individual consumption – COPNI.

The updating of classifications and its intra-coherence within the framework of SUTs is permanently ensured in the frame of conversion table. It has also been necessary to extend this conversion table by presenting the links among all other classifications used for the SUT compilation as the classifications used by Ministry of Finance and other administrative statistics.

2.2.1. Product catalogue

For the description of the resources of goods and services and its allocation among the intermediate and final demand categories, the SUTs framework has its own commodity classification.

During the project work with the Statistics Norway, the frame of the SUT was specified and year 2000 was taken as a base (benchmark) year. In order to comply with the ESA'95 and aiming at more precise results, the numbers of activities and product groups have been increased. The detailed product classification in the SUT has six-digit codes, specifying 880 commodities (groups of products and services). The items in the product catalogue are linked to the basic nomenclatures in order to translate the data from foreign trade statistics (HS customs classification), industrial production statistics (Prodcornomenclature), agricultural statistics (Prodagro nomenclature) and administrative sources into SUT commodities specifications.

The Product catalogue is principally based on standard CPA with further extensions in order to provide a basis for a proper treatment of different types of products, different types of transactions and different types of involved units. A special attention was paid to the product classification in the new frame of SUT by which it became possible to make a distinction between these products or product groups, which on the one hand are levied with identical VAT rate, taxes and subsidies on products and on the other hand to allow the separation of the output into market, non-market and output for own final use.

The following types of goods and services are specified in the SUTs' product catalogue:

- Market goods and services – 727 separated items;
- Goods and services for own final use – 51 separated items;
- Other non-market services – 102 separated items, including the items for consumption of fixed capital for each type of other non-market services;

In the product catalogue the commodities are separated with regard to the different origin, different allocation and different prices:

- Processing services – 100 items are separated;
- Imported goods and services – 18 items are separated;
- Goods and services with specific allocation – 94 items are separated.

For the deflation purposes in the catalogue, relatively significant and competitive on the domestic market imported products are presented separately. At later stage the Use sub-

matrix for imported flows are calculated in the frame of Input-Output Table derived automatically from SUT.

2.2.2. Production units and its presentation in the SUTs' frame

Within the Supply and Use tables three types of units are separated: market producers, producers for own consumption and other non-market producers.

2.2.2.1. Market producers

The identification of statistical units for the description of the production activity of market producers in the national accounts is based on two criteria: location of the production process and existence of the full set of data. This type of units is close to the ESA'95 definition of the local units and it may have more than one activity producing different goods and services. For enterprises with different locations of the production activities the unit of observation is the so-called sub-division of the enterprise. It is a separated part of the enterprise with the definite location and which is able to keep full set of bookkeeping data for description of its production activity. At a detailed level SNA-NT is framed to present 78 industries as market producers belonged to non-financial and financial institutional sectors.

The main data sources for compilation of the gross output and intermediate consumption of market producers are the annual bookkeeping reports on revenues and expenditures with the annexed statistical questionnaires used for transition from bookkeeping data into NA definitions and also for detailed specification of services within the output and intermediate input. For commodity breakdown purposes of the supply and demand side additional information is derived mainly from following statistical surveys:

- Prodcom survey for about 4000 industrial products – production and sales in quantity and value, including goods for/from processing;
- Balances of agricultural goods and services (by farm categories, including farms for subsidiary production of non-agricultural enterprises) incorporated in the system of economic accounts for agriculture – observing initial stocks, purchases, production, sales and intermediate consumption of 70 plant growing goods and 50 livestock breeding products;
- The system of material balances for 130 products group (in physical and value terms) mainly used as intermediate consumption. These balances originate from the past in the conditions of the centrally planned economy. Presently the material balances follow the same structure as of Goods and services national accounts and they are important initially balanced information for the further compilation of the commodity flows in the use table. The balances are compiled on the basis of two annual statistical reports: “Report on resources and sales of raw materials” and “Report on inventories, inputs and consumption of raw materials, fuels and other energy products”.

The category of market producers also covers the activities of small business and self-employed persons as a part of household sector. Small units keeping single accounting

system and self-employed persons are treated by assumption as units of homogeneous production and their output is allocated on the main diagonal of the matrix. Some exceptions are possible for distinguishing non-characteristic trade activities.

The agricultural sector output is estimated on the basis of information about 70 plant growing goods and 50 livestock breeding products derived from the balances of agricultural goods prepared by types of farm categories, including farms for subsidiary production of non-agricultural enterprises. Non-characteristic output of agricultural households (milk, meat products etc.) is presented on the relevant rows for manufacturing goods.

2.2.2.2. Producers for own final use

Own account producers belonging to household sector are separated in 5 branches. The most important are the agricultural households producing for own consumption. The own account construction of dwellings by households, imputed rent of owners occupied dwellings are also specified under the category of non-market producers.

The total production of agricultural households for own final consumption is divided into processed products and products consumed while fresh by the households. The processed agricultural products are treated as non-characteristic output of agricultural households and it is estimated at basic prices. The information is available from Household budget survey (HBS) and from agricultural product balances for the relevant farm types.

Own account construction and capital repair of buildings by private households are defined on the basis of the number of dwellings permissions provided by the municipalities in the “Report on dwellings construction”.

2.2.2.3. Other non-market producers

The units classified as producers of other non-market production belong to the General government and to the Non-profit institutions serving households (NPISHs).

The General government is presented by the activities of its sub-sectors: the producers of Central Government services and Social security institutions are classified into 16 branches and the producers of Local Government services – into 13 branches. For the presentation of other non-market services according to NACE classes a transformation link with the FOFOG classification at the detailed level is used.

Following ESA’95 concept the value of the output of General government and NPISH’s is calculated as a sum of the current expenditure components - intermediate consumption, consumption of fixed capital and compensation of employees. Within Supply and Use table two types of services are separated – “fees” and “consumption” (individual and collective). The data sources have an administrative origin – information for the execution of the budget with the specification of the expenditures by COFOG groups, trail balances and balance sheets by budgetary units.

Within the SNA-NT the COPNI activities of NPISHs are reclassified into 6 NACE branches. The data for NPISHs are available from the annual report on revenue and expenditure and related statistical reference tables. According to the national legislation the non-profit institutions have to present their financial statement with two separated reports – one for the non-profit functions and one for performed market activities.

2.2.3. Final demand categories in the SUTs frame

The total resource of goods and services, domestically produced and imported, is distributed in the Use table by the following categories of final demand: individual consumption of households (disaggregated by 77 COICOP groups); expenditure of Central Government and Local Government for individual and collective consumption (each of them disaggregated by 14 COFOG divisions); expenditure of NPISHs for individual consumption (disaggregated by 8 COPNI division); fixed capital formation (by 20 groups); changes in inventories and exports.

2.2.3.1. Final consumption expenditures

In the Use table Household final consumption expenditure is distributed on 4-digit level of COICOP. Different data sources such as HBS, retail trade statistics and agricultural balances are used for the estimation process. Branch statistics data are used for the valuation of services, including consumption of water, electricity and heat energy.

Since 2000, the detailed structure of the government final consumption expenditures is introduced in the frame of SUTs - into expenditure of Central and Local Government, each of them disaggregated by 14 divisions, according to COFOG. The government final consumption expenditures are calculated by subtracting the sales value of provided services (allocated to the intermediate consumption or to the household final expenditures) from the gross output of general government sector. The allocation of government sales into final demand categories and intermediate consumption is done on the basis of detailed information from the budget reports and extra-budgetary accounts of the governments units.

2.2.3.2. Gross fixed capital formation

Within the new established SUT framework gross fixed capital formation is broken down by investment types – buildings, construction outfits, machinery and equipment, vehicles etc. - and by business sectors.

Data for tangible fixed assets are obtained through the annual investment report with coverage of all units outside households sector. Data on sales on the domestic market of the branches producing investment goods and information from custom statistics on imports of investment goods are also used. Intangible fixed assets are estimated on the basis of a specific annex to the annual balance sheet.

2.2.3.3. Inventories

The changes in inventories of industrial goods are estimated on the basis of the annual Prodcom report on production and sales of industrial output in physical and value terms. For the estimation of changes in stocks of raw materials the material balances are used. Agricultural balances are used to estimate the changes in inventories of agricultural products.

2.2.3.4. Exports

The exports of goods are valued f.o.b. The data are derived from customs declarations and then provided by External trade statistics division in NSI at 8-digit level of the Combined Nomenclature. In addition, the Prodcom data on direct export of industrial goods as a part of the gross output is used. Within the SUT framework the net treatment of the export of processed goods is applied following the information from business statistics and accounting rules of bookkeeping data. The exports of services is based on the Balance of Payments estimates.

2.3. Valuation of transactions

In the SNA-NT software the systematic integration of Production and Expenditure approaches for GDP calculation are applied following the general equations:

- Balance between Supply and Use at detailed commodity level;
- Output as a sum of Intermediate consumption and Value added for each industry.

Balancing equations are applied on each stage of valuation of the commodity flows:

- Basic prices;
- Producers prices, including taxes on products, subsidies on products;
- Trade and transport margins;
- VAT;
- Purchasers prices.

Within the frame of SUT separate sub matrices are systematically organized to describe different types of valuation of commodity flows and to ensure proper application of price indices in the process of deflation of the tables. A link between types of valuation of commodity flows at basic prices, producer's prices, purchaser's prices is methodologically ensured among the set of sub-matrices:

- Use matrix at basic price,
- Use matrices of taxes on products and subsidies on products,
- Use matrices of trade and transport margins,
- Use matrix of non-deductible VAT.

2.3.1. Compilation of trade margins matrix

The trade margins are derived as a difference between the value of the trade turnover and the cost of goods purchased for resale adjusted for changes in stocks.

The commodity flows in the Use matrix are valued at purchaser's prices. In order to transform the Use table from purchaser's prices into basic prices, the deduction of trade and transport margins as well as net product taxes is needed. The trade margins are calculated as a total amount and as a ratio for each commodity flow in the SUT.

As a starting point the value of trade margins by branches is calculated and included in the Supply table. Three types of trade margins are separated in the Product catalogue in the following rows:

- trade of motor vehicles, retail trade with automotive fuel;
- wholesale trade except of motor vehicles;
- retail trade.

The trade margins of the Supply side are prerequisite for the estimation of the trade margins matrices on the Use side. In practice the estimates of the trade output in Supply table are not finalized before the preparation of the allocated trade margins in the Use matrix. In some cases the allocation of the initially defined in Supply table trade margins by products to the user branches and final demand categories could lead to implausible results and than the estimated margins in output side or in the use side need to be changed accordingly.

Business statistics are the main data source for the estimation of trade margins. The annual reports of revenues and expenditures and specified statistical annexes provide information for the trade turnover and the purchased value of the goods sold. Based on that information the trade margins rates at 4-digit level of NACE are calculated. The statistical annex to the annual report specifies the trade turnover – separately for wholesale and retail trade - by COICOP groups. The information is crosschecked with the information provided by the material balances, the production and direct exports/imports.

The estimation procedures are specified for three main types for destination of market products: these with main destination to the production system as intermediate inputs; the investment goods and goods mainly used for final consumption of the households. While the first two categories activate dominantly the wholesale trade, the goods for final consumption engage both the wholesale and retail trade services. Also the practical reason of that distinction is related to the different data sources for these three main destinations of the resource of goods in the Use table.

The estimated commodity flows as intermediate inputs in the production system are based on the information from material balances in quantity and value terms. For each balance, the total resource of a given product is valued at basic prices (for domestic production) or at c.i.f. prices (imported). The allocated resources in the use side of the balance are valued at purchasers' prices. After deduction of the taxes on products the difference between the value of the total resource at basic prices and total use at purchaser's price is treated as margin. In this sense the correct estimate of the trade and

transport margins will allow the balanced data between supply side and demand side of each material balance.

In practice a significant part of investment goods goes directly from producer (or from abroad) to users – investors - and in that case they are not subject of trade intermediation. The estimated trade margins are based on the detailed information from wholesale traders (aggregated at 4-digit NACE class) - of their receipts from sales of investment goods and the purchaser's value of investment goods sold.

For the products, used as individual consumption, both the wholesale and retail margins are considered. The structural business statistics data at 4-digit level of NACE are used for the compilation of trade margins. The statistical annex to the annual report of the trade intermediaries specifies the trade turnover – separately for wholesale and retail trade - by COICOP groups. In addition the comparison of the observed price levels from PPI survey and CPI survey gives a possibility for checking the initially estimated trade margin for a given product.

Finally, the Use matrix for trade margins is crosschecked for overall plausibility with the wholesale and retail margins from the supply side. In case of some inconsistencies, the trade margins from the supply side are accordingly adjusted.

2.3.2. Compilation of VAT matrix

The main features of the newly established SUT framework - detailed product catalogue, distinction between market output, output for own final use and other non-market output and an identification of types of producers/consumers - are a proper base for definition of non-deductible VAT and for the compilation of VAT-rate matrix.

The VAT-rate matrix is designed to reflect the rates of non-deductible VAT, included in the Use matrix in the cells specifying products and users. Three coefficients tables are prepared following the VAT act related regulations:

- The General tax rate (VAT-ORD) - The tax rate is equal to 20 % for each taxable supply of goods or services, including the imported goods, unless provided otherwise in this Act. The tax rate shall be zero in the event of exports.
- A list of products with non-standard VAT rate (VAT-PROD) - This list of products enumerates all products that are not levied with VAT according to the VAT act.
- A list of industries which have the right to deduct VAT paid for purchased products (VAT-USER) - In this table users that can deduct VAT on its purchases, are included in the list with a weight = 0. Users might be in situation where they only have the right to deduct VAT on some parts of their intermediate consumption. Also according to the applied threshold of 50000 BGN (25000 Euros) of turnover for VAT registration a number of small units do not have a right to deduct VAT on its purchases for intermediate consumption and have to be treated as final payers of VAT. For these cases a proportional shares of small business turnover by branches are calculated in order to separate the producers

deducting VAT on purchased products and services. For example: for 16.82 % of the intermediate inputs of agricultural producers supplying products to the market – code 23010 – have to be levied with VAT.

VAT USER											
51110	0.0000	23181	0.0116	23280	0.0109	23553	0.0543	23750	0.0000	28311	0.0000
51120	0.0000	23183	0.0078	23290	0.0024	23601	0.0000	23800	0.0009	28410	0.0000
51220	0.0000	23190	0.0053	23300	0.0011	23602	0.0139	23850	0.0040	28411	0.0000
51230	0.0000	23200	0.0143	23310	0.0017	23603	0.0000	23900	0.0006	28510	0.0000
23010	0.1682	23210	0.0010	23320	0.0024	23604	0.0363	23910	0.0003	28511	0.0000
23020	0.0311	23220	0.0038	23330	0.0088	23610	0.0001	23920	0.0045	28520	0.0000
23050	0.1728	23230	0.0000	23340	0.0023	23620	0.0000	23930	0.0358	28521	0.0000
23100	0.0000	23241	0.0003	23350	0.0031	23631	0.0032	83000	0.1803	28610	0.0000
23110	0.0000	23242	0.0026	23361	0.0119	23633	0.0049	82000	0.0000	28611	0.0000
23120	0.0000	23244	0.0001	23362	0.0193	23640	0.0002	84000	0.1702	28710	0.0000
23130	0.0000	23245	0.0008	23370	0.0001	23650	0.0000	85000	0.1736	28720	0.0000
23140	0.0005	23250	0.0051	23400	0.0000	23659	0.0000	27500	0.0000	28810	0.0000
23151	0.0032	23261	0.0007	23410	0.0002	23660	0.0000	27600	0.0000	28820	0.0000
23152	0.0080	23262	0.0026	23450	0.0167	23670	0.0862	28110	0.0000	28830	0.0000
23155	0.0070	23265	0.0005	23500	0.0119	23700	0.1684	28111	0.0000	28840	0.0000
23159	0.0014	23271	0.0001	23510	0.0033	23710	0.0281	28210	0.0000	66800	0.0000
23160	0.0000	23274	0.0000	23520	0.0728	23720	0.0139	28211	0.0000	66920	0.0000
23170	0.0018	23275	0.0017	23551	0.0024	23730	0.0000	28310	0.0000	66940	0.0000

The SNA-NT application requires the VAT coefficient tables to be connected to each other. For products listed in table VAT-PROD, the VAT will be applied with the given VAT rate. For products not listed in VAT-PROD, the ordinary VAT will be applied. Then the table VAT-USER will be checked. For Users, listed in this table, the temporary VAT rate will be multiplied by the percentage in this table. In practice this gives the possibility by the SNA-NT computer routines to calculate non-deductible VAT as theoretical VAT receipts by using VAT rates by products and type of use for all categories in the SUT frame.

A6		Year 2001		VALUE ADDED TAX TABLE - coefficients as a proportion to total use/supply															
No	Code	INDUSTRIES (NACE) PRODUCTS (CPA)	INPUT OF INDUSTRIES (NACE)						FINAL USES										
			A+B	C+D+E	F	G+H+I	J+K	L to P	FC Exp by HHs	FC Exp by NPISHs	FC Exp by Gov	FC Exp total	GFCF	Changes in stocks	GCF	Exports	Final uses	Total use	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14			
1	A+B	Products of agriculture, forestry, fisherie	0.232	0.005	0.001	0.005	0.000	0.024	0.266	0.708	0.000	0.000	0.708	0.026	0.000	0.026	0.000	0.734	1.000
2	C+D+E	Products from mining and quarrying, ma	0.023	0.002	0.006	0.009	0.003	0.079	0.122	0.827	0.000	0.000	0.827	0.052	0.000	0.052	0.000	0.878	1.000
3	F	Construction work	0.013	0.001	0.009	0.017	0.184	0.173	0.396	0.142	0.000	0.000	0.142	0.462	0.000	0.462	0.000	0.604	1.000
4	G+H+I	Wholesale and retail trade, repair service	0.007	0.001	0.001	0.006	0.004	0.059	0.077	0.923	0.000	0.000	0.923	0.000	0.000	0.000	0.000	0.923	1.000
5	J+K	Financial intermediation services, real est	0.017	0.006	0.003	0.039	0.057	0.330	0.452	0.380	0.000	0.000	0.380	0.168	0.000	0.168	0.000	0.548	1.000
6	L to P	Other services	0.004	0.000	0.000	0.006	0.003	0.318	0.331	0.669	0.000	0.000	0.669	0.000	0.000	0.000	0.000	0.669	1.000
61		Total	0.037	0.002	0.004	0.009	0.010	0.081	0.143	0.801	0.000	0.000	0.801	0.056	0.000	0.056	0.000	0.857	1.000

3. SUTs at constant prices

The calculation of SUT at constant prices is organized within the SNA-NT software. The following features of the SNA-NT can be pointed out:

- sufficiently detailed commodity level;
- definitive description of types of producers/consumers;
- integration with the non-financial sector accounts;
- systematic valuation of the transactions - opportunities for national accounts compilers for plausibility checks and to analyze the different price indices for each single commodity.

3.1. Index formula

Based on the time series of supply and use tables 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.

3.2. Price matrix table

Under the SUT organization of the data flows (in SNA-NT software) the types of price indices are allocated in matrix table “commodities by type of indices”. The following price indices are included in the price matrix table: PPIs – for sales at domestic market, CPIs, Import and Export UV price indices. The matrix table gives possibilities for comparing and analyzing the behavior of different prices for a single commodity as a part of plausibility checking of price indices for further use in the system.

The structure of SUT price catalogue used in the calculations of 2001 SUT at prices of 2000 is presented in the following scheme.

Product codes	Imports_goods 10 value	Imports_srv 10 value	Input pr.ind. 10 value	PPI_dom.use 10 value	PPI_dom.use 13 value	CPI_dom.use 13 value	CPI_H'h consum. 19 value	Exports_goods 19 value	Exports_srv 19 value									
SAM NA_CPA	IM_I	U1	IM_U	U2	PRLO	U3	PR10	U4	PR13	U5	KP13	U6	KP19	U7	EX_I	U8	EX_U	U9
011111	1005	1				1102	1								1088	1		
011113	1005	1				1427	1								1011	1		
011114	1005	1				726	1								1088	1		
011115	1005	1				978	1								1088	1		
011117	1005	1				1148	1								1278	1		
011118	1005	1				1127	1								1088	1		
011119	1005	1				1239	1								1088	1		
011121	1019	1				823	1						1066	1	1088	1		
011421						823	1											
011124	1135	1				949	1						980	1	1088	1		
011424						949	1											
011126	1005	1				1425	1						1312	1	1088	1		
011426						1425	1											
011128	1325	1				1921	1						980	1	1088	1		
011428						1921	1											
011123	1005	1				487	1								1088	1		
011131	1005	1				925	1								1088	1		
011132	1076	1				731	1						1135	1	1088	1		
011432						731	1											
011136	1005	1				1179	1						1135	1	1167	1		
011137	1005	1				487	1								980	1		
011141	1005	1				1083	1								1069	1		
011150						751	1											
011160	1005	1				1062	1								797	1		
011170	957	1				1023	1								1088	1		

The different price indices for each commodity item in the catalogue have to be applied consistently for deflation of domestic output and imports in the Supply table and for deflation of the flows among users in the Use table.

3.2.1. Producer Price Index

PPIs for domestic market are calculated following EU Regulation 1165/98, which established data requirements in relation to coverage, periodicity and timeliness. The PPIs are base weighted (Laspeyres) indices. They are weighted according to sales in the

base year (presently 2000). PPIs are calculated at successive levels of aggregation with indices for each level of aggregation based on the weighted arithmetic mean of indexes from the level below. The weights of the lower level indices are sourced from the PRODCOM survey and weights for PPIs at higher levels of aggregation are based on the value of sales on the domestic market in the base period drawn from Structural Business Statistics Survey results. The calculations of PPIs are based on the following main principles:

- The prices quoted represent prices achieved for a significant proportion of sales of industrial enterprises;
- The products are quoted on the same basis each month, i.e. the same product and terms of sale;
- The product and the terms of sale are described in sufficient detail to ensure consistency each month;
- Prices are ex-factory, ex-mine, etc selling prices, i.e. basic prices excluding trade and transport margins and taxes on products.

3.2.2. Consumer Price Index

The price concept of the consumer price index is consumer price or purchasers' price, i.e. inclusive of trade margins, taxes less subsidies on products and VAT. Since 2000 the geometric mean formula has been used to calculate the elementary aggregate indices. At the aggregated level indices are then calculated by applying the Laspeyres chain formula, with annual links.

3.3.3. Foreign trade index

A sub-component of the project with Statistics Norway for implementing the SNA-NT software for organization of data flows and calculation of SUT at current and constant prices (prices of previous year) involves the improvement of FTS index calculation system for data input to SUT systems. The main goal was to develop an index calculation system relevant to the commodity structure and definition of the National Accounts SUT with new modifications on the applied HB method for price component instead of ordinary UVIs used before. The improvements are concentrated on introducing selection criteria for automatic selection of Representative Price series based on commodity by country coverage. The steps of the cleaning process are organized to ensure as much as possible the homogeneity and representative status of the products entered in the index calculation system.

3.3.4. Earning indices

The earning indices are used for deflation of compensation of employees within the application of cost method procedure for deflation of other non-market services. Presently the cost method is also applied for deflation of the construction output. The concept of earnings is total earnings, including contributions to pension schemes paid by

employees and employers. Average earnings are calculated on the basis of information on the total number of hours performed.

3.3.5. Agricultural Price Indices

The product specification in the agriculture statistics is very detailed giving homogenous products. The price concept for the indices is ex-farm price, exclusive of VAT. Estimates are derived largely by volume projection at a very detailed level i.e. product by product through valuing current year quantities at average selling previous year prices.

3.4 Compilation procedures

The constant price and volume indices compilation is executed on the initially balanced SUTs at current prices for year T-1 (2000) and year T (2001), structured in the same format as regards all classifications and valuation standards.

The procedures start with the compilation of SUT in basic value at constant prices beginning with the domestic supply at commodity level. In the price catalogue for the commodities with product taxes or subsidies recalculations are made, the pure basic value price indices to be ensured. In the cases of using CPIs for deflation of the output of some goods and services the proper recalculations are applied also for elimination of changes in tax rates and distribution margins rate. Also a procedure for elimination of the impact of trade and transport price changes within the export f.o.b. price index is applied.

The preparation work for the deflation of the commodity flows in the Use table valued at basic prices has two main steps:

- The first step is a compilation of average weighted price indices of total Output using PPIs for domestic market and Exports price indices.
- The second step is a constant price calculation of total domestic use at commodity level (at basic prices) using average weighted price index: “Domestic supply + Imports – Exports”.

Within Use table (at basic value) at commodity level, the distribution of total domestic use at constant prices is calculated proportionally to the domestic use in current prices.

The Domestic use at purchasers’ value is calculated automatically using Tax rates and margins’ rates as supplements of basic value from previous year. That extrapolation procedure is in line with the recommended methodology for compilation of trade and transport margins at constant previous year price.

The procedure of theoretical VAT calculation in SNA NT is based on the standardized catalogue with the coefficient tables for description of VAT law. Each year any changes in the VAT law should be introduced in the catalogue and will result in the price changes in the compilation of the SUT at constant prices of previous year.

Supply and Use tables - Volume indices, previous year = 1.000

Year 2001 Table 15: Supply table - previous year volume indices BULGARIA

No	Code	INDUSTRIES (NACE) PRODUCTS (CPA)	OUTPUT OF INDUSTRIES (NACE)							Total	Imports cif	Total supply at basic prices	VALUATION			Total supply at purchasers' prices
			A+B	C+D+E	F	G+H+I	J+K	L to P	Trade and transport margins				Taxes less subsidies on products			
			1	2	3	4	5	6	7				8	9	10	
1	A+B	Products of agriculture, forestry, fisheries and aquaculture	1.010	.852	.694	.855	.674	.264	1.006	1.255	1.014	.944	.999	1.007		
2	C+D+E	Products from mining and quarrying, manufactured products	1.094	1.080	.848	.895	.795	2.861	1.078	1.191	1.115	1.053	1.047	1.103		
3	F	Construction work	.841	1.243	1.150	1.010	1.620	1.743	1.149	2.310	1.167		1.171	1.167		
4	G+H+I	Wholesale and retail trade, repair services, hotel and restaurants	.286	.944	.463	1.122	.254	.258	1.079	1.632	1.124	1.039	1.228	1.181		
5	J+K	Financial intermediation services, real estate, renting and other services	.076	.506	.688	.872	1.061	3.328	1.033	1.583	1.063		1.307	1.065		
6	L to P	Other services	.014	.235	6.944	1.394	.194	.962	.962	2.420	.965		.895	.965		
7		Total	1.007	1.071	1.097	1.106	1.040	.963	1.055	1.249	1.090		1.067	1.089		
8		Cif/fob adjustments on imports								1.000	1.000			1.000		
9		Direct purchases abroad by residents								1.071	1.071			1.071		
10		Total	1.007	1.071	1.097	1.106	1.040	.963	1.055	1.234	1.090		1.067	1.089		
11		Total of which:														
12		- Market output	.981	1.071	1.100	1.105	1.101	1.476	1.082							
13		- Non-market output for own final use	1.084		.994		.986	1.021								
14		- Other non-market output	1.172	1.534		1.217	.806	.873	.879							

Year 2001 Table 16: Use table at purchasers' prices - previous year volume indices BULGARIA

No	Code	INDUSTRIES (NACE) PRODUCTS (CPA)	INPUT OF INDUSTRIES (NACE)							Total	FINAL USES									
			A+B	C+D+E	F	G+H+I	J+K	L to P	FC Exp by HHs		FC Exp by NPISHs	FC Exp by Gov	FC Exp total	GFCF	Changes in stocks	GCF	Exports	Final uses at purchasers' prices	Total use at purchasers' prices	
			1	2	3	4	5	6	7		8	9	10	11	12	13	14	15		
1	A+B	Products of agriculture, forestry, fisheries and aquaculture	.987	1.047	.647	.946	.090	1.123	.996	1.020			1.172	1.021	1.200	.838	1.499	.948	1.023	1.007
2	C+D+E	Products from mining and quarrying, manufactured products	1.047	1.076	1.077	1.083	.962	.954	1.062	1.066			4.775	1.078	1.286	3.699	1.431	1.119	1.141	1.103
3	F	Construction work	1.067	1.194	1.374	1.100	1.247	1.204	1.215	2.815				2.815	1.090	-2.826	1.112	1.071	1.140	1.167
4	G+H+I	Wholesale and retail trade, repair services, hotel and restaurants	1.172	1.232	1.036	1.103	1.468	1.317	1.166	1.165			1.312	1.168				1.220	1.191	1.181
5	J+K	Financial intermediation services, real estate, renting and other services	1.052	1.125	1.405	1.107	1.125	1.150	1.132	.980			.930	.978	2.422	.910	2.277	1.006	1.009	1.065
6	L to P	Other services	.544	.989	.622	.734	.919	.994	.886	.933	1.389	.954	.959					1.773	.973	.965
61		Total	1.006	1.088	1.117	1.074	1.121	1.026	1.074	1.056	1.389	.985	1.044	1.225	5.854	1.324	1.137	1.101	1.089	
62		Cif/fob adjustments on exports																1.000		
63		Direct purchases abroad by residents																1.071		1.071
64		Purchases on the domestic territory by non-residents																1.150		1.150
65		Total intermediate consumption/final use at purchasers' prices	1.006	1.088	1.117	1.074	1.121	1.026	1.074	1.045	1.389	.985	1.034	1.225	5.854	1.324	1.141	1.101	1.089	
70		Value added at basic prices	1.007	1.032	1.064	1.147	1.003	.917	1.031											
71		Output at basic prices	1.007	1.071	1.097	1.106	1.040	.963	1.055											

3.4.1 Trade and Transport margins at constant prices

The value of trade margins at constant prices in the current year (T) is calculated in the Use table by using the "Trade margin rates" from the base year (T-1), computed for all products by category of use. This is tantamount to extrapolating each individual wholesale and retail trade margin in the base year with trends in the volume of goods at basic prices.

Thereby calculated trade margins in constant prices in the Use table at basic value, specified by products and users are aggregated for all users (vector column) by the created "Aggregation account 27500" and are transferred to the Supply table. Then the aggregation account is balanced in constant prices by an automatic adjustment in Use table, to ensure that the sum of trade margins at basic value in Use table equals to the sum of trade margins in the Supply table. This is done by proportional adjustment of the wholesale trade margin and retail trade margin (code 510100 and code 510200 of the product catalogue) delivered to the aggregation account "27500". The constant price figures for the supply of wholesale trade margins (510100) by wholesale trade industry (code 23510 of industry catalogue) and of retail trade margin (510200) by the retail trade industry (code 23520 of industry catalogue) in basic value are corrected and set equal to the use of the same products in account 27500 in the Use table.

The transport margins in constant prices are calculated and balanced in a similar way as for trade margins. The transport margins at basic values are calculated in constant prices in the Use table, specified by products and users. These values at the commodity level are aggregated by users and transferred to the Supply table with the aggregation account for

transport margins (code 27600) including land transport, transport via pipeline, water transport and air transport.

4. Input Output tables

The Supply and Use Tables are transformed into an “Industry by Industry” Input-Output table using the assumption of industry technology – the industries has their own technology irrespective of the products they produced. The calculations are performed at the most detailed level of industries and products. Input-Output tables may be calculated at both current and constant prices, at different levels of aggregation.

The SNA-NT application contains automatic procedure for converting the Supply table (Suppliers by Products) and the Use table (Products by Users) at basic value, to an ”Industry format” Input-Output table by distributing the supply and use of products. For each product, domestic use of the product (intermediate consumption, final consumption, capital formation, changes in inventories) and exports will be linked directly to the domestic suppliers (industries) of the product and to imports of the product.

The main principle is the assumption that export of a product primarily is supplied from domestic industries. Distribution of the exports of a product by supplying industries, are assumed proportionally with the different industries production of the product. Imports, custom duty and the remaining part of domestic production of the product is then subsequently distributed proportionally by the different domestic use of the product. This means that the same import share applies to all domestic use categories of a product, and that all industries supplying a product, have the same market share for all types of use of that product.

In the SUT, the import is distributed by product and not by industry. In the Input - Output tables, imports are distributed by industry by making the assumption that the products are produced and supplied from industries abroad by the same classification that are used for domestic produced products.

5. Further developments

Newly adopted SUT’s framework in the national statistical practice with its main features – integration within the national accounts system, transparency at a detailed level of commodity flows among defined category of users, flexibility and efficiency of the SNA_NT application software – has a significant potential for further development of the national accounts system and also for further development of important basic economic statistics providing data inputs for the national accounts compilation.

During the project work the system proved its capacity for a proper organization of data inputs and for an indication of detected inconsistencies in the internal process of the compilation and balancing of the tables.

5.1 Theoretical VAT receipts

The applied systematic approach for the valuation of the transactions within the SNA-NT application allows the theoretical VAT budget receipts to be calculated in the national accounts. The systematic treatment of VAT in the SUTs will be of significant importance for the estimation of average VAT rate as a part of EU own resources statistics. Before that the non-deductible VAT was identified on the final expenditures only - consumption and investment, while due to the existing relatively high threshold for VAT registration (in 2000 and 2001 the threshold was 75000 BGN near to 47000 Euros, presently it is 50000 BGN – or 25000 Euros) an important segment of the small business especially in trade and other service sectors was not covered by the VAT law. It was also important to recognize as final VAT payers the own accounts production units and other non-market producers.

5.2 Goods for processing and processing services

During the experimental work in the process of compilation and balancing of the tables for 2000 and 2001 the system allowed to detect inconsistencies with the input data sources – especially for the treatment of goods for/from processing and the treatment of transport services related to the import and export of goods.

The issue refers to products that have been imported for processing in the country and after that new products have been exported back. In Bulgaria the percentage of such imports and exports after processing is significant for some commodity groups: as far as the imports are concerned the percentage of raw materials imported for processing in the country comes to 27% while the percentage of exported processed goods amounts to 35 % (2000). Mention should also be made that for about 20 product groups, included in the SUT framework, the share of exported processed goods exceeds 90% for the year 2000. According to ESA 95, both the imports of the raw materials for processing and the exports of the processed finished products should be a part of the imports and exports. The difficulties arise by balancing these commodity flows. Actually the processing service contracts do not change the ownership of the goods for processing and respective new goods after processing. That confronts the data sources from business statistics and bookkeeping data from one hand with the data from customs statistics from another hand.

During the project work the detailed investigation at micro level was made on textiles and clothes industry where the processing services cover more than 80 % of its total turnover. The detailed comparison results showed various approaches for valuation of the exported goods after processing with cases of inconsistencies in recording the types of transactions involved. In the whole variety of cases it was evident that even the customs requirements for gross treatment of the transactions under the processing services contracts, a part of the producers record both in their business accounts and in their custom declarations the turnover on the basis of the prices for provided services. It was also evident that the processing services provided to the resident units are recorded on the net basis. The fact allows to use the net treatment of goods for/from processing in the SUTs framework and to include in the Product catalogue items for specification of processing services. The issue needs further investigation both from methodological point of view as well as from practical organization of data flows into the SUTs system ensuring consistency with the Balance of Payments statistics. The flexibility of SNA-NT application will be further

explored for the possible introduction of booth net- and gross- systems for recording of transactions in processing services.

5.3 Cif-Fob adjustments and treatment of related services

C.i.f.-f.o.b. adjustment and involved treatment of transport services related to the import and export of goods was another area had to be improved in the frame of SUTs with an impact on the current account Balance of Payments (BoP). For a several years the c.i.f.-f.o.b. ratio for valuation of imports f.o.b. prices was fixed as 8 % of total c.i.f. value of imports and the difference – transport and insurance services - was assumed as imports of services. During the last years the imported flows of goods in the national economy increased significantly with an annual average volume index of 120 % stated at more than 70 % share of GDP. Respectively the treatment of 8 % c.i.f.-f.o.b correction as an import of transport services led to an enormous amount of resources of transport services without real possibility for its adequate balancing among the users in the Use matrix. During the project work the existing information in the Customs authorities were investigated and analyzed and a practical procedure for regular estimation was introduced as supplement to the SNA-NT. The applied approach is based on the detailed customs information at the transaction level: by customs regimes, delivery terms, types of transport and nationality of transport. The calculated average proportions of transport and insurance services based on the declared transactions at f.o.b. value are applied to the transactions recorded at c.i.f. value. Among this procedure the treatment of transported services – especially in the case of resident transport carrier – was important. Actually these are transactions between residents without any impact on the imported services. As regards transport services related to the export of goods the calculated proportions for imports at the detailed commodity level and by country are used. All these methodological improvements involved in the experimental process of compilation and balancing of SUTs, have a significant impact on the previously published data in BoP and NA and they will be revised further with the compilation of SUTs.

5.4 Constant price calculation system

The capacity of the SUTs framework and its SNA-NT application software for the constant price calculation has to be seen as a main advantage of the developed SUT system. Presently the potentiality of the SUT system is not completely utilized. The preparatory work on constant price calculations for SUTs 2001 at prices of 2000 indicated areas for further improvements in SUT product catalogue with the separation of some commodity items with the different price changes in respect of different users. The development of price statistics as a result of extensive work under Eurostat's statistical program is an important factor for the improvements of price and volume system in National Accounts.