

REPUBLIC OF MACEDONIA
STATE STATISTICAL OFFICE

Supply and Use Tables for Macedonia

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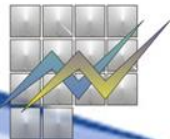
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Introduction

- 2004 - experimental compilation of the SUTs at current prices for the year 2000
 - The first aim - to check availability and reliability of data and data sources needed for more detailed breakdown of GDP aggregates into primary and secondary activities and by products.
 - The main data sources – regular statistical surveys and other administrative data sources (no additional survey was conducted for the compilation of the SUTs).
 - Methodologies: “EUROSTAT Input-Output Manual”, “United Nations Handbook of Input-Output Tables Compilation and Analysis” and methodologies of other countries.



Introduction

- ESA95 concepts and definitions, the same general rules of treatment for transactions as elsewhere in the System of National Accounts.
- Important assistance:
 - 2005 – expert mission from National Statistical Institute of Bulgaria,
 - 2007 – training course for SUTs in Sarajevo within the 3CARDS Regional Programme on Statistics
 - 2007-2013 - EU twining projects for support to the State Statistical Office - most important for the National Accounts – an expert assistance from the Czech Statistical Office.
- 2008 - started regular compilation of:
 - SUTs at current prices - annual compilation (three years after the reference year), (2005, 2006, ..., 2012)
 - Symmetric input-output tables (SIOTs) - five-yearly (2005, 2010)

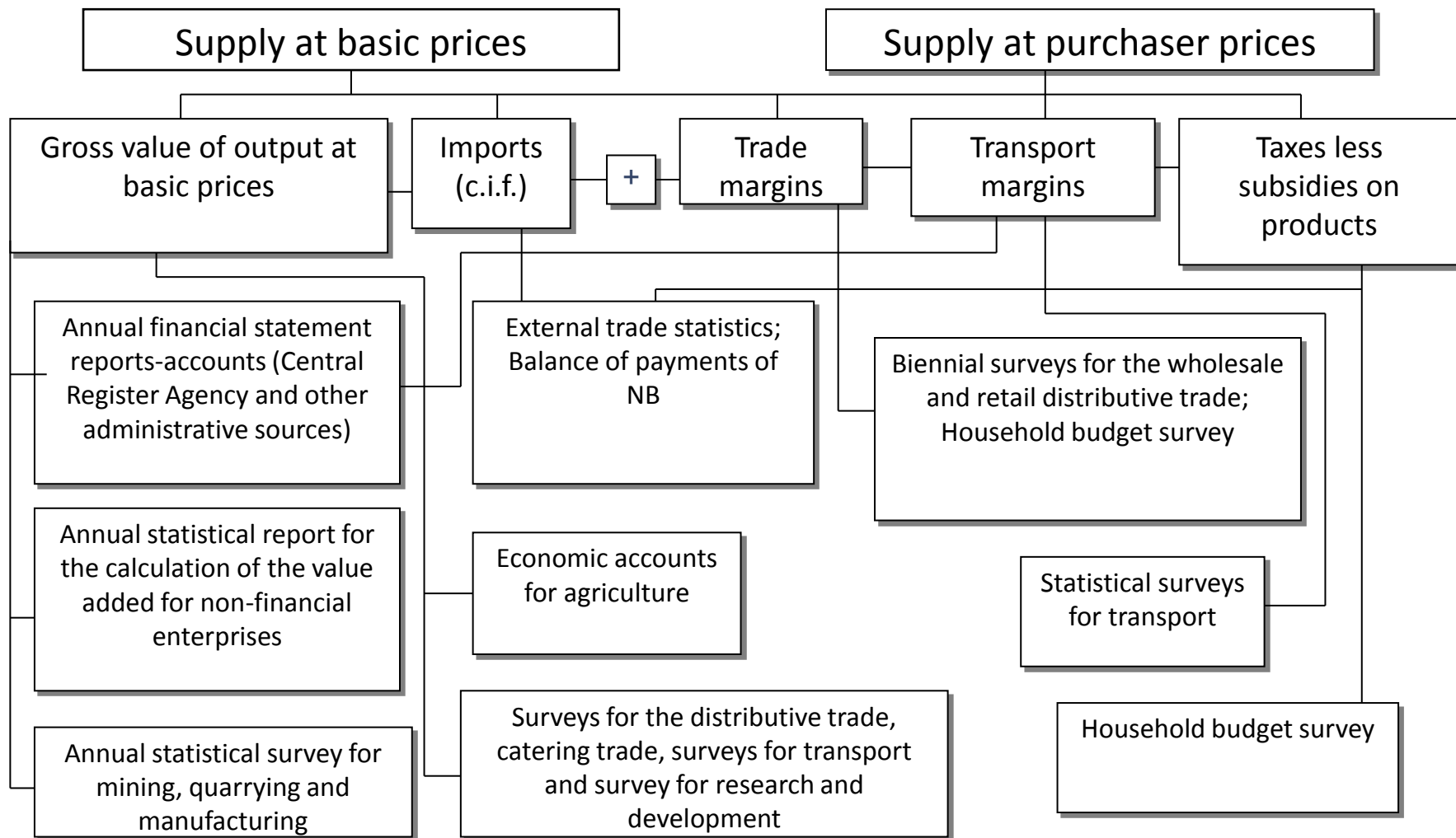


Introduction

- Transmission to EUROSTAT – according to EUROSTAT Transmission Program and templates for SUTs and SIOTs (tables 15 and 16 at current prices and tables 17, 18 and 19)
- Already calculated and published values of GDP aggregates on the level of NACE divisions and totals were used as a frame for the compilation of SUTs.
- 2013 - SUTs were used for the first time as a tool for balancing GDP data calculated by production and expenditure approach.
 - GDP preliminary data for 2012 were balanced by SUTs.
- 2014 – SUTs at current and previous year prices were used as a balancing tool within the National Accounts revision for the period 2005-2012.
- 2014 - SUTs for 2012 were compiled according to ESA2010.



Data Sources - supply





Data Sources - supply

- The value data classified by products - the most important data for the SUTs compilation
- Data sources for the output:
 - The full set of the Annual Financial Reports-Accounts: balance sheet, profit and loss report, receipts and expenditures report, cash flows report and structure of the capital report.
 - All enterprises are obliged by law to submit the full set to the Central Register, which in turn submits the set to the State Statistical Office in electronic format. All data from those reports are stored in the Data Warehouse and processed in SAS software.
 - Annual statistical survey for calculation of value added for non-financial enterprises - used to observe the secondary activities within the organisation structure of enterprises.



Data Sources - supply

- Economic Accounts for Agriculture - compiled annually since 1998 and cover all production activities and production units (including Households small farms). Near to 46 agricultural goods and services are presented in EAA.
- Annual statistical survey on mining, quarrying and manufacturing - used to distinguish the commodity structure of output of NACE activities 05-35. It is based on the PRODCOM list and provides detailed information about the commodity structure of production by activities.
- Annual statistical survey on construction, quarterly statistical survey on distributive trade, quarterly statistical survey on catering trade and annual statistical surveys on transport - used to distinguish the commodity structure of output of NACE activities 41-56.



Data Sources - supply

- Data sources for imports of goods and services: Foreign trade statistics and the Balance of payments of the National Bank.
- Calculation of the wholesale trade margins by CPA commodity groups
 - the gross values of output and imports are multiplied by the wholesale margin rates.
- Calculation of the retail trade margins by CPA commodity groups - the values of final consumption of households and purchases on the domestic territory by non-residents are multiplied by the retail margin rates.
- The wholesale and retail trade margin rates are calculated on the basis of data from trade and price statistics.

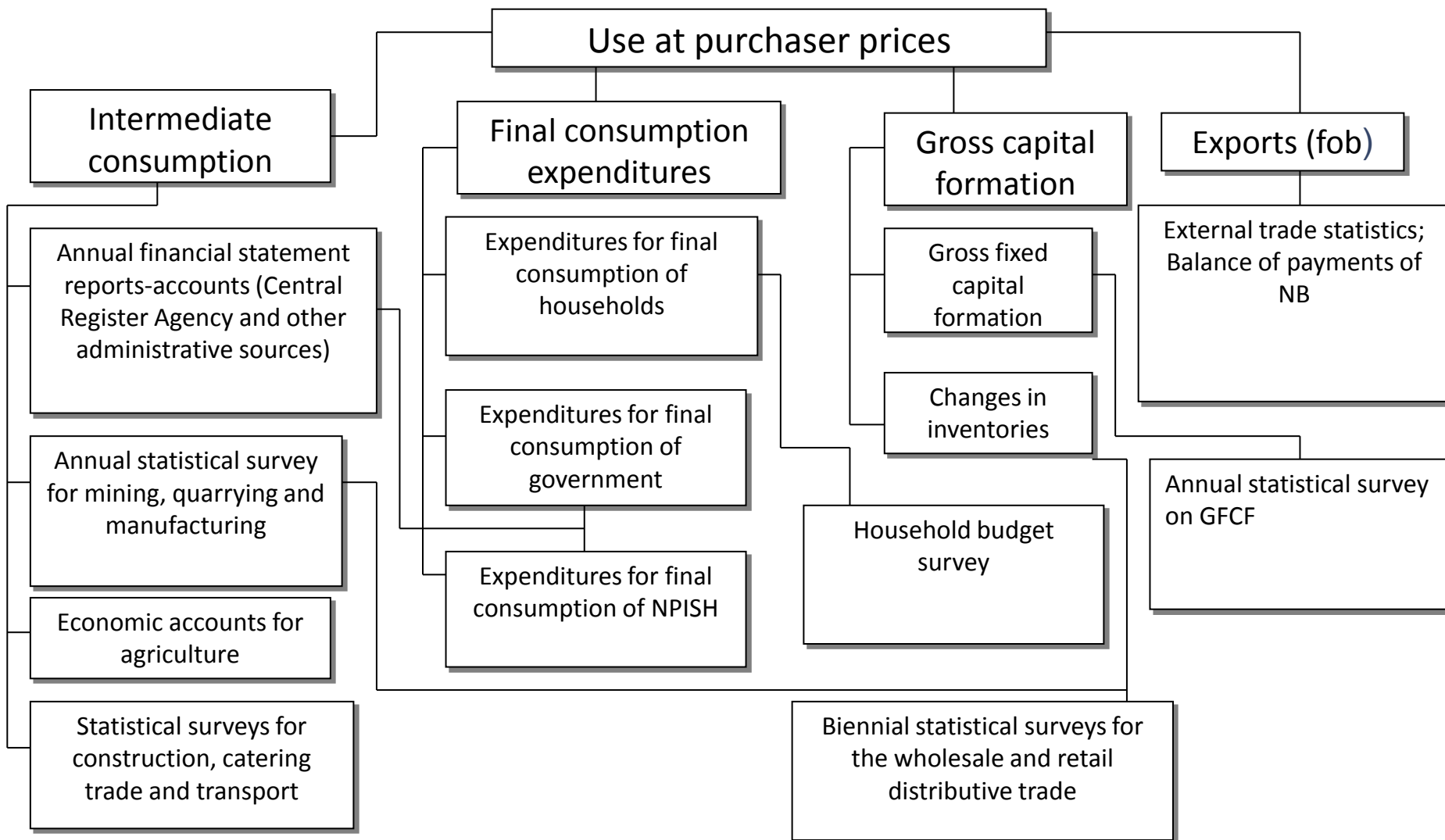


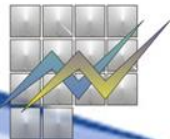
Data Sources - supply

- The transport margins by CPA commodity groups are calculated on the basis of data from the annual statistical surveys on transport, annual financial statement reports-accounts of enterprises and other organisations and the data from the “Special form for the needs of Government”.
- Taxes on products: value added tax (VAT), excise duties and import duties.
 - Theoretical distribution of VAT by CPA commodity groups - taxable purchases (final consumption of households, purchases on the domestic territory by non-residents, intermediate consumption and gross fixed capital formation for VAT non-payers) are multiplied by the prescribed tax rates (5% and 18%).
 - Theoretical distribution of import duties by CPA commodity groups - the value of imports are multiplied by the prescribed customs rates on products.
 - Calculated (theoretical) taxes are afterwards adjusted to the data from tax records.



Data Sources - use





Data Sources - use

- Data sources for the intermediate consumption:
 - Annual Financial Reports - Accounts (supplemented with the “Special form for the needs of Government”).
 - Economic Accounts for Agriculture - the intermediate inputs of agricultural activity (seeds and planting stock, energy, lubricants, fertilisers and soil improvers, plant protection products and pesticides, veterinary expenses, feeding stuffs, etc.).
 - Annual statistical survey on mining, quarrying and manufacturing - expenditures of raw materials, energy and fuels by NACE activities 05-35 and by domestic production and imports.
 - Annual statistical survey on construction – expenditures of building materials and energy by NACE activities 41-43.



Data Sources - use

- Annual statistical survey on expenditures of raw materials for food preparation in catering trade (NACE activities 55-56).

- Final consumption expenditures of households:
 - main data source is Household Budget Survey;
 - data from the Public Revenue Office concerning VAT statistics, data from the Insurance Supervision Agency, data from the National Bank regarding other financial services and
 - data directly taken from the bookkeeping documentation of companies that provide certain services to households (electricity, heating, telephone and post services, insurance and financial services, games of chance)

- Final Consumption expenditures of Government and NPISH - annual financial statement reports of the budget users and of the budget itself as well as data from Ministry of Finance.



Data Sources - use

- GFCF – data from the annual statistical survey on investments, data from construction statistics, commodity flow method for calculation of GFCF in the part of machinery and equipment, data from Annual Financial Reports - Accounts .
- Changes in inventories – distribution by products is based on data from the annual statistical survey on mining, quarrying and manufacturing and biennial statistical surveys on internal distributive trade.
- Exports of goods and services - Foreign trade statistics and the Balance of payments of the National Bank.



Compilation of the Supply and Use Tables – at current prices

- The SUTs are compiled at the 2-digit level of activities (within the columns) according to the National Classification of Activities – NKD (compatible with NACE REV.2) and at the 2-digit level of products (within the rows) according to the CPA 2008.
- The SUTs data at current prices on output, intermediate consumption and gross value added components by activities are adjusted to the Sector Accounts data by the same group of activities. (The Sector Accounts data are already adjusted with methodological and exhaustiveness adjustments and balanced by activities.)
- As the Sector Accounts data are balanced by activities, column totals of the domestic Supply Table at basic prices (outputs by activity) are equal to the left hand side of the Use Table (inputs by activity). The activity (column) balance condition is fulfilled but is not fixed.



Compilation of the Supply and Use Tables – at current prices

- The Czech Statistical Office provided the National Account Sector with the MS Excel software for the compilation of the System of Tables (Sector Accounts and Supply and Use Tables).
- The System of tables is established on one PC in the State Statistical Office. National Accounts staff have special permissions (“full control” or “read only”) for online work on the tables.
- The System provide full cooperation between National Accounts staff who work on the compilation of: Sector Accounts, Supply and Use Tables and GDP estimations at current and previous year prices.
- The whole System is fully standardised, which enabled comparability of data in the time series. Adding, deleted and merging of cells, columns and rows will cause breakdown of the system.



Compilation of the Supply and Use Tables – at current prices

- There are several Excel files (SUP, USE, SEK, SO etc.) interconnected by functional relations (links), comprising the whole System of Tables.
- SUP and USE files are designed for the compilation of the Supply and Use Tables, deflation and balancing commodity flows at current and previous years' prices.
- Both files are mutually linked and include many sheets.
- Most sheets contain three types of tables:
 - input data is in the last table (on the bottom),
 - tables with different adjustments are located in the middle and
 - the first table on a sheet (on the top) contains resulting (final) data (computed data + adjustments).



REPUBLIC OF MACEDONIA STATE STATISTICAL OFFICE

Supply and use table for Macedonia, general overview, current prices, in million denars, 2012

CPA2008		Total output	Imports (c.i.f)	Total supply of goods and services at basic prices (1+2)	Trade margins	Transport margins	Taxes less subsidies on products	Total supply of goods and services at purchaser prices (3+4+5+6)	Total intermediate consumption at purchaser prices	Final consumption expenditure by households	Final consumption expenditure by government	Total final consumption expenditure at purchaser prices	Gross Fixed Capital Formation	Changes in inventories	Exports f.o.b.	Total final use at purchaser prices (5+6+7+8)	Total use of goods and services at purchaser prices (1+9)
		SUPPLY								USE							
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
A	Products of agriculture, forestry and fishing	70 934	8 548	79 482	13 007	126	2 331	94 946	44 510	33 807	32	33 839	650	4 082	11 865	50 436	94 946
B	Mining and quarrying	12 501	17 369	29 870	1 130	614	50	31 664	23 535	629		629		4 281	3 219	8 129	31 664
10; 11; 12	Food products, beverages and tobacco	64 323	33 030	97 353	31 825	80	17 661	146 919	20 433	98 933	166	99 099		7 459	19 928	126 486	146 919
13; 14; 15	Textiles, wearing apparel and leather	21 224	6 345	27 569	6 748		3 732	38 049	12 548	16 168		16 168		- 5 101	14 434	25 501	38 049
16	Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	1 764	3 106	4 870	185		124	5 179	2 768	493		493		1 637	281	2 411	5 179
17	Paper and paper products	2 441	5 745	8 186	1 691	9	345	10 231	7 736	1 186		1 186		1 115	194	2 495	10 231
18	Printing and recording services	4 449	31	4 480			7	4 487	5 067	75		75		- 656	1	- 580	4 487
19	Coke and refined petroleum products	11 485	38 048	49 533	4 749	426	14 847	69 555	39 634	11 625		11 625		8 232	10 064	29 921	69 555
20; 21	Chemicals, chemical products, basic pharmaceutical products and pharmaceutical preparations	18 437	31 380	49 817	7 631	16	2 208	59 672	21 100	9 245	2 100	11 345		- 2 925	30 152	38 572	59 672
22	Rubber and plastic products	7 036	8 908	15 944	1 626		334	17 904	13 932	750		750		853	2 369	3 972	17 904
23	Other non-metallic mineral products	11 351	8 298	19 649	2 609	375	574	23 207	20 002	699		699		- 382	2 888	3 205	23 207
24	Basic metals	34 562	38 725	73 287	3 181	38	149	76 655	29 654	70		70		10 602	36 329	47 001	76 655
25	Fabricated metal products, except machinery and equipment	7 966	5 841	13 807	1 090	85	456	15 438	14 057	690		690	388	- 1 560	1 863	1 381	15 438
26; 27; 28	Computer, electronic and optical products, electrical equipment, machinery and equipment n.e.c.	29 825	38 354	68 179	7 111	65	3 037	78 392	29 342	9 257	40	9 297	23 651	- 1 522	17 624	49 050	78 392
29; 30	Motor vehicles, trailers, semi-trailers and other transport equipment	1 599	13 641	15 240	2 521	1	2 210	19 972	2 944	8 329		8 329	7 303	- 831	2 227	17 028	19 972
31; 32	Furniture; other manufactured goods	3 790	4 916	8 706	1 727		976	11 409	4 389	3 349	180	3 529	1 506	79	1 906	7 020	11 409
33	Repair and installation services of machinery and equipment	1 221		1 221			28	1 249	1 236	13		13				13	1 249
D	Electricity, gas, steam and air-conditioning	33 854	12 124	45 978			2 910	48 888	32 398	14 340		14 340			2 150	16 490	48 888
E	Water supply, sewerage; waste management and remediation activities	7 751	1 073	8 824		52	189	9 065	4 395	2 881	441	3 322		220	1 128	4 670	9 065
F	Construction works	84 308	2 011	86 319			1 584	87 903	13 959	547	1	548	70 618		2 778	73 944	87 903
G	Wholesale and retail trade services; repair services of motor vehicles and motorcycles	91 442		91 442	- 87 085		212	4 569	3 269	1 300		1 300				1 300	4 569
H	Transport and storage services	55 674	17 249	72 923		- 1 887	1 321	72 357	31 346	10 740	824	11 564			29 447	41 011	72 357
I	Accommodation and food services	21 287		21 287			2 972	24 259	6 739	16 680	- 49	16 631			889	17 520	24 259
J	Information and communication services	31 413	5 080	36 493	254		2 657	39 404	15 610	14 132	9 421	14 562	2 047		7 185	23 794	39 404
K	Financial and insurance services	23 859	2 542	26 401				26 401	14 155	10 620		10 620			1 626	12 246	26 401
L	Real estate services	67 625		67 625				67 625	5 390	62 234	1	62 235				62 235	67 625
M	Professional, scientific and technical	22 982	13 804	36 786			1 048	37 834	25 212	259	8 685	952	3 228		8 442	12 622	37 834
N	Administrative and support services	8 708	964	9 672			123	9 795	5 702	1 169	3 159	1 331			2 762	4 093	9 795
O	Public administration and defence services; compulsory social security services	51 178	1 673	52 851				52 851	8 286	53	44 246	44 299			266	44 565	52 851
P	Education services	22 006		22 006			245	22 251	693	5 248	49 16 261	21 558				21 558	22 251
Q	Human health and social work services	24 311		24 311				24 311	486	3 572	189 20 064	23 825				23 825	24 311
R	Arts, entertainment and recreation services	8 788	845	9 633			6	9 639	2 309	3 074	874 1 654	5 602	30		1 698	7 330	9 639
S	Other services	7 299		7 299			683	7 982	1 086	4 246	2 647	6 896				6 896	7 982
T	Services of households as employers; undifferentiated goods and services produced by households for own use	213		213				213	0	213		213				213	213
	Total	867 606	319 650	1 187 256	0	0	63 019	1 250 275	463 922	346 626	3 977	87 031	437 634	109 421	25 583	213 715	1 250 275



Compilation of the Supply and Use Tables – at prices of the previous year

- The State Statistical Office uses the previous year as the base year for national accounts deflation method.
- The SUTs provide a good and consistent framework for the calculation and balancing of national accounts aggregates at previous year's prices.
- Flows of goods and services (output, imports, intermediate consumption, final consumption expenditure of households, of NPISH and of government, GFCF, inventories and exports) are deflated at basic prices to which price indices refer.
- At the level of individual CPA divisions of goods and services the same price indices at basic prices are used for all flows, which enables consistency of used indices at the supply and use side.
- Margins and taxes are deflated separately on the use side and then transferred also to the supply side.



Compilation of the Supply and Use Tables – at prices of the previous year

- The whole process consists of the decomposition of the SUTs to individual value components and compilation of many sub-tables.
- The supply table at basic prices is split into: imports and domestic output.
 - The domestic output is split into: market output, non-market output and specific output (trade and transport margins, imputed rents and FISIM).
 - The domestic output is also split into: output for domestic use and output for export (total export reduced by non-resident purchases from imports and margins).
- The use table is calculated at basic prices (use at purchasers' prices less margins, taxes) because the use side has to be equal in all value components to the supply side. All components of the use table at basic prices (intermediate consumption, final consumption) are split into: use of imports and use of domestic output.



Compilation of the Supply and Use Tables – at prices of the previous year

- The respective price indices are applied to individual sub-tables of the supply and use side.
 - Market output for domestic use - is valued at basic prices and deflated by PPIs.
 - The components of non-market output are deflated separately:
 - intermediate consumption - deflated by implicit deflator from the use side by products,
 - compensation of employees - deflated by change in average wage and
 - consumption of fixed capital - deflated by general PPI.
- Import of goods and other services - deflated by unit value indices of imports.
- Export of goods and services - deflated by unit value indices of exports.



Compilation of the Supply and Use Tables – at prices of the previous year

- FHCE expenditure is calculated at basic prices and split into use of domestic output (deflated by PPIs) and use of imports (deflated by ImUVI).
- VAT, trade and transport margins, subsidies on products, and taxes on products without VAT – are deflated separately. The rates of the previous year are applied on the uses of goods and services valued at previous year's prices (at basic values). Deflation is done in use table data and then transferred also to the supply side.
- The individual components at prices of the previous year are then aggregated back and the SUTs at previous year's prices are thus acquired.
- From these tables, the volume and implicit deflators of output, intermediate consumption, value added, final demand components, at any level of aggregation, are derived in separate tables.



Supply and Use Tables as an integral part of GDP balancing process

- The annual estimates of GDP are produced independently with the production, expenditure and income approach.
- Calculations of GDP with the production and expenditure approaches are carried out using separate data sources.
- Calculation of GDP with the income approach is also carried out, but uses the same data sources as the production approach.
- The SUTs framework provides a statistical framework to include the components of three approaches to measuring GDP, enabling a balanced estimate of GDP at current and previous year's prices to be achieved.
- The process of SUTs balancing is the final stage of the whole process of GDP estimation.



Supply and Use Tables as an integral part of GDP balancing process

- First stage of balancing SUTs:
 - The SUTs are:
 - compiled and adjusted to the Sector Accounts data;
 - the activity (column) balance condition is fulfilled but is not fixed.
 - during the process of SUTs balancing by products, the data by activities can be adjusted too. (The matrix nature of the SUTs means that adjustments to one cell to bring a row into balance can introduce imbalances into other rows and columns.)
 - The time series of individual aggregates are prepared in the necessary format and classifications and updated:
 - output,
 - imports,
 - net taxes on products (taxes minus subsidies),
 - trade margins, transport margins,
 - intermediate consumption,
 - household consumption expenditure,
 - government and non-profit institutions consumption expenditure,
 - GFCF, acquisitions less disposals of valuables, changes in inventories
 - and exports



Supply and Use Tables as an integral part of GDP balancing process

- Time series for the period 2005-2012 at current and previous year prices are prepared in several files with many sheets:
 - Output, intermediate consumption, ratio intermediate consumption/output by 88 NACE activity groups
 - Output for each of the 88 NACE activity groups by CPA commodity groups (commodity structure of output)
 - Intermediate consumption for each of the 88 NACE activity groups by CPA commodity groups (commodity structure of intermediate consumption)
 - Commodity structure of all individual aggregates (output, imports, net taxes on products, trade margins, transport margins, intermediate consumption, household consumption expenditure, government and non-profit institutions consumption expenditure, gross fixed capital formation and acquisitions less disposals of valuables, changes in inventories and exports) at 88 CPA commodity groups.



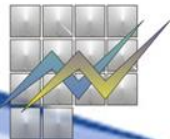
Supply and Use Tables as an integral part of GDP balancing process

- Second stage of balancing SUTs:
 - The product balance condition should be achieved:
 - horizontal balancing of supply and use data within the commodity group: total supply of each commodity group has to be equal to the total use of the same group ("commodity flows" method).
 - There are no strict rules how to make balancing adjustment in order to balance commodity flows. The most important is the history and expert knowledge.
 - Analysing the time series of individual aggregates by activities and products and comparing data with other available statistics (quarterly estimates of GDP, industrial output index, index of construction work, sales indices in the individual industries).



Supply and Use Tables as an integral part of GDP balancing process

- Major deviations from the average values in time series of respective aggregates or ratio indicators are subjected to thorough analysis in order to reveal possible errors in the source data.
- If there are no source data errors detected and there is no explanation for the deviation, the figures are adjusted by balancing corrections.
- Usually the figures are manually adjusted to follow the trend of a related indicator.
- The difference between supply and use within one commodity group is allocated to one or more aggregates (intermediate consumption, FHCE, GFCF or changes in inventories).
- After the deflation procedure is finished, the time series of aggregates in industry and commodity breakdown is checked again and significant inconsistencies are adjusted.



Supply and Use Tables as an integral part of GDP balancing process

- Third stage of balancing SUTs:
 - When manual adjustments have brought the tables into an “almost balanced” state, minor discrepancies by commodity groups are eliminated using the RAS excel application.
 - RAS procedure enables to change the intermediate consumption matrix and distribute the small differences in the intermediate consumption.
 - Required data for RAS: an initial structure of the intermediate consumption matrix and new frame (row sums and column sums).
 - The pre-balancing and the post-balancing data are compared systematically and any balancing adjustments are documented for all compiled SUTs.



Supply and Use Tables as an integral part of GDP balancing process

- Balancing adjustments made in the Supply and Use Tables are provided to Sector Accounts to be incorporated in the goods and services account, sector and sub-sector figures.
- Full consistency between Supply and Use Tables and Sector Accounts is obtained.
- GDP estimates with the production and expenditure approaches are balanced through SUTs.



Goods and services account

Balancing difference SUT 2012					
ESA 2010		Initial data	Final data	Adjustment	%
Current prices		before balancing	after balancing	balancing	balancing
P.1	Output	866,079	867,606	1,527	0.2%
D.21	Taxes on product	63,577	63,688	111	0.2%
D.319	Other subsidies on products	-669	-669	0	0.0%
P.7	Import of goods and services	324007	324007	0	0.0%
	Supplies	1,252,994	1,254,632	1,638	0.1%
P.2	Intermediate consumption	459,326	463,922	4,596	1.0%
P.3	Final consumption expenditures	378,667	431,883	53,216	14.1%
	of which households	287,659	340,875	53,216	18.5%
P.5	Gross capital formation	121,401	135,004	13,603	11.2%
	of which GFCF	96,151	109,071	12,920	13.4%
	Inventories	25,250	25,583	333	1.3%
	Valuables	0	350	350	100.0%
P.6	Export of goods and services	221563	223823	2,260	1.0%
	USES	1,180,957	1,254,632	73,675	6.2%
	Balancing difference	72,037	0	-72,037	x
	Gross value added	406,753	403,684	-3,069	-0.8%
	GDP output approach	469,661	466,703	-2,958	-0.6%
	GDP expenditure approach	397,624	466,703	69,079	17.4%
P6-P7	Net export	-102,444	-100,184	2,260	-2.2%
P3+P5	Gross domestic expenditures	500,068	566,887	66,819	13.4%



Transformation of Supply and Use tables into Symmetric Input-Output Tables

- Base for transformation – supply and use tables valued at basic prices.
- “Product technology” assumption is applied. This method assumes:
 - Transfer of secondary products from the industry where they were produced to the industry in which they represent the primary products.
 - The input structure of the primary producer serves as basis for derivation of input structure of the product.
- The transformation of SUTs only rearranges, on the basis of the output table and the assumption applied, the columns of the intermediate consumption from the use table at basic prices.
- The final use data are left unchanged as in the use table at basic prices.



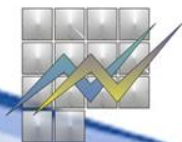
Transformation of Supply and Use tables to Symmetric Input-Output Tables

- The special MS excel application for symmetric I/O table conversion provided by the Czech Statistical Office is used.
- Symmetric “product-by-product” I/O tables are compiled for total, domestic production and imports.



Conclusions

- The Supply and Use Tables are fully integrated into the National Accounts compilation process and provide an adequate accounting framework for compiling consistent and reliable national accounts data.
- The Supply and Use Tables became an important tool for reconciliation of GDP data in an integrated approach.
- As a result of everything mentioned above, the Supply and Use Tables will continuously develop and improve.



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Thank you for your attention!