**22nd International Input-Output Conference**

**Lisbon, Portugal, 14-18 July 2014**

**Compilation of the supply and use/input-output tables according to the ESA 2010 for Estonia**

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***Abstract***

This paper describes the main changes in the supply and use/input-output framework with the implementation of the ESA 2010. Some of conceptual changes (e.g. research and development, weapons system, goods sent abroad for processing, merchanting) will affect production, expenditure and income components of GDP. As a consequence, the industry structure of the production and input/output coefficients will change significantly. This paper provides some examples which show the effects of the changes in the supply and use tables under the ESA 2010.

**Introduction**

In September 2014 Statistics Estonia, like all other EU member states, will carry out a major revision of the national accounts in accordance with the new European System of National Accounts (ESA 2010). Adoption of the new ESA guidelines is obligatory for all member states of the European Union.

Many of the changes in definition from the old ESA 1995 guidelines, to the ESA 2010 have an impact on Gross Domestic Product (GDP) and its components. The most important adjustments in this revision concern research and development (R&D) expenditure, military expenses. These will hence be included in investments. In addition, there are a number of definitional changes which only affect the data by industry or by transactions, and not the economy as a whole. For instance, with the implementation of the ESA 2010, the treatment of goods for processing from abroad changes and consequently the data on imports and exports will decrease significantly, however the effect on the GDP is null.

The Estonian national accounts figures will be revised, using 2010 as the base year. Changes in definitions and data sources will be fully implemented in the supply and use/input-output framework (SUT/IOT for the year 2010 according to the ESA 1995 have been already published). The first results of the revised version of the national accounts for the period 2000-2013 will be published in September 2014. The supply and use tables for the years 2010 and 2011 and symmetric input-output tables for the year 2010 according to the ESA 2010 will be published in December 2014.

In this paper, the major changes in the supply and use/input-output tables due to the revision of the Estonian national accounts are discussed. The effects of the changes on the level of the figures are analysed and the difference between the figures before and after revision are explicitly shown.

The major changes in the supply and use tables from the ESA 1995:

1. Recording of research and development as fixed capital formation
2. Recording of military weapons systems as fixed capital formation
3. “Net” recording of goods sent abroad for processing
4. The recording of merchanting

**RESEARCH AND DEVELOPMENT**

*The treatment of research and development in the ESA 1995*

The recording of market output of R&D services in the supply table is presented in table 1. Market output of R&D services is produced by market R&D producers (specialised commercial research institutes in NACE 72 and by non-specialised corporations as secondary production in various industries). Output by market producers is valued at the revenue from sales, contracts, commissions or fees. Non-market units, such as state universities and also non-profit research institutes produce non-market R&D services and also have income from sales of R&D services.

Table 1. The supply table for 2010 according to the ESA 1995, mln.EEK

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Industries | Industry 1 | Industry 2 | …………. | Market RD  | Non-market RD  | Total Domestic Supply at basic prices | Imports | Trade margins | Taxes less subsidies | Total Domestic Supply at purchasers prices |
| Products |   |   |   |   |   |   |   |   |   |   |   |
| Product 1 |   |   |   |   |   |   |   |   |   |   |   |
| Product 2 |   |   |   |   |   |   |   |   |   |   |   |
| R&D market |   |   |   | …  | 456 | 183 | 721 | 127 |   | 22 | 870 |
| R&D non-market |   |   |   |   |   | 1 230 | 1 230 |   |   |   | 1 230 |
| …………. |   |   |   |   |   |   |   |   |   |   |   |
| Total |   |   |   |   | 456 | 1 413 | 1 951 | 127 | 0 | 22 | 2 100 |

Under ESA 1995, expenditures on research and development (R&D) services by non-financial and financial corporations and institutions in general government and NPISH sectors are by definition recorded as intermediate consumption (table 2).

Table 2. The use table for 2010 according to the ESA 1995, mln.EEK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Industries | Industry 1 | Industry 2 | …………. | Market RD  | Non-market RD  | Total Intermediate Consumption | HCE | GG | NPISH | GFCF | Changes in inventories | Exports | Total final uses |
| Products |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Product 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Product 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| R&D market |   | 2 | 8 |   | 122 | 38 | 645 | 6 |   |   |   |   | 219 | 870 |
| R&D non-market |   |   |   |   |   |   |   |   | 1 230 |   |   |   |   | 1 230 |
| …………. |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Total |   | 2 | 8 |   | 122 | 38 | 645 | 6 | 1 230 |   |   |   | 219 | 2 100 |

*The new treatment of research and development in the ESA 2010*

The main change in ESA 2010 is recognising the products R&D services as capital assets. This will affect several entries in the SUT. From now, the internal R&D-activities of research departments of corporations are explicitly recorded as secondary activity (and not ancillary activity) of the relevant industries. They produce own-account R&D services that is capitalised by themselves.

Table 3. The supply table for 2010 according to the ESA 2010, mln.EEK

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Industries | Industry 1 | Industry 2 | …………. | Market RD  | Non-market RD  | Total Domestic Supply at basic prices | Imports | Trade margins | Taxes less subsidies | Total Domestic Supply at purchasers prices |
| Products |   |   |   |   |   |   |   |   |   |   |   |
| Product 1 |   |   |   |   |   |   |   |   |   |   |   |
| Product 2 |   |   |   |   |   |   |   |   |   |   |   |
| R&D market |   |   |   |   | 456 | 183 | 721 | 127 |   | 22 | 870 |
| R&D non-market |   |   |   |   |   | 995 | 995 |   |   |   | 995 |
| R&D own-account |   | 5 | 10 | 150 |   | 1 153 | 1 969 |   |   |   | 1 969 |
| Total |   |  5 |  10 |  150 | 456 | 2 331 | 3 685 | 127 | 0 | 22 | 3 834 |

The own-account R&D output is recorded in the use table as gross fixed capital formation. The own-account output of RD is capitalized as intellectually property products. In the production approach, the output of market producers increases (when R&D service is produced internally) or the intermediate consumption decreases (when R&D is purchased).

Table 4. The use table for 2010 according to the ESA 2010, mln.EEK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Industries | Industry 1 | Industry 2 | …………. | Market RD  | Non-market RD  | Total Intermediate Consumption | HCE | GG | NPISH | GFCF | Changes in inventories | Exports | Total final uses |
| Products |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Product 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Product 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| R&D market |   |   |   |   |   |   | 160 | 6 |   |   | 485 |   | 219 | 870 |
| R&D non-market |   |   |   |   |   |   |   |   | 964 | 31 |   |   |   | 995 |
| R&D own-account |   |   |   |   |   |   |   |   |   |   | 1 969 |   |   | 1 969 |
| …………. |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Total |   |   |   |   |   |   | 160 | 6 | 964 | 31 | 2 454 | 0 | 219 | 3 834 |

As a consequence, GDP has increased in 2010 by 2 219 mln.EEK (1.0% of GDP). Gross fixed capital formation has increased by 2 454 mln.EEK. The government final consumption decreased by 266 mln.EEK and NPISH final consumption increased by 31 mln.EEK.

**WEAPONS SYSTEMS**

The military weapons systems, such as warships, submarines, military aircraft, tanks, missile carriers and launchers, etc. are used in processes of production for defence services for more than one year, even if their peacetime use is simply to provide deterrence. Under ESA 1995, purchases of weapons systems by military authorities in general government sector were by definition recorded as intermediate consumption (table 5).

Table 5. The use table for 2010 in accordance with the ESA 1995, mln.EEK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Industries | Industry 1 | Industry 2 | …………. | Public administartion and defence | …………. | Total Intermediate Consumption | HCE | GG | NPISH | GFCF | Changes in inventories | Exports | Total final uses |
| Products |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Military product 1 |   |   |   |   | 753 |   | 753 |   |   |   |   |   |   | 753  |
| Military product 2 |   |   |   |   | 50 |   | 50 |   |   |   |   |   |   | 50  |
| Military product 3 |   |   |   |   | 60 |   | 60 |   |   |   |   |   |   | 60  |
| Total |   |   |   |   | 863 |   | 863 |   |   |   |   |   |   | 863  |

In new ESA 2010, purchases of durable weapons systems by military authorities in general government sector are considered as gross capital formation (table 6).

Table 6. The use table in accordance with the ESA 2010, mln.EEK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Industries | Industry 1 | Industry 2 | …………. | Public administartion and defence | …………. | Total Intermediate Consumption | HCE | GG | NPISH | GFCF | Changes in inventories | Exports | Total final uses |
| Products |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Military product 1 |   |   |   |   | - |  |  |   |   |   | 753 |   |   | 753 |
| Military product 2 |   |   |   |   | - |  |  |   |   |   | 50 |   |   | 50 |
| Military product 3 |   |   |   |   | - |  |  |   |   |   | 60 |   |   | 60 |
| Total |   |   |   |   | 0 |  |  |   |   |   | 863 |   |   | 863 |

Since defence is general government non-market production, where the output value is estimated as the sum of the costs, the effect on GDP is equal to the resulting change in the consumption of fixed capital (825 mln.EEK), whilst government consumption changes by the amount of the difference between the reclassified purchase of goods and the change in the consumption of fixed capital (-38 mln.EEK).

Table 7. Changes in the accounts for general government for 2010, mln.EEK

|  |  |
| --- | --- |
| PRODUCTION APPROACH | 2010 |
|  Output of goods and services (at basic prices) | -38 |
|  Intermediate consumption (at purchasers' prices) | -863 |
|  Gross value added (at basic prices) | 825 |
|  Taxes on products | 0 |
|  Subsidies on products |   |
|   |  |
| EXPENDITURE APPROACH |   |
|  Total final consumption expenditure | -38 |
|  Household final consumption expenditure | 0 |
|  NPISH final consumption expenditure | 0 |
|  General government final consumption expenditure | -38 |
|  Gross capital formation | 863 |
|  Gross fixed capital formation | 863 |
|  Changes in inventories | 0 |
|  Acquisitions less disposals of valuables | 0 |
|  Exports of goods and services | 0 |
|  Imports of goods and services | 0 |

As a consequence, GDP has increased in 2010 by 825 mln.EEK (0.4% of GDP). Gross fixed capital formation has increased by 863 mln.EEK. The output value and the government consumption decreased by 38 mln.EEK.

**GOODS SENT ABROAD FOR PROCESSING**

Cross-border processing activities are quite significant in Estonia. About half of manufacturing enterprises involved in contract processing performs work for the non-resident's units. Foreign trade statistics also shows that the gross values of goods sent for processing (particularly inward processing) are significant (please refer to diagram 1).

Diagram 1. Imports for inward processing in total imports of goods for 2000-2008

*The treatment of goods for processing in the ESA 1995*

Goods sent abroad for processing are recorded “gross” in the national accounts. Goods sent abroad for processing are defined as materials or semi-processed goods belonging to a principal enterprise in country A which are shipped to a foreign processor in country B for significant transformation and then returned to the principal in country A. The goods do not change ownership from A to B and B receives from A a fee for processing the goods.

In the supply and use tables, goods sent abroad for processing are included under goods. In case of inward processing, such goods are shown as imports of goods sent from abroad for processing and classified in a different group of the CPA. The value of the goods sent for processing was accounted for 7771 mln.EEK in 2008 (table 8). The processed goods re-exported back become new goods (for instance, transformation of fabric into clothing) and are valued at a higher value as a result of the processing. The value of the goods after processing was estimated at 9869 mln.EEK in 2008.

Table 8. Supply and use table for 2008 according to ESA 1995, mln.EEK

|  | Supply | Use | Total |
| --- | --- | --- | --- |
|  | Output | Imports | Intermediate consumption by industry | Exports | Changes in Inventories |
| Goods for processing:  |  | 7 771 | 7 402 |  | 370 | 7 771 |
| Product 1  |  | 500 | 490 |  | 10 | 500 |
| Product 2 |  | 1 700 | 1 700 |  |  | 1 700 |
| ………. |  | ….. |  |  |  |  |
| Goods processed: | 9 856 |  |  | 9 869 | -13 | 9 856 |
| Product 3 | 800 |  |  | 800 |  |  |
| Product 4 | 2 500 |  |  | 2 510 | 10 | 2 500 |
| ………. |  |  |  |  |  |  |

In the production account, the value of the goods sent for processing is allocated to intermediate consumption of importing (processing) industry. The value of gross output of that industry is equal to the value of the material and the processing fee. In other words, output is adjusted by the value of exports of processed goods and intermediate consumption by the value of imports of goods for processing.

*The treatment of goods for processing in the ESA 2010*

Goods sent abroad for processing are recorded “net” in the national accounts and flows are classified as services (processing fee). The value of goods sent for processing and processed goods are not included in the accounts. Processing fees are shown under production of services on the supply side and as exports of services on the use side. In the production account, the value of goods to be processed is not included in intermediate consumption. Value added in the processing economy is unaffected. Production is classified as a service, not a good.

Table 9. Supply and use table for 2010 according to ESA 2010, mln.EEK

|  |  |  |  |
| --- | --- | --- | --- |
|  | Supply | Use | Total |
|  | Output | Imports | Intermediate consumption by industry | Exports | Changes in Inventories |
| Goods for processing |  | - | - |  |  |  |
| Goods processed | - |  |  | - |  |  |
| Processing fees | 2 455 |  |  | 2 455 |  | 2 455 |

The processing fee received from the principal enterprise for the work performed was estimated at 2455 mln.EEK in 2008 on the basis of SBS and PRODCOM.

Under the ESA 2010, the industry structure in the processing country will change significantly. The ratios of intermediate consumption and value added to gross output of the manufacturing industries engaged in the processing under ESA 1995 and ESA 2010 in 2010 are presented in table 3 below. The biggest changes in the ratios of intermediate consumption to gross output were observed for industries of manufacture of electrical equipment (-5.3%) and manufacture of textiles, wearing apparel and leather product (-4.8%).

Table 10. Differences in the structure by industry for year 2010 due to revision of the ESA 2010, mln.EEK

| Code | Activity | ESA2010 | ESA1995 | Difference |
| --- | --- | --- | --- | --- |
| IC ratio to output | IC ratio to output |
| M.C.10\_11 | Manufacture of food products and beverages | 77,9% | 78,4% | -0,6% |
| M.C.13\_15 | Manufacture of textiles, wearing apparel and leather product | 63,5% | 68,4% | -4,8% |
| M.C.16 | Manufacture of wood and of products of wood and cork, except | 74,2% | 74,7% | -0,5% |
| M.C.17 | Manufacture of paper and paper products | 67,9% | 68,2% | -0,3% |
| M.C.18 | Printing and reproduction of recorded media | 66,8% | 66,9% | -0,1% |
| M.C.19 | Manufacture of coke and refined petroleum products | 58,6% | 59,1% | -0,5% |
| M.C.20 | Manufacture of chemicals and chemical products | 73,4% | 73,8% | -0,4% |
| M.C.21 | Manufacture of basic pharmaceutical products and pharmaceuti | 71,3% | 71,9% | -0,6% |
| M.C.22 | Manufacture of rubber and plastic products | 73,3% | 73,6% | -0,3% |
| M.C.23 | Manufacture of other non-metallic mineral products | 67,1% | 67,5% | -0,5% |
| M.C.24 | Manufacture of basic metals | 78,4% | 78,4% | -0,1% |
| M.C.25 | Manufacture of fabricated metal products, except machinery a | 73,0% | 73,5% | -0,4% |
| M.C.26 | Manufacture of computer, electronic and optical products | 85,7% | 86,2% | -0,4% |
| M.C.27 | Manufacture of electrical equipment | 71,1% | 76,4% | -5,3% |
| M.C.28 | Manufacture of machinery and equipment n.e.c. | 67,1% | 67,6% | -0,6% |
| M.C.29 | Manufacture of motor vehicles, trailers and semi-trailers | 68,7% | 69,8% | -1,1% |
| M.C.30 | Manufacture of other transport equipment | 65,0% | 65,6% | -0,5% |
| M.C.31\_32 | Manufacture of furniture; other manufacturing | 67,6% | 69,0% | -1,4% |
| M.C.33 | Repair and installation of machinery and equipment | 60,7% | 61,0% | -0,3% |

**MERCHANTING**

*The treatment of merchanting in the ESA 1995*

Merchanting is defined as the purchase of a good by a resident of the compiling economy from a non-resident and the subsequent resale of the good to another non-resident. During this process the good does not enter or leave the compiling economy. Merchanting margin is calculated as the value of the goods sold less the cost of purchasing them.

In the supply and use tables in accordance with the ESA 1995, the merchanting margin is recorded under the product of wholesale trade by the industries engaged in the merchanting activities. In 2010, the total amount of merchanting margins by industries calculated from the supply side accounted for 2948 mln.EEK. The contribution of wholesale trade industry was 2296 mln.EEK (78% of total product output). Merchanting margin produced by other activities was estimated at 652 mln.EEK (22%).

Table 11. Supply table for 2010 according to ESA 1995, mln.EEK

|   | Industries | Industry 1 | Industry 2 | …………. | Wholesale trade | …………. | Total Domestic Supply at basic prices | Imports | Trade margins | Taxes less subsidies | Total Domestic Supply at purchasers prices |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Products |   |   |   |   |   |   |   |   |   |   |   |
| Product 1 |   |   |   |   |   |   |   |   |   |   |   |
| Product 2 |   |   |   |   |   |   |   |   |   |   |   |
| …………. |   |   |   |   |   |   |   |   |   |   |   |
| Wholesale trade  |   | 10 | 343 |   | 2 296 |   | 2 948 |   |   |   | 2 948 |
| …………. |   |   |   |   |   |   |   |   |   |   |   |
| Total |   | 10 | 343 |   | 2 296 |   | 2 948 |   |   |   | 2 948 |

In the use table, the merchanting is recorded as an export of services under the product wholesale trade.

Table 12. Use table for 2010 according to ESA 1995, mln.EEK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Industries | Industry 1 | Industry 2 | …………. | Wholesale trade | …………. | Total Intermediate Consumption | HCE | GG | NPISH | GFCF | Changes in inventories | Exports | Total final uses |
| Products |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Product 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Product 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| …………. |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Wholesale trade  |   |   |   |   |   |   |   |   |   |   |   |   | 2 948 | 2 948 |
| …………. |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Total |   |   |   |   |   |   |   |   |   |   |   |   | 2 948 | 2 948 |

*The treatment of merchanting in the ESA 2010*

Merchanting is recorded on a gross basis. The acquisition of goods (imports) by the merchant is recorded in the accounts as a negative export, and the subsequent sale of the goods as a positive export, the difference between sales and purchases of merchanted goods is to be shown as net exports of goods under merchanting.

In the ESA 2010, the output of merchanting activities is allocated to the product wholesale trade across the industries where the production took place. In contrast to ESA 1995 recording, the total output for this product is then redistributed across the products categories (CPA) in the trade margin column (table 13).

Table 13. Supply table for 2010 according to ESA 2010, mln.EEK

|   | Industries | Industry 1 | Industry 2 | …………. | Wholesale trade | …………. | Total Domestic Supply at basic prices | Imports | Trade margins | Taxes less subsidies | Total Domestic Supply at purchasers prices |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Products |   |   |   |   |   |   |   |   |   |   |   |
| Product 1 |   |   |   |   |   |   |   |   | 152 |   | 152 |
| Product 2 |   |   |   |   |   |   |   |   | 1 357 |   | 1 357 |
| …………. |   |   |   |   |   |   |   |   | … |   |   |
| Wholesale trade  |   | 10 | 343 |   | 2 296 |   | 2 948 |   | -2 948 |   | 0 |
| …………. |   |   |   |   |   |   |   |   |   |   |   |
| Total |   | 10 | 343 |   | 2 296 |   | 2 948 |   | 0 |   | 2 948 |

The recording of merchanting in the use table is presented in table 14. The merchanting margin is allocated across the products by CPA at purchasers’ prices.

Table 14. Use table for 2010 according to ESA 2010, mln.EEK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | Industries | Industry 1 | Industry 2 | …………. | Wholesale trade | …………. | Total Intermediate Consumption | HCE | GG | NPISH | GFCF | Changes in inventories | Exports | Total final uses |
| Products |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Product 1 |   |   |   |   |   |   |   |   |   |   |   |   | 152 | 152 |
| Product 2 |   |   |   |   |   |   |   |   |   |   |   |   | 1 357 | 1 357 |
| …………. |   |   |   |   |   |   |   |   |   |   |   |   | …  |   |
| Wholesale trade  |   |   |   |   |   |   |   |   |   |   |   |   | 0 | 0 |
| …………. |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Total |   |   |   |   |   |   |   |   |   |   |   |   | 2 948 | 2 948 |