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**Compilation of investment matrix as an integrated part of the SUT framework for
Estonia**

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Abstract

This paper answers to the following question: why do we need to compile gross fixed capital formation (GFCF) or investment matrix every year? Statistics Estonia compiles the GFCF matrix within the supply and use framework since 2000. The paper discusses the main sources and the methods of estimation of GFCF. An overview of dimensions by type of assets, by kind of activities and by products is given. Procedure of GFCF estimates in current prices, valuation aspects, methodological adjustments and balancing are described in detail. This paper also gives an overview of the estimating GFCF in the previous years' prices, i.e. deflation methods, availability of price information used for deflation, level of product detail, split into domestic and imported components of GFCF. Some challenges of GFCF matrix compilation in practice is discussed.

1. Introduction

Gross fixed capital formation (GFCF) is one of the most important components in domestic demand. The contribution of gross fixed capital formation to the GDP was 26% in 2019. Compilation of gross fixed capital formation (GFCF) or investment matrix every year is a further improvement of the quality of GDP estimates.

The following quality controls are carried out when compiling the investment matrix:

- Quality checks at the individual company level (analysis of reported initial data on investment for completeness and plausibility, comparison of data between various statistical surveys, foreign trade and balance of payment statistics for consistency and coverage, comparison of SBS data with information from the Commercial Register (i.e., annual reports of enterprises);
- Checks at the aggregated level by activity and by institutional sector for coverage and consistency between different surveys;
- Other approaches used (e.g., analysis of time-series).

For all institutional sectors, gross fixed capital formation includes the acquisitions of new and existing tangible assets during the accounting year, including major repairs and land improvement, less disposals of tangible assets. Fixed assets acquired under financial leasing contracts (in the total value of capital goods) as well as own-account construction and major repairs of fixed assets are included in GFCF. Acquisitions less disposals of intangible assets, including own-account produced software and research and development, are also taken into account.

Tangible fixed assets consist of dwellings, other buildings and structures, machinery and equipment, weapons systems, and cultivated assets, which are used in the production process for more than one year.

Intangible fixed assets consist of research and development, mineral exploration and evaluation, computer software and entertainment, literary or artistic originals. Research and development is the value of expenditure on creative work undertaken on a systematic basis in order to increase the stock of knowledge, including the knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

The total amount of GFCF was estimated at 7 578 million euro in 2019.

Table 1 GFCF by type of assets, 2019

NACE	Dwellings	Buildings, structures	Machinery, equipment	Weapons	Cultivated resources	IPP	Total fixed assets
	AN.111	AN.112	AN.113	AN.114	AN.115	AN.117	
M	51	1 916	2 180		22	584	4 752
F		11	22			65	99
N	0	875	170	37	0	297	1 379
O	1 312						1 312
S		24	6		0	5	35
Total	1 363	2 826	2 379	37	22	951	7 578

2. Dimension of gross fixed capital formation

In SUT, gross fixed capital formation (GFCF) has 5 dimensions in terms of breakdowns:

- By institutional sector;
- By activity (94);
- By type of fixed assets (18);
- By product (49 in the supply and use tables);
- A distinction is made between domestically produced and imported products.

In SUT, the investors are split up into five institutional sectors: (1) market activities of non-financial corporations' sector S.11 and households sector S.14, (2) financial corporations S.12, (3) general government, (4) own account activities of households and (5) non-profit institutions serving households (Column 1 of Table 1). General government S.13 and NPISH S.15 are non-market activities.

The activity of capital formation is actually of the same standing as the activity of production, specifying more or less the same number of industries in both estimates (Columns 2 and 3 of Table 2). It is seen that the number of GFCF activities comes close to the corresponding number of activities used for production (output, intermediate consumption, valued added etc). The main difference is for illegal activities and for own use activities of households, where the industries for owner-occupiers of dwellings and own account construction are two industries specifying GFCF. For market and non-market investors/producers, there are no differences.

Table 2 Comparison of type of investors and producers

Type of investors/producers	Number of CFCF investors	Number of producers
1	2	3
(1) Market activities of S.11 and S.14	66	66
(2) Market activities of S.12	3	3
(3) General government of S.13	17	17
(4) NPISH of S.15	6	6
(5) Own final use activities of households	2	5
Illegal activities	-	4
Total	94	101

The classification scheme in SUT, for GFCF by type of assets is based on the classification adopted in ESA 2010 on fixed assets, which specify 18 categories of tangible and intangible fixed assets at most disaggregated level (Table 3). For each kind of activity and institutional sector there is a breakdown by type of assets.

Table 3 Categories of tangible and intangible fixed assets

Type of fixed assets	Code
Dwellings	AN.111
Buildings other than dwellings	AN.1121
Roads	AN.11221
Other structures	AN.11222
Land improvements	AN.1123
Transfer costs of land /costs of transferring ownership	AN.11231
Decommissioning costs	AN.11232

Type of fixed assets	Code
Transport equipment	AN.1131
Computers	AN.11321
ICT electronic equipment	AN.11322
Other machinery and equipment	AN.1139
Weapons systems	AN.114
Cultivated animal biological resources	AN.1151
Cultivated plant biological resources	AN.1152
Research and development	AN.1171
Mineral exploration and evaluation	AN.1172
Computer software	AN.1173
Entertainment, literary or artistic originals	AN.1174

A correspondence table between fixed assets and CPA-based product classification is created. This is described in section 4.

3. Data sources

In this section, detailed estimation methods used by AN code are described.

For GFCF, the main data sources are statistical surveys carried out by Statistics Estonia, and administrative sources. The main data sources are as follows: statistical questionnaire “Annual economic indicators of agricultural, forestry and fishing enterprises”, the Structural Business Statistics (SBS) survey, PSFS System, questionnaire “Insurance statistics”, survey of non-profit institutions, information about credit institutions, big leasing companies and pension funds from Eesti Pank, foreign trade statistics. (Table 4).

Table 4 Main data sources

Institutional sector	Data source
S.11 Non-financial corporations	Structural Business Statistics Module H “Changes in tangible assets”; Statistical questionnaire “Annual economic indicators of agricultural, forestry and fishing enterprises”; Foreign trade statistics.
S.12 Financial corporations	Questionnaires “Insurance statistics” and “Financial intermediation and auxiliary services”; Statistics on credit institutions, big leasing companies and pension funds from Eesti Pank; Annual statements of enterprises from the Commercial Register; Foreign trade statistics.
S.13 General government	The PSFS system; Foreign trade statistics.
S.14 Households (market activities)	Business income declarations provided by the Tax and Customs Board.

Institutional sector	Data source
S.15 NPISHs	Annual financial statements from the Commercial Register; Foreign trade statistics.

Dwellings (AN.111)

Dwellings are estimated in the non-financial corporations sector (S.11), the general government sector (S.13) and the households sector (S.14). The main data sources for estimating dwellings include the Building Register, PSFS, HBS and SBS survey.

In the households sector, estimates for the GFCF of dwellings are made for:

- Purchases and own construction of new dwellings;
- Purchases of existing dwellings;
- The expenditures of households on major repairs and reconstruction.

Estimates for purchases of new dwellings are based on information from the Register of Construction Works. To obtain the GFCF of dwellings, the number of square metres of new dwellings (separately for flats and houses) purchased by households is multiplied by the average square metre price of real estate transactions with new buildings. The price per square metre is obtained from the Land Board data on real estate transactions, depending on the year of construction of housing.

Estimates for major repairs and reconstruction are based on information from the Register of Construction Works. To obtain the GFCF of dwellings, the number of square metres renovated and permitted for use in dwellings owned by households (separately for flats, houses and garages) is multiplied by the average renovation price. The average renovation price per square metre is calculated as the total renovation of dwellings output divided by the renovated area of dwellings.

Purchases of existing dwellings are recorded on a net basis (acquisitions less disposals of dwellings). This means that when the existing asset changes owners, only ownership transfer costs, such as the intermediation fees of real estate agents, fees for notaries and legal services, and state duties, are taken into account. Fees for notaries are calculated using the number and value of notarized purchase-sale contracts of both movable assets and real estate (houses and flats).

It is assumed that the share of notary fees in contract values does not differ much from year to year, and therefore the notary fees can be estimated from the value of purchase-sale contracts. Agents' fees available from the supply side are calculated similarly to notaries' fees, as they are related to the value of purchase-sale contracts of houses and flats (described both as movable assets and as real estate). Information on state duties is taken from the PSFS system.

For non-financial enterprises, the main data source is the e-Land Register. From the e-Land Register, the following information is available:

- Tenements registered as dwellings;
- Ownership form (for calculations, joint, sole and co-operative ownership is investigated); and

- Owners (private, legal and public person).

For the general government sector, the PSFS system – the main data source – provides the necessary breakdown of acquisitions and disposals of dwellings to calculate investments made for dwellings.

Buildings other than dwellings (AN.1121)

Buildings other than dwellings are estimated in all institutional sectors. All the main data sources used for estimating GFCF in institutional sectors offer a distinction for acquisitions and disposals of buildings other than dwellings.

In 2016, the GFCF of dwellings amounted to 965 million euros, which is 18.2% of the total GFCF.

Roads and bridges (AN.11221)

In Estonia, ‘roads and bridges’ are recorded only in the non-financial corporations sector (S.11) and in the government sector (S.13). For the non-financial corporations sector, the SBS survey is the main data source. The last time that the SBS included a separation of roads and bridges from buildings other than dwellings was in 2014. After 2014, roads and bridges are included in buildings and structures. Since 2015 estimates on roads and bridges are calculated using 2014 SBS proportions. Calculations for the government sector are based on information from the PSFS system, which provides detailed information.

Other infrastructure and structures (AN.11222)

Information about the GFCF of other infrastructure and structures (except roads and bridges) is derived from the SBS survey and the PSFS system.

Land improvements (AN.1123)

The value of land improvements is the value of actions that lead to major improvements in the quantity, quality or productivity of land, or prevent its deterioration. §3.128 of ESA 2010 stipulates that major improvements to land include:

- a) reclamation of land from sea by the construction of dikes, sea walls or dams for this purpose;
- b) clearance of forests, rocks, etc. to enable land to be used in production for the first time;
- c) draining of marshes or the irrigation of deserts by the construction of dikes, ditches and irrigation channels; prevention of flooding or erosion by the sea or rivers by the construction of breakwaters, sea walls or flood barriers.

In Estonia, estimates for co-operatives of land improvements in the NPISH sector (0.39 million euros) are made on the basis of information derived from the statistical survey of non-profit institutions.

Decommissioning costs are also classified under land improvements as most of the terminal costs are related to the purpose of cleaning up landfills and mines/quarries to restore land to be used for other purposes. The main data source for decommissioning costs are the financial statements of enterprises owning landfills and mines.

Costs of ownership transfer on land (AN.11231)

These costs are estimated for all institutional sectors. For the non-financial corporations sector, estimates are based on SBS data. Information on financial corporations is derived from the survey of financial intermediation and auxiliary services. For the general government sector, estimates are based on PSFS information. For the households sector, the Estonian Land Board (ELB) is the main data source. However, as no information about activities is available from the ELB, SBS data are used additionally. For non-profit institutions, information from the survey of non-profit institutions is used.

Transport equipment (AN.1131)

These assets are estimated in all institutional sectors. All the main data sources used for estimating GFCF in institutional sectors offer a distinction for the acquisition and disposal of transport equipment. For market activities of non-financial corporations' sector S.11, there is a following breakdown: special transport (CPA 301 ships, 302 railway locomotives, 303 aircrafts) and motor vehicles CPA 29.

Computers (AN.11321)

Similarly, to transport equipment, computers are estimated in all institutional sectors. All the main data sources used for estimating GFCF in institutional sectors offer a distinction for the acquisition and disposal of computers.

ICT equipment (AN.11322)

Information and communication technologies (ICT) equipment (excl. computers) consists of devices using electronic controls and the electronic components used in the devices. Investments in ICT equipment are estimated in all institutional sectors.

Other machinery and equipment (AN.1139)

Other machinery and equipment are estimated in all institutional sectors. All the main data sources used for estimating GFCF in institutional sectors offer a distinction for the acquisition and disposal of other machinery and equipment.

Weapons systems (AN.114)

Weapons systems are vehicles and other equipment such as warships, submarines, military aircraft, tanks, missile carriers and launchers, etc. Most single-use weapons they deliver are recorded as intermediate consumption. Weapons systems are estimated in the general government sector using information from the PSFS system.

Animal resources yielding repeat products (AN.1151)

This type of assets includes animals whose natural growth and regeneration are under the direct control, responsibility and management of institutional units. They include breeding stocks (including fish and poultry), dairy cattle, draught animals, sheep or other animals used for wool production and animals used for transportation, racing or entertainment. In Estonia, animal resources yielding repeat products are estimated in all institutional sectors except the financial

corporations sector. All the main data sources used for estimating GFCF in institutional sectors offer a distinction for the acquisition and disposal of other animal resources yielding repeat products.

Tree, crop and plant resources yielding repeat products (AN.1152)

These are trees (including vines and shrubs) cultivated for products they yield year after year, including those cultivated for fruits and nuts, for sap and resin and for bark and leaf products, whose natural growth and regeneration are under the direct control, responsibility and management of institutional units. Tree, crop and plant resources yielding repeat products are estimated in the non-financial corporations and households sectors. The estimates are based on the SBS data.

Research and development (AN.1171)

Research and development consists of the value of expenditure on creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

All R&D by specialized commercial research laboratories and institutes is considered as market output and is therefore estimated at market prices. No own-account R&D is estimated for NACE 72.

R&D for use within the same enterprise is valued on the basis of the estimated basic prices that would be paid if the research were sub-contracted commercially. If such information is not available, R&D is valued at total production costs (plus a mark-up – except for non-market producers – for net operating surplus or mixed income).

R&D by government units and non-profit research institutes is valued as the sum of costs of production. The revenue from the sale of R&D by non-market producers is considered as market output. It is classified as a different product than own-account R&D and is hence excluded from the capitalization of R&D.

Mineral exploration and evaluation (AN.1172)

The value of mineral exploration and evaluation comprises expenditures on exploration for petroleum, natural gas, non-petroleum deposits and subsequent evaluation of discoveries made. All expenditures on mineral exploration and evaluation, regardless of their success or failure, should be recorded as GFCF.

The evaluation is made:

- On the basis of accumulated accounts paid to other institutional units conducting the activity (market prices);
- On the basis of the costs incurred for exploration undertaken on own-account.

To estimate mineral exploration and evaluation expenditures, two data sources were used:

- Estonian Environmental Board's data on mineral exploration authorizations;
- Fiscal year reports for enterprises performing the mineral exploration and evaluation activity (sales).

Computer software (AN.11731)

Computer software includes computer programs, program descriptions and supporting materials for both systems and applications software. Investments into computer software consist of purchased software and own-account produced software.

The estimates are made for all institutional sectors, except for the households sector (S.14).

Entertainment, literary or artistic originals (AN.1174)

Entertainment, literary or artistic originals include original films, sound recordings, manuscripts, tapes, models, etc., on which drama performances, radio and television programmes, musical performances, sporting events, literary and artistic output, etc. are recorded or embodied. This includes works produced on own-account.

a) Originals include:

- i. cinematographic film, motion picture and video originals;
- ii. television and radio broadcasting originals (TV and radio stock programmes: documentaries, drama, music, arts, history, education, if they satisfy the criteria above);
- iii. literary originals (published literary works) with a separate copyright;
- iv. artistic originals (musical works: composition and performance).

4. Methods of estimation and product breakdown of GFCF

The GFCF structure of flows in SUT contains 2 main stages. In the first stage, GFCF estimates combines fixed assets and industries. In the second stage, types of fixed assets are cross-classified by products based on CPA and balanced in the supply and use tables framework.

In total 49 CPA products are specified, of which 10 product groups are own-account produced tangible and intangible fixed assets: own-account mineral exploration (1.B.0999), machinery and equipment made for own use (code 1.C.2899), own-account construction and major repair (1.F.4199) and decommissioning costs (1.F.4399), own-account produced software (1.J.6299), own-account produced research and development (1.M.7299), entertainment, literary and artistic originals (4 products).

The correspondence tables between fixed assets and CPA-based products is described below.

The first specified type of fixed assets AN.111 is dwellings, which appears as part of GFCF of few SUT-industries. Dwellings are buildings that are used entirely or primarily as residences, including any associated structures, such as garages. The biggest share of dwellings (99 %) is recorded in real estate activities (NACE L). Dwellings are split into apartments AN.111A and houses AN.111H. Nine CPA products are specified in this category (see box below).

GFCF of dwellings (AN.111) is estimated at 1 363 million euro or 18.0% of total GFCF in 2019.

Dwellings AN.111

CPA code	Description	AN code	Description
1.F.41_43	Construction	AN.111A	Apartments

CPA code	Description	AN code	Description
1.F.41_43	Construction	AN.111H	Houses
1.F.4199	Own-account construction of dwellings	AN.111	Houses
1.L.681	Fee for buying and selling of real estate	AN.111H	Houses
1.L.681A	Purchases of existing dwellings	AN.111A_H	Apartments, houses
1.L.681D	Sales of existing buildings	AN.111A_H	Apartments, houses
1.M.69_70	Legal and accounting services; services of head offices; management consulting services	AN.111A_H	Apartments, houses
1.M.69103	Notarial services	AN.111A_H	Apartments, houses
1.O.842	State duties	AN.111A_H	Apartments, houses

The next type of assets AN.1121 is buildings other than dwellings, which appears as part of GFCF of each SUT-industry. They include warehouse and industrial buildings, commercial buildings, buildings for public entertainment, hotels, restaurants, educational and health buildings, etc. Eight CPA products are specified in category (see box below).

GFCF of building is estimated at 2420.7 million euro or 31.9% of total GFCF in 2019.

Buildings AN.1121

CPA code	Description	AN code
1.F.41_43	Buildings other than dwellings	AN.1121
1.F.4199	Own-account construction of buildings	AN.1121
1.L.681	Fee for buying and selling of real estate	AN.1121
1.L.681A	Purchases of existing buildings, other structures	AN.1121
1.L.681D	Sales of existing buildings	AN.1121
1.M.69_70	Legal and accounting services; services of head offices; management consulting services	AN.1121
1.M.69103	Notarial services	AN.1121
1.O.842	State duties	AN.1121

The third type of assets AN.1122 is roads AN.11221 and other structures AN.11222. Examples of structures include roads (e.g., highways, streets, bridges, etc.) and other structures (railways, pipelines, communication and power lines; constructions for sport and recreation). Four CPA products are specified (see box below).

GFCF of other structures is estimated at 387.3 million euro or 5.1% of total GFCF in 2019.

Other structures AN.11221 and AN.11222

CPA code	Description	AN code
1.F.41_43	Roads and other structures	AN.11221, AN.11222
1.L.681	Fee for buying and selling of other structures	AN.11222
1.L.681A	Purchases of existing other structures	AN.11221, AN.11222
1.L.681D	Sales of existing other structures	AN.11221, AN.11222

AN.1123 includes the land improvements AN.1123, the costs of transfer of ownership of land AN.11231, which have yet to be written off, and decommissioning costs AN.11232 also. Eight CPA products are specified (see box below).

GFCF of this category is estimated at 18.3 million euro or 0.2% of total GFCF in 2019.

Land improvements AN.1123, AN.11231

CPA code	Description	AN code
1.F.41_43	Land improvements	AN.1123
1.L.681	Fee for buying and selling of real estate	AN.11231
1.L.681A	Costs of transfer of ownership of land	AN.11231
1.M.69_70	Legal and accounting services; services of head offices; management consulting services	AN.11231
1.M.69103	Notarial services	AN.11231
1.O.842	State duties	AN.11231
1.F.4312	Decommissioning costs	AN.11232
1.F.4399	Decommissioning costs, own-account	AN.11232

The fourth type of assets is machinery and equipment, which consists of three main groups: transport equipment (AN.1131), information and communication technologies (ICT) equipment (AN.1132) and other machinery and equipment (AN.1139).

Transport equipment includes motor vehicles, trailers and semi-trailers, ships and boats, railway and tramway locomotives, aircrafts and other transport equipment for moving people and objects. Ten CPA products are specified (see box below). GFCF of transport equipment is estimated at 703.8 million euro or 9.3% of total GFCF in 2019.

Transport equipment AN.1131

CPA code	Description
1.C.29101	Internal combustion engines of a kind used for motor vehicles; bodies, parts, accessories, electrical and electronic equipment for motor vehicles; parts of trailers and semi-trailers
1.C.29102	Passenger cars
1.C.29103	Goods vehicles, crane lorries, fire engines and other special-purpose motor vehicles; trailers and semi-trailers; containers
1.C.291052	Vehicles for travelling on snow, golf cars and the like, with engines
1.C.301	Ships, boats, floating structures
1.C.302	Railway and tramway locomotives and rolling stock; mechanical traffic control equipment
1.C.303	Aircraft; aircraft engines
1.C.3091	Motorcycles and side-cars
1.C.3092	Bicycles, invalid carriages, baby carriages, golf carts, hand carts;
1.M.71	Architectural and engineering services

Information and communication technologies (ICT) equipment (AN.1132) are devices using electronic controls and the electronic components used in the devices. Two products within CPA 2008 are specified: electronic equipment (1.C.261), and computers (1.C.262). GFCF of ICT is estimated at 418.1 million euro or 5.5% of total GFCF in 2019.

ICT equipment AN.11321 and AN.11322

CPA code	Description	AN code
1.C.261	Communication equipment; measuring, testing and navigating equipment; electronic, optical and medical instruments, automation equipment, mobile phones and other phones;	AN.11322
1.C.262	Computing machinery and parts and accessories thereof, peripheral equipment; magnetic and optical media	AN.11321

Last group is other machinery and equipment (AN.1139) not elsewhere classified. Examples include electrical equipment, general- and special-purpose machinery and equipment, furniture, and other manufactured goods. Eleven CPA products are specified (see box below). GFCF of other machinery and equipment is estimated at 1 257.2 million euro or 16.6% of total GFCF in 2019.

Other machinery and equipment AN.1139

CPA code	Description
1.C.222	Plastic packing goods; other plastic products
1.C.232	Ceramic products, clay building materials, ornamental or building stone and other non-metallic mineral products
1.C.251	Structural metal products; reservoirs of metal; steam generators, cutlery, tools, wire products, fasteners; ships' propellers; metal articles for bathroom and kitchen; other fabricated metal products
1.C.264	Video monitors, tape recorders, video cameras, headphones and other consumer electronics; watches and clocks; cameras and lenses
1.C.271	Electric motors, generators, transformers and electricity distribution and control apparatus; accumulators, wiring and other electrical equipment
1.C.275	Electric and non-electric domestic appliances
1.C.281	General- and special-purpose machinery
1.C.2899	Equipment, made for own use
1.C.31	Furniture
1.C.322	Musical instruments, sports and other goods
1.C.325	Medical furniture; other medical and dental instruments and supplies

Weapons systems (AN.114) are vehicles and other equipment such as warships, submarines, military aircraft, tanks. Two products are specified. GFCF of weapons is estimated at 36.6 million euro or 10.5% of total GFCF in 2019.

Weapons systems AN.114

CPA code	Description
1.C.254	Weapons
1.C.304	Military fighting vehicles

Cultivated biological resources (AN.115) consist of animal resources yielding repeat products (AN.1151) and tree, crop and plant resources yielding repeat products (AN.1152). Two CPA products are specified. GFCF of cultivated biological assets is estimated at 22.0 million euro or 0.3% of total GFCF in 2019.

Cultivated biological resources AN.1151 and AN.1152

CPA code	Description	AN code
1.A.014A	Livestock	AN.1151

CPA code	Description	AN code
1.A.011E	Plantations	AN.1152

Intellectual property products (AN.117) consist of the results of research and development (AN.1171), mineral exploration and evaluation (AN.1172), computer software and databases (AN.1173), entertainment, literary or artistic originals and other intellectual property products (AN.1174) and 10 CPA products.

GFCF of IPP is estimated at 950.7 million euro or 12.5% of total GFCF in 2019. The largest IPP are computer programming and R&D with 8.1% and 4.0% in total GFCF.

Intellectual property products AN.117

CPA code	Description	AN code
1.M.72	Scientific research and development services	AN.1171
1.M.721N	Market services of non-market scientific R&D	AN.1171
1.M.7299	Own account production of R&D	AN.1171
1.B.0999	Mineral exploration	AN.1172
1.J.62_63	Computer programming	AN.1173
1.J.6299	Own-account produced software	AN.1173
1.J.591	Cinematographic film, motion picture and video originals	AN.1174
1.J.599	Television and radio broadcasting originals	AN.1174
1.R.901	Artistic originals	AN.1174
1.R.902	Literary originals	AN.1174

GFCF matrix by 94 activities and by 49 product groups is compiled as an integral part of the annual SUT system. Estimates for initial GFCF matrix at purchasers' prices are based on the commodity flow method and detailed foreign trade data for imports of capital goods. A distinction is made between domestically produced and imported products.

For all items, the negative value of GFCF is counterbalanced by a corresponding positive value for other final uses, i.e., household consumption expenditure in the case of passenger cars, and exports for all other items. Exports of existing fixed assets are particularly important for ships, aircraft, and locomotives.

5. GFCF estimates at constant prices of the previous year

GFCF at the previous year prices is calculated in the supply and use tables framework.

For capital goods, the price indices at purchasers' value are not available from the price statistics. In general, the estimation methodology for gross fixed capital formation is similar with deflation methodology used for intermediate consumption. First, gross fixed capital formation (at basic prices) is deflated on a product-by-product basis for the different asset groups:

1. Dwellings, construction of buildings and structures are deflated using the construction price index;

2. Machinery and equipment, cars and other transport equipment are deflated using the domestic market PPI for deflation of domestically produced products, and the import price indices for deflation of imported products;
3. Computers are deflated using the PPI index of computer equipment and the import price index for deflation of imported products;
4. Software and IPP are deflated using the CPI index,
5. The transfers costs (commission charges, intermediation fees, legal services, notarial services) are deflated with the corresponding CPIs;
6. Cultivated assets are deflated using the agricultural price indices.

The constant price taxes and margins for each product are calculated by applying the base year tax and margin rates on the GFCF at constant basic prices (i.e. volume projection method).

References

1. European System of Accounts – ESA 2010
2. Handbook on Supply and Use Tables and Input-Output Tables with Extensions and Applications, UN 2018
3. Handbook on price and volume measures in national accounts. Eurostat
4. Manual of Supply, Use and Input-Output Tables. Eurostat
5. Commission Decision of 30 November 1998 (98/715/EC)
6. Commission Decision of 17 December 2002 (2002/990/EC)
7. The use of annual integrated supply and use tables as a tool for integrated price and volume measurements