

Joint Eurostat/OECD 2019 questionnaire on the methodology underlying capital stocks data in national accounts

Country: Italy

Date: August 2019

Information regarding Gross Fixed Capital Formation (GFCF) compilation

This information sheet presents metadata provided by the country for publication by Eurostat. It informs on the methods and sources used to compile GFCF under the [European System of Accounts 2010 \(ESA 2010\)](#). While the questionnaire has a common structure, the level of detail of replies differs from one country to another and, therefore, only available country replies are shown here.

For easier cross-country comparison, users of GFCF data are invited to consult the tabular presentation of metadata on estimation of capital stocks by asset type, industry and institutional sector:

[Capital Stock Metadata in Tabular Format](#)

N111. Dwellings

Question 1. What is/are the main source/s to estimate GFCF in dwellings in your country, and which are the products or assets included under this asset category? Please specify if sources differ across industries and/or institutional sectors.

The estimates of the asset N111 are composed of the estimates of the following sub-aggregates: new private dwellings and enlargements, major maintenance of residential buildings, an evaluation of unauthorised dwellings and of demolition activity and an estimate of the costs of ownership transfer related to dwellings. Information necessary to the estimate of new private constructions and enlargements in dwellings is collected through the survey on "Building Permits". The evaluation process uses the "quantity per price" method.

The estimate of major maintenance of dwellings uses data on major maintenance expenditures declared by households in the House Budget Survey. These data are integrated with the information collected in the individual income tax returns, regarding the expenditures incurred by taxpayers for dwellings renovations and for renewable energy plants, for which, according to the current Italian fiscal legislation, a tax deduction may be claimed.

The unauthorized dwellings (i.e. built in violation of the rules governing the Italian building permit regulations) for a benchmark year (2011) are evaluated through the following sources: a) the Census of Population and Housing, 2001 and 2011; b) the monthly survey of Building Permits in the years between 2001 and 2011; and, c) estimates of unauthorized dwellings from 2001 to 2011 as compiled by CRESME. From the benchmark year onwards, the dynamics of the estimates of

unauthorised dwellings (in terms of number of dwellings), available annually by Cresme, is used as indicator.

The evaluation of the expenditure for demolition is based on information provided by the Frame-SBS database with reference to Nace Rev.2 43.11.

For the estimate of the costs of ownership transfer, the source used is the number of building properties purchased and sold, collected annually by the Revenue Agency of the Ministry of Economy and Finance (former Real Estate and Land Registry Agency) and distinguished into residential and non-residential. The number of transactions, once transformed into surface areas, are properly inflated.

Basic sources do not differ across industries and institutional sectors. When we move from asset to industry classification, the value of GFCF in dwellings is attributed to real estate industry (Nace Rev. 2 five digit codes 68.20.0 and 68.20.1) . The estimate of GFCF in dwellings by institutional sector use information from other sources just to make the breakdown by sector. GFCF in dwellings occupied by the owners are allocated to S14 (Households as Consumers- HC); GFCF in dwellings for investment purposes allocated to S11, S12, S13, S14 (Households as Producer -HP) and S15 using appropriate information. If information are not available, indirect approaches are used (as in the case of S15).

Question 2. What is the length of the GFCF series for dwellings? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if these differ across industries and institutional sectors.

The time series of GFCF in dwellings starts from 1870. Historical data (before 1970) were estimated in the middle of nineties by ISTAT to allow the estimation of capital stocks by means of the Perpetual Inventory Method (PIM). The retropolation was carried out for the following three typologies of assets: construction, other machinery and equipment and transport equipment using appropriate indicators for the entire period 1951-1969. Time series of GFCF by industry were retropolated, instead, identifying two sub-periods(1960-1969 and 1951-1959) because of the lack of homogeneous information for the entire period. Finally, for construction data were retropolated back to 1870.

For further details about sources and methods used for the estimation of historical data, you can see:

- 1) Lupi,C.,Mantegazza S.(1994) ""Ricostruzione delle serie degli investimenti per branca e calcolo dello stock di capitale"", ISTAT, Quaderni di Ricerca n.14/1994.
- 2) ISTAT (1995), Investimenti, Stock di Capitale e Produttività dei Fattori, Note e Relazioni n.2
- 3) Cholette,P. (1988) ""Concepts, Definitions and Principles of Benchmarking and Interpolation of Time Series"", Working Paper n.TSRA-87-014E, Statistics Canada.

Question 3. Are costs of ownership transfer included in GFCF? How do you define them and treat them in the estimation of capital stocks of dwellings (e.g. treated equally to GFCF, or specific average service life/depreciation profile for these costs)?

Based on the classification by asset, costs of ownership transfer must be included in the capital formation in construction separating estimates for dwellings and for non-residential buildings. These costs include the legal fees and the real estate agencies intermediation activities charges, which

represent a large share of the total of the costs of ownership transfer. Further, an evaluation of mortgage charges and of the expenditure for buying and selling services of own real estates are added to the costs of the legal fees and real estate agencies intermediation services for dwellings.

The capital stock in dwellings is valued net of costs of ownership transfer. For these kind of costs (residential and non-residential together) we assume specific average service life/depreciation profile.

Question 4. What price indices do you use to deflate GFCF in dwellings, and how do you construct these indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries / institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

National accounts deflators for Dwellings (N111) are chain linked deflators. Currently, Italian price statistics does not provide PPIs for the construction sector.

Therefore, the main data sources that are used for estimating them are construction costs indexes (CCI). In the case of dwellings the cost of construction of residential buildings is used. Italian CCI is an input price index. Consequently it measures changes in prices of inputs for the construction process by monitoring separately the cost of each factor (materials, labour, transports and freights). It is worthwhile stressing that an input price index measures only the changes in the prices of construction inputs. Precisely this means an input price is a production cost rather than a producer price index. The weighting system is derived by a bill of quantities i.e. a complete list of items that detail the construction project.

We deflate the GFCF net of value added taxes (VAT) using construction costs index. The VAT component of GFCF is deflated using the volume extrapolation method (it is assumed that the volume index of VAT is the same that the volume index of GFCF net of VAT). This volume index is applied to the value of VAT in the previous year to derive the volume of VAT in the current year).

For deflation of the costs of ownership transfer appropriate CPI is used.

N1121. Buildings other than dwellings

Question 1. Do you have specific GFCF series for detailed asset categories (e.g. office buildings, industrial buildings, public buildings, etc.)? Are your GFCF series broken down by industry and/or institutional sector? If your answer is yes to any of these questions, please describe and provide the link to available data and relevant documents.

We do not produce detailed GFCF time series for different private non-residential buildings. We do produce a separate GFCF time series for public non-residential buildings (but without distinguishing among different typologies). Actually, like described for the asset N111, the GFCF for asset N1121 encompasses the following sub-aggregates: new private constructions and enlargements, new public buildings, major maintenance activity performed on non-residential buildings, land improvements, demolition activity and costs of ownership transfer. The GFCF series are broken down by industry and institutional sector.

For industry breakdown, see:

<http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National%20Accounts/Annual%20national%20accounts>

In terms of dissemination, asset N1121 is published together with asset 1122 (Other structures).

For institutional sector breakdown, see:

<http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National%20Accounts/Annual%20national%20accounts/>

Also in this case asset N1121 is disseminated together with asset 1122 (Other structures).

Question 2. What is/are the main source/s to estimate GFCF in buildings other than dwellings in your country? Please specify if sources differ across industries and/or institutional sectors.

The estimate of new non-residential buildings and the enlargements of existing buildings of the private sector is compiled starting from the information collected by the Istat survey on “Building permits”. The process is based on the “quantity per price” approach and takes into consideration different non-residential typologies and costs of construction for industrial warehouses, offices, buildings for touristic use, supermarkets and shopping mall and agricultural buildings. With reference to public non-residential buildings, the main data source is represented by the budgets of the public bodies taken into consideration in National Accounts for estimating capital formation expenditure in the consolidated account of General Government. With reference to the major maintenance of non-residential buildings, the surveys on businesses carried out yearly contain specific information on the major maintenance performed by enterprises on own buildings.

Basic sources do not differ across industries and institutional sectors. When we move from asset to industry classification, the value of GFCF in non-residential buildings is attributed to different industries using SBS information on acquisitions. Sector disaggregation is estimated considering the asset/industry disaggregation as a constrain: in every branch, the value of GFCF by asset has to be allocated to all the sectors engaged in that activity. A share of the total is assigned to households as producers (S.14-HP). This represents the investment by natural persons (not covered by SBS as they are not enterprises) who acquire non-residential buildings in order to rent them. In this case a market output of households is identified (NACE Div. Real estate activities 68, Renting and operating of own or leased real estate, 68.2). The percentage of non-residential buildings rented by natural persons is provided by the Revenue Agency, that makes available the distribution of the stock of non-residential buildings by type of owner (individuals/enterprises) and by type of use (instrumental buildings/buildings acquired for investment purpose). On average, around 14% of the total non-residential buildings are rented by the owners who are individuals and are then assigned to Producer Households. The remaining share of GFCF in non-residential buildings is assigned to all the other sectors (S.11, S.12, S.13, S.15) and to the small enterprises included in S.14-HP.

Question 3. What is the length of the GFCF series? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if these differs across assets within this asset category, industries and institutional sectors.

The time series of GFCF in buildings other than dwellings (together with GFCF in Other structures) starts from 1870. Historical data (before 1970) were estimated in the middle of nineties by ISTAT to allow the estimation of capital stocks by means of the Perpetual Inventory Method (PIM). The retropolation was carried out for the following three typologies of assets: construction, other machinery and equipment and transport equipment using appropriate indicators for the entire period 1951-1969. Time series of GFCF by industry were retropolated instead, identifying two sub-periods (1960-1969 and 1951-1959) because of the lack of homogenous information for the entire period. Finally, construction data were retropolated back to 1870.

For further details about sources and methods used for the estimation of historical data, you can see:

- 1) Lupi, C., Mantegazza S. (1994) "Ricostruzione delle serie degli investimenti per branca e calcolo dello stock di capitale", ISTAT, Quaderni di Ricerca n.14/1994.
- 2) ISTAT (1995), Investimenti, Stock di Capitale e Produttività dei Fattori, Note e Relazioni n.2
- 3) Cholette, P. (1988) "Concepts, Definitions and Principles of Benchmarking and Interpolation of Time Series", Working Paper n.TSRA-87-014E, Statistics Canada.

Question 4. Are costs of ownership transfer of buildings other than dwellings included in this GFCF series? How do you define them and treat them in the estimation of net capital stocks of buildings other than dwellings (e.g. treated equally to GFCF, or specific average service life/depreciation profile for these costs)?

Based on the classification by asset, costs of ownership transfer must be included in the capital formation in construction separating estimates for dwellings and for non-residential buildings. These costs include the legal fees and the real estate agencies intermediation activities charges, which represent a large share of the total of the costs of ownership transfer. Further, an evaluation of the expenditure for buying and selling services of own real estates are added to the costs of the legal fees and real estate agencies intermediation services for non-residential buildings.

The capital stock in buildings other than dwellings is valued net of costs of ownership transfer. For these kind of costs (residential and non-residential together) we assume specific average service life/depreciation profile.

Question 5. What price indices do you use to deflate GFCF in buildings other than dwellings, and how do you construct these indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries/institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

National accounts deflators for Buildings other than dwellings (N1121) are chain linked deflators. The main data sources that are used for estimating them are the construction costs indexes. In particular for non-residential buildings the construction cost index for industrial buildings was used. When this index was no more available, the construction cost index for dwellings was used.

We deflate the GFCF net of value added taxes using construction costs indexes. The value added tax component of GFCF is deflated using the volume extrapolation method (it is assumed that the

volume index of VAT is the same than the volume index of GFCF net of VAT). This volume index is applied to the value of VAT in the previous year to derive the volume of VAT in the current year).

N1122. Other structures

Question 1. Do you have specific GFCF series for detailed asset categories (e.g. roads, railways, bridges, etc.)? Are your GFCF series broken down by industry and/or institutional sector? If your answer is yes to any of these questions, please describe and provide the link to available data and relevant documents.

The GFCF of S13 makes a distinction only between roads and other civil engineering works (bridges, railways etc.). The series are broken down by industry and institutional sector. Basic sources do not differ across industries and institutional sectors. When we move from asset to industry classification, GFCF in Other structures (AN1122) is broken down by industrial activity using different data sources: the industry distribution of GFCF of sectors S12 and S13 is based on the industry classification of each institutional unit belonging to these sectors. The main data sources for estimating GFCF for these units are the corporation financial statements for S12 and the budgets of the public bodies - for S13. Estimates for the other sectors are mainly based on data on GFCF expenditures available from Structural Business Statistics (SBS), integrated with supplementary data sources for industries not covered by SBS (e.g. GFCF of agriculture are estimated using Istat survey on building permits). The GFCF series are broken down by industry and institutional sector.

For industry breakdown, see [http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National Accounts/Annual national accounts/Gross fixed capital formation by asset and industry](http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National%20Accounts/Annual%20national%20accounts/Gross%20fixed%20capital%20formation%20by%20asset%20and%20industry). At level of dissemination asset N1122 is published together with asset 1121 (Buildings other than dwellings).

For institutional sector breakdown, see [http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National Accounts/Annual sector accounts/Gross fixed capital formation by asset](http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National%20Accounts/Annual%20sector%20accounts/Gross%20fixed%20capital%20formation%20by%20asset). Also, in this case, asset N1122 is disseminated together with asset 1121 (Buildings other than dwellings).

Question 2. What is/are the main source/s to estimate GFCF in other structures in your country? Please specify if sources differ across industries and/or institutional sectors.

The information used for the estimate of GFCF in civil engineering works made by central and local entities that operate in the public services segment and are directly or indirectly controlled (or financed) by public entities is based on the Regional Public Accounts database of the Ministry of Economic Development, integrated with information from financial statements and explanatory notes for public companies not present in the Regional Public Accounts. These entities allowed to broaden the coverage of units belonging to the so-called Non-General-Government Sector (NGG) that is to say those units not included in S13 and to improve the quality of the estimates for infrastructures.

The sources used for the estimate of the capital formation in construction of General Government (Sector S.13) are several, and differ between central and local government. The Central Government entities that account for the main share of construction expenditure are the State and ANAS. Regarding the State, the distribution by type of asset of the amount of expenditure for capital formation, originating from the State Consolidated Cash Account provided by the State General

Accounting Department, is obtained through the analysis of the payment orders of Category 21 – Gross fixed capital formation and land purchases – of the State Budget. This analysis allows the identification of the various types of asset to which spending is directed, allowing properly classifying the items to be included in GFCF, in accordance with ESA 2010. On the other hand, the construction expenditure by ANAS regards exclusively road works and is estimated on the basis of the analysis of its financial statement.

For other entities of central governments, for which the expenditure for capital formation in construction is concentrated exclusively on non-residential buildings, the estimation is derived from the financial statements of the individual entities and from the fiscal data collected by the RIDDCUE survey. Also for local government administrations, the sources and estimation methods are several. For the Regions, similarly to what takes place for the State, a detailed analysis of the expenditures for the capital formation of each region is carried out, with appropriate reclassifications in order to exclude expenditures not in line with the ESA 2010 definition of gross fixed capital formation.

For the Provinces, Municipalities, and Mountain Communities, data on construction drawn from the Final Account Certificates of the units, is attributed by type of asset considering information on loans granted to the local entities by “Cassa Depositi e Prestiti” by type of work. This operation allows to breakdown the total expenditure in construction between buildings, road works, and civil engineering works.

The other types of local governments present expenditures in constructions exclusively in non-residential buildings. The sources are many: the Omogenea Redazione dei Conti for Universities, the balance sheets of the funds for the Local Health Care Units and the Chambers of Commerce, and data drawn from the RIDDCUE survey for other local government entities.

The estimate of the capital formation of Social Security Funds is based on the financial statements of the individual funds, and regards exclusively residential and non-residential buildings."

Question 3. What is the length of this GFCF series? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if these differs across assets within this asset category, industries and institutional sectors.

The time series of GFCF in Other structures starts from 1870 (together with the asset Buildings other than dwellings).

Historical data (before 1970) were estimated in the middle of nineties by ISTAT to allow the estimation of capital stocks by means of the Perpetual Inventory Method (PIM). The retropolation was carried out for the following three typologies of assets: construction, other machinery and equipment and transport equipment using appropriate indicators for the entire period 1951-1969. Time series of GFCF by industry were retropolated instead, identifying two sub-periods(1960-1969 and 1951-1959) because of the lack of homogenous information for the entire period. Finally, construction data were retropolated back to 1870.

For further details about sources and methods used for the estimation of historical data, you can see:

- 1) Lupi,C.,Mantegazza S.(1994) ""Ricostruzione delle serie degli investimenti per branca e calcolo dello stock di capitale"", ISTAT, Quaderni di Ricerca n.14/1994.
- 2) ISTAT (1995), Investimenti, Stock di Capitale e Produttività dei Fattori, Note e Relazioni n.2
- 3) Cholette,P. (1988) "Concepts, Definitions and Principles of Benchmarking and Interpolation of Time Series", Working Paper n.TSRA-87-014E, Statistics Canada".

Question 4. Are costs of ownership transfer of other structures included in this GFCF series? How do you define them and treat them in the estimation of net capital stocks of other structures (e.g. treated equally to GFCF, or specific average service life/depreciation profile for these costs)?

There is no estimate of the costs of ownership transfer for other structures (infrastructures). These costs are estimated only for dwellings and for non-residential buildings both private and public.

Question 5. What price indices do you use to deflate GFCF in other structures, and how do you construct these indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries / institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

National accounts deflators, both for Dwellings (AN111) and Other buildings and structures (AN112) are chain linked deflators. The main data sources that are used for estimating them are construction costs indices, in particular CCI for road stretch (with/without tunnel).

We deflate the GFCF net of value added taxes using construction costs indexes. The value added tax component of GFCF is deflated using the volume extrapolation method (it is assumed that the volume index of VAT is the same than the volume index of GFCF net of VAT).This volume index is applied to the value of VAT in the previous year to derive the volume of VAT in the current year).

N1123. Land improvements

Question 1. Does GFCF in other buildings and structures (N112) reported in questionnaires 0102 (GDP identity from the expenditure side), 0302 (Capital formation) and 2200 (Cross-classification of gross fixed capital formation (GFCF) by industry and by asset (transactions)) include land improvements (N1123)?

Land improvements is included in other buildings and structures GFCF (N112) in Table 1, 3 and 22 of the ESA 2010Transmission programme of data.

Question 2. What is/are the main source/s to estimate the value of GFCF in land improvements in your country? Please specify if sources differ across industries and/or institutional sectors.

The estimate of the value of GFCF in land improvements is based on information derived from the survey conducted in collaboration between Istat and CREA (ex INEA) on the economic performance of agricultural enterprises (RICA-REA survey). The data collected from companies provide basic information on the economic performance of farm enterprises. They allow estimating the main economic aggregates in accordance with a conceptual framework similar to that adopted for the economic performance of enterprises in the manufacturing and services sectors. Section 2 of the

questionnaire contains information on the purchases and sales of fixed assets during the financial year, including expenditures for land improvements (such as the construction of farm roads, tillage and drainage systems, farm watering systems, land re-composition or farm unification).

The share of land improvements evaluated with respect to the total expenditure in fixed capital declared by the respondents was grossed up to the universe of farm enterprises. The final value of the land improvements was estimated applying the weight obtained from the survey to the total of investments in agriculture by industry. Basic sources do not differ across industries and institutional sectors. The above mentioned methodology works when estimates for benchmark year are computed. From the benchmark year onwards, the dynamics of the long-term loans granted for agriculture investments, available quarterly by Central Bank, is used as indicator.

Question 3. Are costs of ownership transfer of land included in land improvements (N1123) and hence in the aggregate asset category other buildings and structures (N112) that you report in the national accounts questionnaires 0102, 0302 and 2200?

The costs of ownership transfer of land (mainly agricultural land) are not included in land improvements (N1123). A recent simulation done in the occasion of the GNI visit on Italian National accounts gave as result a negligible value for this kind of costs concerning land.

Question 4. What price indices do you use to deflate GFCF in land improvements, and how do you construct these indices? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries / institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

We do not use specific price indices for land improvement. The deflator is the same used for buildings other than dwellings (N1121).

N1131. Transport equipment

Question 1. What is/are the main source/s to estimate GFCF in transport equipment in your country?

The asset N1131 is estimated at the following level of detail using specific sources:

1) Road transport equipment (new one) (part of N1131):

The GFCF estimate in new cars is done with the quantity per price approach, based on the car registration data; the quantities are represented by the number of registrations and the prices are the actual transaction prices (as per the invoice).

The registration data are provided by UNRAE (Unione Nazionale Rappresentanti Autoveicoli Esteri, Association of foreign car makers), which processes the data originating from the public motor vehicle register (Pubblico Registro Automobilistico – PRA). The breakdown of total expenditure for the purchase of new cars, between spending for final consumption of households and gross fixed capital formation, is based on the type of owner. All the registrations, for which the owner is identified by a numerical tax code number or by an alphanumeric tax code number that corresponds to a unit present in the business register and classified in one of the following economic activities: taxi and car and driver

hire, driving schools, trade intermediaries, insurance agents, car rental, and financial promoters (NACE classes 46.11-46.19, 49.32, 66.19, 66.22, 77.1), belong to GFCF.

All other registrations are considered as household consumption. The estimate of the yearly GFCF in other motor vehicles is obtained by the quantity per price method, starting from the microdata regarding the registrations of commercial vehicles, industrial vehicles, buses and minibuses, to which the estimates on trailers and semitrailers are added. As for cars, information on the registrations of other motor vehicles is developed by processing the data from the public motor vehicle register (PRA) that are supplied by UNRAE.

2) Road transport equipment (second hands one) (part of N1131):

As concerns transactions involving used cars, the estimate regards both the exchanges between resident units and sales to non-residents (exports). For the calculation of the exchanges of ownership of used cars between resident units, use is made of the data on the individual registrations provided by UNRAE (Association of foreign car makers), which processes the data originating from the public motor vehicle register (PRA). These data make it possible to identify, for each transaction, both the seller and the purchaser and, moreover, report the invoice price at which the transaction took place.

3) Repair of motor vehicles (part of N1131):

The GFCF in transport equipment (N1131) also includes the major maintenance of motor vehicles, which in the 262 product classification correspond to product 162 ("Services of repair and maintenance of motor vehicles and motorcycles," corresponding to CPA 45.2 and 45.40.5). The estimate of the capital formation in major maintenance of motor vehicles is obtained on the basis of the information regarding "expenses for major maintenance of machinery and motor vehicles" available in the Frame-SBS database.

4) Aircraft and satellites (part of N1131):

The main component of the capital formation in "Aircraft and space vehicles" consists of the purchases of civilian aircraft registered in the national aircraft register (Registro Aeronautico Nazionale – RAN), managed by the Italian civil aviation authority (Ente Nazionale per l'Aviazione Civile – ENAC). Moreover, the capital formation in aircraft carried out by the Ministry of Defence (distinguished between civilian aircraft and warplanes) and the capital formation in "Space vehicles (including satellites) and their launch vehicles" are added. The capital formation in warplanes is included in the Weapon systems category (N114), while the capital formation in transport equipment (N1131), also includes the major maintenance thereof estimated with the commodity-flow approach. The estimate of the yearly capital formation in civilian aircraft is obtained using the price by quantity method and is calculated as the difference between positive capital formation (entries in the register) and negative capital formation (cancellation).

5) Locomotives and railway rolling stock (part of N1131):

GFCF in locomotives and railway rolling stock is obtained, separately for the purchase components of new assets and of major maintenance, directly from the notes to the financial statements of the corporations operating in the railway transport and land transport of passengers.

6) Ships (part of AN.1131):

The main components of the GFCF in ships consists of vessels classified in naval registries and in ships made by the Ministry of Defense, distinguished in ships for civilian use and warships. The classification of the capital formation by asset includes capital formation in warships in the Weapon systems category (N114). Capital formation in transport equipment (N1131) includes the major maintenance thereof (estimated with the commodity-flow approach). The list of ships is defined, starting from the data of the Italian shipping register (Registro Navale Italiano – RINA), which every year provides a list and the main characteristics of the ships in the merchant fleet and transport, as well as fishing ships flying the Italian flag. This list is integrated with information of other international classifying bodies (Bureau Veritas/Veristar, Germanischer Lloyd/GL Group and American Bureau of Shipping/ABS Eagle) and with the IHS FAIRPLAY register. For each ship, a set of information is collected, including gross tonnage, shipbuilder, owner, type and flag.

Question 2. Do you have specific GFCF series for detailed asset categories (e.g. motor vehicles, ships, railway locomotives, aircrafts, etc.)? Are your GFCF series broken down by industry and/or institutional sector? If your answer is yes to any of these questions, please describe and provide the link to available data and relevant documents.

Yes, we have specific series as described in the previous paragraphs 1. The GFCF series are broken down by industry and institutional sector.

For industry breakdown, see [http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National Accounts/Annual national accounts/Gross fixed capital formation by asset and industry](http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National%20Accounts/Annual%20national%20accounts/Gross%20fixed%20capital%20formation%20by%20asset%20and%20industry).

For institutional sector breakdown, see [http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National Accounts/Annual sector accounts/Gross fixed capital formation by asset](http://dati.istat.it/?lang=en&SubSessionId=7effc662-1cdd-4b1c-9066-43c7e69ef815/National%20Accounts/Annual%20sector%20accounts/Gross%20fixed%20capital%20formation%20by%20asset).

Question 3. What is the length of these GFCF series? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if these differ across assets within this category, industries and institutional sectors.

The transport equipment time series (separated for Road transport equipment, Other transport equipment and Major maintenance) start from 1951.

Question 4. What price indices do you use to deflate GFCF in transport equipment, and how do you construct these indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries/institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

Ad hoc price indices (cars are deflated using the corresponding CPI for example) are used. The process of deflation does not take into account quality changes of goods.

ICT equipment (N1132): computer hardware (N11321) + telecommunications equipment (N11322)

Question 1. What is/are the main source/s to estimate GFCF in computer hardware (N11321) and telecommunications equipment (N11322) in your country? Do you have specific GFCF series for detailed assets within these categories (e.g. data processing machines, peripheral equipment, storage units, etc.) in different industries and/or institutional sectors?

The estimate of the capital formation in ICT Equipment (AN.1132) consists of the sum of the capital formation in product 95 (“Components and electronic boards; computers and peripheral equipment; optical and magnetic supports,” corresponding to CPA 2612, 2620, and 2680), product 96 (“Equipment for communication,” corresponding to CPA 2630), and of the corresponding expenses for installations and for major maintenance and repairs. This estimate is obtained with the commodity-flow approach. The estimate of the costs for major maintenance and repairs and for installation and assembly is provided by the sum of the capital formation in product 249 (“Repair services for computers and communications equipment” corresponding to CPA 95.2) and of a portion of the capital formation in products 140 (“Repair services,” corresponding to CPA from 3311 to 3319) and 141 (“Services of installation of machinery and industrial apparatus,” corresponding to CPA 3320).

The estimate of the asset AN.1132 cannot be obtained with the simple aggregation of estimates at the level of 256 products. The reason is that at this level of aggregation only “Repair services” and “Services of installation of machinery and industrial apparatus” are generically identified, with no information on the type of capital good to which they refer (Transport equipment, ICT Equipment, or Other machinery or equipment). The identification of the part of capital formation in products 140 and 141 with regard to ICT equipment is thus obtained on the basis of the estimates of the commodity-flow method at the level of disaggregation of CPA to 6 digits, suitable to identify the costs for ICT equipment.

Question 2. What is the length of GFCF in computer hardware and telecommunications equipment? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if these differ across detailed assets within these asset categories, industries and/or institutional sectors.

Computer hardware and telecommunications series start from 1951 as said before when construction assets were described.

Question 3. What price indices do you use to deflate GFCF in computer hardware and telecommunications equipment, and how do you construct these indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries / institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

Deflation of each component of GFCF at purchaser prices (for each product): output for goods produced in the country using PPI; the imports using import price indices; where not available, Unit Values are used; duties, trade margins, transport margins and non-deductible VAT are deflated using volume extrapolation method. The process of deflation does not take into account quality changes of goods.

Other machinery and equipment and weapons systems (N110): Other machinery and equipment (N1139) + weapons systems (N114)

Question 1. What is/are the main source/s to estimate GFCF in other machinery and equipment and weapons systems in your country? Do you have specific GFCF series for detailed assets within these categories (e.g. electrical equipment, weapons, etc.) in different industries and/or institutional sectors?

The estimate of the capital formation in Other machinery and equipment (AN.1139) includes acquisitions of new goods and related expenses for installation and for major maintenance net of disposals (exports of existing fixed assets). For major maintenance and repairs, the component purchased by third parties and that produced for own final use are estimated separately.

The capital formation in new goods and in the related expenses for installation and for major maintenance and repairs provided by third parties are obtained with the commodity-flow approach for all types of products except for capital formation in new goods of Machines for agriculture and forestry (product 110 in the 256 classification, corresponding to CPA 2830); these are assessed on the basis of expense data provided by the National Union of Agricultural Machine Manufacturers (Unione nazionale costruttori macchine agricole – UNACOMA), to which the non-deductible VAT is added.

Expenditures for weapons systems that constitute fixed capital used in the production of defense services and included in gross fixed capital formation, include two components: deliveries under long term contracts, and other military goods. The deliveries refers to goods whose construction and, therefore, delivery takes place over a number of years, because it corresponds to equipment in leasing, complex systems, or heavy equipment built over a span of time longer than one year. The data on deliveries are provided by the Ministry of Defense and subdivided into 10 military capital formation programmes. Only a subset of these are expenses for systems that meet the definition of Weapons systems (AN.114) of ESA 2010.

Each program considered includes a component of current account expenses related to the purchase of military services and goods, and a capital account component related to expenses for construction, modernization, renovation, transformation and major maintenance of materials and equipment for the army.

In the State Budget (Ministry of Defense), the capital account component of the deliveries is included in the expenses for gross fixed capital formation, while the current one is included in the expenses for the purchase of goods and services. The latter is therefore reclassified from intermediate consumption to gross fixed capital formation.

The other military goods are goods not included in the deliveries and recorded in the State Budget (Ministry of Defense) among the expenses for the purchase of goods and services, in the economic category “Weapons and war materiel for military uses” (CE3 2.1.3) and in the COFOG function 2.1 “Military defense”. For the purposes of compiling the national accounts in accordance with ESA

2010, these expenses are considered related to fixed assets and therefore reclassified from intermediate consumption (P2) to gross fixed capital formation (P51).

Question 2. What is the length of GFCF in other machinery and equipment and weapons systems? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if these differ across assets within each asset category, industries and/or institutional sectors.

Other machinery and equipment time series starts from 1951 as said before when construction assets were described. Weapons systems series starts from 1995.

Question 3. What price indices do you use to deflate GFCF in other machinery and equipment and weapons systems, and how do you construct these indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries / institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

Deflation of each component of GFCF at purchaser prices (for each product): output for goods produced in the country using PPI; the imports using import price indices; where not available, Unit Values are used; duties, trade margins, transport margins and non-deductible VAT are deflated using volume extrapolation method. The process of deflation does not take into account quality changes of goods. N114 is deflated using output deflators of manufacture industries.

Cultivated biological resources (N115)

Question 1. What is/are the main source/s to estimate GFCF in cultivated biological resources in your country? Do you have specific GFCF series for detailed assets within these categories (e.g. orchards, crops, dairy cattle, etc.) in different industries and/or institutional sectors?

Capital formation in new plantations, that is the planting of new orchards, vineyards, olive groves, citrus groves, etc. is calculated from the survey on "Estimate of crop, flower and pot plant production and area".

Capital formation in animals regards mainly the heifers destined for milk production, which, once they enter production, become dairy cows. The sources used to estimate the capital formation in animals are the surveys on stocks and monthly slaughtering; other information used for the estimate originate from the monthly survey of the prices for the products sold by farmers and from foreign trade data. GFCF in plantations and animals consider specific products within the general assets.

Question 2. What is the length of GFCF in cultivated biological resources? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if these differ across products within this asset category, industries and/or institutional sectors.

Time series in cultivated biological resources start from 1951 (only for plantations).

Question 3. What price indices do you use to construct volume measures of cultivated biological resources, and how do you construct these indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries / institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

For plantations, appropriate technical price indices are used.

For animals, appropriate Istat price indices are used. The process of deflation does not take into account quality changes of goods.

Research and development (N1171)

Question 1. Do you estimate GFCF in R&D by detailed R&D asset type? If yes, please specify the detailed R&D asset breakdown.

We produce different estimates of GFCF in R&D: 1) R&D output for own final use and 2) Capital formation in R&D purchased by third parties, but disseminate only the total R&D.

Question 2. What is/are the main source/s to estimate GFCF in research and development (R&D)? Please describe briefly the architecture of your estimation method and specify if these differ across different R&D assets (if a breakdown is available), industries and/or institutional sectors.

R&D output for own final use (P.12).

The main source is the Survey on research and development activities in enterprises. The survey is conducted yearly by Istat using the methods recommended by the OECD Manual on the statistical measurement of R&D activities (Frascati Manual). Balance of Payments statistics, Structural Business Statistics, Balance Sheets of institutional units belonging to S13 and S15 sectors represent additional sources used in the estimation process of R&D. The estimate of R&D output is made as the sum of production costs (in line with the indications of the Eurostat Manual on R&D capitalization). The cost of labour and the intermediate consumption are obtained directly by the survey based on the Frascati manual. The estimate of labour costs originates from the entry "Expenses for internal personnel engaged in R&D" of the survey (consisting of the sum of expenses for researchers, technical personnel, and other personnel). Intermediate consumption is obtained as the sum of costs for "External personnel (consultants)" and for "Other current expenses" (derived as the sum of costs for "Purchase of consumables" and for "Purchase of intramural R&D services") and of the costs for extramural research.

R&D purchased by third parties:

The estimate of the capital formation in R&D purchased by third parties is obtained separately for the domestic output component and for the imported one. The main sources used are the statistical surveys on research and development in enterprises, in public institutions, and in private non-profit institutions, the data on imports and exports, as well as fiscal data concerning units producing R&D for the component related to the sector S.13. The estimate is based on the hypothesis that all R&D output for domestic use produced by performers (which is to say, non-exported output) corresponds to capital formation with the only exception of the component purchased by the performers themselves

(expenses for extramural research, whether of domestic or imported origin). The latter is considered intermediate consumption (in line with the indication of the Eurostat Manual on Measuring Research and Development in ESA 2010, Par. 5.13).

Question 3. What is the length of GFCF in R&D in your country? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if these differ across assets within this category, industries and institutional sectors.

GFCF of R&D estimates have been retroplated till 1992 using the following indicators: total intramural expenditures from FM surveys for market producers; final consumption from NA estimates for General government and NPISH.

The industry distribution of GFCF for the market sector (S11+S12+S13) is obtained through the following steps: i) R&D output produced for own final use (at the industry level) is estimated assuming that all output that is not financed by other enterprises is produced on own account; ii) an estimate of total sales of market sector is obtained subtracting own account GFCF from total output; iii) an estimate of internal sales of market sector is obtained subtracting exports from total sales; iv) an estimate of total purchases of market sector is obtained adding imports and purchases from other sectors; v) total purchases of market sector are distributed by industry according to SBS data on expenditure for R&D services; and, vi) total GFCF by industry is obtained adding up own account GFCF (from step i) and purchased GFCF (from step v). The industry distribution for General Government and NPISH is based on the industry classification of each institutional unit belonging to these sectors.

Question 4. What price indices do you use to deflate GFCF in R&D and how do you construct these price indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries / institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

Own-account R&D:

For market producers, an input cost approach is used:

- for the compensation of employees, the Average Wage Method is used.
- intermediate consumption are deflated using the deflator of intermediate consumption of R&D industry.
- consumption of fixed capital is deflated using GFCF deflator at the industry level.
- for net operating surplus (NOS), the volume index calculated for output is applied.

For GG accounts (S13), the same approach is applied.

Purchased R&D:

The approach described above is applied.

No adjustment for quality is considered in price indices used for deflating GFCF in R&D.

Mineral exploration and evaluation (N1172)

Question 1. Do you estimate GFCF in mineral exploration and evaluation by detailed asset type? If yes, please specify the detailed asset breakdown.

We do not estimate GFCF in Mineral exploration and evaluation (N1172) by detailed asset type.

Question 2. What is/are the main source/s to estimate GFCF in mineral exploration and evaluation? Please describe briefly the architecture of your estimation method and specify if these differ across detailed assets within this asset category, industries and/or institutional sectors.

Balance sheets of the main Italian firms operating in the activity of mining and extraction of energy products. We refer to data on mineral exploration that are available in the balance sheets statements of mining firms.

Question 3. What is the length of GFCF in mineral exploration and evaluation? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if these differ across assets within this category, industries and institutional sectors.

Time series started from 1951.

Question 4. What price indices do you use to deflate GFCF in mineral exploration and evaluation and how do you construct these price indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries/institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

We use CCI (construction cost indices). No adjustment for quality improvements is considered.

Computer software and databases (N1173)

Question 1. What is/are the main source/s to estimate GFCF in computer software and databases? Please describe briefly the architecture of your estimation method and specify if these differ across types of software (see previous question), industries and/or institutional sectors.

The main sources used to compile GFCF in software and database are: Structural Business Surveys, Labour Force Survey, International Trade in services surveys, administrative or tax records.

The estimate of the capital formation in Computer software and databases (N1173) is obtained separately for the purchased component and for the component produced for own final use.

The output for own final use (P.12) of software and database is estimated on the basis of production costs, including an integration for the net operating surplus (except for the non-market producers) (ESA 2010, Par. 3.136). The estimate of the value of output for own final use is obtained by estimating each cost component separately for the software (N11731) and for the databases (N11732). The shares of total employees that contribute to the creation of software, is estimated using data on employment by occupation drawn from the Labor Force Survey (LFS). The occupations selected correspond to the following occupation in the International Standard Classification of Occupations

(ISCO08): “Information and communications technology service managers” (ISCO 133), “Software and applications developers and analysts” (ISCO 251) excluding “database technicians”; “Information and communications technology operations and user support technicians” (ISCO 351). The shares of total employees that contribute to the creation of databases, as for the case of software, correspond to the following occupations: “database and network professionals” (ISCO 252); “database technicians” (part of ISCO 351); “Data entry clerks” (ISCO 4132).

The estimates of the purchased software and databases components are obtained by means of the commodity-flow approach. The compilation method is done at a level of detail that makes possible to identify the products related to “Computer consulting services” (CPA 6202), “IT equipment management services” (CPA 6203) and “Other services related to information and computer technologies” (CPA 6209), that do not come under the definition of software programs and therefore must be excluded from the estimate of capital formation. The shares for the products related to software programs are established to exclude from GFCF the components of the total expenditure that must be considered intermediate consumption. These are components such as the value of the software incorporated into the hardware, the subcontract of programming services, ordinary software maintenance, and software purchases that are used in the production process for less than one year.

The purchased component is broken down by industrial activity using different data sources: the industry distribution of software GFCF of sectors S12 and S13 is based on the industry classification of each institutional unit belonging to these sector. Estimates for the other sectors are mainly based on data software GFCF expenditures available from Structural Business Statistics. Output for own final use is estimated at the industry level since the beginning of the process of computation.

Question 2. What is the length of this GFCF series? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if this differ across assets within this category, industries and institutional sectors.

Time series started from 1951.

Question 3. What price indices do you use to deflate GFCF in computer software and databases and how do you construct these price indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries / institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

a) Purchased software:

for the pre-packaged software: As suggested by the Manual on IPPs, it is used US BEA price index adjusted by the relative inflation rate between Italy and US.

For the customized software: For domestic production, the producer price index (PPI) of Computer programming, consultancy, and related services and information services (J62 CPA) is used. For import, the US BEA price index adjusted by the relative inflation rate between Italy and US is used.

b) Own account software:

For market producers an input cost approach is used:

- for the compensation of employees, the Average Wage Method is used.
- intermediate consumption are deflated using the deflator of intermediate consumption of R&D industry.
- consumption of fixed capital is deflated using GFCF deflator at the industry level.
- for net operating surplus (NOS), the volume index calculated for output is applied.

For GG accounts (S13), the same approach is applied.

No adjustment for quality is considered in price indices used for deflating GFCF in computer software and databases.

Entertainment, literary and artistic originals (N1174)

Question 1. Do you estimate GFCF in entertainment, literary and artistic by detailed asset type? If yes, please specify the detailed asset breakdown.

The estimate of the capital formation in Entertainment, literary or artistic originals (N1174) includes films and television productions (product 194 in 262 classification, corresponding to CPA 59.11 and 59.20) and literary and musical originals (product 249 in the 262 classification, corresponding to CPA 90).

Question 2. What is/are the main source/s to estimate GFCF in entertainment, literary and artistic originals? Please describe briefly the architecture of your estimation method and specify if these differ across detailed products within this asset category, industries and institutional sectors.

Capital formation in films and television productions:

For films and television productions, both the capital formation purchased from third parties and the component produced for own final use are estimated. The first component is obtained with the commodity-flow approach whilst the second one is estimated based on production costs.

The value of the capital formation in original films is provided by the sum of the production costs of Italian films and of Italian capital formation invested in co-productions. The figure is taken from a specialized magazine (Tutti i numeri del cinema italiano) published by ANICA. As regards films an estimate of the amount of the costs incurred for the editing and dubbing of foreign films is added. For television productions, the estimate of the capital formation produced for own use equals the costs incurred by RAI (the public broadcasting company) for the production of programmes for repeated use, in compliance with the principle of considering in fixed capital formation only the goods of a duration exceeding one year.

The analysis of information reported in the financial statements of other television and radio transmission and programming corporations has shown that the output for own use of utility programmes is absent or takes on negligible values; specifically, in the Mediaset group, the leading private television operator, production and broadcasting are handled by two distinct companies, with the production company selling programming to the broadcasting company, then no output for own final use is actually produced.

Literary and musical originals:

The literary and musical originals are estimated based on the current value of the future results expected from exploitation of the royalties. We estimate gross fixed capital formation in the following category of originals: films and television productions and literary and musical originals. We estimate separately artistic originals used exclusively by the producer for producing copies (output for own-final use) and the artistic original that are purchased from third parties. The latter are estimated through the commodity flow method, while sources and methods used to estimate the own account component are described below."

Question 3. What is the length of GFCF in entertainment, literary and artistic originals? If long GFCF series are available (previous to 1995), how do you estimate historical data? Please, describe additional sources and/or methods, and specify if this differ across assets within this category, industries and institutional sectors.

Time series started from 1951.

Question 4. What price indices do you use to deflate GFCF in entertainment, literary and artistic originals and how do you construct these price indices? How do you account for quality improvements? Do you use specific price indices for detailed asset categories? Do these price indices differ across industries / institutional sectors? If they are available, please provide links to and/or relevant documents and metadata on their construction.

CPI are used for deflating asset N1174: The process of deflation does not take into account quality changes of goods.