



European Construction Sector Observatory

Methodological Note

June 2019



Definitions

The Construction sector definition followed in the ECSO country databases and factsheets is based on the second, most recent (2008) revision of the NACE classification. NACE (from the French term "Nomenclature Statistique des Activités économiques dans la Communauté européenne") is the statistical classification of economic activities in the European Community. More information on the methodology of the classification, as well as a full list of the sector and subsector codes and their definitions, can be found here:

<http://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF>

The **Construction sector definition** adopted throughout the compilation of the database and fact sheets is as follows:

1. **Narrow definition** of the construction sector: this refers to sector F - Construction, as defined by the NACE rev.2 classification:

NACE F - Construction

- F.41 - Construction of buildings
 - F.41.1 - Development of building projects
 - F.41.10 - Development of building projects
 - F.41.2 - Construction of residential and non-residential buildings
 - F.41.20 - Construction of residential and non-residential buildings
- F.42 - Civil engineering
 - F.42.1 - Construction of roads and railways
 - F.42.11 - Construction of roads and motorways
 - F.42.12 - Construction of railways and underground railways
 - F.42.13 - Construction of bridges and tunnels
 - F.42.2 - Construction of utility projects
 - F.42.21 - Construction of utility projects for fluids
 - F.42.22 - Construction of utility projects for electricity and telecommunications
 - F.42.9 - Construction of other civil engineering projects
 - F.42.91 - Construction of water projects
 - F.42.99 - Construction of other civil engineering projects n.e.c.
- F.43 - Specialised construction activities
 - F.43.1 - Demolition and site preparation
 - F.43.11 - Demolition
 - F.43.12 - Site preparation
 - F.43.13 - Test drilling and boring
 - F.43.2 - Electrical, plumbing and other construction installation activities
 - F.43.21 - Electrical installation
 - F.43.22 - Plumbing, heat and air-conditioning installation
 - F.43.29 - Other construction installation
 - F.43.3 - Building completion and finishing
 - F.43.31 - Plastering

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- F.43.32 - Joinery installation
- F.43.33 - Floor and wall covering
- F.43.34 - Painting and glazing
- F.43.39 - Other building completion and finishing
- F.43.9 - Other specialised construction activities
 - F.43.91 - Roofing activities
 - F.43.99 - Other specialised construction activities n.e.c.

2. **Broader definition** of construction: this includes sector F, as well as other sectoral activities, namely real estate activities (NACE L), architectural and engineering activities and related technical consultancy (NACE M) and certain manufacturing sub-sectors (NACE C), related to the construction sector:

NACE L – Real estate activities

- L.68.1 - Buying and selling of own real estate
- L.68.2 - Renting and operating of own or leased real estate
- L.68.3 - Real estate activities on a fee or contract basis

NACE M - Professional, scientific and technical activities

- M.71.1 - Architectural and engineering activities and related technical consultancy

NACE C – Manufacturing

- C.16.2 - Manufacture of products of wood, cork, straw and plaiting materials
- C.23.3 - Manufacture of clay building materials
- C.23.5 - Manufacture of cement, lime and plaster
- C.23.6 - Manufacture of articles of concrete, cement and plaster
- C.23.7 - Cutting, shaping and finishing of stone
- C.25.1 - Manufacture of structural metal products

The **classification** of companies by R&D expenditure according to the 2015 EU Industrial R&D Investment Scoreboard is based on the industry structure and definitions of the ICB (industry Classification Benchmark). The construction-related companies considered for the CFS are classified as follows:

2000 – Industrials

2300 - Construction & Materials

- 2350 - Construction & Materials
 - 2353 - Building Materials & Fixtures: Producers of materials used in the construction and refurbishment of buildings and structures, including cement and other aggregates, wooden beams and frames, paint, glass, roofing and flooring materials other than carpets. Includes producers of bathroom and kitchen fixtures, plumbing supplies and central air-conditioning and heating equipment. Excludes producers of raw lumber, which are classified under Forestry.
 - 2357 - Heavy Construction: Companies engaged in the construction of commercial buildings, infrastructure such as roads and bridges, residential apartment buildings, and providers of services to construction companies, such as architects, masons, plumbers and electrical contractors.

2700 - Industrial Goods & Services

- 2750 - Industrial Engineering
 - 2753 - Commercial Vehicles & Trucks: Manufacturers and distributors of commercial vehicles and heavy agricultural and construction machinery, including rail cars, tractors, bulldozers, cranes, buses and industrial lawn mowers. Includes non-military shipbuilders, such as builders of cruise ships and ferries.
- 2790 - Support Services

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- 2797 - Industrial Suppliers: Distributors and wholesalers of diversified products and equipment primarily used in the commercial and industrial sectors. Includes builders merchants.

Apparent labour productivity is the gross added value per person employed in three sub-sectors of the construction sector.

Construction cost index measures the development of costs incurred by the contractor to carry out the construction process.

Equivalised income is the household income recalculated to take into account the different financial requirements of different household types (e.g. larger households typically need a higher income than smaller ones to achieve a comparable standard of living)

Gross operating surplus is a measure of profitability of the sector. It represents the surplus generated by operating activities after the labour factor input has been recompensed (Eurostat).

Gross fixed capital formation is a measure of the net increase in fixed capital, i.e. of investments in construction (commercial and industrial buildings, residential dwellings, roads and railways), machinery and equipment.

Gross value added (GVA) at market prices is the output at market prices minus intermediate consumption at purchaser prices; it is a balancing item of the national accounts' production account. GVA at factor costs can be derived by subtracting other taxes on production from GVA at basic prices and adding other subsidies on production ($GVA + \text{taxes on products} - \text{subsidies on products} = \text{GDP}$). GVA is used in the estimation of Gross Domestic Product (GDP) as GVA measures the contribution to the economy of each individual producer, industry or sector in a given country. **Investment ratio** is the share of gross fixed capital formation in the GDP

Loan-to-Value ratio is the ratio of the mortgaged amount to the appraised value of the property

Lower tier constructors are often smaller companies further down the construction supply chain, which take on smaller scale projects

Nature 2000 is a European ecological network of special habitat protection areas as per the directives 92/43/EEC and 2009/147/EC.

Output gap is the difference between the actual and potential GDP.

Potential GDP is the hypothetical GDP that a country would have if it was perfectly efficient, e.g. there was no unemployment and all resources were used at their full capacity.

Product-process innovation entails the combination of product innovation (i.e. the introduction of a new good with respect to the market or to the company itself, e.g. nano-materials, energy-efficient materials) and process innovation (i.e. major structural changes that increase the efficiency of the production of a good or service, e.g. more efficient human capital management to cut costs and increase productivity).

Volume index of production is an index of value added by the construction sector, at constant prices (i.e. stripped out of inflationary movements).

Forecasting key sectoral figures in construction

Rationale

The lack of sufficiently long time series of data at sub-sector level prevents us from developing robust econometric models. Therefore, a more simplistic approach has been adopted to estimate the forecasts. The approach used here is based on the assumption that value added is a predictor for all other forecasted indicators.

Statistical data from EU wide providers (e.g. Eurostat) is published with some delay. This results in the fact that the latest available data can be one or two years old, depending on the time of the publication of the CFS. Most of the Eurostat data on 2016 will be available only after July 2017.

Step 1: Forecast of Value Added

The first step of the forecasting process was to forecast the value added for each of the NACE sub-sectors forming the broad construction industry. The following procedure was followed:

- 1) The forecast of VA for each sub-sector is based on the forecast of the nearest high-level NACE sector produced for the SME Annual Report. The SME database contains forecasts for VA at the NACE 1-digit and NACE 2-digit level only. For those 1-digit and 2-digit sectors which are part of the broad definition of construction, the forecasts from the SME database were used directly.
- 2) For the NACE 3-digit subsectors, which were not forecasted in the SME database, we assume a growth rate equal to the growth rate of the overarching NACE 2-digit subsector forecasts over time.

Step 2: Forecast of employment

- 1) The forecasts for each NACE 3-digit subsector were created assuming constant apparent labour productivity (number of persons employed / VA) ratio for 2014-2016. The rationale behind the assumption of a constant labour productivity ratio is an economic one – it is expected that apparent labour productivity would not change much between 2013 and 2016.
- 2) This constant ratio for each subsector has been assumed equal to the respective ratio in 2013 – this is the last year of historic data for employment, but the first year where VA is forecasted.
- 3) The levels of employment for the NACE 3-digit sectors were forecasted using the assumed ratios between these levels and VA, and the forecasted VA levels.
- 4) The levels of employment for the NACE 2-digit and 1-digit sectors were produced as a simple sum of the 3-digit sectors they contain, i.e. building them from the bottom up. Therefore, these forecasts differ slightly from the employment forecasts previously used from the SME database.

Step 3: Forecast of number of enterprises

- 1) The methodology for forecasting number of enterprises which we followed is the same as the methodology for forecasting Value Added: we used the top-level sector forecasts from the SME database and assumed that sub-sectors followed the same growth rate as the higher-level sectors.

- 2) The forecast for number of employees per enterprise is a simple ratio of the forecasts of employment and number of enterprises in the respective sector.

Step 4: Forecasting Turnover and Volume index of production

- 1) Volume index of production in total construction, construction of buildings and construction of civil engineering works have been forecasted assuming the same growth rates as the growth rates of gross fixed capital formation in the respective sector in the AMECO forecasts.
- 2) Turnover has been forecasted on the basis of the VA forecast, assuming the same growth rate over time.

Product rankings: Domestic production, exports, imports and domestic sale

Data source

The data used to produce this section of the country databases were accessed through the Easy ComExt data portal, which contains both PRODCOM and ComExt data. PRODCOM provides data on the production, exports and imports of manufactured products at the specific product code-level, whereas ComExt also provides information on exporting destinations, however only an NACE 4-digit level.

Selection of products

1. Broad definition of the construction sector. All 6-digit product groups from those manufacturing sectors which are considered part of the broad definition of the construction industry have been included in the analysis.
2. Additional construction-related products. The starting point for identifying additional products used in construction activities was the selection of all products within those additional NACE 4-digit sectors considered more distantly related to construction. The resulting detailed-level product list was vetted through desk research performed by LE, to eliminate those products clearly not used in construction. Additionally, all product descriptions in the remaining NACE 4-digit sectors not elsewhere considered were screened for key search terms such as 'machinery' and 'insulation' (and their roots and derivatives), to identify any other products potentially used in construction activities. As a result, a total of 334 products from 32 different NACE 4-digit sectors were included in the additional construction-related products for analysis.

Reporting level

The PRODCOM database provides rich, product-level data of annual production, exports and imports values at country level. Each product is characterised by a 9-digit code. However, the description of products at such a disaggregated level is often not meaningful to the reader. Therefore, after the initial stage of product selection, the data has been aggregated up to 6-digit product groups, in order to provide information of more practical use for the ECSO. This means that products which are part of the 6-digit product group included but were not identified as additional construction-related products, if any, would not form part of the aggregates. For the manufacturing products from NACE 4-digit sectors in the broad definition of construction, this is, of course, not a relevant concern.

The process of data aggregation uses the RAMON Classifications database, which includes the list of PRODCOM products and their mapping from NACE 4-digit level, to a 6-digit product group, to the most disaggregated 9-digit product code, and their definitions. Before producing each ranking, the value of the indicator of interest has been aggregated to 6-digit product group level by simply summing the values of all products within each 6-digit product group together.

PRODCOM includes annual data from 2009 to 2015.

Product group rankings

The rankings produced for each country database are characterised by three dimensions:

- **Indicator** (aggregated from 9-digit to 6-digit product group through summing of values):
 - Value of exports (EUR) from the country of interest; or
 - Value of domestic sales (EUR) in the country of interest, defined as:

$$\text{Domestic sales value}_t = \text{Production value}_t + \text{Imports value}_t - \text{Exports value}_t$$

- **Ranking criteria:**
 - Ranking of the indicator according to its 2015 value in the country of interest; or
 - Ranking of the indicator according to its 2015 value in the total EU28; and
- **Relevance to the construction industry:**
 - Whether product groups included are from the NACE 4-digit industrial classifications which are included in the broad definition of the construction industry; or
 - The product groups included represent additional construction-related products not included in the broad definition of the construction industry.

It is worth noting that when producing exports rankings according to the value in the country of interest, both intra- and extra- EU28 exports are considered. However, when producing exports rankings according to the value in the EU28, the ranking factor of products is extra- EU28 exports, but the actual values of exports presented for each product group still take into account both intra- and extra-EU28 exports.

This results in the following total of 8 rankings:

Highest-ranking construction products according to country exports;

- Highest-ranking additional construction products according to country exports;
- Highest-ranking construction products according to EU28 exports;
- Highest-ranking additional construction-related products according to EU28 exports;
- Highest-ranking construction products according to country domestic sales (apparent consumption);
- Highest-ranking additional construction-related products according to country domestic sales (apparent consumption);
- Highest-ranking construction products according to EU28 domestic sales (apparent consumption);
- Highest-ranking additional construction-related products according to EU-28 domestic sales (apparent consumption);

Additionally, a full ranking of 6-digit product groups according to their share of country exports in broad construction NACE 4-digit sector (according to 2015 values) has been produced as a summary.

Exporting partners rankings

In addition to the export and domestic sales 6-digit product group rankings based on PRODCOM data, the database incorporates information on the exporting destination country. This data is available from the ComExt data tables, but only at the NACE 4-digit level. Two rankings were produced:

- Top 30 exporting destinations according to their share of exports in **construction-related product group**; and
- Top 30 exporting destinations according to their share of exports in **additional construction-related product group**
- The additional construction-related NACE 4-digit product groups included here are those where the contained additional construction-related 6-digit product groups comprised at least 50% in combined 2015 exports value of the respective additionally identified NACE 4-digit product group.