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ADL	Autoregressive distributed lag
ANA	Annual national accounts
approx.	approximately
ARIMA	Autoregressive integrated moving average
AZR	Arbeitszeitrechnung (calculation of working hours)
BA	Bundesagentur für Arbeit (Federal Employment Agency)
BevStatG	Bevölkerungsstatistikgesetz (Law on statistics of the population)
BDSV	Bundesvereinigung Deutscher Stahlrecycling- und Entsorgungsunternehmen e.V. (Federal Association of German Steel Recycling and Disposal Companies)
BGB	Bürgerliches Gesetzbuch (German civil code)
BLE	Bundesanstalt für Landwirtschaft und Ernährung (Federal Office for Agriculture and Food)
BMF	Bundesministerium der Finanzen (Federal Ministry of Finance)
BV	Berlin method (for seasonal adjustment)
CF	Commodity flow account
COICOP	Classification of individual consumption by purpose
EBV	Erdölbevorratungsverband (Petroleum Stockpiling Association)
e.g	for example
EMI	Markit/BME Einkaufsmanager-Index (Purchasing manager index)
ECA	European Court of Auditors
ESA	European System of Accounts
ESS	European Statistical System
etc.	et cetera
EU	European Union
EUR	Euro
Eurostat	Statistical Office of the European Communities
EVAS	Einheitliches Verzeichnis aller Statistiken der statistischen Ämter des Bundes und der Länder (Integrated list of all statistics compiled by the Federal Statistical Office and the Statistical Offices of the Länder)
e.V.	eingetragener Verein (registered association)
FAQ	frequently asked questions
FMFA	Bundesministerium für Ernährung und Landwirtschaft (Federal Ministry of Food an Agriculture)
FISIM	Financial intermediation services indirectly measured
GDP	Gross domestic product
GDV	Gesamtverband der Deutschen Versicherungswirtschaft (German Insurance Association)

GENESIS	Gemeinsames neues statistisches Informationssystem (Common new statistical information system)
GFCF	Gross fixed capital formation
GNI	Gross national income
GP	Güterverzeichnis für Produktionsstatistiken (German classification of products)
GVA	Gross value added
HFCE	Household final consumption expenditure
IAB	Institut für Arbeitsmarkt- und Berufsforschung (Institute for Employment Research)
i.e.	that is
Ifo-Institute	Institut für Wirtschaftsforschung, München (Institute for Economic Research, Munich)
ILO	International Labour Organization
IMF	International Monetary Fund
incl.	including
IOA	Input-output accounts
NA	National accounts
NACE	Nomenclature statistique des activités économiques dans la Communauté Européenne (statistical classification of economic activities in the European Community)
No.	number
NPISH	Non-profit institutions serving households
PIM	Perpetual-inventory method
OECD	Organisation for Economic Cooperation and Development
QNA	Quarterly national accounts
R&D	Research and development
Rev.	Revision
S.	Sector
SGB	Sozialgesetzbuch (German Code of Social Law)
SNA	System of national accounts
TP	transmission programme
VO	Regulation
WiSta	Wirtschaft und Statistik (Scientific Journal)
WZ	Klassifikation der Wirtschaftszweige (German classification of economic activities)

Preliminary remarks

The present document contains the detailed description of the quarterly methods and sources used for the compilation of the gross domestic product and the gross national income of the Federal Republic of Germany in compliance with the European System of National and Regional Accounts 2010 (ESA 2010). It is an updated version of the description of quarterly calculation of national accounts in accordance with ESA 1995 published in March 2008 (English language version). The present version incorporates the results of the comprehensive revision of the national accounts which was completed in September 2014. The main purpose of the 2014 major revision was to implement the current ESA 2010, which has replaced the former ESA 1995 version as the legally binding basis for the national accounts calculations.

The main methodological changes caused by ESA 2010 concern the following issues:

- recording of expenditure on research and development as capital formation instead of intermediate consumption;
- modified delimitation of the so-called small tools, i.e. durable goods of small value such as inexpensive tools and small devices;
- recording of military weapons systems as capital formation instead of intermediate consumption of general government;
- changes in the delineation of units to the government sector.

In addition to that, numerous non-conceptual changes were also incorporated into the German national accounts within the scope of the 2014 major revision. These include, among others, recalculation of dwelling services as a consequence of the 2011 Census and the coverage of certain illegal activities.

The structure of the description follows a uniform European standard that was developed by the Statistical Office of the European Communities (Eurostat) in order to respond to the increasing demand of NA users for uniform country-specific information about the methods and sources of the quarterly calculations of the domestic product. This publication is at the same time the contribution of Germany to the improvement of the European information situation in this area, which Eurostat is striving to achieve.

The figures stated in this publication are provided by way of example for the quarters of 2015 on the date of computation August 2016. Results of the national accounts are published in the following series of the Fachserie 18:

Reihe 1.1	First annual results
Reihe 1.2	Quarterly results
Reihe 1.3	Seasonally adjusted quarterly results using Census-X-12-ARIMA and BV4.1
Reihe 1.4	Detaillierte Jahresergebnisse (detailed annual results, available in German only)
Reihe 1.5	Lange Reihen ab 1970 (Long-time series since 1970, available in German only)

The present inventory was compiled by staff from the National Accounts Divisions of Department D “National Accounts, Prices” in the Federal Statistical Office of the Federal Republic of Germany.

Wiesbaden, August 2017

Chapter 1 Overview of the system of quarterly national accounts

Production, income, consumption or capital formation are major aspects of economic activity, and are also key factors in national accounts. The purpose of national accounts is to provide the most comprehensive, arranged and well-structured quantified picture of a country's entire economy. So that this comprehensibility can be achieved, data have to be condensed. On one hand the numerous economic units are grouped together. On the other hand economic transactions are aggregated and meaningful measurement categories derived. On the international stage, the most commonly used aggregate is gross domestic product (GDP). The quarterly results of the domestic product calculation are an essential element of general short-term economic monitoring and an indispensable basis for national accounting analysis and forecasts in the national and international framework.

1.1 Organisation and institutional arrangements

With regard to organisation, the national accounts (NA) are at present combined with other national accounting systems in the Federal Statistical Office as shown below:

D1 Domestic Product, Input-Output Accounts

D2 National income, Sector Accounts, Employment

With regard to organisation, quarterly domestic product is for the most part calculated in divisions D1and D2. At the moment (mid 2017), around 130 persons (full-time and part-time employees) are employed at the NA department, including management and administration and excluding trainees and apprentices, excluding the financial accounts and balance of payments statistics divisions (field of activity of the German Central Bank – Deutsche Bundesbank), excluding regional accounting (Statistical Offices of the Länder) and excluding labour volume accounts (Institute for Employment Research (IAB) of the Federal Employment Agency).

The quarterly domestic product calculations are completely integrated into the annual accounts with regard to contents, time and personnel, i.e. there are no separate responsibilities for quarterly accounts on the one hand and annual accounts on the other hand. The particular advantage of this is that special knowledge of certain aggregates or industries can be used comprehensively and that the interrelation between provisional and final results is always taken account of.

1.2 Publication timetable, revisions policy and dissemination of QNA

First quarterly results of gross domestic product without particular breakdown (internationally also called "flash estimate") are published as flash releases around 45 days after the end of a reporting quarter – largely harmonised at the European level.

The more detailed figures are published in the form of a detailed press release, on the internet, in the GENESIS database and as free-of-charge electronic publications (Fachserie 18 "National Accounts", Reihe 1.2 and 1.3) around 55 days after the end of the reporting quarter.

In addition to the production side of gross domestic product broken down by eleven industries (A10 plus manufacturing) and the use side aggregates (each nominal and price-adjusted), the detailed results also include data on income, employment and volume of labour that are likewise represented in the breakdown by industries mentioned above.

At the publication dates mentioned, previous quarters are also revised if necessary, and at the summer release date, up to four preceding years and the associated quarters may be revised (so-called current revisions).

1.3 QNA compilation approach

The concepts, definitions and classifications of the European System of National and Regional Accounts of 2010 (ESA 2010) are applied to all calculations. For the most recent periods, the quarterly results are usually extrapolated with suitable indicators and reconciled with annual results as soon as these are available from the relevant surveys. Exceptions from this procedure are primarily made with regard to the calculation of gross fixed capital formation in machinery and equipment that is determined using the commodity flow (CF) method based on monthly and quarterly data and the calculation of the export surplus (external balance of goods and services) that is derived from the monthly data of the foreign trade and balance of payments statistics. For these aggregates, the annual results arise from the summation of the quarters. At any time, the data sets of the quarterly accounts correspond to the results of the annual accounts.

In Germany, quarterly GDP – as in the annual calculations – is determined using the production approach (generation-of-income account) and the expenditure approach (use-of-income account), with both approaches to a large degree being autonomous and being brought together in a balancing process. The so-called GDP flash release (after t+45 days) is also based on this procedure. The third variant via the income approach (distribution-of-income account) cannot be applied in Germany due to the lack of information about entrepreneurial income for periods of less than one year. Therefore, “operating surplus including mixed income” is determined as a residual component.

The entire spectrum of the short-term economic statistics (supplemented by some non-official information) is used as data base for the GDP calculations. The concrete methods of calculation are crucially dependent on data availability. On the one hand, nominal indicators are used (e.g. turnover of trade and the hotel and restaurant industry, exports, imports) which are deflated with price data and, on the other, "real" indicators are used (e.g. production indices in manufacturing, hours worked in the construction industry, passenger and tonne-kilometres in transportation) which are inflated with price indices to get results at current prices.

1.4 Balancing, benchmarking and other reconciliation procedures

With regard to the reconciliation and validation of the quarterly GDP calculations, a distinction can be made between the following phases: partial reconciliation of components, macroeconomic GDP balancing and in-process quality assurance.

In the partial reconciliation of components, aggregates that are especially closely linked as regards statistics are checked for coherence already in the preliminary stages of GDP reconciliation.

This is followed by central GDP balancing on the macro level which is used to bring together in a macroeconomic system the calculation results of the production and expenditure approaches that are to a large degree determined independently. This reconciliation is a systematic iterative procedure in which in an interactive process between several competent and experienced persons, taking account of a large number of different indices, a result is finally defined. So, this is not a mechanical procedure or a mathematical method defined beforehand. The process focuses on the analysis of the results in the course of time (time series). In particular, the following aspects are considered in the process: the comparison between "new" and "old" results (of an earlier date of computation), the comparison between provisional and final results (for past years), the plausibility of the changes in inventories and of the implicit deflators, a feedback with the results of the distribution-of-income account (e.g. operating surplus, labour's share in national income, savings ratio) and the results of the sector accounts, an analysis of other macroeconomic indices (productivity, unit labour costs) and finally also a feedback with the results adjusted for seasonal and calendar variations. The result always is a consistent data set with coherent quarterly and annual results at current and at constant prices.

In addition to that, a number of other measures are applied in the context of in-process quality assurance which have repercussions on the final NA results via checks and matching procedures.

1.5 Volume estimates

In accordance with international conventions and binding European legislation, volumes are measured on the basis of an annually changing price basis (previous-year price basis) with chain-linking. In accordance with European regulations, the index type used for the measurement of volumes is a Laspeyres index and, accordingly, a Paasche index is used for the implicit measurement of prices (i.e. just as for the former fixed price basis). The "annual overlap" method is applied to draw up the quarterly accounts. Due to the non-additivity of the chained volume data, the publications mainly refer to chain indices and their rates of change and to the calculational contribution to growth rates. Absolute values at previous-year prices, chained volume data (with reference year 2010) and contribution to growth rates are published in a free-of-charge electronic publication (Chain-linked volume data and contribution to growth).

1.6 Seasonal and calendar adjustment

In addition to the year-on-year comparison of the quarterly GDP (original values), the seasonally adjusted previous-quarter comparison is shown in the German NA to facilitate a more current short-term economic analysis. To this end, the Federal Statistical Office has started using the internationally accepted Census X-12-ARIMA method (current version 0.2.8) in the year 2000 for adjustments for seasonal and calendar variations of the quarterly time series of the NA, based on close partnership and division of labour with Deutsche Bundesbank. Adjustments for seasonal and calendar variations are made on every publication date, with the seasonal factors being estimated once per year (in August) and these projected seasonal factors usually being used on the following dates. The Federal Statistical Office publishes the results in the separate Reihe 1.3 "Seasonally adjusted quarterly results according to Census X-12-ARIMA and BV4.1" of Fachserie 18, National Accounts. In the publication, the seasonally and calendar-adjusted values in accordance with the Berlin method BV4.1 are additionally shown to provide data users with information about the methodological determination of the seasonal adjustment. In addition to the seasonally and calendar-adjusted data of the production and use sides and the labour volume accounts, this also includes the data for the distribution side and the employment accounts.

1.7 Additional information

This methodological description of the quarterly calculation of gross domestic product focuses on explaining the extrapolation process for the quarterly figures of the most recent periods. The calculation of annual figures is described in two additional methodological descriptions of the domestic product at current prices and of the measurement of prices and volumes in the national accounts, all in accordance with ESA 2010 .

Links to:

- **Homepage NA**

NA homepage in German:
http://www.destatis.de › Volkswirtschaftliche Gesamtrechnungen

NA homepage in English:
http://www.destatis.de › English › National accounts

- **Press releases**

NA press releases overview page in German:
http://www.destatis.de › Volkswirtschaftliche Gesamtrechnungen › Pressemitteilungen

NA press releases overview page in English:
http://www.destatis.de › English › National accounts › Press releases

- **Fachserie 18 in the statistics shop or publications on the website**

NA publications in German:
http://www.destatis.de ›Publikationen › Fachveröffentlichungen › Volkswirtschaftliche Gesamtrechnungen

NA publications in English:
http://www.destatis.de › English › Publications › Specialized publications › National accounts

- **GENESIS NA pages**

GENESIS homepage in German (breakdown by topics only after logon screen):
https://www-genesis.destatis.de/genesis/online/logon

GENESIS homepage in English (breakdown by topics only after logon screen):
https://www-genesis.destatis.de/genesis/online/logon › English

- **FAQs on NA**

FAQs on NA in German:
http://www.destatis.de › Volkswirtschaftliche Gesamtrechnungen › FAQ

FAQs on NA in English:
http://www.destatis.de › Volkswirtschaftliche Gesamtrechnungen › FAQ

- **Quality report NA**

Quality report on:
http://www.destatis.de › Publikationen › Qualitätsberichte › Volkswirtschaftliche Gesamtrechnungen

Quality report on NA in English:
http://www.destatis.de › Publications › Quality Reports › National Accounts

Chapter 2 Publication timetable, revisions policy and dissemination of QNA

As the calculations themselves, the revision dates for the quarterly calculations of GDP are completely integrated in the annual accounts. A distinction is made between current revisions and major revisions that take place at larger intervals. In the current revisions, the quarters of up to four preceding years are revised once a year basically in connection with the calculation of the second quarter of a year. A revision of the four preceding quarters may be made for the calculations of the first quarter of a year. As the time calculations are made for the third and fourth quarter of a year, changes may result for the preceding quarters of the same year, but not for the previous year.

The major revisions of the entire time series with annual and quarterly data usually take place every five years and involve changes of concepts and classifications.

2.1 Release policy

The quarterly results of the official national accounts are represented and published in a large number of tables at regular intervals throughout the year, the schedule depending, among other things, on the delivery commitments to Eurostat. They are made available to the users in the form of free-of-charge electronic publications (Fachserie 18 "National Accounts", Reihe 1.2 "Quarterly results" and Reihe 1.3 "Seasonally adjusted quarterly results according to Census X-12-ARIMA and BV4.1"), in the GENESIS database, in selected tables on the internet and through other channels. Furthermore, the most important results are released and commented on in press releases at the respective publication dates.

First results of quarterly gross domestic product without particular breakdown (internationally also called "flash estimates") are published as flash releases around 45 days after the end of the reporting quarter – largely harmonised at the European level. The detailed results are published around ten days later, i.e. after t+55 days, in the form of a detailed press release, that is mid/end May (1st quarter), mid/end August (2nd quarter), mid/end November (3rd quarter) and mid/end February (4th quarter). At these release dates, previous quarters are also revised if necessary, and at the summer release date, up to four preceding years and the associated quarters may be revised (so-called current revisions). However, GDP is usually not revised between t+45 and t+55 because this is just one single calculation date spread over two release dates due to the internal processes of the calculations. The results are published in a press release issued at 8 am, and on the internet, in the GENESIS database and in the free-of-charge electronic publications of Fachserie 18 mentioned above.

The precise publication dates of a year are announced already at the end of the preceding year in the Federal Statistical Office's on-line published release calendar (at http://www.destatis.de › Press › Preview).

In Germany, quarterly sector accounts and quarterly government tables are supplied to Eurostat in accordance with the European regulations no later than after t+85 days.

2.2 Contents published

The quarterly publication of the detailed gross domestic product (t+55) comprises the balanced results of the production, expenditure and income approach of GDP and of the employment and labour volume accounts. In a breakdown by eleven industries (A10 plus manufacturing), the following results are shown: gross value added (GVA) at current prices and price-adjusted, compensation of employees, wages and salaries, persons in employment, employees, hours worked by/per per-

son(s) in employment and by/per employee(s), GDP or GVA at current prices per person in employment / per hour worked by persons in employment, labour productivity per person in employment / per hour worked by persons in employment, compensation of employees and wages and salaries per employee / per hour worked by employees and unit labour costs in accordance with the per person and the per hour concept.

The following is published on the use side: private consumption expenditure, household and government final consumption expenditure, gross fixed capital formation (GFCF) broken down by GFCF in machinery and equipment, GFCF in construction and GFCF in other products, furthermore changes in inventories including acquisitions less disposals of valuables and imports and exports of goods and services and the resulting external balance of goods and services. Consumption is further shown for the subdivisions final consumption expenditure and actual final consumption and broken down by eight purposes of use. Gross fixed capital formation, imports and exports and government final consumption expenditure are likewise published with a finer level of disaggregation. The use side data are shown both at current prices and price- adjusted (with the exception of detailed government final consumption expenditure). For some aggregates, the implicit deflators are additionally shown and for imports and exports also the terms-of-trade effect.

The publications are focused on the absolute values in euro at current prices, the price-adjusted chain indices (reference year 2010) and the rates of change. Chained absolute values and the non-chained data at previous-year prices are published in a free-of-charge electronic publication ("Chain-linked volume data and contribution to growth"). As for balance items chain index or chained absolute value is not reasonable or not easily possible, therefore only the respective calculational contribution to GDP growth rates are represented for the price-adjusted external balance of goods and services and the price-adjusted changes in inventories (see also section 3.3.1).

For part of these variables seasonally and calendar-adjusted data and for some distribution variables only seasonally adjusted data are published in accordance with the two methods Census X-12-ARIMA and Berlin method BV4.1.

Monthly results are not published in the German NA. [1]

2.3 Special transmissions

The quarterly results of the German national accounts are transmitted to Eurostat in accordance with the compulsory ESA transmission programme (TP). Apart from the legally binding TP, there are additional arrangements between Eurostat and the Member States – so-called Gentleman's Agreements – regarding early data transmission of national GDP results. Due to such an agreement, the result of the national GDP flash release (GDP flash estimate) after t+45 days is transmitted to Eurostat already one day prior to publication subject to an embargo to enable calculation and simultaneous publication of European GDP. In 2016, Eurostat started to publish an additional "preliminary flash estimate" for the EU and Euro area GDP, which is released after t+30 days. Again, national results are transmitted to Eurostat one day prior to publication subject to an embargo, allowing the German national result only to be used for calculating European aggregates but not to be published.

Apart from Eurostat, privileged users include Deutsche Bundesbank and some ministries. Since the seasonally and calendar-adjusted results are drawn up in a partnership with Deutsche Bundesbank, the necessary results of the original values are available to Deutsche Bundesbank on the working level already some days prior to the release date t+55. One hour prior to official publication of the press release, the Federal Ministry of Economics and Technology and the Federal Ministry of Finance receive it by fax with an embargo notice.

1 An exception is the data on persons in employment which are calculated on a monthly basis and published in a separate press release in the context of labour market reporting (ILO concept).

2.4 Policy for metadata

The German QNA has joined the SDDS of the IMF. For details, see http://dsbb.imf.org/Applications/web/dsbbhome.

Extensive metadata are also provided in the GENESIS on-line database (https://www.genesis.destatis.de/genesis/online/logon) (Code 81, National accounts of the Federation).

A clearly structured overview of the metadata on the NA is additionally provided and can be downloaded free of charge. http://www.destatis.de › Publications › Quality Reports › National accounts, domestic product.

Chapter 3 Overall QNA compilation approach

3.1 General architecture of the QNA system

The QNA for the calculation of gross domestic product in Germany are an indicator-based extrapolating procedure with complete integration into the final annual national accounts. With regard to procedures, a distinction is to be made between the short-term quarterly accounts (excluding annual national accounts) and the later quarterly accounts with an adjustment to the independently determined annual results (benchmarking).

The quarterly accounts are drawn up in close analogy to the annual national accounts. This analogy includes NA concepts, results and the persons dealing with the matter. Of course, the NA concepts for quarterly and annual accounts are basically identical. However, the information basis for the quarterly accounts is often not as comprehensive as for the annual national accounts, so that occasionally plausible hypotheses have to be used as a substitute. The results of the quarterly and annual national accounts are at any date of computation fully compatible and aggregatable. After all, both calculation systems are managed by the same organisational units and by the same persons. This organisational structure enables these persons to strictly specialise on certain characteristics or industries and also directly ensures a differentiated feedback between final annual accounts and short-term quarterly accounts.

Similar to the annual national accounts, gross domestic product is calculated in the quarterly accounts in principle based on two separate and independent approaches, namely the generation-of-income account (production approach) and the use-of-income account (expenditure approach). The distribution-of-income account (income approach) as a possible third pillar can be applied only partially because information about entrepreneurial income is insufficient. Generation-of-income and use-of-income account are to a large degree independent of each other, so that effective mutual control is possible. However, where the same indicators are used, advance reconciliation is effected to prevent unnecessary differences in the calculations (e.g. for the initial values of the construction statistics as the basis for the calculation of gross fixed capital formation and value added in the construction industry).

Production and expenditure approach for the calculation of gross domestic product are always applied in detail, which is so to speak using a bottom-up method. This means that even in the first provisional calculations or in the GDP flash estimates, no direct estimate of GDP is made out of the time series or in dependence on other explanatory exogenous variables.

Actually, a mix of methods of calculation is employed which is to a large extent determined by the concrete data base. For example, in some cases extrapolating is effected with nominal indicators (e.g. turnover) and the price-adjusted variables are derived by deflating, or extrapolation is carried out first (e.g. with production indices) and then converted to nominal variables by inflating. A common characteristic of all calculations is the close integration of nominal and price-adjusted estimates, i.e. the procedures are usually carried out by the same experts. This enables plausibility checks of the nominal and price-adjusted figures and of the implicit price index.

Another characteristic is the focus on the calculation of original (unadjusted) values as the first calculation stage. This applies both for the calculation results of the production and expenditure approach and for GDP adjustment as well. The seasonally and calendar-adjusted results are determined only in a second stage of the calculation procedure. This approach is regarded as reasonable because only in this way the “original” values can be determined truly independently of the rather mathematical seasonal and calendar adjustment procedures, and afterwards the effects of different adjustment methods can be shown clearly.

Extrapolation is the dominating calculation technique. Only in exceptional cases, absolute values from special statistics are taken over directly into the NA (e.g. in the calculation of government final

consumption expenditure). In the extrapolation process, a national accounts variable is in principle determined by multiplying the original value (W) in the respective previous year's quarter with the rate of change of a suitable indicator (Ind):

$$W(t) = W(t-1) \times \{ Ind(t) / Ind(t-1) \}$$

The currently applied system of the QNA does not use the instrument of input output accounts (IOA), complete supply and use tables are not available. Integration of the IOA into the German NA is performed only in the context of the annual accounts.[2] Nevertheless, there are elements of a commodity flow approach in the quarterly accounts. For instance, domestic gross fixed capital formation in machinery and equipment is determined at a very fine level of product disaggregation as difference between product supply (production plus imports) and exports.

A peculiarity is the calculation of the financial intermediation services indirectly measured (FISIM). Also in the quarterly accounts the FISIM are estimated with a special calculation model completely as a separate stratum for all necessary variables (supply and all use categories, nominal and price-adjusted) which are then added to the provisional calculation results without FISIM.

3.2 Balancing, benchmarking and other reconciliation procedures

3.2.1 Quarterly GDP balancing procedure

In Germany, GDP is calculated in two separate ways in the quarterly accounts as well:The generation-of-input account (production approach) determines GDP via gross value added by the producers and the net taxes on products, while the use-of-income account (expenditure approach) determines GDP as the sum of consumption expenditure, capital formation and the balance of exports and imports. In both approaches, the calculations are made largely independently and combined in a macroeconomic balancing process. Even though complete calculation of GDP via the distribution side (income approach) is not possible in Germany due to the lack of information about entrepreneurial income, results from the distribution-of-income account are used to check the plausibility of GDP figures. This is done, for example, by means of macroeconomic ratios. In the quarterly calculations of GDP, balancing is initially based on the rates of change of the unadjusted figures in comparison with the previous year. Adjustments for seasonal and calendar variation are made only in a subsequent step (with feedback). In contrast to this, the level determination of GDP or GNI is examined in more detail in the context of the annual accounts.[3]

Basically, three partial processes of the balancing, reconciliation and validation of the quarterly GDP calculations can be distinguished:

(1) Partial reconciliation of components

(2) Macroeconomic GDP balancing

(3) In-process quality assurance

A partial reconciliation of components (1) is performed before the macroeconomic balancing. In the process, aggregates which are particularly closely related through their statistics are checked for coherence prior to GDP balancing. Examples of this are, in particular, reconciling the calculation of capital expenditure on building and structures with construction industry output or reconciling the baseline values for retailing, in order, on the one hand, to calculate household final consumption

2 More detailed information is contained in the NA methodological description of the annual results, published as Fachserie 18, Series S.30, Wiesbaden 2016, sections 6.1.2.

3 See the methodological description of the annual national accounts, in Fachserie 18, Series S.30, Wiesbaden 2016, section 6.

expenditure, and, on the other hand, to apply the production approach for the retail trade industry. This includes adjusting the figures due to the analysis between provisional indicators and final NA results. An attempt is made to come as close as possible to the expected final results by applying supplementary deductions or additions to the statistical indicators in the current GDP calculations.

The following macroeconomic GDP balancing procedure (2) serves to verify the respective results of the largely independently calculated GDP in the production and the expenditure approaches and to combine them in a macroeconomic system. This procedure is performed separately in each calculation of GDP, starting with the first provisional quarterly GDP calculations (t+45 days after the end of a quarter), via the regular more in-depth annual calculations (for the first time after t+18 months) until the major revisions of NA and back-casting which are performed at intervals of several years (mostly involving changes of methodology). In the course of these calculation cycles, the statistical data base becomes ever more dense and the quality of the NA results is progressively improved.

The practice of macroeconomic GDP balancing is characterised by a systematic, multi-stage, iterative procedure, in which a number of national accounts experts establish in an interactive process an optimised result with respect to a whole series of various indicators. Thus, this is not an automatic process or a predetermined sequence of mathematical steps. The balancing process can be broken down into the following steps:

(1) It starts with the calculation results of the production and the expenditure approach (annual and quarterly results, at current prices and price-adjusted).

(2) Identification and checking of existing deviations

(3) Analysis of results over several periods (time series)

(4) Comparison of "new" and "old" results (from the previous calculation)

(5) Comparison of provisional and final results (for previous years and quarters)

(6) First feedback/verification of "weak" and less reliable aggregates

(7) Plausibility check of changes in inventories (after the first balancing round)

(8) Plausibility check of implicit deflators (after the first balancing round, for GDP, aggregates of the production and expenditure approach)

(9) Feedback with (provisional) seasonally and calendar-adjusted results

(10) Feedback with results of income approach (e.g. operating surplus, labour share in national income, savings ratio)

(11) Analysis of other macroeconomic indicators (productivity, unit labour costs)

(12) Feedback with results of sector accounts (in particular coherence)

(13) Analysis of balancing differences in the time series

(14) Breakdown of balancing differences (published figures) mainly using arithmetical methods (with subsequent plausibility checks, particularly of the time series)

(15) Comparison with the results of other external institutions

(16) Discussion and feedback from external NA experts (particularly in the case of seasonally and calendar-adjusted results, experts from the Deutsche Bundesbank)

In breaking down the balancing differences (step 14) by industries in the production approach, the initial structure of gross value added (by industries) remains unaltered. The gross value added by

industries is balanced towards the already determined gross domestic product, whereas the output usually remains unchanged (because of the better statistical basis) and the balancing entry is recorded under intermediate consumption. In this procedure, a few of the accounting categories are exempted from balancing (e.g. sectors S.13 General Government, S.15 Non-profit Institutions and S.12 Financial Corporations), because either the respective results are considered to be particularly robust or they are already being processed elsewhere in other subsystems (sector accounts).

Finally, these balancing entries are checked once more during the calculation of annual national accounts, based on the detailed supply and use tables with a time lag of currently around three years. However, there are no quarterly supply and use tables in the German NA. It would be very time and resource consuming to draw up such tables. Moreover, any potential gain of knowledge seems to be rather limited if missing quarterly or monthly data have to be provided by assuming constant ratios (e.g. constant use or input structures). An additional weakness is the fact that the product-related structure of exports and imports shows considerable uncertainties due to the exemption threshold of the foreign trade statistics.

The size of the balancing differences between the calculation results of the production and the expenditure approaches varies in the individual quarters and does not show a stable pattern. Moreover, the data base changes with every revision of quarterly accounts. The size of the total difference between production and expenditure approach is less than one per cent, measured by the price-adjusted rates of change of GDP on the previous year (average absolute deviation in percentage points; calculation based on the quarterly estimates for the years 1999 to 2015). It should be kept in mind, though, that the calculation result of the expenditure approach is actually not strictly determined due to the comparably weak statistical basis of the changes in inventories. Of course, the difference between balanced results and the calculation results is smaller and on average amounts to less than half a percentage point. In general, the balanced GDP lies in the interval between the calculated results according to the production approach on the one hand and the expenditure approach on the other; that applies to both the absolute value and the rates of change.

In addition to these two approaches to determine GDP, there is a wide range of other measures of quality assurance during the process (3) of the calculations, which are described in more detail in section 3.2.3.

3.2.2 Benchmarking of QNA to ANA

The question of adjustment between quarterly and annual results arises primarily when annual results are determined at a later time in an independent calculation, thus deviating from the provisional quarterly accounts. Since usually the annual results have a better statistical basis, the quarterly results are adjusted to the annual results (examples: large parts of the generation-of-income account, gross fixed capital formation in construction). However, there are also cases where the annual results are determined directly as the sum of the quarterly results, so that an adjustment problem does not arise (examples: exports, imports, gross fixed capital formation in machinery and equipment). Mixed types also exist, for example in cases where the quarterly results are adjusted to annual indicators by means of corrective factors (example: delivery side of retail trade in private consumption expenditure).

The first provisional annual results (after t+15 or t+45, t+135, t+225 days as well) are usually determined on the basis of short-term infra-annual indicators, so that in most cases the annual results arise as the sum of the quarters and in so far there is no adjustment problem.

Necessary adjustments of the quarters to better-founded annual results are made for the individual aggregates or industries using methods of calculation that are quite varied and adapted to the specific situation, i.e. there is no uniform mathematical method. Unless specific methods exist, the quarters are adjusted proportionally in a simplified fashion. Although this solution has the advantage that the rates of change of the original values in the year-on-year comparison are not dis-

torted and also the rates of change compared to the previous quarter are not distorted (within a calendar year), there is the disadvantage that there may be a discrepancy between the first quarter of a year and the last quarter of the previous year due to statistics. This problem is examined with the help of seasonally and calendar-adjusted series and corrected ad hoc where a case is important.

Since in the practice of the German NA a calculation and balancing of unadjusted original values is done first, the seasonal and calendar effects are included in the quarterly results, and the calendar effects in the original annual results as well. The seasonal and calendar adjustment is effected only in a subsequent calculation. When estimating the calendar effects, only such effects are taken account of that may be contained in the original values due to the base statistics used.

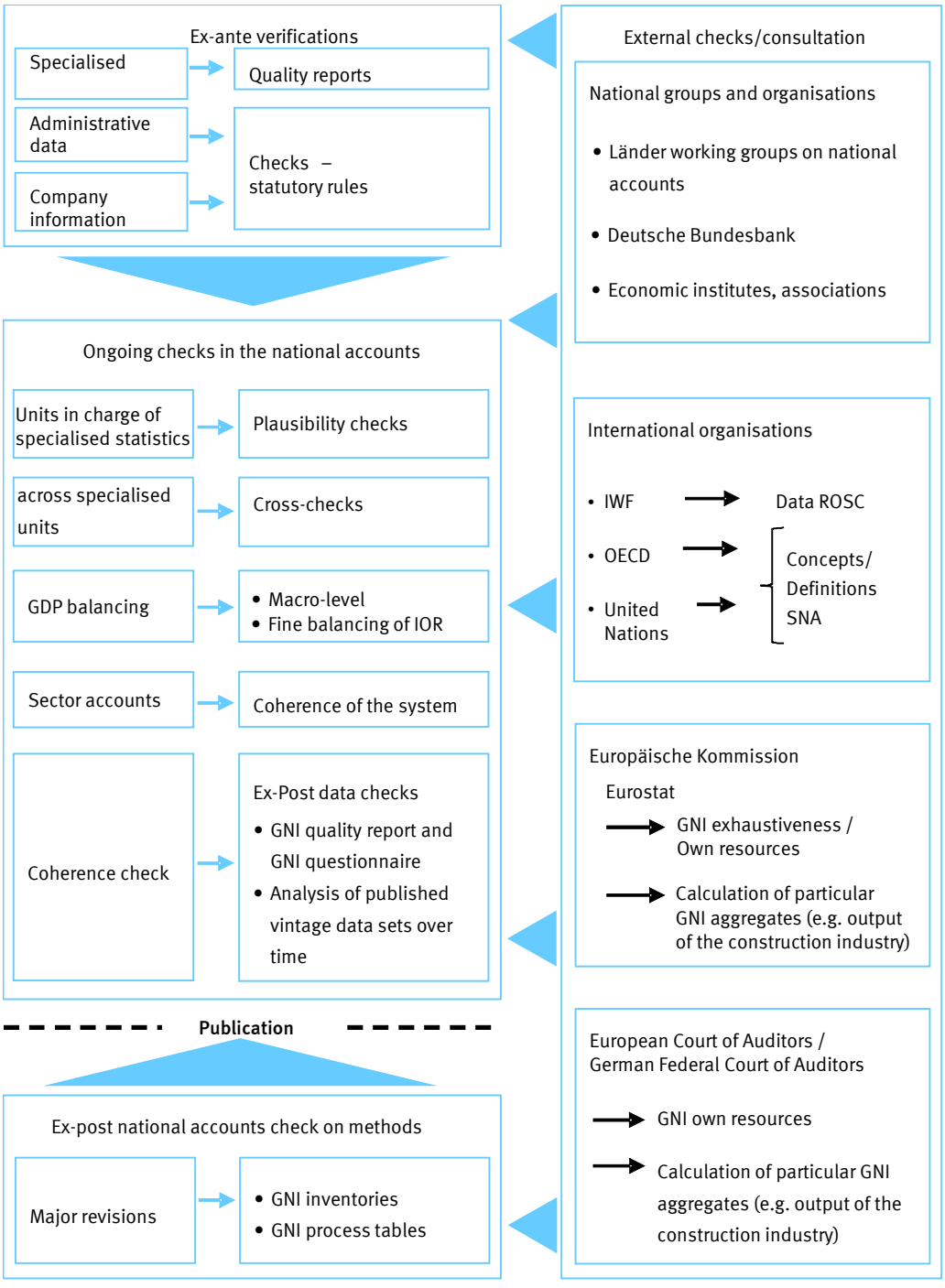
3.2.3 Other reconciliations of QNA different from balancing and benchmarking

The macroeconomic balancing of gross domestic product may be regarded as a central component of a comprehensive system of quality assurance during the process of the NA.

Below is a summary of additional elements of the quality assurance procedure currently applied in Germany in the form of comparisons and other checks.[4]

4 Detailed explanations of the individual elements of the quality assurance are given in the methodological description of the annual accounts, Fachserie 18, Series S.30, Wiesbaden 2016, section 6.2.

Overview 3-1: Quality assurance in the German system of national accounts



A distinction is made between:

a) Ex-ante checks (in the base statistics)
b) Continuous NA checking (of the results)
c) Ex-post NA checks (of the methods)
d) External audits and consultations

a) Ex-ante checks

Before the actual national accounts calculations can start, a series of quality checks must be performed, most of which will have already been made by those supplying the source statistics. In the system of national accounts, the results of a wide range of primary and secondary surveys are processed as well as information from other administrative data, which are checked for plausibility at first. Due to such plausibility checks, occasional corrections are made to the base statistics for the purpose of the NA. These are documented by the NA staff, so that the calculations can be retraced and understood at any time. Moreover, as part of meetings held with working parties on special statistics, matters concerning content and timetable of national accounts are also discussed.

b) Continuous NA checking

During the compilation process of the national accounts aggregates, quality control checks are constantly being conducted, a synopsis of which is shown in Figure 3-1. The basis data are checked for plausibility and then compared with data from other available sources. The employees who are responsible for particular accounting areas are also in direct personal contact with each other, and, if necessary, ad-hoc meetings are conducted at the working level and documented where necessary. The early availability of a schedule for all dates of NA calculation means that all employees know precisely when the calculation results must be available. A special section which also prepares the balancing and publication of the results is responsible for deadline monitoring.

The NA calculations are followed by additional cross-sectional checks that may, for example, be carried out based on the employment figures by industries and sectors. After the (provisional) GDP balancing (see section 3.2.1), a further check takes place in the context of drawing up the sector accounts in view of the complete system coherence. This is a check entailing an analysis of whether the macro-economic circuit is complete and consistent – in other words, whether the production approach, expenditure approach, income approach and financial accounts in the various sectors of the economy are congruent with each other. In this context, reconciliation and a coherence check are performed on every date of calculation with the financial accounts drawn up by Deutsche Bundesbank. In addition to that, analyses are performed of productivity indices such as gross value added per person in employment or per hour worked by persons in employment or unit labour costs.

c) Ex-post NA checks

Additional control instruments that finally are applied after publication of the results are the GNI questionnaire and the annual report on the quality of the GNI data. While the GNI questionnaire once more checks the coherence of the components of gross national income, the GNI quality report above all provides information about the reasons for changes due to revisions. Parallel to the preparation of the quality report on the GNI data, complex ex-post control tables are prepared in which the publication states over time are also documented and analysed. In this context, it should be pointed out the publicly available "real-time database" of the German Central Bank (Deutsche Bundesbank)[5]. In addition, as part of major revisions, descriptions of the compiling methods in the national accounts are updated in accordance with standard EU rules, and other fundamental ex-post control checks of the methods are conducted at regular intervals by the preparation of 'GNI process tables'.

d) External audits and consultations

On the one hand, the Deutsche Bundesbank provides important components for the system of national accounts with the results of the balance-of-payments statistics and of the financial accounts. In addition, the close cooperation with the Deutsche Bundesbank in the calculations of seasonally and calendar-adjusted national accounts results offers further points for the examination and checking for plausibility of the national accounts data. Research institutions, ministries and the broad

5 http://www.bundesbank.de/Navigation/DE/Statistiken/Zeitreihen_Datenbanken/Echtzeitdatenbank/realtime_zeitreihen_node.html

expert community indirectly also verify the official national accounts results externally and check them for plausibility, e.g. through direct bilateral contacts or in specialized discussion groups.

This is finally supplemented by additional external checks by international institutions. For instance, in the context of GNI own resources control, the European Commission (Eurostat) at regular intervals checks whether the binding definitions and concepts of ESA are adhered to and whether the methods and results are comparable and complete. For a number of years, the European Court of Auditors (ECA) has also been getting involved with checking the national accounts calculations of EU member states as part of the calculation of GNI own-resources. The ECA has audited the German GNI calculation for the last time in 2012.

3.2.4 Amount of estimation in various releases

The extent of the estimations made at the different dates of calculation of the quarterly accounts is very different for the individual aggregates, as Table 3-1shows. In fact, the variety of the differences with regard to the available data base is considerably larger than shown in the table because the individual aggregates themselves may be composed of a large number of areas of calculation. Column "Well-founded indicators" in the table indicates the part of the calculations that is based on data sources that well represent the characteristic to be calculated. In contrast to this, column "Other information" shows the part of the calculation that is based on alternative indicators, conclusions by analogy or other estimation models.

In some areas, monthly data sources can be used, the results of which usually are available within a narrow time frame, thus being completely available for the first calculation of the past quarter (at t+45 days). A special situation arises with regard to the calculation of taxes on products. Although the basic information for the three months of the past quarter is already available, too, an estimation must be made because, depending on the tax type, the monthly results are shifted by one or two months to achieve accrual-based accounts in accordance with ESA 2010. Although in other areas base data for the most recent periods are available for the calculations, the method of calculation applied is model-based, so that nevertheless a certain scope for estimates remains. This is, for example, the case in the calculation of gross fixed capital formation in machinery and equipment and FISIM[6].

In many cases, alternative estimation procedures have to be applied for the first quarterly accounts especially in those areas of calculation that are based on quarterly data sources, because the results from these data sources are not yet available.

Furthermore, there are areas of calculation in which information for periods of less than one year is not available at all and, therefore, alternative indicators or models have to be used on every date of computation to calculate the quarterly accounts. However, these areas are of comparatively minor importance in Germany in relation to total GDP.

The data situation shown in Table 3-1 exclusively refers to the dates of computation of the quarterly accounts. The final calculation that is based on annual indicators is not reflected.

6 Financial intermediation services indirectly measured.

Table 3-1 Data bases at different dates of computation of the quarterly accounts

	Initial calculation after T + 1.5 months		Initial calculation after T + 4.5 months		Initial calculation after T + 7.5 months		Initial calculation after T + 10.5 months		For information: Share of the respective component in GDP in %
	Well-founded indicators	Other information	Well-founded indicators	Other information	Well-founded indicators	Other information	Well-founded indicators	Other information	
	Coverage in %								in %
Components of the production approach									
Gross value added	**77**	**23**	**95**	**5**	**95**	**5**	**95**	5	90.0
Agriculture, forestry and fishing	65	35	75	25	80	20	80	20	0.6
Industry, excluding construction	90	10	90	10	90	10	90	10	23.3
Construction	70	30	100	0	100	0	100	0	4.1
Trade, transport, accommodation and food services	60	40	100	0	100	0	100	0	14.2
Information and communication	75	25	100	0	100	0	100	0	4.3
Financial and insurance activities	42	58	42	58	42	58	42	58	3.7
Real estate activities	100	0	100	0	100	0	100	0	9.8
Business services	100	0	100	0	100	0	100	0	10.0
Public services, education, health	50	50	99	1	99	1	99	1	16.4
Other services	100	0	100	0	100	0	100	0	3.6
Taxes on products	85	15	100	0	100	0	100	0	10.3
Subsidies on products	5	95	100	0	100	0	100	0	0.3
Components of the expenditure approach									
Final consumption expenditure									**73.2**
Households	69	31	84	16	84	16	84	16	52.1
Non-profit institutions serving households (NPISHs)	0	100	0	100	0	100	0	100	1.8
General government	10	90	99	1	99	1	99	1	19.2
Gross capital formation	**50**	**50**	**81**	**19**	**81**	**19**	**81**	**19**	**19.2**
Gross fixed capital formation	**49**	**51**	**80**	**20**	**80**	**20**	**80**	**20**	**19.9**
Machinery and equipment	60	40	100	0	100	0	100	0	6.6
Buildings	45	55	80	20	80	20	80	20	9.7
Other products	0	100	0	100	0	100	0	100	3.6
Changes in inventories and acquisitions less disposals	0	100	0	100	0	100	0	100	-0.7
Exports	**94**	**6**	**100**	**0**	**100**	**0**	**100**	**0**	**46.8**
Exports (goods)	100	0	100	0	100	0	100	0	38.9
Exports (services)	67	33	100	0	100	0	100	0	7.9

	Initial calculation after T + 1.5 months		Initial calculation after T + 4.5 months		Initial calculation after T + 7.5 months		Initial calculation after T + 10.5 months		For information: Share of the respective component in GDP in %
	Well-founded indicators	Other information	Well-founded indicators	Other information	Well-founded indicators	Other information	Well-founded indicators	Other information	
	Coverage in %								in %
Imports	**92**	**8**	**100**	**0**	**100**	**0**	**100**	**0**	**39.2**
Imports (goods)	100	0	100	0	100	0	100	0	30.2
Imports (services)	67	33	100	0	100	0	100	0	9.0
Components of the income approach									
Compensation of employees (domestic)	**65**	**35**	**94**	**6**	**95**	**5**	**95**	**5**	**50.8**
Wages and salaries	63	37	94	6	95	5	95	5	41.6
Employers' social contributions	71	29	96	4	96	4	96	4	9.2
Gross operating surplus including mixed income	0	100	0	100	0	100	0	100	39.4
Taxes on production	88	12	100	0	100	0	100	0	10.8
Subsidies	66	34	100	0	100	0	100	0	0.9
Consumption of fixed capital	0	100	0	100	0	100	0	100	17.7
Components of the employment accounts									
Persons in employment (domestic)	**67**	**33**	**96**	**4**	**96**	**4**	**96**	**4**	
Employees	63	37	95	5	96	4	96	4	
Self-employed persons and family workers	99	1	99	1	99	1	99	1	
Hours worked (domestic) per person in employment	**52**	**48**	**76**	**24**	**84**	**16**	**89**	**11**	
Employees	51	49	73	27	81	19	85	15	

3.3 Volume estimates

3.3.1 General volume policy

Volumes are measured in accordance with international conventions and binding European legislation on the basis of an annually changing price basis (previous-year price basis) with chain-linking. In contrast to the earlier calculation of a fixed price basis the previous year is used as a base year. The use of a base year that is as up to date as possible is to make the calculation of the "real" rates of change more precise, in particular with regard to the growth of gross domestic product and its components.

This is what is actually done in the calculation when applying the method of previous year's price base: the values of a specific year are deflated by means of price indices which are always based on the annual average of the previous year. This produces, first of all, a sequence of annual results at previous year's prices (for example, results for 2016 at prices of 2015, results for 2015 at prices of 2014, etc.). These results are referred to as unlinked volume data at previous year's prices.

However, due to the changing price base, unlinked volume data cannot be compared with each other over time. It is therefore not meaningful to show change rates. To obtain a comparable time series, index figures have to be produced, which will then be chain-linked. As a result, chain indices are obtained that relate to a specific reference year (since the 2014 revision, the reference year 2010 has been used all over the EU).

In accordance with European regulations, the index type used for the measurement of volumes is a Laspeyres index and, accordingly, a Paasche index is used for the implicit measurement of prices (i.e. just like with the earlier fixed price basis).[7] Multiplying the chain indices by the nominal values of a reference year will give chain-linked volume data (billion euros).

While additivity of the components of an aggregate at previous-year prices is also guaranteed, this is not true for the chain-linked results. In contrast to the fixed price method applied formerly, the chain-linked volume data are no longer additive, i.e. the sum of the chain-linked sub-aggregates deviates from the value of the chain-linked total aggregate. For example, the sum of the chain-linked expenditure aggregates of GDP deviates from the chain-linked GDP itself. These deviations occur in all data in which aggregations of single items or balances are represented (such as gross value added by industries). For logical reasons, the chain-linking differences occurring are agreed not to be eliminated by calculation. In publications, this non-additivity may lead to interpretation problems for the data users and to possible errors in the calculations and the analysis. This is why the national accounts publications currently focus on the chain indices and their change rates. Chain-linked volume data (for reference year 2010) as well as unlinked volume data at previous year’s prices and contributions to GDP growth are available in an electronic working paper.

For the quarterly accounts, different technical solutions are applied at the international level to create chain-linked indices. Following extensive trial calculations, the Federal Statistical Office in agreement with the Deutsche Bundesbank has decided to apply the "annual overlap" method. The "annual overlap" method above all has the advantage of time additivity, i.e. identity between the sum of the quarterly values and the independently determined annual results. This simplifies the computation procedures and can be used to advantage for seasonal adjustment (in particular for indirect seasonal adjustment; see section 3.3.3).

A special problem in chain-linking is the representation of balancing items, particularly the changes in inventories and the balance of exports and imports. Since these variables may over time also have negative values, representation of the time series as chain-linked index is not reasonable and

7 This is a deviation from the practice in the United States where a Fisher index is used to measure volumes (geometric mean of Laspeyres and Paasche index).

calculation of chain-linked volumes is not easily possible. In the German NA, balancing items are therefore only shown as contributions to GDP growth. Only the contributions to growth allow a comprehensive and disruption-free representation of the use side of GDP, as percentage rates of change or index numbers cannot be shown for all aggregates (also for the data at current prices).

The calculation of the contribution to growth rates may basically be done in three different ways:

a) Calculation from additive absolute values: In this "classic" approach, the absolute differences to the previous year are related to the previous year's gross domestic product for each individual aggregate.

b) Calculation from weighted growth rates: The contribution to growth rates can also be derived as weighted growth rates with the shares in previous year's GDP serving as weights.

c) Calculation using a "comparative approach": The contribution to growth rates of a certain aggregate are determined as difference between the actual GDP growth rate and a hypothetical growth rate of GDP that would result if the corresponding aggregate did not change compared to the previous period.

In the German NA the "comparative approach" is applied. The advantage of the "comparative approach" is that it can be used consistently also in the quarterly chain-linked methods that differ at the international level. It is logically founded and there is no need for additional assumptions as in the alternative solutions specified above. However, it can be shown that strict additivity of the contributions to growth (to the rate of change of GDP) is given for annual values only, but not in all cases for the quarterly results. Furthermore, it must be emphasised that these calculated contributions to growth are only calculatory contributions of individual aggregates to the development of GDP. This is not connected with an economic analysis of the growth effect of certain demand aggregates (i.e. the negative contribution to growth rate made by the imports is not distributed to the other aggregates). Such analyses would have to be performed additionally in separate evaluations on the basis of input-output tables.

To make these calculations comprehensible to external users, it is also necessary to provide the results at previous-year prices (i.e. prior to chain-linking). They are published in the working paper mentioned above, which includes besides unlinked volume data also chain-linked volume data and contributions to GDP growth of main national accounts aggregates[8]. The Federal Statistical Office calculates the contributions to growth by means of an Excel macro, which has been developed by the Deutsche Bundesbank and which is made available to users free of charge on request. The programme is called "KIX" and enables the calculation of mathematical contribution to growth rates based on the "comparative approach" and the aggregation or disaggregation of chain indices.[9]

The box below shows the formulas.

8 National Accounts, Chain-linked volume data and contributions to growth.

9 The macro is available from the Deutsche Bundesbank on request and can be used provided that the relevant terms of use are accepted and complied with.

Calculation of contribution to growth rates

1. Calculation from additive absolute values

(1) $$Y(t) = A_1(t) + A_2(t) + \ldots + A_n(t) = \sum_i A_i(t)$$

where $Y(t)$ = GDP in period t; $A_i(t)$ = aggregates A_i in period t

(2) $$r(t) = \frac{Y(t) - Y(t-1)}{Y(t-1)}$$

where $r(t)$ = GDP growth rate

(3) $$r(t) = \sum_i \frac{A_i(t) - A_i(t-1)}{Y(t-1)} = \sum_i \frac{\Delta A_i}{Y(t-1)} = \sum_i c_i$$

where c_i = contribution to growth rate of aggregate i

2. Calculation from weighted growth rates

(4) $$r(t) = \sum_i \frac{\Delta A_i}{Y(t-1)} = \sum_i \frac{\Delta A_i}{A_i(t-1)} * \frac{A_i(t-1)}{Y(t-1)}$$

(5) $$r(t) = \sum_i r_i(t) * w_i(t-1)$$

where $r_i(t) = \frac{\Delta A_i}{A_i(t-1)}$ = growth rate of aggregate i

and $w_i(t-1) = \frac{A_i(t-1)}{Y(t-1)}$ = weight of aggregate i in previous period (t–1)

3. Calculation using a "comparative approach"

It follows from equation (3), e.g. for the contribution to growth rate c_n of aggregate A_n,

(6) $$c_n = \frac{\Delta A_n}{Y(t-1)}$$

(7) $$c_n = r(t) - \sum \frac{\Delta A_i - \Delta A_n}{Y(t-1)}$$

i.e. the contribution to growth rate (c_n) of a certain aggregate A_n can be determined as difference between GDP growth rate [r(t)] and a hypothetical GDP growth rate that would result if the aggregate did not show any change on the previous period (i.e. $\Delta A_n = 0$).

In this way, the contribution to growth rates for any aggregate can generally be calculated, i.e. for example for A_n = changes in inventories or for A_n = external balance of goods and services.

This approach can be generalised and transferred to the calculation methods with chain-linked time series.

3.3.2 Chain-linking and benchmarking

The benchmark adjustment between quarterly and annual national accounts has various dimensions. The problem does not arise for the first provisional quarterly accounts, because the quarterly domestic product calculations are completely integrated into the annual accounts with regard to contents, time and personnel. A benchmark adjustment becomes necessary only if independently determined and better founded annual values become available at a later time. In the German NA, benchmark adjustment is effected in the context of the annual calculations initially for the original values at current prices (cf. section 3.2.2). The chain-linking method selected (annual overlap) additionally ensures time additivity between quarterly and annual data, so that no additional benchmarking is necessary in this regard.

3.3.3 Chain-linking and seasonal adjustment

In addition to the year-on-year comparison of quarterly GDP with its production side and use side aggregates (original values), the previous-quarter comparison of these variables is shown in the German NA for the purpose of more up-to-date short-term economic analyses. However, due to the different seasonal influences, this comparison requires a seasonal and usually also a calendar adjustment.

In Germany, seasonal adjustment is made on the basis of the reconciled, chain-linked unadjusted figures. An indirect approach is used, i.e. usually the individual components of an aggregate are adjusted directly for seasonal variations, whereas the aggregates are adjusted indirectly by adding up the seasonally adjusted components.

The problem of non-additivity of chain-linked indices or chain-linked in the German NA is solved by means of a special program (Excel macro) named “KIX” that enables both the aggregation or disaggregation of several variables and the calculation of mathematical contribution to growth rates.

3.4 Seasonal and calendar adjustment

Two different methods of seasonal and calendar adjustment are used in parallel in the German QNA: Census X-12-ARIMA and the Berlin method BV4.1. The Federal Statistical Office publishes the results of both methods in the separate Reihe 1.3 "Seasonally adjusted quarterly results according to Census X-12-ARIMA and BV4.1" of Fachserie 18, National Accounts. In addition to the seasonally and calendar-adjusted data of the production and use sides and the labour volume accounts it also contains the only seasonally adjusted data of the distribution side and the employment accounts.

The NA data adjusted for seasonal and calendar variations using Census X-12-ARIMA are part of the mandatory data delivery to Eurostat by the Federal Statistical Office.

In the German NA, additivity of the totals with regard to components and time is enforced by adjusting the quarters to the respective annual total by means of a uniform factor and reconciling the individual sub-aggregates by means of a so-called derivation pattern. Thus, the sum of the seasonally and calendar-adjusted quarterly figures, on the one hand, and the only calendar-adjusted annual figure, on the other, are consistent with each other, and this is also true for the sum of the only seasonally adjusted quarterly figures, on the one hand, and the unadjusted annual figure, on the other.

On request, the Federal Statistical Office and Deutsche Bundesbank provide users of the seasonally and calendar-adjusted results with all information about their creation. This makes the results comprehensible to all data users at any time, which results in a high degree of transparency.

3.4.1 Policy for seasonal adjustment

For the seasonal adjustment of the quarterly time series of the NA, the Federal Statistical Office has been using the internationally better known method Census X-12-ARIMA (current version 0.2.8) since the year 2000 in addition to the Berlin method (current version: BV4.1). The seasonal and calendar adjustment with the Census method is effected in close co-operation with Deutsche Bundesbank based on partnership and the division of labour and is aligned closely to the "ESS Guidelines on Seasonal Adjustment".

In the context of the X-12-ARIMA programme, ARIMA models are used for forecasts at the end of the time series and for outlier identification and replacement just as most of the available diagnostics, i.e. possibilities to optimise seasonal adjustment by means of various tests. The programme additionally requires numerous series-specific settings of the various parameters for all series that are directly to be adjusted. This, for example, includes the definition of the ARIMA model, the period, the outlier identification and replacement and of other options. All parameters have to be defined separately for each time series. The settings of the parameters are checked at regular intervals and adjusted if necessary.

All price-adjusted series and the deflators are usually directly adjusted. Time series at current prices are derived from them indirectly by multiplying the seasonally and price-adjusted values with the seasonally adjusted prices. In most cases, direct adjustment is effected at the finest possible levels and indirect adjustment at the less fine level of aggregation. However, GDP is directly adjusted. More information about which series are directly adjusted and which indirectly is described in the so-called derivation pattern.

The second seasonal adjustment method used for the results shown in this supplement is BV4.1 (Berlin Method, version 4.1). In contrast to Census X-12-ARIMA, the BV4.1 method does not require any manual definition of series-specific methodical parameters. Consequently, the transparency of the analysis results is automatically ensured. However, using the extreme value detection can invalidate the additivity of the series. To ensure nonetheless consistent results, some of the time series are indirectly seasonally adjusted. The calculation rules for these indirectly adjusted time series are consistent with the rules for the Census method. A user-friendly PC version of the method is provided free of charge by the Federal Statistical Office to anyone interested.

3.4.2 Policy for calendar adjustment

Prior to seasonal adjustment with Census X-12-ARIMA, those unadjusted variables (original values) for which calendar adjustment is regarded as reasonable are calendar-adjusted with the help of calendar factors. The calendar factors are determined on the basis of monthly indicator series which complies with the "ESS Guidelines on Seasonal Adjustment". For instance, the monthly turnover index of retail trade is used as one of the indicators for the estimation of the calendar factors of private consumption expenditure. The monthly calendar factors determined from the monthly indicator series are aggregated into calendar factors for quarters and finally weighted together to form the calendar factor of the associated time series of the NA.

3.4.3 Revision policy for seasonally adjusted data

The seasonal adjustment model as well as further parameters such as outliers and filters are recalculated once per year in August (in the context of the revision of the last four years). At that time, the entire calendar factors and seasonal factors are recalculated and forecasted for several years. These forecasted seasonal factors are usually used for all subsequent quarterly release dates. However, these factors are nonetheless checked every quarter and may be changed if necessary for individual series (controlled current adjustment). In general, seasonal adjustment is performed with already calendar-adjusted time series, so that for most aggregates both seasonally and calendar-adjusted

and only calendar-adjusted series exist. Based on updated seasonal factors, modified results may also appear in the whole time series from 1991 onwards.

The calendar factors are checked at regular intervals and adjusted if necessary, usually once per year in August.

Chapter 4 GDP components: the production approach

Starting from the output of the economic units, gross value added (GVA) is calculated by deducting intermediate consumption. As indicator for the economic performance of the economic units, it is the central variable of the generation-of-income account (production approach).

Due to the data situation in Germany, the calculations of GVA are carried out separately for the sectors enterprises (combination of the sectors non-financial corporations, financial corporations and households), general government and non-profit institutions serving households, with the sectors in the calculation additionally being disaggregated by industries[10] or parts of them. Since in the general government and non-profit institutions serving households sectors the bases and methods of calculation are very similar across all industries, the calculations for these sectors are described first.

Gross value added of general government

Gross value added of general government is calculated separately for the subsectors central government, state government, local government and social security funds, and within these subsectors for market and non-market output, broken down by seventeen industries. In the breakdown by industries, in which results for GVA are published on a quarterly basis (see Table 4-1), units of the general government sector are present in all industries with the exception of the industries manufacturing, construction, information and communication as well as financial and insurance services. The calculation for these units is described below in a general view. The functional breakdown in the results of the annual accounts statistics of the public finance statistics for the Länder and local government and in the quarterly results for the central government and of the quarterly results for the social insurance branches is the basis of calculation for the distribution of government production to industries. The functional breakdown from the annual results is used as a proxy for the in-year data from the cash statistics.

For the non-market output of general government (including output produced for own final use), gross value added is composed of the sum of compensation of employees, consumption of fixed capital (of the capital stock used in non-market output) and other taxes on production paid less other subsidies on production received. For the market output within the general government sector, value added is determined as the difference between output and intermediate consumption, as in the case of enterprises. Output in the industries with market output of general government mainly results from general government sales (predominantly utilisation fees and similar income from economic activities). The basis for compensation of employees, intermediate consumption and general government sales is mainly the results of the quarterly cash results of the core budgets and of the extra-budgets using cameralistic/double-entry accounting of the Federation, the Länder and the social insurance (EVAS 71512) and quarterly cash results of the core budgets and of the extra-budgets using cameralistic/double-entry accounting of the municipalities/associations of municipalities (EVAS 71517), supplemented by information from the accounting results of the core budgets, of the extra budgets using cameralistic/double-entry accounting and of other public funds, institutions and enterprises using cameralistic/double-entry accounting of the Federation, the Länder and the social insurance (EVAS 71712) and the accounting results of the core budgets, of the extra budgets using cameralistic/double-entry accounting and of other public funds, institutions and enterprises using cameralistic/double-entry accounting of the municipalities/associations of municipalities (EVAS 71717). Moreover, for extra budgets of general government data from quarterly higher education finance statistics (EVAS 21372), and quarterly statistics for public funds, institutions and enterprises (only for units of general government) (EVAS 71611) are being used, supplemented by information on annual higher education finance statistics (EVAS 21371) and annual statistics for public funds, institutions and enterprises (EVAS 71811).

10 In accordance with the Classification of Economic Activities, Edition 2008 (WZ 2008), or NACE Rev. 2.

Missing data for periods of less than one year for subareas of general government (e. g. accident insurance) are estimated based on the annual accounts of the public finance statistics. With regard to the compensation of employees, vacation bonus and Christmas bonus are booked in the quarter in which they are paid and not distributed across the calendar year. Consumption of fixed capital is valuated at replacement costs. Other subsidies received are taken from the accounting data of the Federal Employment Agency for periods of less than one year. Other taxes on production paid are derived from the quarterly cash statistics and the annual accounts statistics of the financial statistics.

Gross value added of the non-profit institutions serving households (NPISHs) sector

The activities of the units in the sector non-profit institutions serving households (S.15) are broken down into ten different industries. The areas in which economic activity at present occurs in this sector are programming and broadcasting activities (NACE/WZ division 60) beginning from 2013 onwards, scientific research and development (NACE/WZ 72), education (NACE/WZ 85), human health services (NACE/WZ 86), residential care activities (NACE/WZ 87), social work activities without accommodation (NACE/WZ 88), creative, arts and entertainment activities (NACE/WZ 90), libraries, archives, museums and other cultural activities (NACE/WZ 91), sports activities and amusement and recreation activities (NACE/WZ 93), activities of membership organisations (WZ 94).

The quarterly calculations of GVA and output are carried out likewise for the non-profit institutions regardless of industry. Direct information for the calculations is not available. Estimation is made with the help of indicators. For price-adjusted figures, this is done by extrapolating the previous year's quarter with the rates of change of employment, which are available by sector and by industry. For nominal figures extrapolation is done via the rate of change of the compensation of the employees working in the sector, which is available in the same breakdown. The deflator results implicitly as the quotient of nominal and price-adjusted figures.

Gross value added of all sectors

In a next step, the results for the sectors are aggregated to a total result for each industry. Summation of the individual industries yields the gross value added of all industries (bottom-up approach).

In the calculation of gross value added, output is valuated at basic prices and intermediate consumption at purchaser's prices. To get from GVA at basic prices to GDP at market prices, taxes on products are added and subsidies on products subtracted. Table 4—1 uses the year 2015 as an example to show quarterly GVA by industries and GDP derived.

In the current quarterly accounts of output and intermediate consumption, the previous year's quarters are usually extrapolated by means of suitable quarterly or monthly indicator series (aggregated into quarters). Depending on sector, calculation is different: nominal (with subsequent deflating), price-adjusted (with subsequent inflating) or nominal and price-adjusted (with implicit determination of a deflator). The calculation results of the generation-of-income account are matched with the use-of-income account in the context of a macroeconomic reconciliation, in which process the results of the distribution-of-income account (e.g. net operating surplus and unit labour costs) are also used. If necessary, so-called macroeconomic balancing adjustments are performed which are usually made in the generation-of-income account by means of a change to intermediate consumption. Once the mostly more detailed annual base statistics are available, the quarterly results are adjusted to the new level of the annual results of the respective economic sector, leaving their seasonal pattern unchanged.

Table 4-1: Gross value added by industries and gross domestic product

at current prices, 2015

	Q1	Q2	Q3	Q4.	Year
	in Euro billion				
Agriculture, forestry and fishing	4.155	4.394	4.336	4.466	17.351
Industry, excluding construction	173.666	176.992	179.131	177.670	707.459
Including: Manufacturing	151.022	156.881	158.879	155.826	622.608
Construction	24.787	30.669	33.415	35.884	124.755
Trade, transport, accommodation and food services	100.841	108.859	110.494	109.973	430.167
Information and communication	32.876	31.815	33.910	33.031	131.632
Financial and insurance services	27.812	28.073	27.716	27.329	110.930
Real estate activities	74.445	73.685	75.981	73.167	297.278
Business services	75.322	72.133	78.995	76.808	303.258
Public services, education, health	123.100	119.792	123.495	130.767	497.154
Other services	27.266	26.419	28.126	27.867	109.678
All industries	664.270	672.831	695.599	696.962	2,729.662
+ Net taxes on products [1)]	75.140	73.159	76.061	78.798	303.158
= Gross domestic product	739.410	745.990	771.660	775.760	3,032.820

1) Taxes less subsidies on products

4.1 Gross value added by industries (FISIM and R&D not allocated)

In the following, the economic sector calculations are described in detail for the business sector. The sector results of general government and non-profit institutions serving households are added to the economic sector results shown here to arrive at the total result for a respective economic sector (Table 4-1). The financial intermediation services indirectly measured (FISIM) and the results of research and development (R&D) are calculated separately and incorporated by sector afterwards.

4.1.1 Agriculture, forestry and fishing

The current quarterly calculation is carried out by extrapolating output and intermediate consumption of the previous year's quarter. This is done separately for the branches agriculture, forestry and fishing. In later calculations, annual results of the agriculture and forestry accounts are incorporated.

To this end, the annual output (if applicable, estimate of expected harvest) is distributed to the quarters using an estimated key for the costs incurred. For the other products of agriculture, monthly data from the statistics of slaughtering and slaughtering weights (EVAS 41331) respectively from the poultry statistics (EVAS 41322 and 41323) as well as calculations of producers of cow milk delivery to milk processing establishments published by Federal Ministry of Food and Agriculture (FMFA) are used as extrapolation indicators. Intermediate consumption is determined by the resulting chain-linked price-adjusted ratio of intermediate consumption[11] of the previous year. For nominal calculation, the monthly indices of producer prices for agricultural products (EVAS 61211) respectively

11 The price-adjusted chain-linked intermediate consumption rates are derived as ratio of price-adjusted chain-linked intermediate consumption and production volumes of the previous year.

indices of purchase prices for agricultural machinery and materials (EVAS 61221) are used for extrapolation in addition to the quantity indicators.

According to ESA 2010, the output of forestry corresponds to growth (standing timber) measured as the present value of future proceeds less costs expected (forest tending, logging) plus the logging activity in the reporting period and the ancillary activities. The quarterly calculation for the most recent periods is carried out on the basis of a quantity-price model. As infra-annual data on quantities are not available, the quantity is extrapolated with a long-term estimated average rise of currently 1%. The selling price is extrapolated with the changes of the monthly producer price index of products from wood felling (EVAS 61211) from the state forests – total raw timber (excluding turnover tax) – aggregated on a quarterly basis. Intermediate consumption is determined by the resulting chain-linked real ratio of intermediate consumption of the previous year. Afterwards price-adjusted results are inflated with the development of the last-named producer price indices.

No short-term indicators are available for fishing at the time of calculation. Therefore at the current edge the results for output are based mainly on estimations. Also in this branch the quantity-price-model – as described above – is applied. At a later calculation date, these estimations are replaced by the monthly data of the Federal Agency for Agriculture and Food (BLE) on catches of deep-sea fishing, which are available with a certain delay. As regards catches of inland fishing, no infra-annual data are available. Therefore currently quantity is extrapolated with a rate of 1 %. Intermediate consumption is calculated using the resulting chain-linked real ratio of intermediate consumption of the previous year. As price development for all fish products the consumer price index for Germany (EVAS 61111) "Fish and fish products" is used, which is also used for inflating the results adjusted for price.

4.1.2 Industry, excluding construction

Although only the results for industry without construction, and among them those for manufacturing, are published quarterly in the national publications and only these combined aggregates are to be delivered to Eurostat, the calculations are differentiated by four branches: mining and quarrying (NACE/WZ section B), manufacturing (NACE/WZ section C), energy supply (NACE/WZ section D) and water supply including sewerage, waste management and remediation activities (NACE/WZ section E).

The results for manufacturing as well as mining and quarrying are calculated by extrapolating price-adjusted quarterly gross value added. The respective previous year's quarter is extrapolated with the rate of change of the monthly indices of production in manufacturing, mining and quarrying (EVAS 42153) aggregated to quarters.

The rate of change of the indicator's original value is used, if necessary adjusted to the corrections to be expected for the subsequent publications of the index (final figure, quarterly and annual correction). Price-adjusted output is determined by means of a price-adjusted ratio of intermediate consumption which is initially kept constant in the context of the extrapolation.

Price-adjusted output is inflated by means of an up-to-date weighted output price index (index of producer prices for industrial products and index of export prices (EVAS 61241, 61421). In doing so, both price series are weighted with previous year's shares of domestic and non-domestic turnover. Price-adjusted intermediate consumption is inflated with a weighted input price index. The indices of producer prices for agricultural and industrial products, indices of selling prices in wholesale trade, consumer price index for Germany and index of import prices (EVAS 61211, 61241, 61281, 61111 and 61411) are weighted together in accordance with the shares of the respective product groups based on the results of the input-output calculations. Nominal gross value added is finally calculated as difference between nominal output and nominal intermediate consumption.

In WZ section energy supply (NACE/WZ section D), price-adjusted output of the overall sector is quarterly extrapolated with the (not seasonally and calendar-adjusted) trend of the production index

compared to the previous year's quarter.Price-adjusted intermediate consumption is calculated using the chain-linked real ratio of intermediate consumption. This means that the chain-linked and price-adjusted ratio of intermediate consumption is assumed to be constant for a short time. After that, double inflating takes place of output and intermediate consumption with input and output prices that are broken down in detail and weighted as up to date as possible. Both nominal and price-adjusted gross value added result as difference between output and intermediate consumption.

In WZ section water supply including sewerage, waste management and remediation activities (NACE/WZ section E) the quarterly calculation of output and intermediate consumption on price-adjusted level is done keeping constant the results of the last original calculation, as up-to-date explicit infra-annual official information for this section is not available. Nominal results are derived by inflating with currently available input and output-prices. Gross value added in nominal as well as in price-adjusted terms is the result of subtraction of intermediate consumption from output. The extrapolation approach in the range of water supply that deviates from energy supply results from the structural changes that took place in the energy sector from 2011 onwards (e.g. because of renewable energies, Fukushima-effect). For this reason, the development of the production index of energy supply is not applicable to WZ section water supply.

In these industries the quarterly previous year's price results are calculated separately for output and intermediate consumption. The corresponding previous year's price results for gross value added are determined as difference between these results in previous year's average prices.

4.1.3 Construction

Calculations for construction are carried out quarterly for three WZ divisions, namely construction of buildings (NACE/WZ division 41), civil engineering (NACE/WZ division 42) and specialised construction activities (NACE/WZ division 43). This is not least due to the fact that the base statistics available for construction of buildings and civil engineering on the one hand and for specialised construction activities on the other hand are very different.

The results of divisions construction of buildings and civil engineering are extrapolated with the trend of hours worked taken from the monthly report in the building industry proper (incl. indices of orders received) (EVAS 44111). It is multiplied with an estimated real productivity trend which is basically orientated towards long-time averages but also towards up-to-date assessments. Additionally, a so-called "Firmenkreissprung" (employee size class delimitation) is taken account of which is to anticipate the need for correction of the grossing-up factor in the monthly report in the building industry proper (enterprises with 20 or more employees to enterprises with one or more employees from the complete count in June of every year). Price-adjusted output and price-adjusted intermediate consumption are inflated with weighted output and input prices. The output prices primarily stem from the price indices for the construction industry (EVAS 61261), while the input prices are formed from various price information in accordance with the composition of intermediate consumption.

In the field of specialised construction activities combined trends of turnover figures according to the quarterly crafts report (EVAS 53211) (for enterprises with between 1 and 19 employees) and the quarterly survey in the finishing trade and with property developers (EVAS 44131) (for enterprises with 20 or more employees) are used to update the nominal output. To prevent undercoverage with regard to the annual original calculation with more complete data basis, the output trend is increased by a regularly updated addition. For the calculation of a price-adjusted output, deflation is effected with a weighted output price index on the basis of price indices for the construction industry (EVAS 61261). Since up-to-date information is not available, price-adjusted intermediate consumption is determined based on the resulting chain-linked real ratios of intermediate consumption of the previous year, that are kept approximately constant. Intermediate consumption is inflated with input prices that are broken down in detail. Price-adjusted gross value added in the construc-

tion industry results as difference between price-adjusted output and price-adjusted intermediate consumption.

At the first estimation date, provisional turnover figures are available for enterprises with 20 or more employees only, which account for just around half of the total volume in the finishing trades. The final turnover trend of this size class and the turnover trend of enterprises with between 1 and 19 employees have to be estimated. Additionally, any implausibility detected (e.g. faulty reporting by enterprises, incomplete registers, rapid inclusion of companies found) has to be eliminated or taken account of in the estimation approach. Final results of enterprises with between 1 and 19 employees are available after around t + 60 days.

Elements for checking plausibility used at the estimation date are:

- Time series adjusted on working day
- Shares of the secondary construction in total construction industry over time
- Offset between the trend of the better founded results of primary construction and the secondary construction
- Examination of the more stable employee size class trend according to the quarterly survey in finishing trade (20 employees or more) compared to the crafts report (1 to 19 employees)
- Integration of the dispatches of cement

4.1.4 Trade, transport, accommodation and food services

Quarterly updates of figures for the trade sector are made separately for three areas of calculation, namely for the WZ divisions wholesale and retail trade and repair of motor vehicles and motorcycles (NACE/WZ division 45), wholesale trade, except of motor vehicles and motorcycles (NACE/ WZ division 46) and retail trade, except of motor vehicles and motorcycles (NACE/WZ division 47).

The extrapolation variable for WZ division wholesale and retail trade and repair of motor vehicles and motorcycles is quarterly gross value added at current prices. The rate of change obtained from aggregating monthly turnover index numbers of the monthly statistics of motor vehicle sales including motor vehicle maintenance and repair (EVAS 45214) to a quarterly figure compared to the corresponding quarter of the previous year is eventually adapted to the forthcoming corrections in the event of transition to the more complete base statistics. The amount of these correction factors is derived from comparisons of the updated results of the NA with the data of the business register and the data of the annual trade survey. The amount of the necessary addition to the indicator is checked every year and corrected if necessary. Finally, the results of the respective previous year's quarter are extrapolated with the previous year rate of change of the (not seasonally and calendar-adjusted) monthly turnover index numbers, aggregated into quarters, of the sale of motor vehicles division (EVAS 45214).

Price-adjusted gross value added of wholesale and retail trade and repair of motor vehicles and motorcycles is calculated by deflating with a price index determined by counting back turnover index numbers. In the absence of current information, nominal and the resulting real ratios of intermediate consumption of the previous year are used in order to calculate output and intermediate consumption using the extrapolated gross value added.

Also for the other trading sectors wholesale trade, except of motor vehicles and motorcycles and retail trade, except of motor vehicles and motorcycles the quarterly gross value added at current prices is the extrapolation variable. While doing so, the results of the respective previous year quarter are extrapolated with the previous year rate of change of the (not seasonally and calendar-adjusted) monthly turnover index numbers, aggregated into quarters of the monthly statistics of wholesale trade and commission trade and of the monthly statistics of retail trade (EVAS 45211, 45212). The rates of change obtained from turnover index numbers are eventually adapted – as described above – to the forthcoming corrections in the event of transition to the more complete yearly base statistics.

Deflation of the nominal gross value added in retail trade, except of motor vehicles and motorcycles is done with a price index calculated on the basis of information of the specialized statistics. The price index of the previous year is extrapolated with a rate of change stemming from counted back nominal and real turnover index numbers. In wholesale trade, except of motor vehicles and motorcycles (including wholesaling) deflation of the gross value added is done with a deflator weighted as up-to-date as possible, that is composed of the prices of turnover index numbers and an export price index encompassing turnover with the rest of the world.

Also in these divisions of the classification of economic activities current information on the ratios of intermediate consumption is not available, so the nominal and the resulting real chain-linked ratios of the previous year are applied, in order to calculate the relevant output on the basis of the extrapolated gross value added.

Section accommodation and food services (NACE/WZ section I) is determined by the two subdivisions accommodation (NACE/WZ division 55) and food and beverage service activities (NACE/WZ division 56). The relevant data of gross value added in current prices are extrapolated using the monthly nominal turnover index numbers of the monthly statistics of the hotel and restaurant industry (EVAS 45213), aggregated into quarters. Also in this case of extrapolation the not seasonally and calendar-adjusted rates of change as compared with the same quarter of the previous year are used. If necessary, the rates of change generated by the turnover index numbers are priorly adapted – as already described – to past corrections in the event of transfer to the more complete yearly basis statistics. Price-adjusted gross value added of the subdivisions is calculated by deflating with a deflator determined by counting back turnover index numbers. In the event of missing current information on intermediate consumption, the nominal and the resulting real chain-linked ratios are taken unchanged in the current quarterly assessment.

For the quarterly calculation of the division transportation and storage (NACE/WZ divisions 49 to 53) gross value added of the relevant quarter of the previous year is extrapolated at the current edge using six subdivisions. Extrapolation indicators are the relevant rates of change of the turnover index of the quarterly short-term statistical surveys in the service sector (EVAS 47414) in a breakdown by economic sectors. Calculations are first done in current prices. The different results in a breakdown by economic sectors are then deflated with relevant price indices of official statistics, as the producer price indices for transport and logistics services (EVAS 61311) and selected consumer price indices for Germany (EVAS 61111).

In order to check the plausibility of the turnover indices of business statistics in the field of the service sector, all other available infra-annual information, partly with a time-lag (e. g. monthly respectively quarterly information on various transport services from transport statistics, toll revenues, annual reports of Lufthansa and post operators) are constantly observed and compared with the results of the business statistics. Due to the consequent knowledge gained the extrapolation indicator is eventually adapted in a breakdown by economic sectors.

As in other industries described formerly for the subsections traffic and storage services current quarterly information on the development of intermediate consumption is not available. Therefore, the nominal and the resulting chain-linked ratios of intermediate consumption of the previous year are taken unchanged in the current quarterly assessment. The nominal and price-adjusted gross value added is determined as difference of output and intermediate consumption.

4.1.5 Information and communication

The section information and communication (NACE/WZ section J) was created in the context of the introduction of the classification of economic activities WZ 2008 respectively NACE Rev. 2. It encompasses publishing activities (NACE/WZ division 58), motion picture, video and television programme production, sound recording and music publishing activities (NACE/WZ division 59), programming and broadcasting activities (NACE/WZ division 60), telecommunications (NACE/WZ divi-

sion 61), computer programming, consultancy and related activities (NACE/WZ division 62) and information service activities (NACE/WZ division 63).

With the exception of the division telecommunications the quarterly calculation of price-adjusted gross value added for all other above mentioned divisions is determined by the respective rates of change compared with the respective quarter of the previous year of the volume of work. Hereby, the volume of work is determined as the product of the relevant data on employed persons of the employment accounts, which are available in the needed breakdown by economic divisions and sectors, and the data on hours worked per employee made available by the Institute for Employment and Vocational Research, Nuremberg (IAB), of the Federal Employment Agency, in a breakdown of A*38 at the relevant calculation date. Besides the quarterly data of the volume of work on a nominal level, quarterly turnover indices of the short-term statistical surveys in the service sector (EVAS 47414) for the individual divisions of information and communication are available after a given period, too. However, the results for the above-mentioned industries are very susceptible to revision at the current edge, hence, they are constantly observed as well as information taken of the business reports of the Deutsche Telecom, but cannot be used as priority extrapolation indicators.

The rates of changes thus determined are applied in the same way to output, intermediate consumption and gross value added.

The price-adjusted results of gross value added determined in this way are then inflated with relevant price information of official statistics, as the producer price indices for business services (EVAS 61361) gradually available over a period of time since 2006 and price trends of the consumer price index for Germany (EVAS 61111, in order to get nominal data of gross value added.

As for the economic sector of the division telecommunications the quarterly extrapolation of gross value added is done – analogous to the approach used for the transport sector – using the rates of change of the turnover index as compared to the relevant quarter of the previous year, as for this economic sector the results of business statistics are less susceptible to revision in comparison to the industries of information and communication described previously.

Also in the economic sector of telecommunications the nominal and the resulting chain-linked real ratios of intermediate consumption of the previous year are assumed to remain unchanged in the current quarterly view. The nominal and price-adjusted gross value added then is the result of subtracting the intermediate consumption from gross value added.

In order to deflate the nominal results in the area telecommunication, the relevant price information of the producer price indices for business services (EVAS 61361) are used.

4.1.6 Financial and insurance services

This industry includes the divisions financial service activities, except insurance and pension funding (WZ 64), insurance, reinsurance and pension funding, except compulsory social security (WZ 65) and activities auxiliary to financial services and insurance activities (WZ 66). For quarterly accounts, suitable alternative indicators are used due to the lack of intra-year source statistics. Only the FISIM calculation can rely on monthly available data.

The output of financial service activities (WZ 64) mainly consists of FISIM on the one hand and services charged directly to customers on the other hand. For the FISIM calculation, monthly data from Deutsche Bundesbank on assets and liabilities of financial monetary institutions (EVAS 841) broken down by sector of borrower or creditor, as well as monthly data on interest rates (EVAS 843) are used. Other incomes from directly charged services (e.g. fees) are estimated based on the development of the balance sheet total of resident credit institutions. Suitable indicators for the short-term trend of intermediate consumption for financial service activities are not available. Therefore, ratios of intermediate consumption which are derived from the last available annual profit and loss accounts of credit institutions are kept constant. For the calculation of values at previous-year prices, the deflated sum of loans and deposits is used as volume indicator for extrapolation.

The output of insurance, reinsurance and pension funding (WZ 65) mainly consists of the service charge which has to be amended by income from other services as well as own-account production. Annual forecasts by the association Gesamtverband der Deutschen Versicherungswirtschaft (GDV) of the insurance premiums earned are used for the calculation of the service charge at current prices. The annual rates of change forecasted for the different insurance branches are used as an estimate for the quarters. This also applies for the income from other services and for intermediate consumption. As in the annual accounts, the deflated sum of the insurance benefits paid to the policy holders is used as indicator for volume trend extrapolation.

The division activities auxiliary to financial services and insurance activities (WZ 66) is very heterogeneous and comprises inter alia administration of financial markets, security and commodity contracts brokerage, activities of insurance agents and brokers and fund management activities. For all subdivisions, intra-year indicators do not exist. Value added is estimated based on industry expectations and is verified or modified with the help of newspaper announcements, company reports or similar information where necessary.

4.1.7 Real estate activities

The economic section of real estate activities (NACE/WZ section L) comprises not only the commercial area but also the renting of dwellings.

Quarterly calculations of nominal and price-adjusted gross value added are done separately, namely for the part of commercial real estate activities and the renting of dwellings. Both parts are then merged to an overall result.

For the quarterly calculation of gross value added in the area of commercial real estate activities (without renting of dwellings) extrapolation is done on the basis of price-adjusted results of the previous year by means of the results of work volume as calculated in national accounts, which consist of the components employed persons in the enterprise sector and the hours worked (per person employed) of the IAB. The resulting rates of change of the work volume as compared to the relevant quarter of the previous year are similarly applied to output, intermediate consumption and gross value added. As inflators of the extrapolated price-adjusted results area specific price developments are used; as far as these are missing, results of comparable economic sectors are assumed.

The quarterly calculation of dwelling services (for all institutional sectors) is based on a so-called stratification model, as are the annual accounts (see method description of national accounts[12]). The quarterly output of dwelling services is calculated using an extrapolation of the quantity structure of each stratum broken down by leased dwellings and owner-occupied dwellings as well as an extrapolation of rental prices based on price statistics. For the extrapolation of the quantity structure the previous year`s number of dwellings and living floor space are extrapolated using data of the building completion statistics (EVAS 31121) and – if not available in time – data of the building permissions statistics (EVAS 31111). The result is the actual year´s annual average number of dwellings and living floor space, respectively. As no information on quarterly data is available, the annual average living floor space is converted to an in-year model-based pattern. The change of the number of parking facilities (garages and parking lots) over time in connection with dwellings is extrapolated for each quarter based on the quantity trend of occupied dwellings. Calculations are carried out separately for leased dwellings and owner-occupied dwellings. The output of dwelling services is determined by multiplying the average net rent per square meter by the corresponding inhabited floor space. The calculation is done differentiated by strata. The output of parking facilities services results from the multiplication of the amount of parking facilities and the average rent. Net rental prices of dwellings and rents of parking facilities are extrapolated based on monthly available up-to-

12 Chain-linked intermediate consumption rates of ratio are derived from the proportion of chain linked intermediate consumption on production based on previous year.

date price indices of the consumer price statistics (EVAS 61111). Intermediate consumption is determined based on ratios of intermediate consumption identified in household surveys. In the calculation process, the intermediate consumption ratio is left unchanged for all quarters of a year. In the current calculation the intermediate consumption ratio equals the ration of the previous year.

4.1.8 Business services

The economic section business services encompasses section M (NACE/WZ divisions 69 to 75) and section N (NACE/WZ divisions 77 to 82) of the WZ 2008 respectively of NACE Rev. 2. There are no output results in a breakdown by economic sectors available for a quarterly calculation of the different divisions of the business services. The extrapolation of the different branches of the economy is done on the basis of the price-adjusted results of the previous year. As an alternative for the extrapolation indicators the results for the volume of work are used, as in many other industries. The rates of change of the volume of work as compared to the relevant quarter of the previous year are applied in the same way to output, intermediate consumption and gross value added. The trend of prices in a breakdown by economic sectors, as the producer price indices for business services (EVAS 61361), which is available successively in the course of time from 2006 onwards and the development of the consumer price index for Germany (EVAS 61111) are used as deflators of the extrapolated price-adjusted results.

4.1.9 Public services, education and health

Calculations in the divisions education (NACE/WZ division 85), human health activities (NACE/WZ division 86), residential care activities (NACE/WZ division 87) and social work activities without accommodation (NACE/WZ division 88) are done in the same way as for business services in the business sector, extrapolating on the basis of the volume of work with subsequent inflation. In order to check the plausibility of the calculation method, particularly for human health activities, the development of expenditure of health insurance is continuously observed and analyzed. If needed, the rates of change generated on the basis of the volume of work are increased or reduced in some areas taking account of the corrections to be expected at the transition to the more complete yearly basic statistics. As for business services the quarterly rates of change of hours worked of the workforce as compared to the relevant quarter of the previous year are applied in the same way to output, intermediate consumption and gross value added. Besides the calculations described here, which apply only for the economic units of the business sector, in this combined economic sector the activities of the sector general government play an important role. This mainly applies for the area public administration and defense, compulsory social security (NACE/WZ division 84), where only units of the sector general government are active. But also in other subsections, e.g. education, units of the sector general government contribute significantly to gross value added. The calculation of these parts of value added was described at the beginning of chapter 4 for the sector general government as a whole. Analogically, the same is true for the activities of the economic units within the sector non-profit institutions serving households (NPISHs), which are equally located in the areas education, human health and social work activities.

4.1.10 Other services

The other services encompass the divisions arts, entertainment and recreation (NACE/WZ divisions 90 to 93), other services not elsewhere classified (NACE/WZ divisions 94 to 96) and the private households (NACE/WZ division 97)[13].

13 Private households with staff.

The quarterly calculation for the business sector occurs analogically to the approach applied for business services. Data basis for the extrapolation of price-adjusted gross value added are the rates of change of the volume of work as compared to the relevant quarter of the previous year.

As well as in some other areas of the economy, the rates of change of the volume of work are increased or reduced in some areas of other services, taking account of the corrections to be expected at the transition to the more complete yearly basic statistics. As inflators of the extrapolated price-adjusted results area specific price developments are used; as far as they are missing, developments of comparable economic divisions are assumed.

In the composite area of other services besides the calculations described above, which only relate to the economic units of the business sector, also the units of the sector general government and of the sector non-profit institutions serving households (NPISHs) are represented, which also contribute significantly to gross value added. This applies in particular to the economic division arts, entertainment and recreation.

In the group of activities of business, employers and professional membership organisations serving enterprises (NACE/WZ group 94.1), in the business sector – analogous to the calculation method applied for the sector of non-profit institutions serving households (NPISHs), which contributes most to value added in this group – the nominal values are extrapolated with the development of the quarterly compensation of employees in a breakdown by sectors and economic activities. The price-adjusted calculation is done by extrapolation with the relevant development of employed persons. The deflator results implicitly as quotient of the nominal and of the price-adjusted result.

In the combined divisions other services also private households (NACE/WZ division 97) are covered. As agreed, the nominal gross value added corresponds to the compensation of employees paid to domestics, including income in kind. The compensation of employees is calculated in a quarterly way – analogous to the yearly approach – by extrapolating the average earnings using tariff information and multiplication with the number of employees in this area. Price adjusted gross value added is determined by division of the relevant price series of the consumer price index for Germany (EVAS 61111) (services of domestic help).

4.2 FISIM[14]

Financial intermediaries invoice direct charges for their services only partly – this makes them different from other industries. A significant part of their income is generated by paying lower interests to depositors for their deposits and charging higher interest to borrowers for their loans. Assuming that interbank transactions are subject to a service-free rate (reference rate), FISIM from transactions with other sectors can be calculated via a difference calculation. FISIM for depositors are calculated as stock of deposits multiplied by the reference rate minus stock of deposits multiplied by the actual interest rate on deposits. Along the same lines, the FISIM for borrowers is calculated as:

(stock of loans X actual interest rate) – (stock of loans X reference rate).

The data base for the quarterly calculation of FISIM is the monthly information provided by Deutsche Bundesbank on assets and liabilities of monetary financial institutions (EVAS 841) and on interest rates (EVAS 843). This information is available both for interbank transactions and for sectoral transactions with non-banks. Furthermore, loans and deposits can be broken down according to their maturities. Calculations are carried out in detail according to sectors of creditors and borrowers. Moreover, for the private household sector information can be broken down by the type of loan (mortgage loans or loan for consumption). This approach ensures that together with the calculation of FISIM production by financial intermediaries, the allocation to user sectors as well as the use of

14 Financial Intermediation Services Indirectly Measured.

FISIM as intermediate consumption or final consumption is available. The calculation is described in detail in the methodological description of the annual accounts.[15]

4.3 Net taxes on products

The net taxes on products are taxes on products less subsidies on products.

In the generation-of-income account, gross value added is represented at basic prices, i.e. it does not contain taxes on products such as turnover tax, insurance tax or excise duties on energy, spirits or tobacco, but it does contain the subsidies on products paid by the government or the European Union (EU) such as EU premiums and aids to public transport. Net taxes on products are added to calculate GDP at market prices from the total of gross value added of all industries at basic prices.

Taxes on products are determined based on the monthly tax reports of the Federal Ministry of Finance (BMF) on community taxes and on pure central government and Länder taxes. Pure local government taxes are derived from the quarterly results of the financial statistics (EVAS 71211). Where necessary, the cash figures are shifted by one or two months in accordance with the accrual concept subject to the payment periods provided by relevant tax law. The backdating of the tax revenue is an attempt to bring the cash data closer to the point in time at which the tax liability incurred. The results of the balance of payments statistics of Deutsche Bundesbank are used for the taxes to be paid to the EU.

The taxes on products comprise value-added tax, import duties and other taxes on products. Import duties include excise duty on imports, customs duty on imports and levies and monetary compensatory amounts. Other taxes on products include the excise duties from domestic production, the EU taxes (e.g. production levy on sugar) and entertainment tax, insurance tax, fire protection tax, property transfer tax, betting and lottery tax, aviation tax, casino levy and contributions payable to the German National Petroleum Stockpiling Agency.

The nominal taxes on products are in principle defined by public finance statistics. The deflator results from either the change of the tax rates or separate calculations. These separate calculations should reflect changes in the composition of the assessment basis and, for value-dependent taxes on products, their price changes. The price-adjusted results are then calculated by deflating the partly time shifted cash figures with the relevant deflators. Excise duties are distinguished into excise duties on energy, tobacco, spirits, alcopops, intermediate products, coffee, electricity, sparkling wine and beer. For the calculation of the deflator for the excise duties on tobacco (cigarettes, fine cut, pipe tobacco etc.) and energy (petrol, diesel oil, biodiesel, light and heavy fuel oil etc.), a more detailed breakdown by types of products is made to take account of the different tax rates. For the other excise duties, the deflators are calculated exclusively from the change of the tax rates.

Information about subsidies on products for the quarterly calculations is obtained from the cash figures of the central government budget and the extra-budgets of central government for the central government and the EU (EVAS 71512). In respect of EU subsidies, annex E "Marktordnungsabgaben der EU" of chapter 1004 "Marktordnung, Maßnahmen der Notfallvorsorge" is relevant. The sources used for the Länder and local government are cash figures of the public finance statistics (EVAS 71512 and 71517). Currently, subsidies on products are assigned to the industries agriculture, food industry, wholesale trade and transport. These subsidies are paid in the relevant quarter, based on quantities or values, for goods or services produced, traded or exported. For the calculation, the price-adjusted results by industries for the previous year's subsidies on products are extrapolated with the rates of change of quarterly price-adjusted output available for these industries. Where an output value is not available, the rate of change of a production index or a rate of change based on quantities is used alternatively. The total of the results by industries yields the quarterly result for all industries.

15 See Federal Statistical Office, Fachserie 18, series S.30, 2016, section 3.17.

Overview 4-1: Gross value added at basic prices by industries

(simplified representation)

Industry	Method applied	Sources; indicators (m = monthly, q = quarterly)	Level of detail of calculation	I. = inflating; D. = deflating
Agriculture, forestry and fishing (section 4.1.1)	Estimate; indicators	slaughter quantities (m), milk production (q), egg production (q), vegetable production (q), fish catches (q)	3 branches	I. with indices of producer prices for agricultural products, I. with consumer price index for selected products, I. with indices of purchase prices for agricultural machinery and materials, I. with producer price index of products from wood felling, I. with consumer price index for fish and fish products
Industry, excluding construction (section 4.1.2)				
Mining and quarrying	Indicators	production index (m)	1 branch	I. with producer prices and other price indices
Manufacturing	Indicators	production index (m)	1 branch	I. with producer prices and other price indices
Energy supply; water supply, sewerage, waste management and remediation activities	Indicators	production index (m)	2 branches	I. with producer prices and other price indices
Construction (section 4.1.3)	Indicators, estimate	hours worked (m) productivity estimate, turnover (q)	2 branches	I. in primary construction with construction prices, D. in finishing trades with construction prices
Trade, transport, accommodation and food services (section 4.1.4)				
Wholesale and retail trade; repair of motor vehicles and motorcycles	Indicators	turnover (m)	3 branches	D. with (back-calculated) wholesale and retail price indices (including motor vehicles and motorcycles) and other price indices
Transportation and storage	Indicators	short-term statistical surveys in the service sector (q)	6 branches	D. with price series of consumer price index or. D. with price series of producer price indices for transport and logistics services
Accommodation and food services	Indicators	turnover (m)	2 branches	D. with (back-calculated) price indices for food and beverage serving services
Information and communication (section 4.1.5)				

Industry	Method applied	Sources; indicators (m = monthly, q = quarterly)	Level of detail of calculation	I. = inflating; D. = deflating
Publishing, audiovisual and broadcasting activities	Estimate	employees (q), hours worked per person in employment (q)	3 branches	I. with consumer price indices or producer price indices
Telecommunications	Indicators	short-term statistical surveys in the service sector (q)	1 branch	D. with price series of producer price index
Computer programming, information service activities	Estimate	employees (q), hours worked per person in employment (q)	2 branches	I. with producer price indices
Financial and insurance services (section 4.1.6)	Alternative indicators, estimate	banking statistics of the Deutsche Bundesbank on assets and liabilities and on interest rates (m), (FISIM-production)	Breakdown by FISIM and other service charge for financial services, by insurance segments and estimations e.g. Deutsche Bundesbank (German Federal Bank), exchanges	D. with deflated sum of loans and deposits as volume indicator, D. with deflated sum of benefits paid to policy holders
Real estate activities (section 4.1.7)				
Dwelling services	Stratification modell	quantity extrapolation using building permissions statistics, price indices (m)	32 strata each for owner-occupied and let dwellings	D. with consumer price indices
Residual real estate activities	Estimate	employees (q), hours worked per person in employment (q)	1 branch	I. with consumer price indices
Business services (section 4.1.8)	Estimate	employees (q), hours worked per person in employment (q)	13 branches	I. with consumer price indices or producer price indices
Public services, education, health (section 4.1.9)				
Public administration and defence; compulsory social security; and general government units in the other industries	basic statistics (supplemented by estimates for state government, local government and parts of social security funds)	public finance statistics (q), accounting results of social security funds (q), higher education finance statistics (q), statistics for public funds, institutions and enterprises (only for units of general government) (q)	4 subsectors of general government, by market and non-market output	D. by using input method (not for units of the general government sector in division education NACE/WZ 85)
Education	Estimate	employees (q) hours worked per person in employment (q)	1 branch	I. with consumer price indices
Human health and social work activities	Estimate	employees (q) hours worked per person in employment (q)	3 branches	I. with consumer price indices

Industry	Method applied	Sources; indicators (m = monthly, q = quarterly)	Level of detail of calculation	I. = inflating; D. = deflating
Other services (section 4.1.10)	Estimate	employees (q) hours worked per person in employment (q)	7 branches	I. with consumer price indices
Trade, employers' and professional associations	indicators	employees (q), compensation of employees (q)	1 branch	nominal and price-adjusted figures extrapolated separately
Private households	indicators	compensation of employees (q)	1 branch	D. with price series of the consumer price indices
For information: non-profit institutions serving households	Indicators	employees (q), compensation of employees (q)	10 branches	nominal and price-adjusted figures extrapolated separately
FISIM (section 4.2)	Indicators	banking statistics of the Deutsche Bundesbank on assets and liabilities and on interest rates (m)	by sectors and financial instruments (41 items)	volume extrapolation using price-adjusted trend figures of loans and deposits
Research and development	Estimate	expert knowledge in consideration of development of NACE/WZ 72 (research and development)	overall and by NACE Rev.2	nominal and price-adjusted figures extrapolated separately
Taxes on products (section 4.3)	Indicators	reports of Federal Ministry of Finance (m), financial statistics (q), balance of payments statistics (m), EU-budget (q)	by types of taxes	D. with tax rates and (partly) product prices
Subsidies on products (section 4.3)	Indicators	reports of Federal Ministry of Finance (q), financial statistics (q)	overall and by NACE Rev.2	nominal and price-adjusted figures extrapolated separately

Chapter 5 GDP components: the expenditure approach

The expenditure approach is used to measure the economic performance of a national economy from the use side. This approach starts from the final use of domestic goods and services. The use categories consumption expenditure, gross capital formation and external balance of goods and services determine the value of gross domestic product (GDP) at the use side. Table 5-1 shows the components of GDP in accordance with the expenditure approach.

Table 5-1: Use of gross domestic product

at current prices, 2015

	Q1	Q2	Q3	Q4	Year
	Euro billions				
Private consumption expenditure	389.744	407.607	417.711	420.912	1,635.974
Households	376.333	393.983	404.133	407.132	1,581.581
Non-profit institutions serving households	13.411	13.624	13.578	13.78	54.393
+ Government final consumption expenditure	140.332	141.697	142.887	158.784	583.7
+ Gross capital formation	153.727	134.041	159.142	136.697	583.607
Gross fixed capital formation	136.205	151.804	155.333	160.478	603.82
Machinery and equipment	44.893	48.874	48.251	58.161	200.179
Construction	65.004	76.225	79.999	73.793	295.021
Other products	26.308	26.705	27.083	28.524	108.62
Changes in inventories and acquisitions less disposals of valuables	17.522	-17.763	3.809	-23.781	-20.213
+ Balance of exports and imports	55.607	62.645	51.92	59.367	229.539
Exports	343.855	356.763	358.276	359.895	2,418.789
Imports	288.248	294.118	306.356	300.528	1,189.250
= Gross domestic product	739.41	745.99	771.66	775.76	3,032.820

In principle, three approaches may be applied to calculate GDP via use categories. Firstly, the purchasers or users of the goods may be questioned about their expenditures. Secondly, the producers of the goods and services may be questioned about their deliveries to consumers, investors and the rest of the world. Thirdly, an estimate may be made of the use structures for goods and services (commodity flow (CF) method). The decision about which approach is taken in practice depends on the statistics available. Especially for the short-term quarterly accounts, the calculation method is very much determined by the up-to-dateness of the statistical data base.

5.1 Household final consumption expenditure

In the German national accounts, household final consumption expenditure (HFCE) is calculated using the supplier approach. This method is based on the turnover of suppliers of goods and services to private households. For this purpose all available statistics on suppliers are evaluated. The suppliers are broken down into 'supply sources' which generally correspond to the economic activities in NACE Rev. 2 (WZ 2008). Annual turnover results are derived from different official statistics such as business register, structural service statistics, census of crafts and turnover tax statistics. Consumption ratios reflecting the part of turnover delivered to private households are taken from e.g. the annual trade statistics.[16]

16 See Federal Statistical Office, Fachserie 18, series S.30, Wiesbaden 2016, for annual compilation.

These results were supplemented by special assessments for certain products e.g. tobacco products, energy, motor vehicles, fuel, rents for dwellings which are calculated by means of quantities price models. For some goods the annual and quarterly results are the aggregation of monthly statistical results (tobacco products, motor vehicles). For other products the annual data is allocated to quarters: So the calculation of the quarterly energy purchases is based on annual data of the Working Group on Energy Balances.

In general the annual statistics publish their results after 18 months at the latest. Therefore, the publication of HFCE in August of each year comprises the annual results for the reporting year t-2. On the basis of monthly and quarterly statistics the annual results for HFCE are allocated to quarters (except most special assessments). The monthly and quarterly statistics are also used to calculate HFCE for the reporting periods t and t-1 (years and quarters) and are described below.

Basis for the calculation of quarterly HFCE are the monthly turnover results in retail trade (EVAS 45212), in trade of motor vehicles (EVAS 45214), in the hotel and restaurant industry (EVAS 45213) and the quarterly turnover results concerning services (EVAS 47414) and crafts (EVAS 53211). Another important statistical source is the Federal Motor Transport Authority. It publishes data concerning new registrations and changes of ownerships of motor vehicles. The prices for cars are provided by the Deutsche Automobil Treuhand GmbH. The tobacco tax statistics provides monthly data to calculate tobacco consumption. Energy consumption is based on quarterly data published by the Federal Office for Economic Affairs and by the German Association of the Energy and Water Industries. The quarterly estimations for some service industries such as health services are using compensation of employees' data coming from monthly results of the Federal Employment Agency and information from different collective agreements.

The expenditure for dwellings rented is based on the stock of dwellings (represented as living space) per quarter and an extrapolation of rental prices based on price statistics. The expenditure for financial and insurance services is estimated on the basis of the change of output of these branches. Purchases of households from general government are calculated on the basis of the quarterly income of general government.

The results concerning consumption of resident private households in the rest of the world and the consumption of non-resident households on the domestic territory are derived from the monthly Balance of Payments Statistics (Deutsche Bundesbank).

The consumer price indices are available for "purposes" according to the Classification of Individual Consumption According to Purpose (COICOP). Therefore, for price adjustment HFCE is split into purposes. First HFCE is calculated in a breakdown of approximately 370 supply sources and 16 special assessments which allows a good transition to purposes. Most special assessments are directly related to purposes. Statistical sources for the breakdown according to purposes are the annual statistics in trade and the hotel and restaurant industry, information of special associations or direct allocations especially in the service industries. Finally, the price adjustment is based on 368 COICOP positions and the related consumer price indices.

5.2 Government final consumption expenditure

Government final consumption expenditure is defined as government non-market output that is provided to the general public without special charge. It is calculated from the output of government non-market output (total of gross value added of general government in the field of non-market output plus intermediate consumption used), less sales from non-market output and less output produced for own final use and plus the social benefits in kind which are provided but not produced by general government. Final consumption expenditure is calculated separately for the government subsectors.

For the calculation of intermediate consumption, sales and social benefits in kind, the same statistical sources are used as for the determination of gross value added of general government (see Chapter 4). Own produced research and development as well as software as part of government non-market output for own final use are estimated via models; the latter within the context of the investment calculations.

With the exception of the education sector, government final consumption expenditure is deflated using the input method. In the education sector, output is deflated based on volume measures. Price-adjusted value added is obtained by deducting deflated intermediate consumption (so-called direct measurement of output).

Government final consumption expenditure is split into actual collective and actual individual consumption by using information from the functional breakdown of the annual results of the public finance statistics.

5.3 NPISH final consumption expenditure

Final consumption expenditure of the non-profit institutions serving households (NPISHs) is extrapolated quarterly by ten industries, analogous to GVA of this sector determined using the production approach (see Chapter 4). In contrast to the annual national accounts which are drawn up by deducting sales and own produced assets from output, only the total aggregate is extrapolated on a quarterly basis, due to the data base. In price-adjusted terms, this is done by extrapolating the previous year's quarter with the available rates of change of persons employed by this sector and by industries. In nominal terms the extrapolation is done via the rate of change of the compensation of employees in that sector. The deflator results implicitly as the quotient of the nominal and the price-adjusted result.

5.4 Gross capital formation

Gross capital formation consists of gross fixed capital formation (GFCF) and changes in inventories plus acquisitions less disposals of valuables. Fixed capital formation is according to ESA 2010 classified into so-called tangible fixed assets and intellectual property products. In Germany, for practical reasons the latter are in the quarterly accounts combined with a (very small) part of tangible fixed assets, namely cultivated biological resources, under the term of "other products". Thus a division into three categories of fixed capital formation arises: gross fixed capital formation a) in buildings and structures, b) in machinery and equipment and c) in other products. The corresponding quarterly methods of calculation are described in chapter 5.4.1 a)-c). Paragraph d) deals with the sector accounting of GFCF. Changes in inventories and acquisitions less disposals of valuables are the content of chapter 5.4.2.

5.4.1 Gross fixed capital formation

a) Gross fixed capital formation in buildings and structures

The calculation of gross fixed capital formation in buildings and structures (formerly known as GFCF in construction) is based on the data declared by enterprises that provide construction services and other services to be attributed to gross fixed capital formation in buildings and structures. The following areas of calculation can be distinguished: firstly construction activities / civil engineering (main construction industry), secondly building completion work, thirdly manufacturing services, own-account output and ancillary construction services (services provided by architects, real estate agents and similar). Furthermore, gross fixed capital formation in buildings and structures is broken

down by eight construction types: 1) residential construction and non-residential construction, the latter subdivided into 2) agricultural buildings, 3) commercial buildings, 4) public buildings, 5) buildings of non-profit institutions serving households, 6) commercial civil engineering, 7) public road construction and 8) other public civil engineering.

In the first estimate for a past quarter, main construction industry is broken down by the eight construction types based on the number of monthly hours worked shown in the monthly report on main construction industry (EVAS 44111). The change in hours worked is supplemented by a change in productivity and the employee size class delimitation ("Firmenkreissprung" in German, until 2017). The estimation for the productivity change is based on long time series in which the annual construction services or the turnover in main construction industry are related to the hours worked. The "Firmenkreissprung" indicates how the proportion of small businesses (less than 20 employees) to large businesses (20 and more employees) changes and has to be considered because solely large enterprises are questioned every month about their hours worked. Only a first, rough estimate of the turnover trend for enterprises with 20 and more employees is available for the building completion work. The other construction operations are estimated based on the combined trend in main construction industry and building completion work.

After 90 days, for the second quarterly estimates, turnover results for the building completion work are available additionally from craft reports (EVAS 53211) and building completion work statistics (EVAS 44131). Moreover, first results for the manufacturing output are available at that time from the quarterly production statistics and monthly foreign trade statistics (EVAS 42131, 51141, 51231). Information on ancillary construction services and own-account output is not available for this estimate. They are still based on the results for main construction industry and building completion work.

Final calculations are carried out each year one and a half years after the end of the reporting year by incorporating important annual surveys that are not available before[17]. To a large extent, these surveys replace the estimates described above based on provisional indicators. This includes both the business survey and the cost structure statistics in main construction industry and building completion industry (EVAS 44211, 44252, 44253) that inquire about the annual construction output and cost incurred for external labour. These annual figures are distributed to quarters by means of the hours worked in main construction industry. The value-added tax statistics (EVAS 73311) provide important annual figures for the building completion work and own-account activities. The distribution to quarters for the building completion work is based on the results of the craft reports and the costs of hired wage work (taken from the cost structure statistics). The construction activity statistics provide data on building permissions and construction work completed (EVAS 31111, 31121) which are the basis of the estimate of own-account output in residential construction. The quarterly distribution of ancillary construction services and own-account output is based on the in-year trends of main construction industry and building completion work. Overview 5-1 shows the availability of the data for the individual areas of calculation of gross fixed capital formation in buildings and structures.

17 For the annual calculation see Federal Statistical Office, Fachserie 18, series S.30, Wiesbaden 2016, section 5.10.1.

Overview 5-1: Data base for the calculation of gross fixed capital formation in buildings and structures (GFCF BS) for the year 2010

GFCF – BS total	Main construction industry	Building completion industry	Manufacturing	Services, own account output
Value percentage (2010)	31%	34%	6%	29%
What information is available?				
1st estimate, quarters	Hours worked	Turnover ›20 persons employed	–	–
2nd estimate, quarters	Hours worked	Turnover ›1 person employed	Production, foreign trade	–
Final estimate, year	Output per year, Cost structure	Turnover tax statistics	Production, foreign trade	Turnover tax statistics, model

The construction price statistics (EVAS 61261) provide construction price indices for price adjustment each quarter already on the date of the first estimate. Prices are adjusted based on a matrix of eight construction types and seven construction producers.

b) Gross fixed capital formation in machinery and equipment and military weapons

Data for military weapons are aggregated with GFCF in machinery for reasons of secrecy only. Their quarterly calculation is explained in the chapter on government final consumption (5.2).

The calculation of gross fixed capital formation in machinery and equipment is based on the commodity flow (CF) method. In short, the domestic supply is first determined from base statistics with a detailed breakdown of goods. By applying capital formation ratios and adding some supplements and corrections, machinery and equipment can be derived from this. The CF method is mainly based on sources that are available on a quarterly basis at present, e.g. the production statistics (EVAS 42131), or even on a monthly basis, e.g. turnover surveys and the foreign trade statistics (EVAS 51141, 51231). Therefore, the up-to-date quarterly accounts already follow the CF pattern that has been described in detail for the annual accounts[18]. The quarterly results can be accumulated directly to form annual results. Besides this, an annual investor calculation exists that is based on surveys. The CF results, however, determine the sub-annual trend of gross fixed capital formation in machinery and equipment.

The most important data sources for the CF method are the quarterly production statistics that, apart from some ancillary services, cover the entire spectrum of machinery and equipment, and the foreign trade statistics available monthly. Together, they enable the calculation of a base value for the domestic supply of goods (domestic production plus imports less exports). Moreover, the foreign trade statistics supply indications during the year for some necessary corrections and supplements, e.g. with regard to export and import of used machinery and equipment. For other important CF supplements, up-to-date and periodic information is also available. For instance, capital formation services and changes in inventories of machinery and equipment at the manufacturers' are modelled

18 See Federal Statistical Office, Fachserie 18, series S.30, Wiesbaden 2016, section 5.10.2.

from the proportions in time-series by goods between output and turnover figures. This adjustment is made to implement the ESA-compliant delimitation of machinery and equipment – not goods produced but goods sold. Remaining CF components for which no original sub-annual sources are available are estimated quarterly with the help of the known quarterly trend of suitable guide variables, e.g. output or domestic supply of new goods. For other elements, e.g. the trade and transport margins, well-founded indications are available only at very irregular intervals of several years. Therefore, constant factors are used as stopgaps.

In contrast to the CF approach, the investment data on passenger cars result directly from physical quantities. The licensing figures of the Federal Motor Transport Authority (EVAS 46251) broken down by vehicle keeper groups are valuated with prices quarterly which are recorded for the determination of the household final consumption expenditure but cover commercial registered cars as well[19].

The CF pattern of the machinery and equipment calculations are explained in detail in the methodological description already cited.[20] Directly upon receipt of the last of the in-year data that become available, i.e. the quarterly production statistics, the complete CF results can be presented as early as around four months after the end of a quarter. For the first publication of a current quarter (at present t+45 days), some CF elements, therefore, have to be estimated completely or for some months. This is done taking account both of up-to-date information and the results of econometric model calculations, each for original figures in current prices and chain-linked, seasonally adjusted data. In the process, the CF pattern is in principle retained completely. However, it is tightened up in so far as certain supplementary items of the CF method are summarised by forming quotients. The structural identity of the procedures of provisional estimations and final calculations facilitates and improves the practically necessary estimations in a continuous learning and improvement process.

c) Other products

Other products are composed of 1) research and development, 2) software and databases, 3) entertainment, literary and artistic originals, 4) mineral exploration, 5) land ownership transfer costs and 6) cultivated biological resources. They reached a considerable amount of 88.4 billion EUR in 2010, of which research and development (70%) and software and databases (24%) have the largest shares. Nevertheless, no specific quarterly data sources are available for any of these individual elements, so that the – already forecast based – annual figures have to be split up according to either suitable in-year reference indicators or mathematical decomposition techniques. At this juncture seasonal artefacts in the quarterly results which are not covered by statistical sources should be avoided. Hence, mathematical decomposition that generates smooth transitions between the quarters has become the predominant method.[21] It is employed for (non-governmental) research and development, entertainment, literary and artistic originals and within the asset calculation for the quarterly capital consumption. The annual results for software and databases are quartered with reference to the sub-annual proportions of GFCF in software-related hardware, especially IT and industrial machines. The ownership transfer costs for undeveloped land are calculated in the context of gross fixed capital formation in buildings and structures and then separated and spread sub-annually with a similar pattern. The topic annual forecast for mineral exploration is quarterly divided according to the temporal distribution of civil engineering. Cultivated biological resources are determined within the generation-of-income framework and quartered according to agricultural production. Due to their still comparatively moderate weight, the existing uncertainties in the quarterly estimate of other products have just marginal influence on the quality of total quarterly GDP.

19 See also section 5.1 above.
20 See the overview in Federal Statistical Office, Fachserie 18, series S.30, Wiesbaden 2016, section 5.10.2.3, figure 5-11.
21 The simple but effective technique applied is known within the German National Accounting community as the “Hoffer formula”. For detailed explanations see Oltmanns, Erich: Hoffersche Formel, Wista 5/2016, pp. 62-72.

d) Sector calculation

The division of the GFCF categories by sectors is conducted separately from the calculations mentioned above. It is not applicable to mineral exploitation and cultivated biological resources (each 100% S.11 Non-financial corporations) as well as military weapons (100% S.13 General government). The sectoral partition of research and development (S.11, S.12, S.13, S.15) and also entertainment, literary and artistic originals (S.11, S.15) is determined by the indication of the statistical basic material. The sectoral division of quarterly GFCF in buildings and structures is based on the hours worked which are available from the monthly report on the main construction industry (EVAS 44111) and allow for classification in five sectors. Software and databases are quarterly divided by S.13 and non-S.13 also by applying the ratio of the annual output shares of S.13 at the detailed economic activities. The same holds for GFCF in machinery and equipment: Quarterly public budget statistics indicate the joint amount for machinery and equipment plus software and databases of the general government. By subtracting the value of software and databases measured in the step before quarterly GFCF in machinery and equipment for S.13 is laid open and permits the subdivision of the amount for S.1 (total economy) in S.13 and non-S.13.

5.4.2 Changes in inventories and acquisitions less disposals of valuables

In Germany, data on the sub-annual changes of inventories (of output and input goods) are not collected. Therefore, extrapolations of sub-annual changes in inventories have to be based on indicators. Important indications for the inventories trend for the most recent periods are, on the one hand, obtained from the difference between monthly production and turnover index in manufacturing (EVAS 42153, 42152) and, on the other hand, by means of the monthly results of qualitative research in stock trends, especially the so-called ifo inventory assessment and the Markit/BME Purchasing Manager Index (EMI). The plausibility of the extrapolated and harmonized results is checked in the context of the reconciliation of generation-of-income and use-of-income accounts of domestic product in the overall connection with the other GDP aggregates.

Neither short-term statistics nor in-year indicators are available for the quarterly estimate of acquisitions less disposals of valuables. The valuables of the respective previous year's quarter are extrapolated from the time series by four subareas. The monthly "price index" of interest rates for long-term government bonds is used as a substitute deflator.

5.5 Balance of exports and imports

The balance of exports and imports is calculated by deducting imports from exports. Exports and imports comprise goods and services transactions between residents and non-residents. Source statistics for calculating exports and imports of goods and services are available on a monthly basis. Therefore, sources and calculation methods for calculating quarterly and annual accounts coincide. Source statistics for cross-border goods transactions are foreign trade statistics (EVAS 51141 intra-EU trade, EVAS 51231 extra-EU trade) and for cross-border service transactions balance of payments statistics (EVAS 831) by Deutsche Bundesbank. Source data from foreign trade statistics are not fully consistent with the methodology of national accounts. In particular goods transactions have to be shown in national accounts when a change of economic ownership between residents and non-residents has taken place. This may happen regardless of goods crossing a border physically. However, a physical cross-border transaction of goods is essential for recording goods transactions in foreign trade statistics. This is why source statistics are being modified in national accounts[22]

22 For detailed information on the method of calculation see Federal Statistical Office, Fachserie 18, series S.30, Wiesbaden 2016, section 5.13.

For the calculation of price-adjusted figures, the nominal values of exports and imports are mainly deflated with the price indices of the import and export price statistics (EVAS 61411, 61421). Since deflating is effected at a fine level of product disaggregation, the (implicit) deflators of the NA are "Paasche" price indices that deviate from the price-statistical original data with fixed weighting (Laspeyres indices).

Overview 5-2: Use-side aggregates of gross domestic product

(simplified representation)

Use-side aggregates	Method applied	Sources, indicators (m = monthly; q = quarterly)	Level of detail of calculation	I. = inflating; D. = deflating
Household final consumption expenditure (section 5.1)	Base statistics, indicators (supply sector approach)	Statistics on turnover in trade and hotel and restaurant industry (m) or crafts (q)	368 con-sumption purposes	D. with consumer price indices
Government final consumption expenditure (section 5.2)	Mainly from base statistics	Financial statistics (q), calculation results of the social insurance branches (q)	Subsectors, actual individual and collective consumption	D. using input method (direct output measurement in education sector)
Final consumption expenditure of NPISHs (section 5.3)	Estimate	Employees (m), compensation of employees (q)	5 industries	Nominal and price-adjusted results extrapolated separately
Gross fixed capital formation (section 5.4				
- Gross fixed capital formation in construction (section 5.4.1.a)	Indicators, estimate	Hours worked (m), turnover (q)	7 construction producers	I./D. with construction price indices by 8 construction types and 7 types of producers
- Gross fixed capital formation in machinery and equipment (section 5.4.1.b)	Base statistics, indicators (commodity flow method)	Production statistics (q), turnover surveys (m), foreign trade statistics (m)	2100 types of products of the GP classification	D. with producer and import price indices, approx. 230 combinations of products
- Other products (section 5.4.1.c)	Extrapolation, decomposition	No specific statistical sources		D. R&D with specific price index based on production factors D. Software with specific price index based on IT-providers
Changes in inventories and acquisitions less disposals of valuables (section 5.4.2)	Indicators, estimate	Production and turnover index in manufacturing (m), ifo inventory assessment (m)		Nominal and price-adjusted results estimated separately
Exports and imports (section 5.5)	Base statistics	Foreign trade statistics (m), balance of payments statistics (m)	Goods and services	D. with import and export price indices

Chapter 6 GDP components: the income approach

In contrast to the production and the expenditure approach, the income approach is not based on transactions in products but on the types of income. Since information about entrepreneurial income is only very fragmentary in Germany, independent calculation of GDP or GNI via the income approach is not possible.

Table 6-1 below documents the GDP components generated within Germany. The following description is also based on this table. Since operating surplus including mixed income cannot be independently determined in Germany, it actually results as the residual from the difference of GVA determined via the production approach and the compensation of employees.

In a different approach, the focus is on the income received by residents. The central variable here is the national income and its components: compensation of resident employees, on the one hand, and entrepreneurial and property incomes determined as differences, on the other.

Table 6-1: GDP components based on income approach

at current prices, 2015

		Q1	Q2	Q3	Q4	Year
		Euro billion				
	Compensation of employees in Germany	357.124	376.762	379.663	423.415	1,536.964
	Wages and salaries	290.907	307.802	311.093	347.737	1,257,539
	Employers' social contributions	66.217	68.96	68.57	75.678	279,425
+	Gross operating surplus including mixed income (domestic)	233.97	223.164	239.953	195.705	892.792
+	Other taxes on production less other subsidies	73.176	72.905	75.983	77.842	299.906
=	Gross value added at basic prices	664.27	672.831	695.599	696.962	2,729.662
+	Taxes on products less subsidies on products	75.14	73.159	76.061	78.798	303.158
=	Gross domestic product	739.41	745.99	771.66	775.76	3,032.820
–	Consumption of fixed capital	132.989	133.543	134.284	134.91	535.726
=	Net domestic product	606.421	612.447	637.376	640.85	2,497.094

6.1 Compensation of employees

Compensation of employees comprises all compensations in cash and in kind that an employer provides to an employee for work done. It is therefore a measure of remuneration or of the costs of labour as a production factor.

Compensation of employees is published quarterly broken down by eleven industries (A10 plus manufacturing). It is composed of wages and salaries and the employers' actual and imputed social contributions. According to the national concept (place of residence concept), the compensation of employees consists of the remuneration received by residents from domestic and foreign employers, while according to the domestic concept (workplace location concept), inward commuters to Germany are to be included and outward commuters are to be excluded.

Wages and salaries

Wages and salaries as by far the largest component of the compensation of employees also include bonuses for difficult working conditions, additional monthly salaries, vacation pay, commissions, tips and gratuities and similar things in addition to the basic wages and salaries. Also included are benefits in money's worth resulting from the discounted or free-of-charge surrender of goods such

as private use of company cars or the provision of discounted or free-of-charge canteen meals or lunch coupons.

Wages and salaries are calculated by multiplying the number of employees by average earnings (wages and salaries per employee). The data determined for the respective quarter in the context of the employment accounts by individual industries are used to determine the number of employees. The classification of industries generally follows the double-digit level of statistical classification of economic activities or NACE Rev.2, respectively. Furthermore, a distinction is made for employees for each industry by their occupational status (e.g. salaried employees, waged employees (workers), civil servants, persons in marginal employment). The most important source for the determination of the number of employees is the employment statistics (EVAS 13111) of the Federal Employment Agency. The average earnings for the respective quarter are estimated by the quarterly extrapolation of base values also differentiated by industry and occupational status. Depending on industry, availability and data quality, the indicators used to estimate the extrapolation are based on the monthly business surveys of manufacturing, mining, pit and quarry industry, construction and gas and water supply. Furthermore, the index on nominal wages, the results of the quarterly earnings survey and collective agreements on wages and salaries are used as data sources for the quarterly extrapolation of base values.

The calculation of quarterly wages and salaries in the general government sector differs from the above-mentioned approach: For the general government sector (S.13), the quarterly cash statistics of the financial statistics is used as a basis for determining the compensation of employees. The wages and salaries paid in the general government sector are then derived from these data by subtracting employers' social contributions from the compensation of employees.

Employers' social contributions

The employers' social contributions reflect the expenditure incurred by the employers for ensuring an entitlement to social benefits for their employees. The risks from illness, old age and unemployment are covered, among other things. The employers' social contributions comprise actual and imputed social contributions.

The actual social contributions are paid by households in Germany and in the rest of the world to acquire or receive entitlement to social benefits in cash and in kind. The social contributions are paid to social security institutions or private social insurance systems (such as pension funds and direct insurance schemes). Additional contributions are received by social insurance systems as capital income of private households, which can arise when systems are funded.

Imputed social contributions represent the equivalent value of social benefits paid by employers to the beneficiaries directly without the intervention of any third party and without the accrual of reserves. Imputed social contributions predominantly fall upon civil servant pensions and employer subsidies for civil servants health expenditures. Furthermore, contributions to benevolent funds count as imputed social contributions. The beneficiaries may be current or former employees or other persons entitled such as surviving dependents.

In the German national accounts, social contributions are subdivided both regarding the type of social security institution and the group of contributor. A distinction is made between the social contributions made by employers, by employees, by self-employed persons and by non-employed persons. In Germany, however, the social contributions are statistically not recorded based on these groups of persons but on the income side of the social insurance carriers. Since the data provided by the social security institutions only incompletely reveal the contributors, estimates have to be used for the breakdown by contributors. For social security, the social contributions are assigned to the groups of contributors in accordance with the legal regulations regarding social contribution payment burdens or in accordance with the actual facts. For private social insurance systems the subdivision in groups of contributors is made according to the realities.

Monthly and quarterly data on the major part of the actual social contributions are provided by the Federal Ministry of Health, statutory pension insurance and the Federal Employment Agency. Various

sources are used for the rest of the actual social contributions and partly only annual data are available. For this comparably small portion of the social contributions it is assumed that the quarterly distribution of the contributions corresponds to the distribution of the wages and salaries.

The imputed social contributions are, as mentioned before, for the major part the equivalent value of benefits provided by general government to its civil servants. On the one hand, the results are based on the actually paid allowances and aids as shown in the quarterly financial statistics and, on the other, the imputed social contributions for the old-age pensions of the civil servants are calculated in proportion to their salaries. Outside the general government sector, quarterly imputed social contributions are likewise determined mainly in proportion to the relevant wages and salaries.

6.2 Other taxes on production less other subsidies on production

Other taxes on production paid to general government less other subsidies paid by general government represent other net taxes on production. Both items are calculated separately.

Taxes on production are determined based on the monthly tax reports of the Federal Ministry of Finance (BMF) for community taxes and for pure central government and Länder taxes. Pure local government taxes are obtained from the quarterly cash results of the core budgets and of the extra-budgets using cameralistic/double-entry accounting of the municipalities/associations of municipalities (EVAS 71517). If necessary, the cash figures are shifted by one month to achieve accrual-based assignment in accordance with the payment periods provided by the relevant tax law. Since 2013, licence for public broadcasting is included in the other taxes on production. The corresponding data is derived from the annual accounts of the public broadcasting institutions.

Information on the subsidies paid by general government is obtained from the quarterly cash results of the core budgets and of the extra-budgets using cameralistic/double-entry accounting of the Federation, the Länder and the social insurance (EVAS 71512) and quarterly cash results of the core budgets and of the extra-budgets using cameralistic/double-entry accounting of the municipalities/associations of municipalities (EVAS 71517).

6.3 Gross operating surplus and mixed income

Gross operating surplus and mixed income are determined as residual values. This applies to the calculation by economic activities and by institutional sectors. According to the production approach, gross operating surplus is that part of gross value added that has accrued to the production factor capital and the entrepreneurial output. The gross operating surplus of the national economy consists of the gross operating surplus of the sectors non-financial (S.11) and financial corporations (S.12), general government (S.13), private households (S.14) and non-profit institutions serving households (S.15). The sectors private households and non-profit institutions serving private households are only shown combined in the quarterly accounts.

Gross operating surplus is calculated as gross value added minus compensation of employees paid minus other net taxes on production (chapter 6.2). In the private household sector including non-profit institutions serving households (S.14/S.15), a distinction is made between gross operating surplus and mixed income. Gross operating surplus is calculated from gross operating surplus from owner-occupied dwellings plus gross operating surplus of non-profit institutions serving households (S.15).

Mixed income is generated from legally unincorporated market producers which are assigned to the households sector, unless they are quasi-corporations. In Germany, these market producers comprise sole proprietors, self-employed freelancers, self-employed farmers and types of co-operation below the level of a partnership such as civil law associations and joint practices of physicians,

lawyers, architects and others. In the case of sole proprietorships and self-employed persons of the private households sector this is referred to as mixed income, because it contains to a by far larger extent the remuneration for the proprietors and the family workers work that cannot be separated from income upon investment. Furthermore, mixed income includes the letting of dwellings by households, the output produced for own final use in the form of agricultural production in gardens and the own-account output in construction.

6.4 Consumption of fixed capital

Consumption of fixed capital is determined using the internationally recommended perpetual inventory method (PIM) by adding up by years the consumption of fixed capital of all investments still in stock in the reporting year. This is done separately for machinery and equipment by 13 product groups and for military weapons systems, for structures by eight types of buildings and structures as well as for four types of intellectual property products. On the basis of

- long investment series at volume terms of a reference year;
- estimates of the average economic service life of the fixed assets;
- an assumed retirement function for the distribution of the actual retirements of fixed assets around the average economic service life (gamma function); and
- the application of a straight-line method of depreciation;

the annual consumption of fixed capital at volume terms of the reference year is determined first. The distribution to quarters is done by using an empirical formula[23] that produces a smooth trend. After that, the quarterly volume figures are converted into current prices and previous year's prices by using the quarterly price indices of the investments, with the product disaggregation described above. These can be used to form all necessary aggregations and to chain-link the resulting growth rates.

Quarterly consumption of fixed capital at current and previous year's prices as well as quarterly chain indices for the consumption of fixed capital are determined for the following breakdowns:

• General government sector:	for market and non-market producers by 16 industries and 4 subsectors
• Non-profit institutions serving households sector:	by 10 industries
• Financial corporations sector:	by 3 subsectors and 4 industries
• Dwellings:	by 4 sectors and 2 subsectors
• National economy:	by buildings (of which dwellings and other buildings and structures), machinery and equipment and other fixed assets (intellectual property products and tree, crop and plant resources yielding repeat products)

23 1) $Q1_t = (12\,D_t + 5\,D_{t-1} - 1\,D_{t+1}) : 64$ 2) $Q2_t = (20\,D_t - 1\,D_{t-1} - 3\,D_{t+1}) : 64$

3) $Q3_t = (20\,D_t - 3\,D_{t-1} - 1\,D_{t+1}) : 64$ 4) $Q4_t = (12\,D_t - 1\,D_{t-1} + 5\,D_{t+1}) : 64$

Q1 to Q4: Quarterly figures of the first to fourth quarter, D: annual figures, t: reporting year

Overview 6-1: Distribution aggregates of gross domestic product and cross-border primary income

(simplified representation)

Distribution aggregates/ Cross border income flows	Method applied	Sources, indicators (m = monthly; q = quarterly)	Level of detail of calculation	I. = inflating; D. = deflating
Compensation of employees (section 6.1)				
Wages and salaries	Indicators , extrapolation model	Statistics of industry (m), collective agreements, financial statistics (q)	45 industries, 2 statuses in employment	-
Employers' social contributions	Indicators , estimate	Federal Ministry of Health, Verband deutscher Rentenversiche-rungsträger, Federal Employment Agency (BA), financial statistics (q)	2 statuses in employment	-
Net taxes on production to general government (section 6.2)	Indicators	Tax reports by the Federal Ministry of Finance (BMF) (m), financial statistics (q)	Taxes on production paid to general government, subsidies paid by general government	-
Consumption of fixed capital (section 6.4)	Model calculation (perpetual inventory method, PIM)	Perpetual inventory method (PIM) for the annual national accounts, empirical formula for distribution to quarters	4 types of products, 5 sectors, 7 sub-sectors; for 2 sectors and 4 sub-sectors by 16 industries	I. with the price indices for gross fixed capital formation
Balance of primary income between residents of Germany and the rest of the world				
Balance of income from employment (section 8.1)	Indicators , estimate	BMF reports (m), information on in-commuters (border workers and seasonal workers) by BA (q)	In-commuters and out-commuters by types for number, earnings, employers' social contributions	-
Balance of property income (section 8.2)	Indicators	Balance of payments statistics (m)	Property income received and paid	-
Balance of taxes on production and imports and subsidies (section 8.3)	Indicators	Balance of payments statistics (m), BMF reports (m)	Taxes on production and imports and subsidies	-

Chapter 7 Population and employment

7.1 Population

Data on population according to the European system of accounts 2010 (ESA) are based on official intercensal updates of population. Starting point of these updates is the current population as provided by the 2011 Census.

According to official demographic statistics the current population is updated by birth and death as well as migration (cross-border immigration and emigration). The base data for statistics on birth and death are provided by the registrar's offices and the base data on migration are provided by the residents' registration offices. Legal base is the Population Statistics Law (EVAS 12411).[24] The statistics comprise all cases of birth, death and migration. Therefore, sampling errors do not occur.

The quarterly population averages represented in national accounts are calculated as the arithmetic mean of the current population statistics. The annual mean results are initially determined on the basis of the quarterly means and later on reconciled with the final annual results of the current population statistics once they have been published. Methodological explanations on details about official intercensal updates of population are provided by the specialised unit on demographic statistics.[25]

Table 7-1: Population, persons in employment by industries, status in employment and hours worked

2015

	Q1	Q2	Q3	Q4	Year
National concept			1000 persons		
Population [1]	81,378	81,502	81,730	82,116	81,681
Employees	42,511	42,898	43,124	43,382	42,979
Domestic concept					
Agriculture, forestry and fishing	612	676	654	604	637
Industry, excluding construction	8,050	8,061	8,114	8,125	8,087
Including: Manufacturing	7,476	7,487	7,538	7,549	7,512
Construction	2,364	2,425	2,466	2,461	2,430
Trade, transport, accommodation and food services	9,704	9,839	9,914	9,978	9,856
Information and communication	1,206	1,214	1,217	1,218	1,213
Financial and insurance activities	1,189	1,183	1,186	1,194	1,187
Real estate activities	464	466	468	468	467
Business services	5,621	5,729	5,830	5,842	5,757
Public services, education, health	10,387	10,434	10,437	10,593	10,462
Other services	2,915	2,958	2,986	2,974	2,961
Persons in employment	42,512	42,985	43,272	43,457	43,057
Employees	38,156	38,641	38,925	39,162	38,721
Self-employed [2]	4,356	4,344	4,347	4,295	4,336
			Million hours		
Hours worked by persons in employment [3]	14,881	13,876	15,060	15,077	58,895
Hours worked by employees [3]	12,738	11,846	12,860	12,948	50,393

1) Average population based on the 2011 Census (on 9th of May: 80 219 695 inhabitants). - 2) Including family workers. - 3) Source for hours worked: Institute for Employment Research of the Federal Employment Agency, Nuremberg.

24 Law on statistics of the population movement and the updating of the population level (in German language: Gesetz über die Statistik der Bevölkerungsbewegung und die Fortschreibung des Bevölkerungsstandes), Bevölkerungsstatistikgesetz (BevStatG) as published on 20 April 2013.

25 See https://www.destatis.de/EN/FactsFigures/SocietyState/Population/Population.html

7.2 Employment: persons

As part of the national accounting system of the Federal Statistical Office, employment accounts continuously provide monthly, quarterly and annual data on the development of employment in Germany. ESA 2010 specifies in a binding manner the concepts and definitions to be applied in national accounts and the integrated employment accounts. The definition of employment according to ESA 2010 is in line with the standards set up by the International Labour Organization (ILO) for the compilation of internationally comparable labour market statistics.

In national accounts, persons in employment are considered to comprise all persons who perform a gainful activity as employees (wage earners, salaried employees, public officials, marginally employed persons, soldiers), as self-employed or as family workers or who have an employment contract. These persons are counted as persons in employment irrespective of the hours actually worked or to be worked according to the work contract. Also, it is irrelevant whether the employment is the person's main source of livelihood. Persons performing several jobs at the same time are covered only once, that is, with their main job (person-related concept).

Depending on the purpose, the number of persons in employment is shown for Germany as a whole and in a breakdown by status in employment according to the national concept (place-of-residence concept) or the domestic concept (place-of-employment concept). To change over from the national concept to the domestic concept, non-residents working in Germany are added and residents working abroad are subtracted. The quarterly and annual numbers of persons in employment by industry are always shown according to the domestic concept in national accounts.

The employment accounts are designed in several stages. The first stage includes preliminary estimations for the overall economy of the latest reference month, which are performed separately for various groups of persons in employment (employees subject to full social insurance contributions, marginal employees with low pay, short-term marginal employees, persons in subsidised job opportunities, public officials, soldiers, persons engaged in paid voluntary military or social services, self-employed and unpaid family workers). All other monthly, quarterly and annual results of employment accounts are generally based on detailed calculations by industry for each group of persons in employment.

Currently about 60 individual statistical sources obtained through different reporting channels are evaluated for the calculations (second stage). Data on the number of persons in employment that are used as base data and for extrapolating the results of the employment accounts are obtained both by means of personal, business or company surveys and from secondary statistics by evaluating administrative documents. In addition to the statistics for individual industries, the following are the most important employment-statistical sources: the statistics of the Federal Employment Agency about employees subject to social insurance contribution and in marginal employment (EVAS 13111), public service personnel statistics (EVAS 741, available only on an annual basis), the results of the microcensus (EVAS 122), data of the business register (EVAS 521) and reports of individual institutions (e.g. monthly reports of the Federal Ministry of Defence on the number of soldiers), the figures of the Federal Employment Agency on additional jobs in the context of work opportunities as provided in the German Code of Social Law (SGB II).[26]

During the calculations, the employment data sources are continuously checked for consistency. Furthermore, the results are validated against other national accounting aggregates (in particular the results of the production approach of the GDP and the calculation of the compensation of employees).

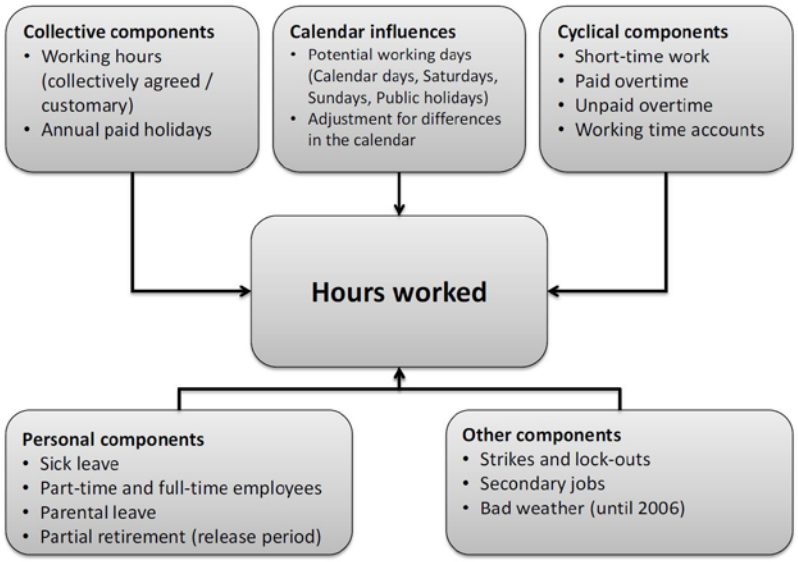
26 For an overview of the used sources in German language see Lüken, Stephan, Die deutsche Erwerbstätigenrechnung für Volkswirtschaftliche Gesamtrechnungen und Arbeitsmarktstatistik. Erfahrungen und Erkenntnisse aus sechs Jahrzehnten. In: Wirtschaft und Statistik. Ausgabe Mai 2012, S. 385 - 405.

7.3 Employment: hours worked

The *Working Time Measurement Concept* (in German: *Arbeitszeitrechnung, AZR*) of the Institute of Employment Research is integrated into the German national accounts since 1996. During the following years it has been improved continuously and had to be customised to new requirements due to ESA 2010. The AZR is well-documented, so only the main concepts are explained here.[27]

The calculation of hours worked and the volume of work within the framework of the AZR is based on a differentiated componentwise accounting concept, where calendar effects, collectively agreed standards, business cycle influences as well as personal and other components are considered. Figure 7-1 provides an overview

Figure 7-1: Components of hours worked in the working time measurement concept



Source: Wanger, Susanne/Weigand, Roland/Zapf, Ines. Measuring hours worked in Germany. Contents, data and methodological essentials of the IAB working time measurement concept. IAB-Discussion Paper 21/2015, p. 11.

Due to the numerous components and the dimensions to be considered in the AZR, a total of 20 different statistics and surveys are processed in the AZR to cover all areas with sufficient information.

Differing sources, periodicities, types of surveys and degrees of coverage are faced by the measurement concept. Working hours of gainfully employed persons are calculated separately for dependent employees as well as for the self-employed persons and family workers. Furthermore, the AZR calculates all components broken down into full-time and part-time employment (exception: secondary jobs).

27 See Wanger, Susanne, Weigand, Roland, Zapf, Ines, Measuring Hours Worked in Germany. Contents, data and methodological essentials of the IAB working time measurement concept. IAB Discussion Paper 21/2015.

The AZR is based on a quarterly calculation. Overall, the calculation of the aggregate volume of work follows a bottom-up concept. Information specific to the economic sector is calculated for the single components and the calculations of hours worked are established separately for each branch of industry. The results are subsequently aggregated to a macroeconomic outcome. This bottom-up approach is demanding in terms of the availability of sector-specific data on working time, but has a great potential for structural sector research. For components where sufficient sector-specific data are not available, a top-down approach is used and the macroeconomic aggregate is disaggregated to industry figures (e. g. for the components paid and unpaid overtime, working-time accounts and sick leave). All results of the AZR have been based on a calculation into 38 economic sectors, known as the A*38 break-down according to the WZ 2008 classification of economic branches since the last general revision of the national accounts in 2011.

The recent general revision 2014 led to fundamental changes of the AZR. The addition of the component „unpaid overtime“ was new, which has become necessary due to the changeover to ESA 2010. Also the unpaid overtime takes part in the overall production. Consideration and estimation of unpaid overtime in the AZR was necessary and a consistent database/estimation models for this component were established.

Chapter 8 Flash estimates

8.1 GDP flash estimate

Starting in 2002, the Federal Statistical Office has performed several studies on the feasibility of a GDP flash estimate which is to provide reliable quick estimates for the quarterly gross domestic product already within 30 days of the end of a quarter. The current practice of publication is that the "regular" quarterly GDP is for the first time published after around 45 days.

The examinations were based on a detailed stocktaking of the methods for quick estimates of gross domestic product applied by other national statistical offices. Building on this experience, a method has been developed which is called "three-pillar forecast" and consists of the following modules: expert forecast, econometric forecast and reconciled forecast.

1) Expert forecast

The expert forecast consists of the estimates by the Specialised Sections responsible for the production-side and use-side aggregates, with a wide variety of methods being used.

2) Econometric forecast

The econometric forecast yields purely quantitative estimates for the price-adjusted (real) original values of the aggregates on the production and use sides of GDP based on the data that are available approximately 27 days after the end of a quarter. As regards method, the forecasting procedures used are so-called ARIMA models. Depending on the data base, these procedures known from the time series analysis are used to forecast monthly or quarterly indicators, which are then used to determine the trend of an aggregate, or to forecast the aggregate itself.

3) Reconciled forecast

The reconciled forecast is based on the estimation results of the expert forecast and the econometric forecast. In a multistage process, a reconciled forecast of the price-adjusted values in comparison with the previous year is derived from the differing estimates and for GDP as well.

In this way, the GDP flash estimate combines the established methods of NA calculation with new econometric approaches to the forecasting of macroeconomic data. The procedure selected deliberately follows the procedure of the subsequent "regular" GDP calculation: on the one hand, to prevent breaks due to methodology and, on the other, to make comprehensive use of the existing know-how of all experts.

8.2 Employment flash estimate

The Federal Statistical Office publishes macroeconomic employment figures for Germany around 30 days after the end of each quarter. The employment figures are based on a monthly calculation system and they are the result of the employment accounts that are integrated into the national accounts and (see Chapter 7.2).

The calculation system for the employment accounts is not based on just one single rigid procedure but combines different methodical approaches. In addition to the conventional NA methods (expert forecasts or calculations based on employment-statistical data), this includes the application of mathematical/statistical forecasting methods. The calculation results achieved independently of each other via different ways are reconciled using primary data such as the continuous microcensus. All information and data are brought together to form the final results basically in an open and unbiased fashion. This mix of methods both guarantees high flexibility and enables the realisation of synergy benefits. For instance, the mathematical/statistical methods, in particular the time series

analysis, are important instruments for the assessment of the current trend and the typical seasonal trend of employment. Expert estimates take account of irregular effects (e.g. weather effects or revisions of laws that have an effect on employment policy). However these effects are able to be identified by using mathematical methods, such as regression analyses.

The results of the monthly employment flash estimate are based on a "three-way model":

1) Expert estimates

Shortly after the end of the quarter (t+30) the source situation for expert estimates is incomplete. In a first step a "Top-Down-model" is used. The estimates concern the national economy only in a total by status in employment (self-employed, unpaid family workers, wage earners, salaried employees, public officials, marginally employed persons, soldiers).

2) Econometric forecasting method

In the employment accounts two different types of mathematical and statistical forecasting methods are used: On the one hand, ARIMA (Autoregressive Integrated Moving Average) forecasts are made. Here data patterns of a time series are used for forecasts. On the other hand, an indicator-based ADL (Autoregressive Distributed Lag) forecast is practised at a macroeconomic level, information by other data series is considered. Both are one-step forecasts that can be made at short notice and independently of the receipt of employment-statistical data sources.

3) Matching of results

In a final phase – analogous to the GDP flash at 30 days – the results of the expert estimate and the forecast that have been determined independently of each other are assessed and a final result is determined on these bases. In the process, specific characteristics of the mathematical/statistical forecasting methods, overall assessments of the general economic situation and the current employment market trends are taken account of. The result of this matching procedure represents the first publication of the employment figures approximately 30 days after the end of the reporting month.

The flash estimates in the employment accounts introduced by the Federal Statistical Office in 2005 in accordance with the procedure described are continuously developed and subjected to quality inspections.

Chapter 9 Main data sources used

9.1 Official data sources

EVAS no.	Name of survey	Relation to EU surveys	Periodicity	Provision of the results	Key characteristics for the quarterly accounts	Adjustments of the data collected
12211	Microcensus basic programme	Labour Force Survey	quarterly	t+3 months	Regular or occasional activity, marginal employment, status in employment, hours worked	
13111	Employment statistic		monthly, quarterly at end of quarter, annual	t+6 months Annual results via remunerations t+2 years	Employees subject to social insurance contributions	
13231	Labour market and unemployment statistics in accordance with the ILO concept	Labour Force Survey	monthly	t+1 month	Persons in employment	
21371	Finance statistics of institutions of higher education		yearly	t+17 months	Third party funds; Expenditure; Income or expenses; Income and expenditure by species; Income and expenditure or expenditure, income and expenditure on investments by species	
21372	Finance statistics of institutions of higher education		quarterly	t+4 months	Expenses and income or expenses, income and investment expenditure; Name of the university; University type.	
31111	Statistics of building permits	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+2 months	Builders; Residential building; Living space; Usable area; Predominantly used heating energy; Space content; Construction of new buildings; Non-residential buildings; Predominantly used building material; Construction work on existing buildings; House type; Estimated cost of the building; Full floors; Number of rooms; Type of heating	

EVAS no.	Name of survey	Relation to EU surveys	Periodicity	Provision of the results	Key characteristics for the quarterly accounts	Adjustments of the data collected
31121	Statistics of construction work completed		yearly	t+9 months	Builders; Residential building; Living space; Usable area; Predominantly used heating energy; Space content; Construction of new buildings; Non-residential buildings; Predominantly used building material; Construction work on existing buildings; House type; Estimated cost of the building; Full floors; Number of rooms; Type of heating	
41322	Poultry statistics: survey in poultry Slaughterhouses	Reg. (EC) No 1165/2008 on livestock and meat statistics and repealing Directives 93/23 / EEC, 93/24 / EEC and 93/25 / EEC	monthly	t+1 months	Number of slaughtered poultry; Slaughter weight.	
41323	Poultry statistics: survey in holdings with laying hen husbandry	Reg. (EC) No 1234/2007 establishing a common organization of agricultural products and specific provisions for certain agricultural products (Uniformed CMO Reg.), as amended by Reg. (EC) No 513/2010	monthly	t+2 months	Eggs, hens	
41331	Statistics of slaughtering and slaughtering weights	Reg. (EC) No 1165/2008 on livestock and livestock statistics and repealing Directives 93/23 / EEC, 93/24 / EEC and 93/25 / EEC	monthly	t+2 months	Pigs; Sheep; Cattle; Horses; Slaughtering; Slaughter weight; Goats	
42111	Monthly report including orders received survey for enterprises in the field of manufacturing, mining and quarrying	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+2 months	Turnover, number of employees, hours worked, total wages and salaries, orders received	
42131	Quarterly production survey in the field of manufacturing, mining and quarrying		quarterly	t+3 months	Production, repairs, assembling and processing	
42152	Indices of turnover in the field of manufacturing, mining and quarrying	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+1.2 months	Turnover index	

EVAS no.	Name of survey	Relation to EU surveys	Periodicity	Provision of the results	Key characteristics for the quarterly accounts	Adjustments of the data collected
42153	Indices of production in the field of manufacturing, mining and quarrying	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+1.3 months	Production index	If necessary, added estimate due to expected correction
42251	Cost structure survey in the field of manufacturing, mining and quarrying		annual	t+18 months	Overall output by components, costs by cost types, number of employees	
43111	Monthly report on energy and water supply		monthly	t+1.5 months	Persons in employment, wages and salaries	
43311	Monthly report on electricity supply	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly, annual	t+2 months	Electricity balance - industry (external procurement from public grid)	
44111	Monthly report in the building industry proper (incl. indices of orders received)	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+50 days	Persons in employment, wages and salaries, hours worked, turnover	
44131	Quarterly survey in the finishing trade and with property developers	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	quarterly	t+2 months	Number of employees, wages and salaries, hours worked, turnover	
44141	Statistics on order book levels in primary construction		quarterly	t+2 months	Volume index order book	
44211	Annual survey of investment on main construction industry		annual	t+18 months	Turnover, persons in employment, wages, investment	
44252	Structural survey of small enterprises in construction		annual	t+18 months	Turnover, persons in employment, type of costs, investments	
45253	Cost structure survey of enterprises in construction and property developer		annual	t+18 months	Turnover, persons in employment, capitalised production, inventories, costs, value added tax, subsidies, R&D	
45211	Monthly statistics of wholesale trade and commission trade	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+2 months	Turnover, number of full-time and part-time workers	

EVAS no.	Name of survey	Relation to EU surveys	Periodicity	Provision of the results	Key characteristics for the quarterly accounts	Adjustments of the data collected
45212	Monthly statistics of retail trade	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+1 months	Turnover, number of full-time and part-time workers	
45213	Monthly statistics of the hotel and restaurant industry	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+1.5 months	Turnover, number of full-time and part-time workers	
45214	Monthly statistics of motor vehicle sales including motor vehicle maintenance and repair	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+2 months	Turnover, number of full-time and part-time workers	
46141	Long-distance passenger transport statistics of the railways	Reg. (EC) no. 91/2003, as amended by Reg. (EC) no. 219/2009	quarterly	t+3 months	Passengers, passenger-kilometres	
46181	Quarterly statistics on commercial short-distance passenger transport and long-distance coach transport	Reg. (EC) no. 91/2003, as amended by Reg. (EC) no. 219/2009	quarterly	t+3 months	Passengers, transport performance (passenger-kilometres), regular line traffic	
46251	Statistics on number of motor vehicles and trailers in use, vehicle defects		monthly	t+1.5 months	Changes of ownership, new registrations	
47414	Short-term statistical surveys in the service sector	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	quarterly	t+2.3 months	Sales or revenue; Number of persons employed; Economic focus	
51141	Intra-Community trade	Reg. (EC) no. 638/2004, as amended by Reg. (EC) no. 659/2014	monthly	t+1.5 months	Import, export, arrival, dispatch	
51231	Extra-Community trade	Reg. (EC) no. 471/2009, as amended by Reg. (EC) no. 2119/2016	monthly	t+1.5 months	Import, export, arrival, dispatch	
52111	Business Register		annual	t+21months	Turnover, employees subject to social insurance contributions, economic activity	
53211	Quarterly crafts report		quarterly	t+2.5 months	Persons in employment; Sales; Economic activity; Business	

EVAS no.	Name of survey	Relation to EU surveys	Periodicity	Provision of the results	Key characteristics for the quarterly accounts	Adjustments of the data collected
61111	Consumer price index for Germany	Reg. (EC) No 2016/792 on harmonized indices of consumer prices and the House Price Index, and repealing Council Reg. (EC) No 2494/95	monthly	t+15 days	Rent; Remuneration; Fees; Prices; Lease; Price-defining characteristics.	
61131	Retail price index		monthly	t+15 days	Price index	
61141	Price index for the hotel and restaurant industry		monthly	t+15 days	Price index	
61211	Index of producer prices for agricultural products		monthly	t+1 months	Prices for agricultural products	
61221	Index of purchase prices for agricultural machinery and materials		quarterly	t+1 months	Prices and charges for works and services	
61231	Producer price index of products from wood felling		monthly	t+4 months	Prices for raw wood designated according to type, grade, quality and trading conditions.	
61241	Index of producer prices for industrial products	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+1.2 months	Prices; Description of goods; Sales conditions	
61261	Price indices for the construction industry	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	quarterly	t+10 days	Prices for works and services marked by type and characteristics	
61281	Index of selling prices in wholesale trade		monthly	t+36 days	Prices; Description of goods; Sales conditions	
61311	Producer price indices for transport and logistics services	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	quarterly	t+3 month	Prices; Price-defining characteristics.	
61361	Producer price indices for business services	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	quarterly	t+3 months	Prices; Price-defining characteristics.	
61411	Index of import prices	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+27 days	Prices; Purchasing conditions; Description of goods; Country of origin.	

EVAS no.	Name of survey	Relation to EU surveys	Periodicity	Provision of the results	Key characteristics for the quarterly accounts	Adjustments of the data collected
61421	Index of export prices	Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 461/2012	monthly	t+28 days	Prices; Description of goods; Country of destination; Sales conditions.	
62321	Quarterly survey of earnings		quarterly	t+2 months	Gross earnings, hours of work paid, economic activities	
71211	Tax budget		quarterly	t+5 months	Tax revenues, tariffs	
71512	Quarterly cash results of the core budgets and of the extra budgets using cameralistic/ double entry accounting of the Federation (incl. EU shares), the Länder and social insurance		quarterly	t+3 months	Revenue; Expenditure; Construction expenditures; Cash on hand	Harmonisation with final calculation results
71517	Quarterly cash results of the core budgets and of the extra budgets using cameralistic/ double entry accounting of the Federation (incl. EU shares), the Länder and social insurance		quarterly	t+2.5 month	Revenue; Expenditure; Construction expenditures; Cash on hand	Harmonisation with final calculation results
71611	Quarterly data of extra budgets using commercial accounting	Reg. (EC) No 549/2013 on the European System of National and Regional Accounts in the European Union	quarterly	t+3 month	Actual revenue by types; Actual expenditure by types; Expenditure on investment by types; Liabilities due to creditors; Financial transactions by types	
71712	Accounting results of the core budgets, of the extra budgets using cameralistic/double-entry accounting and of other public funds, institutions and enterprises using cameralistic/ double entry accounting of the Federation (incl. EU shares), the Länder and social insurance		yearly	t+23 months	Revenue and expenditure by types and scope of tasks; Annual result; Function plan; Section; Chapter; Grouping plan.	

EVAS no.	Name of survey	Relation to EU surveys	Periodicity	Provision of the results	Key characteristics for the quarterly accounts	Adjustments of the data collected
71717	Accounting results of the core budgets, of the extra budgets using cameral-istic/double-entry accounting and of other public funds, institutions and enterprises using cameralistic/ double entry accounting of the municipalities/ associations of municipalities		yearly	t+21 months	Product groups and accounts according to product framework and account framework; Duties and groupings according to kameral household system.	
71811	Annual accounts of extra budgets using commer-cial accounting and of other public funds, institutions and enterprises using commercial accounting		yearly	t+23 months	Expenditure; Balance sheet total; Year gain / loss; Plant proof; Bal-ance sheet profit / loss; Fixed assets; Income; Current assets; Equity; Accruals; Liabilities.	
73311	Turnover tax statistics		yearly	t+16 months	Turnover, value added tax, legal form, fiscal unity, input tax, pre-payment period, NACE	
74111	Public service personnel statis-tic		yearly	t+6 months	Information about personnel of the public sector	
79911	Statistics of excise duties on tobacco products		quarterly	t+3 weeks	Purchase and issue of fiscal stamps	
83111	Balance of pay-ments statistics		monthly	t+2 months	Import and export of goods and services, freight income (sea freight)	
841	Foreign exchange statistics		monthly	t+1 month	Official exchange rates	
843	Interest rates statistics		monthly	t+2 months	Average, effective interest rates	

9.2 Other data sources

Ser. no.	Name of data source	Organisation, and purpose of the data collection	Periodicity	Provision of the results	Key characteristics for the quarterly accounts	Adjustments of the data collected
1	Tax report	BMF	monthly	t+ 0.5 month	Taxes	
2		Zementverband (cement association)	monthly	t+ 1.5 months	Domestic sales of cement	
3	Quarterly statement	Lufthansa AG	quarterly	t+ 0.9 months	Turnover	
4	Quarterly statement	Telekom group	quarterly	t+ 1.3 months	Turnover trend	
5	Quarterly statement	Post AG	quarterly	t+ 1.3 months	Turnover trend	
6	Quarterly statement	Fraport AG	quarterly	t+ 1.5 months	Turnover trend	
7	Toll		monthly	t+ 0.5 months	Income trend	
8	Travel agencies index	Chamber of Commerce and Industry Hannover	monthly	t+ 0.5 months	Turnover trend	
9	Petroleum data	Petroleum trade association (Mineralölwirtschaftsverband)			Domestic supply of diesel, gasoline and heating oil	
10	Ifo stock assessmen	Ifo-institute Munich			Change in inventories	Averaging
11	Inventories of the Petroleum Stockpiling Association	Petroleum Stockpiling Association (EBV)	quarterly		Inventories	
12		Bundesvereinigung Deutscher stahlrecycling- und Entsorgungsunternehmen e.V. (BDSV)	monthly		Scrap prices	
13	Cows' milk delivery to German dairy companies	Federal Ministry of Food and Agriculture	monthly	t+ 3 months	amount	