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# Quarterly National Accounts (QNA)

# in Germany

# – Methods and data sources –

Final Report

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# Abbreviations

| | |
|---|---|
| A6 | Classification of divisions of the "Classification of Economic Activities, Edition 2003 (WZ 2003)" into 6 industries |
| AG | Aktiengesellschaft (public limited company) |
| ANA | Annual national accounts |
| ARIMA | Autoregressive integrated moving average |
| Art. | Article |
| BA | Federal Employment Agency |
| BGB | German civil code |
| BMF | Federal Ministry of Finance |
| BV4 | Berlin method (for seasonal adjustment) |
| approx. | approximately |
| CET | Central European Time |
| CF | Commodity flow accounting |
| COICOP | Classification of individual consumption by purpose |
| Data ROSC | Data report on the observance of standards and codes |
| e.g. | For example |
| EAA/EAF | Economic accounts for agriculture /forestry |
| EC | European Community |
| ECA | European Court of Auditors |
| ECB | European Central Bank |
| ESA | European System of National and Regional Accounts |
| et seq. | And the following |
| etc. | And so on |
| EU | European Union |
| 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) |
| FAQ | Frequently asked questions |
| FISIM | Financial intermediation services indirectly measured |
| GDP | Gross domestic product |
| 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 |
| i.e. | That is |
| IAB | Institut für Arbeitsmarkt- und Berufsforschung (Institute for Employment Research) |
| ifo institute | Institut für Wirtschaftsforschung, München (Institute for Economic Research, Munich) |
| ILO | International Labour Organization |
| IMF | International Monetary Fund |
| IOA | Input-output accounts |
| NA | National accounts |
| NACE Rev. 1.1 | Nomenclature statistique des activités économiques dans la Communauté Européenne (statistical classification of economic activities in the European Community) |
| n.e.c. | Not elsewhere classified |

| | |
|---|---|
| No. | Number |
| OECD | Organisation for Economic Cooperation and Development |
| p. | Page |
| QNA | Quarterly national accounts |
| Reg. | Regulation |
| S | Sector |
| S. | Special series |
| SDDS | Special data dissemination standard (IMF) |
| SGB | German Code of Social Law |
| SNA | System of National Accounts |
| VO | Regulation |
| WG NA of the Länder | Working group National Accounts of the Länder |
| WZ 2003 | Classification of Economic Activities, Edition 2003 (WZ 2003) (identical with NACE Rev.1.1) |

# Preliminary remark

This final report contains the full description of the methods and data sources for the quarterly national accounts (QNA) calculations in accordance with ESA 1995. It is a full updated version and complete revision of the description first published in April 2003 in German language. All changes resulting from the revision of the national accounts completed in April 2005 have been incorporated into the description. The most important key issues of the revision that have an effect on the quarterly calculations of the national accounts were:

- The change of the methods of measuring prices and volumes
- The calculation and distribution to the users of the financial intermediation services indirectly measured (FISIM)

The structure of the description was changed in order to follow a uniform European standard that was developed by the Statistical Office of the European Communities (Eurostat) as laid down in Eurostat C2/CN 598b Rev.1 document "Guidelines for the drafting of QNA inventories" presented at the meeting of the Working Group on National Account in May 2006 in Luxembourg. It has been developed 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.

The figures stated in this publication are provided by way of example for the quarters of 2006 on the date of computation August 2007. Additional results of the quarterly domestic product calculations of the national accounts are published in the following series of subject-matter series 18:

- Series 1.2 Quarterly results
- Series 1.3 Seasonally adjusted quarterly results according to Census X-12 ARIMA and BV4.1
- Series S.27 Revised quarterly results 1970 to 1991
- Series S.28 Revised seasonally and calendar-adjusted quarterly results according to Census X-12 ARIMA and BV4.1, 1970 to 1991

and further the German version of this description in:

- Series S.23 Vierteljährliche Berechnungen des Inlandsprodukts nach ESVG 1995 – Methoden und Grundlagen –, Neufassung nach Revision 2005, Wiesbaden, 28. September 2007.

This present methodological description has been drawn up by employees from the National Accounts Division of Directorate III in the Federal Statistical Office of the Federal Republic of Germany.

Wiesbaden, January 2008

# Chapter 1 Overview of the system of quarterly national accounts

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]

## 1.1 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:

- IIIA Domestic Product, Production and Expenditure
- IIIB National income, General Government, External Economic Transactions
- IIIC Input-Output Accounts, National Wealth Accounts
- IIID Labour Market
- IIIE Environmental-Economic Accounting

With regard to organisation, quarterly domestic product is for the most part calculated in divisions IIIA and IIIB, partly also in IIID (employment) and IIIC (consumption of fixed capital, deflators). At the moment (mid 2007), around 110 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 (Land Statistical Offices) and excluding labour volume accounts (Institute for Employment Research (IAB) of the Federal Employment Agency). Around two thirds of this group of persons are involved in quarterly GDP accounting, although in most cases with just a fraction of their total working hours.

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 the quarterly accounts. 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

The quarterly figures of gross domestic product without particular breakdown (internationally also called "flash estimate") are published as flash reports around 45 days after the end of a reporting quarter – harmonised as far as possible 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 a free-of-charge electronic publication (subject-matter series 18 "National Accounts", series 1.2 and 1.3) around 55 days after the end of the reporting quarter.

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1 The quarterly national accounts (QNA) now include the quarterly sector accounts (QSA) in addition to the domestic product calculation. However, the QSA are not the subject matter of this methodological description.

In addition to the production side of gross domestic product broken down by seven industries (A6 plus manufacturing) and the use side aggregates (each both 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 regular revisions).

## 1.3 QNA compilation approach

The concepts, definitions and classifications of the European System of National and Regional Accounts of 1995 (ESA 1995) 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 rate, therefore, 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 report (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 the 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: advance reconciliation of sub-variables, macroeconomic GDP balancing and in-process quality assurance.

In the advance reconciliation of sub-variables, 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, an optimised result is finally defined (trial and error). 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 the context of the 2005 revision, an essential change of the method of calculation was introduced to the German NA with regard to the measurement of prices and volumes. In accordance with international conventions and binding European legislation, volumes are now 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). Following extensive trial calculations, the Federal Statistical Office in agreement with Deutsche Bundesbank has decided to apply the "annual overlap" method 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. Interested data users will on request be provided with absolute values at previous-year prices or chained volume data (with reference year 2000).

## 1.6 Seasonal adjustment and working day correction

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 provide a more current short-term economic analysis. To this end, the Federal Statistical Office has started using the internationally known 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 series 1.3 "Seasonally adjusted quarterly results according to Census X-12-ARIMA and BV4.1" (formerly a supplement to series 3) of subject-matter series 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 which at the moment are adjusted only for seasonal, but not for calendar, variations.

## 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 1995.

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

- **Subject-matter series 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 – Häufig gestellte Fragen

FAQs on NA in English:
http://www.destatis.de › English › National accounts › FAQ – Frequently Asked Questions

- **Quality report NA (German only)**

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

# 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 regular revisions and benchmark revisions that take place at larger intervals (with changes of concept). In the regular 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. Due to the increasing importance of previous-quarter comparisons of seasonally and calendar-adjusted results, a revision of the four preceding quarters may be made for the calculations of the first quarter of a year if considerable changes have occurred in particular in the fourth quarter of the previous year. At 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 benchmark 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 (subject-matter series 18 "National Accounts“, series 1.2 "Quarterly results" and series 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.

Quarterly gross domestic product results without particular breakdown (internationally also called "flash estimates") are published in the form of a flash report around 45 days after the end of the reporting quarter – harmonised on the European level as far as possible. 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 regular 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 CET, and on the internet, in the GENESIS database and in the free-of-charge electronic publications of subject-matter series 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 › Presse › Terminvorschau).

In Germany, quarterly sector accounts and quarterly government tables are supplied to Eurostat in accordance with the European regulations no later than after t+90 or t+70 days. At the

moment, however, these results are released to the full extent only for the calculation of European aggregates. In Germany, just part of these results is published.

## 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 seven industries (A6 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 person(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, labour costs and earnings 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 2000) and the rates of change. However, the chained absolute values and the non-chained data at previous-year prices are made available on request. 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.

At the moment, just certain selected variables from the quarterly sector accounts and the quarterly government tables are published in Germany.

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

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

## 2.3 Special transmissions

The quarterly results of the German NA are transmitted to Eurostat in accordance with the compulsory ESA delivery programme, and also to the OECD.

Apart from Eurostat, privileged users include Deutsche Bundesbank and some ministries. The result of the GDP flash report (GDP flash estimate) after t+45 days is transmitted to Eurostat already one day prior to publication subject to an embargo to enable simultaneous publication of European GDP. 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 release date t+55. One hour prior to official publication of the press release, the Federal Ministry of Economics and Technology, the Federal Chancellery and the Federal Ministry of Finance receive it by fax with an embargo notice.

## 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) (subject area 81, National Accounts of the federation).

A clearly structured overview of the metadata on the NA is additionally provided by the quality report published for the first time in 2006 that can be downloaded free of charge. http://www.destatis.de › Publikationen › Qualitätsberichte › Volkswirtschaftliche Gesamtrechnungen (currently available only in German).

# Chapter 3 Overall QNA compilation approach

## 3.1 Explanation of the overall compilation approach

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 (ANA). 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 national accounting concepts for quarterly and annual national 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 leg 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), i.e. complete **supply and use tables** are not available. Integration of the IOA into the German NA is exclusively effected in the context of the annual accounts.[1] 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). In the quarterly accounts as well, using a special calculation model, the FISIM are estimated 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 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 external balance of goods and services. 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, results from the distribution-of-income account are nonetheless 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 mainly based on the **rates of change of the "original" values** in comparison with the previous year. Adjustments for seasonal and calendar variation are made

[1] More detailed information on this is contained in the NA methodological description of the annual results, published as subject-matter series 18, series S.22, Wiesbaden 2007, sections 6.1.2, 7.1.d and 7.2.3.

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.[1]

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

(1) Macroeconomic GDP balancing
(2) Advance reconciliation of sub-variables
(3) In-process quality assurance

**GDP balancing on the macro level (1)** is used to check the calculation results of the largely independently determined production and expenditure approaches to GDP and to combine them in a macroeconomic system. This procedure is performed separately in each GDP calculation, starting with the first provisional quarterly GDP calculations (t+45 days after the end of a quarter), then in the regular in-depth annual calculations (for the first time after t+18 months) and finally in the benchmark revisions of the NA and retrograde calculations that 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 denser and the quality of the NA results is gradually improved.

The practice of macroeconomic GDP balancing is characterised by a systematic iterative procedure in which in an interactive process between several competent and experienced persons, taking account of a large number of different variables, an optimised result is finally defined (trial and error). So, this is not a mechanical procedure or a mathematical method defined beforehand. The balancing process can be divided into the following steps:

(1) The starting point is the calculation result from the production and expenditure approaches (annual and quarterly results, at current prices and price-adjusted).
(2) Determination and checking of the deviations
(3) Analysis of the results over time (time series)
(4) Comparison of "new" with "old" results (of the preceding calculation)
(5) Comparison of provisional with final results (for past years, quarters)
(6) First feedback/verification for "soft" and less firm aggregates
(7) Plausibility of the changes in inventories (following first balancing cycles)
(8) Plausibility of the implicit deflators (following the first balancing cycles, for GDP, production-side and use-side aggregates)
(9) Feedback with (provisional) seasonally and calendar-adjusted results
(10) Feedback with results from the distribution-of-income account (e.g. operating surplus, labour's share in national income, savings ratio)
(11) Analysis of additional macroeconomic indices (productivity, unit labour costs)
(12) Feedback with results of the sector accounts (in particular coherence)
(13) Analysis of the balancing differences in the time series

1 See the methodological description of the final annual national accounts, in subject-matter series 18, series S.22, Wiesbaden 2007, section 6.

(14) Breakdown of the balancing differences at a finer level of disaggregation (published figures) mainly using mechanical methods (with subsequent plausibility check, in particular of the time series)

(15) Comparison with the results of other external institutions

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

The more in-depth breakdown of the balancing differences (step 14) in particular concerns the results of the generation-of-income account (production approach). The gross value added of the industries is balanced towards the already defined gross domestic product, with output usually remaining unchanged (because of better statistical foundation) and the cross entry being made for intermediate consumption. In this procedure, a few calculation areas are exempted from balancing (e.g. general government sector and financial corporations sector) because the results either are regarded as particularly well founded or are being processed already in other sub-systems (sector accounts).

A final verification of these balancing entries is effected in the context of the annual national accounts on the basis of the detailed **supply and use tables** with a time lag of currently around three years (e.g. the tables for the 2004 reporting year could for the first time be used in the summer of 2007). 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 infra-annual data have to be provided by assuming constant ratios (e.g. constant use or input structures). Additional weak points result from the fact that the product-related structure of the 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 based on the production and expenditure approaches to GDP varies in the individual quarters and does not show a stable pattern. Moreover, the data base changes with every revision of a quarterly account. The order of magnitude of the total difference between production and expenditure approach to GDP is slightly less than one per cent gauged by the price-adjusted rates of change on the previous year (average absolute deviation in percentage points; calculation based on the quarterly estimates for the years 1999 to 2006). It must, in particular, be heeded that the calculation result of the uses side is actually not strictly determined due to the fact that the changes in inventories are founded on a weak statistical basis. Of course, the difference between balanced results and the calculation results is smaller and on average amounts to less than half a percentage point.

An **advance reconciliation of sub-variables (2)** is performed before the macro balancing. In the process, aggregates which are especially closely linked as regards statistics are checked for coherence already before GDP balancing. Examples of this are, in particular, the matching of the calculation of gross fixed capital formation in construction with the calculation of construction industry output or the matching of the initial values for the retail trade for calculation of private consumption expenditure, on the one hand, and for the generation-of-income account of the retail trade sector, on the other. This category also includes the adjustments due to analysis between provisional indicators and final NA results. An attempt is made to come as close as possible to the final results to be expected by applying supplementary deductions or additions to the statistical indicators in the current GDP accounting.

In addition to these two approaches to determining GDP, there is a wide range of other measures for **in-process quality assurance (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 about adjustment between quarterly and annual results arises primarily when annual results are determined at a later time in an independent calculation and where these then deviate 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 here 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 distorted 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.

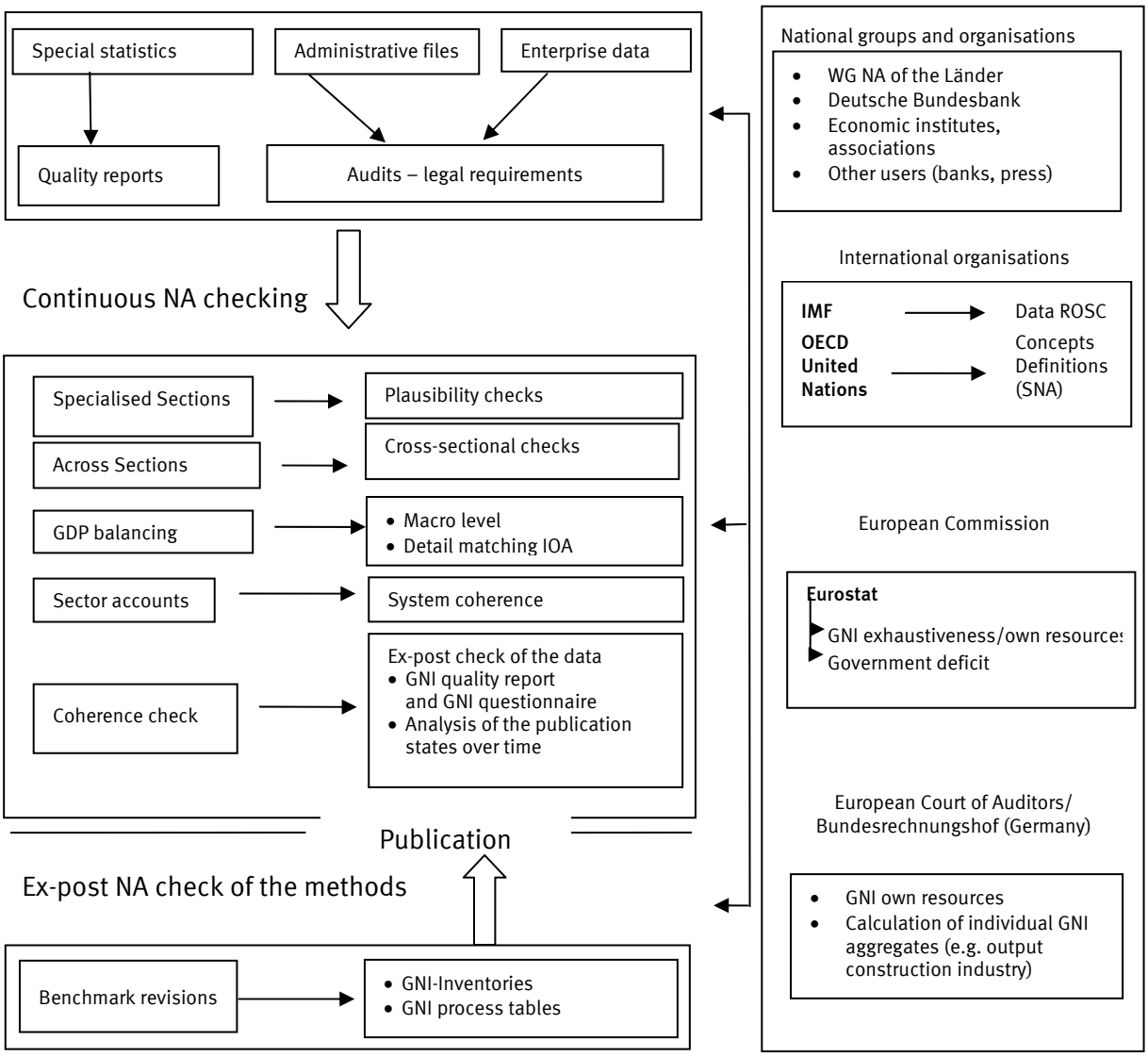
Since in the practice of the German NA a calculation and balancing of unadjusted original values is done first, the **seasonal and calendar effects** are included in the quarterly results, and the calendar effects in the original annual results as well. The seasonal and calendar adjustment is effected only in a subsequent calculation. When estimating the calendar effects, particular care is taken that 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 reconciliation 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 **in-process quality assurance** of the NA. Overview 3—1

below is a summary of additional elements of the quality assurance procedure currently applied in Germany in the form of comparisons and other checks.[1]

**Overview 3—1: Quality assurance in the German NA**




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

1 Detailed explanations of the individual elements of the quality assurance are given in the methodological description of the final annual accounts, subject-matter series 18, series S.22, Wiesbaden 2007, section 6.2.

### a) Ex-ante checks

A number of quality checks are effected even before the NA calculations are made, which to some extent are carried out already by the suppliers of the original statistics or are performed by the NA staff in close consultation with them. Due to such plausibility checks, occasional corrections are made to the base statistics for the purposes of the NA. They are documented by the NA staff in the form of notes and annotations, so that the calculations can be retraced and understood at any time. Moreover, the interests of the NA may be taken account of in the planning and designing process at the specialised statistics departments at an early stage both with regard to time and contents by NA representatives participating in meetings of the Heads of Section of the specialised statistics departments.

### b) Continuous NA checking

In addition to the plausibility checks of individual, prioritised statistics, cross-checks are also made with other data sources that likewise represent the characteristic to be shown or similar facts. The employees responsible for certain interlocked areas of calculation are always in close direct contact with each other. If and when required, ad hoc meetings are held on the working level to ensure a uniform course of action, e.g. with regard to the adjustment of the original data to the concepts of the NA. 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 GDP aggregates is responsible for deadline monitoring.

The NA calculations are then followed by additional cross-sectional checks that may, for example, be carried out based on the employment figures by industries and sectors. 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. The subsequent GDP balancing (see section 3.2.1) is, in the context of the drawing up of the sector accounts, followed by another check of the complete system coherence. This is a check in which it is examined whether the economic cycle is closed, i.e. whether generation, use and distribution of income accounts and financial accounts by sectors are coherent 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.

### 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. In parallel with this, the publication states over time are also documented and analysed. Moreover, the GNI inventories are updated in the context of major revisions in accordance with specifications that are uniformly applied in the EU. In this way, additional fundamental ex-post checks of the methods take place at regular intervals which even have been extended by the GNI process tables (an in-depth representation in tabular form of the data sources and adjustment types used).

**d) External audits and consultations**

Feedback on the NA calculations comes from national committees and organisations, above all from the working group NA of the Länder which in Germany carries out the NA calculations on the regional level and from Deutsche Bundesbank, an important external partner for the NA calculations. With the results of the balance of payments statistics and the financial accounts, Deutsche Bundesbank supplies building blocks for the system of the NA and, in turn, the close co-operation with regard to the seasonal adjustment of the NA results provides Deutsche Bundesbank with additional data for the verification and plausibility check of the NA results. Furthermore, feedback which partially is limited to individual aggregates is provided by associations and institutes and other users.

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 1995 are adhered to and whether the methods and results are comparable and complete. Likewise in the context of the calculation of the GNI own resources, the European Court of Auditors (ECA) has started carrying out elaborate audits at the statistical offices of the member countries. The ECA has audited the German GNI calculation in 2004 and another audit of the calculations especially in the field of construction industry was performed in April 2006. Finally, the International Monetary Fund (IMF) has also performed an extensive audit in 2005 of parts of the official statistics, in which, among other things, the NA themselves and areas of the financial statistics relevant to the NA have been examined.

### 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—1 shows. 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 data of which usually are available promptly. In many areas, the monthly results are available completely already for the first calculation of the past quarter. A special situation arises with regard to the calculation of the taxes on products. Although the basic information for the three months of the past quarter is available already for the first calculation, 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 1995. 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[1].

1 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 | | Calculation after T + 4.5 months | | Calculation after T + 7.5 months | | Calculation after T + 10.5 months | | For information: Share of the respective component in GDP in % |
|---|---|---|---|---|---|---|---|---|---|
| | Degree of coverage in % | | | | | | | | |
| | Well-founded indicators | Other information | Well-founded indicators | Other information | Well-founded indicators | Other information | Well-founded indicators | Other information | |
| **Components of the production approach** | | | | | | | | | |
| **Gross value added** | **70** | **30** | **88** | **12** | **89** | **11** | **89** | **11** | **90.2** |
| Agriculture, forestry and fishing | 20 | 80 | 30 | 70 | 50 | 50 | 90 | 10 | 0.8 |
| Industry, including energy | 85 | 15 | 95 | 5 | 95 | 5 | 95 | 5 | 22.9 |
| Construction industry | 50 | 50 | 95 | 5 | 95 | 5 | 95 | 5 | 3.6 |
| Trade and transport | 60 | 40 | 75 | 25 | 80 | 20 | 80 | 20 | 16.1 |
| Financial, renting and business activities | 70 | 30 | 83 | 17 | 83 | 17 | 83 | 17 | 26.6 |
| Other service activities | 67 | 33 | 96 | 4 | 96 | 4 | 96 | 4 | 20.2 |
| Taxes on products | 60 | 40 | 100 | 0 | 100 | 0 | 100 | 0 | 10.1 |
| Subsidies on products | 5 | 95 | 100 | 0 | 100 | 0 | 100 | 0 | 0.3 |
| **Components of the expenditure approach** | | | | | | | | | |
| **Final consumption expenditure** | **58** | **42** | **96** | **4** | **96** | **4** | **96** | **4** | **76.8** |
| Households | 74 | 26 | 97 | 3 | 97 | 3 | 97 | 3 | 56.9 |
| Non-profit institutions serving households | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 1.6 |
| General government | 14 | 86 | 99 | 1 | 99 | 1 | 99 | 1 | 18.3 |
| **Gross capital formation** | **50** | **50** | **81** | **19** | **81** | **19** | **81** | **19** | **17.8** |
| **Gross fixed capital formation** | **49** | **51** | **80** | **20** | **80** | **20** | **80** | **20** | **18.0** |
| Machinery and equipment | 60 | 40 | 100 | 0 | 100 | 0 | 100 | 0 | 7.5 |
| Buildings | 47 | 53 | 74 | 26 | 74 | 26 | 74 | 26 | 9.4 |
| Other products | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 1.1 |
| Changes in inventories and acquisitions less disposals | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | – 0.2 |
| **Exports** | **96** | **4** | **100** | **0** | **100** | **0** | **100** | **0** | **45.0** |
| Exports (goods) | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 39.1 |
| Exports (services) | 67 | 33 | 100 | 0 | 100 | 0 | 100 | 0 | 5.9 |
| **Imports** | **94** | **6** | **100** | **0** | **100** | **0** | **100** | **0** | **39.6** |
| Imports (goods) | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 32.1 |
| Imports (services) | 67 | 33 | 100 | 0 | 100 | 0 | 100 | 0 | 7.5 |
| **Components of the income approach** | | | | | | | | | |
| **Compensation of employees (domestic)** | **65** | **35** | **94** | **6** | **95** | **5** | **95** | **5** | **49.5** |
| Total of wages and salaries | 63 | 37 | 94 | 6 | 95 | 5 | 95 | 5 | 39.9 |
| Social contributions by employers | 71 | 29 | 96 | 4 | 96 | 4 | 96 | 4 | 9.6 |
| Gross operating surplus including mixed income | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 39.6 |
| Taxes on production | 67 | 33 | 100 | 0 | 100 | 0 | 100 | 0 | 12.4 |
| Subsidies | 66 | 34 | 100 | 0 | 100 | 0 | 100 | 0 | 1.5 |
| Consumption of fixed capital | 0 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 14.6 |
| **Components of the employment accounts** | | | | | | | | | |
| **Persons in employment (domestic)** | **67** | **34** | **93** | **7** | **93** | **7** | **93** | **7** | |
| Employees | 62 | 38 | 92 | 8 | 92 | 8 | 92 | 8 | |
| Self-employed persons and family workers | 99 | 1 | 99 | 1 | 99 | 1 | 99 | 1 | |
| **Hours worked (domestic) per person in employment** | **39** | **61** | **57** | **43** | **84** | **16** | **84** | **16** | |
| Employees | 42 | 58 | 64 | 36 | 96 | 4 | 96 | 4 | |
| Self-employed persons and family workers | 20 | 80 | 20 | 80 | 20 | 80 | 20 | 80 | |

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.

## 3.3 Volume estimates

### 3.3.1 General volume policy

In the context of the 2005 revision, an essential change of the method of calculation was introduced to the German NA with regard to the measurement of prices and volumes. Volumes are now 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. The new method has replaced the earlier calculation at constant prices of a fixed price base year that usually was changed every five years. 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.

The immediate legal cause for the introduction of the previous-year price basis into the German NA is Commission Decision 98/715/EC of 30 November 1998 (clarifying Annex A to (ESA) Council Regulation No. 2223/96 as concerns the principles for measuring prices and volumes). This legal act provides for the following under principle 3: "Volume measures derived at the elementary level of aggregation shall be aggregated using weights derived from the previous year".

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).[1]

For the quarterly accounts, different technical solutions are applied at the international level to create chain indices. In the international discussion, a distinction is made between three methods based on the papers issued by the International Monetary Fund (annual overlap, quarterly overlap, over the year)[2]. At the European level, only recommendations exist so far for one of the methods mentioned first. However, there is no legal determination, also due to the fact that the concrete basic conditions in the NA of the member states differ in parts. Following extensive trial calculations, the Federal Statistical Office in agreement with Deutsche

1 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).

2 See International Monetary Fund, "Quarterly National Accounts Manual – Concepts, Data Sources and Compilation" 2001 (in particular Chapter IX); on the internet at: www.imf.org/external/pubs/ft/qna/2000/textbook/index/htm, additionally Nierhaus, W.: "Zur Einführung der Vorjahrespreisbasis in der deutschen Statistik: Besonderheiten der Quartalsrechnung" in ifo-Schnelldienst, issue 15/2004 (available only in German).

Bundesbank has decided to apply the **"annual overlap"** method. The trial calculations have shown a good agreement between the calculation results from the different methods and that usually no significant deviations occur. 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).

While additivity of the components of an aggregate at previous-year prices is also guaranteed, this is not true for the chained results. In contrast to the fixed price method applied formerly, the chained absolute values are no longer additive, i.e. the sum of the chained sub-aggregates deviates from the value of the chained total aggregate. For example, the sum of the chained expenditure aggregates of GDP deviates from the chained 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 the publication practice, this **non-additivity** may lead to interpretation becoming problematic for the data users and to possible errors in the calculations and the analysis. Therefore, the chain indices and their rates of change and the contributions to GDP growth are currently emphasised in the **publications** of the NA as regards volume data. However, interested data users will on request also be provided with absolute values at previous-year prices or chained absolute values (for reference year 2000).

A special problem in chain-linking is the representation of **balance items**, particularly of the changes in inventories and the external balance of goods and services. Since these variables may over time also have negative values, representation of the time series as chain index is not reasonable and calculation of chained absolute values is not easily possible. In our opinion, the internationally discussed alternative solutions are also not satisfactory:

a) The external balance of goods and services is approximated as the difference between the chained series of imports and exports (although additivity is not given for chained series).
b) The share of the changes in inventories or of the external balance of goods and services in GDP is determined from the (additive) results at previous-year prices and then multiplied with chained gross domestic product. This, too, is at best a pragmatic alternative solution.

In the German NA, the result of the discussion was that the aggregates' contributions to GDP growth provide a logical solution approach. Actually, only the contributions to growth allow a comprehensive and disruption-free representation of the use side of GDP, for example because percentage rates of change or index numbers cannot be represented 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 GDP growth rate and a hypothetical growth rate that would result if the aggregate did not show any change.

The "comparative approach" is currently applied in the German NA. The advantage of the "comparative approach" is that it can be used consistently also in the quarterly chaining 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 contributions to growth only are calculatory contributions 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 necessary to provide the results at previous-year prices (i.e. prior to chaining). As an alternative, a calculation program (Excel macro) has been created for the German NA in co-operation with Deutsche Bundesbank which is made available to users free of charge on request. The program is called "KIX" and enables the calculation of calculatory contribution to growth rates based on the "comparative approach" and the aggregation or disaggregation of chain indices.[1]

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

The box below shows the formulas.

**Calculation of contribution to growth rates**

1. Calculation from additive absolute values

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

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 chained time series.

### 3.3.2 Chain-linking and benchmarking

The benchmark adjustment between quarterly and annual national accounts has various dimensions. A benchmark adjustment becomes necessary only if independently determined and better founded annual values become available at a later time. The problem does not arise for the first provisional quarterly accounts. 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 chaining 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, chained original values. 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 indices or chained absolute values in the German NA is solved by a special program (Excel macro) named KIX that enables both the aggregation or disaggregation of several variables and the calculation of calculatory contribution to growth rates. The latter is important for the representation of the balance items changes in inventories and external balance of goods and services for which the calculation of price-adjusted chain indices or rates of change is not reasonably possible and for which, therefore, only contributions to GDP growth are shown.

## 3.4 Seasonal adjustment and working day correction

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 series 1.3 "Seasonally adjusted quarterly results according to Census X-12-ARIMA and BV4.1" of subject-matter series 18, National Accounts (formerly a supplement to series 3). 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 for which at present a calendar adjustment is not made.

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. Following the adoption of the revised delivery programme expected to take place in 2007, some only calendar-adjusted data will have to be supplied in addition.

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. In the case of Census X-12-ARIMA, this concerns for example the control files, the derivation pattern, the estimated seasonal and calendar factors and the KIX Excel macro. 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.

In the context of the X-12-ARIMA programme, ARIMA models are used for forecasts at the end of the time series and for outliner 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 directly to be adjusted series. This, for example, includes the definition of the ARIMA model, the support period, the outliner 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. The seasonal factors are recalculated once per year in August (in connection with the revision of the last four years) and each time projected for one year. These projected seasonal factors are usually used on all subsequent quarter dates. However, the projected seasonal factors are checked on every quarter date and may be changed if necessary for individual series with the help of a new seasonal adjustment run.

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 likewise directly adjusted. Exact information about which series are directly adjusted and which indirectly is contained in the so-called derivation pattern.

### 3.4.2 Policy for working-day correction

Prior to seasonal adjustment, 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 because trial

calculations have shown that this leads to more meaningful results than calendar adjustment derived directly from the quarterly time series, and because this complies with the international recommendations. 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.

The calendar factors are checked at regular intervals and adjusted if necessary, usually once per year in August. Seasonal adjustment is then effected with the already calendar-adjusted time series, so that for most aggregates both seasonally and calendar-adjusted and only calendar-adjusted series exist.

# Chapter 4 GDP components (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 additionally being disaggregated by industries[1] 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 the general government sector**

Gross value added of general government is calculated separately for the subsectors central government, Länder, local government and social insurance, and within these subsectors for market and other non-market output, broken down by ten 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 contained in all industries with the exception of the construction industry. 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 financial 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 approximately transferred to the in-year data from the cash statistics.

For the **other 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 other 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. The basis for the compensation of employees and intermediate consumption is formed mainly by the results of the quarterly accounts of the central government, the results of the quarterly cash statistics of the financial statistics for Länder and local government (EVAS 71136, 71137) and the results of the quarterly accounts of individual social insurance branches (EVAS 71135), supplemented by information from the annual accounts of the financial statistics (EVAS 71141). Missing data for periods of less than one year for subareas of general government (joint boards, statutory health and long-term care insurance, accident insurance) are estimated based on the annual accounts of the financial 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. Back-payments in the case of increases in pay rates are assigned to the quarter in which a back-payment is made. Consumption of fixed capital is valuated at replacement costs. Other subsidies received are taken from the accounting data of the Federal Employment Agency

1 In accordance with the Classification of Economic Activities, Edition 2003 (WZ 2003), or NACE Rev. 1.1

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. 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 market output of general government mainly results from general government sales (predominantly utilisation fees and similar income from economic activities of general government in the industries with market output).

- **Gross value added of the NPISHs sector**

The activities of the units in sector non-profit institutions serving households (S.15) are combined into five different industries. The areas in which economic activity at present occurs in this sector are research and development (WZ 73), education (WZ 80), health and social work (WZ 85), trade unions, political parties and other interest groups, church and other religious organisations (WZ 91.2+3) and recreational, cultural and sporting activities (WZ 92).

The quarterly calculations of GVA and output are carried out equally 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 likewise available in the same breakdown. The deflator results implicitly as the quotient of nominal and price-adjusted figures.

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 2006 as an example to show quarterly GVA by industries and GDP derived.

In the current quarterly accounts of outputs 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 made which in the generation-of-income account are usually made 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 for the year 2006**

Thousand million euros

| | | 1st quarter | 2nd quarter | 3rd quarter | 4th quarter | Year |
|---|---|---|---|---|---|---|
| | Agriculture, forestry and fishing | 4.07 | 4.52 | 4.64 | 4.61 | 17.84 |
| | Industry, including energy | 128.91 | 130.38 | 133.41 | 138.71 | 531.41 |
| | Construction industry | 17.10 | 21.10 | 24.02 | 21.67 | 83.89 |
| | Trade and transport | 86.88 | 93.09 | 97.63 | 97.43 | 375.03 |
| | Financial, renting and business service activities | 152.47 | 152.72 | 157.92 | 154.94 | 618.05 |
| | Other service activities | 113.13 | 113.60 | 116.62 | 124.65 | 468.00 |
| | All industries | 502.56 | 515.41 | 534.24 | 542.01 | 2,094.22 |
| + | Net taxes on products[1)] | 56.34 | 55.79 | 56.26 | 59.59 | 227.98 |
| = | Gross domestic product | 558.90 | 571.20 | 590.50 | 601.60 | 2,322.20 |

1) Taxes on products less subsidies on products

## 4.1 Gross value added by industries (excluding FISIM)

In the following, the economic sector calculations are described in detail for the enterprises 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) 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, horticulture and landscaping, forestry and fishing. In later calculations, annual results of the agriculture and forestry accounts and the turnover tax statistics (horticulture and landscaping) are incorporated.

In accordance with the concept, **crops** are shown as work in progress. 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 slaughter figures (EVAS 41331) or sales are used as extrapolation indicators. Intermediate consumption is initially determined in price-adjusted values with the ratio of intermediate consumption of the previous year's quarter. For nominal calculation, the monthly producer price indices for products of agriculture (EVAS 61211) or the price indices of agricultural means of production are used for extrapolation in addition to the quantity indicators.

The quarter structure for **horticulture and landscaping** results from the average turnover index numbers in the wholesale trade with flowers and plants (WZ 51.22) (EVAS 45211). Extrapolation for the most recent periods is predominantly effected based on the time series. Extrapolated nominal output is deflated with the price index for ornamental tree nurseries. Intermediate

consumption is calculated on the basis of the ratio of intermediate consumption in the annual accounts.

According to ESA 1995, 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. The quantity is extrapolated with a long-term estimated average rise of currently 1%. Until early 2000 when storms caused great damage, the selling price was extrapolated with the changes of the monthly producer price indices for products of forestry from the state forests – total raw timber (excluding turnover tax). Due to the extreme decline in prices as a result of the storm damage, the consumer price index (EVAS 61111) has been used in addition since the 1st quarter of the year 2000 to update the selling price. Intermediate consumption is initially determined at price-adjusted values with the previous year's ratio of intermediate consumption and then inflated with a price index for intermediate consumption of forestry which is extrapolated based on the time series and general economic information.

No short-term indicators are available for **fishing**. For price-adjusted figures, output is estimated from the time series. After that, nominal figures are calculated by inflating with the consumer price index for "fresh fish and fish products". Intermediate consumption is nominally calculated based on the previous year's ratio of intermediate consumption and deflated with a price index for intermediate consumption of fishing which is extrapolated based on the time series and general economic information.

### 4.1.2 Industry, including energy

Although only the results for industry, including energy, 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 three branches: mining and quarrying, manufacturing and electricity, gas and water supply.

The results for **manufacturing and 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 production indices in mining or in manufacturing (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 (producer price index and export price index (EVAS 61241, 61421) 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 producer prices of agricultural or industrial products and the price indices for civil engineering, wholesale trade, consumer prices and imports (EVAS 61211, 61241, 61261, 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 **electricity, gas and water supply**, price-adjusted output of the overall sector is quarterly extrapolated with the (not seasonally and calendar-adjusted) trend of the production price index compared to the previous year's quarter. Price-adjusted intermediate consumption is calculated with the previous year's price-adjusted ratio of intermediate consumption. This means that the 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 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 industry

The quarterly calculations are carried out separately for the WZ sections primary construction and secondary construction. This is not least due to the fact that the base statistics available for both construction industry subsectors are very different.

The results for **primary construction** are extrapolated with the trend of hours worked. 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 expansion factor in construction reporting (EVAS 44111) (enterprises with 20 or more employees to enterprises with 1 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 construction price statistics (EVAS 61261), while the input prices are formed from various price information in accordance with the composition of intermediate consumption.

In the **secondary construction**, combined quarterly trends of turnover figures according to craft reports (EVAS 53211) (for enterprises with between 1 and 19 employees) and construction reporting (EVAS 44131) (for enterprises with 20 or more employees) are used to update the nominal output. To prevent undercoverage, 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 (construction prices). Since up-to-date information is not available, price-adjusted intermediate consumption is determined based on previous year's price-adjusted ratios of intermediate consumption that are kept constant. Intermediate consumption is inflated with input prices that are broken down in detail. Price-adjusted gross value added in the construction 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 one third 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 (20 or more)

### 4.1.4 Trade and transport, communication

Quarterly updates of figures for the trade sector are made separately for three areas of calculation, namely for the WZ divisions sale of motor vehicles and motorcycles, wholesale trade and commission trade (except of motor vehicles and motorcycles) and retail trade (except of motor vehicles and motorcycles and automotive fuel).

The extrapolation variable for WZ division **sale of motor vehicles and motorcycles** is quarterly gross value added at current prices. The rate of change obtained from the turnover index numbers of the trade statistics is previously adjusted to corrections expected to be made in the transition process 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 turnover tax statistics, the data of the annual trade survey and the data of the business register. 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's rate of change of the (not seasonally and calendar-adjusted) monthly turnover index numbers, aggregated into quarters, of the sale of motor vehicles division.

Price-adjusted gross value added in the sale of motor vehicles division is calculated by deflating with a price index from the back-calculated turnover index numbers. Due to the lack of more up-to-date information, the nominal and price-adjusted previous year's ratios of intermediate consumption are used to calculate the associated output and intermediate consumption from the extrapolated gross value added figures.

Quarterly gross value added at current prices is the extrapolation variable also for the trade branches **wholesale trade and commission trade** (except of motor vehicles and motorcycles) and **retail trade** (except of motor vehicles and motorcycles and automotive fuel). The results of the respective previous year's quarter are extrapolated with the previous year's rate of change of the (not seasonally and calendar-adjusted) monthly turnover index numbers, aggregated into quarters, of wholesale trade (including commission trade) and retail trade (EVAS 45211, 45241). As described before, the rates of change obtained from the turnover index numbers are previously adjusted to corrections expected to be made in the transition process to the more complete annual base statistics.

Gross value added in **retail trade** is deflated with a price index calculated from the data of the specialised statistics. The previous year's price index is extrapolated with a rate of change that results from the back-calculated current and real turnover index numbers. In **wholesale trade**

(including commission trade), gross value added is price-adjusted with a deflator that is weighted as up to date as possible and composed of the prices of the turnover index numbers and a Paasche export price index for turnover with the rest of the world.

In these WZ divisions as well, up-to-date information is not available about the ratios of intermediate consumption, so that the previous year's nominal and price-adjusted ratios are used to calculate the associated output from the extrapolated gross value added figures.

In the **hotel and restaurant industry**, gross value added at current prices is extrapolated by means of the monthly nominal turnover index numbers, aggregated into quarters, of the hotel and restaurant industry (EVAS 45411). Again, the not seasonally and calendar-adjusted rates of change on the previous year's quarter are used for extrapolation. As described before, the rates of change obtained from the turnover index numbers are previously adjusted to past corrections made during the transition to the more complete annual base statistics.

Real gross value added is calculated by means of price adjustment with a deflator based on the back-calculated turnover index numbers. Due to the lack of up-to-date information about intermediate consumption, the previous year's nominal and price-adjusted rates are used without change in the current quarter examination.

For the quarterly calculation for the most recent periods of the **transport** branch, the gross value added of the respective previous year's quarter is extrapolated broken down by around 20 subclasses. Important indicators for land transport, water transport and air transport are monthly data from the official statistics on passenger-kilometres, tonne-kilometres or income for individual means of transport (EVAS 46141, 46231, 46321, 46421). For water transport, monthly freight income from balance of payments statistics of Deutsche Bundesbank (EVAS 83111), and for air transport, data from the financial statements of Lufthansa are used in addition.

Hardly any indicators are available for "supporting and auxiliary transport activities". The estimates of subclasses "travel agencies" and "tour operators and tourist assistance activities" are based on data published by associations. The other items are extrapolated with analogue rates of change in land transport, water transport and air transport.

The estimate for **telecommunications** is at the moment still mainly based on the financial statements of Deutsche Post and Telekom, data from associations, market reports and general economic information.

Depending on the data base, calculation is initially carried out either nominally or in price-adjusted terms and the result is then deflated or inflated with the relevant price index of the official statistics or nominal and price-adjusted results are determined independently of each other.

### 4.1.5 Financial, renting and business service activities

This industry includes the branches financial intermediation, real estate and renting activities, computer and related activities, research and development and other business activities.

The **financial intermediation** comprises the **subdivisions financial business, insurance business and financial auxiliaries**. For the most part, suitable alternative indicators are used for the quarterly estimate due to the lack of short-term base statistics.

The output of the **financial business** (WZ 65) is primarily composed of the FISIM and the proceeds from secondary business. For calculation, monthly data from Deutsche Bundesbank on assets and liabilities (EVAS 47251) and on interest rates (EVAS 84331) are used to update the FISIM, while the other proceeds from banking business (charges etc.) are estimated based on the monthly business volume trend.

Since suitable indicators for the short-term trend of intermediate consumption are not available, ratios of intermediate consumption, that are derived from the banks' annual profit and loss accounts, are assumed to be constant. For calculation of the values at previous-year prices, the deflated sum of loans and deposits is used as volume indicator for extrapolation.

A similar method is used to calculate quarterly price-adjusted gross value added of the **insurance business** (WZ 66). The output of the insurance business mainly consists of the remunerations for services to which any income from other services and own produced assets are to be added. The annual forecasts by "Gesamtverband der Deutschen Versicherungswirtschaft" of the insurance premiums earned and the insurance benefits paid are used to calculate the remunerations for services at current prices. The annual rates of change forecast for the different insurance branches are in the same way assumed for the quarters. This also goes for the other services of the insurers and for intermediate consumption. As in the annual accounts, the deflated sum of the benefits paid to the policy holders is used as indicator for volume trend extrapolation.

**Financial auxiliaries** (WZ67) comprises administration of financial markets, security broking and fund management and activities auxiliary to financial intermediation and to insurance and pension funding n. e. c.. Indicators for periods of less than one year are not available for all of these subdivisions. GVA is estimated quarterly based on industry expectations and verified or modified if necessary with the help of newspaper announcements, company reports and similar information.

No short-term base statistics on gross value added or turnover are available for the quarterly estimate of **real estate activities and renting** (WZ 70, 71) (excluding letting of dwellings), **computer and related activities** (WZ 72), **research and development** (WZ 73) and **other business activities** (WZ 74). Therefore, alternative indicators have to be used. In these branches, extrapolation is effected on the basis of the price-adjusted previous year's results using the results for volume of labour, calculated in the context of the NA, that consist of the components persons in employment in the business enterprise sector and hours worked (per person in employment). The rates of change on the respective previous year's quarter determined for volume of labour are equally applied to output, intermediate consumption and gross value added. The rate of change obtained from the volume of labour is in some areas previously adjusted to corrections expected to be made in the transition process to the more complete annual base statistics. Specific price trends for the branches are used as inflators for the extrapolated price-adjusted results. Where they are not available, trends in comparable branches are applied.

The quarterly calculation of the **letting of dwellings** (for all institutional sectors) is based on a so-called stratification model, as are the annual accounts[1]. The quarterly calculation of output for the letting of dwellings is based on a quantity extrapolation of the living floor space in the individual strata separated by dwellings let and owner-occupied dwellings. To this end, the

1 Cf. Federal Statistical Office, subject-matter series 18, series S.22, 2007, section 3.17.1.2.

previous year's number of dwellings is extrapolated based on the building permissions statistics (EVAS 31111) and multiplied with the previous year's average living floor space per dwelling. The result is the annual average living floor space for the current year. In order to represent quality improvements in newly built and also in stock of dwellings, the annual average living floor space thus determined is increased using two quality factors and then a price-adjusted output for the total year is calculated. To convert this annual average result into an in-year trend, a constant quarter-on-quarter growth rate in the current year is assumed due to the unavailability of statistical information. This calculation is carried out for the rent exclusive of heating expenses and the cold cost allocations that are to be deducted from that rent in order to calculate output. The garage rent quantity trend is extrapolated for the quarters based on the living floor space trend. The resulting price-adjusted output of the letting of dwellings (including garage rents) is multiplied with available up-to-date price indices from the consumer price statistics to calculate nominal output. As in the annual accounts, intermediate consumption is determined based on ratios of intermediate consumption identified in household surveys. In the process, the intermediate consumption ratio is left unchanged in the price-adjusted result, while nominal intermediate consumption results from inflation with a price index from the consumer prices statistics (EVAS 61111).

### 4.1.6 Other service activities

As in the case of the business service activities, the calculations in the industries **education** (WZ 80)**, health and social work** (WZ 85)**, sewage and refuse disposal, sanitation and similar activities** (WZ 90), **recreational, cultural and sporting activities** (WZ 92) **and other service activities** (WZ 93) are carried out by means of extrapolation based on volume of labour, with subsequent inflating. The rate of change obtained on the basis of the volume of labour is in some areas adjusted to corrections expected to be made in the transition process to the more complete annual base statistics.

In branch **activities of business, employers' and professional organizations** (WZ 91.1), the nominal figures are extrapolated with the trend of the quarterly compensations of employees in the business enterprise sector of this area of economic activities. Calculation in price-adjusted terms is done by extrapolation with the respective trend of persons in employment. The deflator results implicitly as the quotient of nominal and price-adjusted result.

**Private households with employed persons** (WZ 95) are also represented in this combined industry. As agreed, nominal GVA corresponds to the compensation of employees paid to domestic staff which also includes payments in kind. In analogy to the annual procedure, the compensation of employees is calculated quarterly by extrapolating the average earnings based on agreed-wage information and multiplying them by the number of employees in this branch. Price-adjusted GVA is determined by deflating with appropriate prices.

Apart from the calculations described here that solely concern the economic units of the business enterprise sector, the activities of general government play an important role particularly in this industry. This primarily concerns the subsectors public administration, defence and compulsory social security in which exclusively general government sector units are active. However, in other subsectors (such as education, disposal services) as well, units of the general government sector make a major contribution to GVA. The calculation of these shares of value added is described at the start of this present chapter 4 for the general government sector

as a whole. The same applies to the activities of the economic units of the non-profit institutions serving households most of which are also part of this industry.

## 4.2 FISIM

The data base for the quarterly calculation of the FISIM is the monthly information provided by Deutsche Bundesbank on the assets and liabilities of the monetary financial institutes (EVAS 47251) and on interest rates (EVAS 84331). The combination of the loans and deposits with the applicable interest rates yields estimates for the banks' income from interest and interest expenditure. The reference interest rate results from the interbank liabilities and the interest paid by domestic banks to domestic banks. If the banks' loans and deposits by sectors are multiplied with this reference rate, then the balance of actual income from interest and actual interest expenditure is the service remuneration of the banks. The calculation is described in detail in the methodological description of the annual accounts.[1]

## 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 petroleum products, 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 agriculture. 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 and using quarterly figures for the pure local government taxes that are provided from the results of the financial statistics. Where necessary, the cash figures are shifted by one or two months in accordance with the accruals 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 activity, transaction or other event takes place that creates the tax liability. The results of the balance of payments statistics of Deutsche Bundesbank are used for the taxes to be paid to the EU. Both taxes on products and subsidies on products are shown at current prices as well as price adjusted.

The **taxes on products** comprise value-added tax, import duties and other taxes on products. The value-added tax payments are composed of turnover tax paid to general government and turnover tax paid to the EU. 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 (milk and cereals co-responsibility levies, production levy on sugar) and entertainment tax, insurance tax, fire service tax, real estate transfer tax, betting and lottery tax.

1 Cf. Federal Statistical Office, subject-matter series 18, series S.22, 2007, sections 3.16.1.2 and 9.1.

The nominal taxes on products are in principle defined by financial statistics. The deflator results from either the change of the tax rates or separate calculations. These separate calculations are to 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 cash figures with the relevant deflators. Excise duties are distinguished into excise duties on petroleum products, tobacco, spirits, alcopops, intermediate products, coffee, electricity, sparkling wines and beer. For the calculation of the deflator for the excise duties on tobacco (cigarettes, fine cut, pipe tobacco etc.) and petroleum products (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 for the central government and the EU from the cash figures of the central government budget, with annex E "Marktordnungsabgaben der EU" of chapter 1004 "Marktordnung, Maßnahmen der Notfallvorsorge" being relevant with regard to the EU. The sources used for the Länder and local government are the cash figures of the financial statistics. The subsidies on products are at the moment assigned to the industries agriculture, food industry, wholesale trade and transport. These are subsidies that were 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.

**Quarterly calculations of gross domestic product (t+55 days)**

**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 figures (m), milk deliveries to dairies (m) | 4 branches | I. with producer prices for agricultural products, D. with price index for ornamental tree nurseries, I. with consumer price index for selected products |
| Industry, including energy (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 |
| Electricity, gas and water supply | Indicators | Production index (m) | 1 branch | I. with producer prices and other price indices |
| Construction industry (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 and transport (section 4.1.4) | | | | |
| Wholesale and retail trade; repair of motor vehicles and household goods | Indicators | Turnover (m) | 3 branches | D. with wholesale and retail prices |
| Hotel and restaurant industry | Indicators | Turnover (m) | 1 branch | D. with price series of the consumer price index |
| Transport | Indicators | Statistics on passenger-kilometres and tonne-kilometres (m), income for individual means of transport (m), balance of payments statistics (m) | 20 branches | D. with price series of the consumer price index for passenger transport, I. with price series of the consumer price index for taxis, D. with sea freight index |
| Supporting and auxiliary transport services | Indicators, estimate | Irregular information from associations | | D. with price series of the consumer price index for travel agencies and tour operators |
| Telecommunications | Indicators | Financial statements Post, Telekom and similar | | I. or D. depending on data base |

| Industry | Method applied | Sources, indicators (m = monthly; q = quarterly) | Level of detail of calculation | I.= inflating; D.= deflating |
|---|---|---|---|---|
| Financial, renting and business service activities (section 4.1.5) | | | | |
| Financial business | Alternative indicators, estimate | Banking statistics of Deutsche Bundesbank on assets and liabilities and on interest rates (m); life and health insurance premiums (q) | Breakdown by classes of banks and insurance companies | D. with deflated sum of loans and deposits as volume indicator<br>D. with deflated sum of benefits paid to policy holders |
| Letting of dwellings | Stratification model | Quantity extrapolation using building permissions statistics, price indices (m) | 33 strata each for owner-occupied and let dwellings | I. with consumer price indices |
| Real estate, renting and business services | Estimate | Persons in employment (m) hours worked per person in employment (q) | 5 branches | I. with consumer price indices |
| Other service activities (section 4.1.6) | | | | |
| Public administration, defence, compulsory social security services; and general government units in other industries | Mainly from base statistics | Financial statistics (q), accounting results of social insurance branches (q) | 4 subsectors of general government, by market and other non-market output | D. using input method (where other non-market output) |
| Provision of other services | Estimate | Persons in employment (m) hours worked per person in employment (q) | 5 branches | I. with price series of the consumer price indices |
| Trade, employers' and professional associations | Indicators | Employees (m)<br>compensation of employees (q) | 1 branch | Nominal and price-adjusted figures extrapolated separately |
| Households with domestic staff | Indicators | Employees (m), compensation of employees, volume of labour (q) | 1 branch | D. with appropriate consumer price indices |
| For information: non-profit institutions serving households | Indicators | Employees (m)<br>compensation of employees (q) | 5 branches | Nominal and price-adjusted figures extrapolated separately |
| FISIM<br>(section 4.2) | indicators | Banking statistics of Deutsche Bundesbank on assets and liabilities and on interest rates (m) | By sectors and financial instruments (31 items) | Volume extrapolation using price-adjusted trend of loans and deposits |
| Taxes on products<br>(section 4.3) | Indicators | Reports of Federal Ministry of Finance (m), financial statistics (q) | By types and receiving sectors | D. with tax rates and (partly) product prices |
| subsidies on products<br>(section 4.3) | Indicators | Balance of payments statistics (m), financial statistics (q) | By paying sectors | Nominal and price-adjusted figures extrapolated separately |

# Chapter 5 GDP components (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 for the year 2006**

Thousand million euros

| | 1st quarter | 2nd quarter | 3rd quarter | 4th quarter | Year |
|---|---|---|---|---|---|
| Private consumption expenditure | 325.36 | 335.38 | 340.67 | 356.09 | 1,357.50 |
| Households | 316.26 | 326.98 | 331.63 | 346.69 | 1,321.56 |
| Non-profit institutions serving households | 9.10 | 8.40 | 9.04 | 9.40 | 35.94 |
| + Government final consumption expenditure | 102.42 | 102.84 | 103.98 | 116.64 | 425.88 |
| + Gross capital formation | 100.60 | 103.05 | 121.05 | 87.74 | 412.44 |
| Gross fixed capital formation | 86.67 | 106.77 | 109.43 | 114.24 | 417.11 |
| Machinery and equipment | 38.34 | 43.79 | 41.74 | 49.81 | 173.68 |
| Construction | 42.20 | 56.56 | 61.12 | 57.30 | 217.18 |
| Other products | 6.13 | 6.42 | 6.57 | 7.13 | 26.25 |
| Changes in inventories and acquisitions less disposals of valuables | 13.93 | – 3.72 | 11.62 | – 26.50 | – 4.67 |
| + Export surplus (external balance of goods and services) | 30.52 | 29.93 | 24.80 | 41.13 | 126.38 |
| Exports | 248.91 | 253.80 | 260.44 | 283.33 | 1,046.48 |
| Imports | 218.39 | 223.87 | 235.64 | 242.20 | 920.10 |
| = Gross domestic product | 558.90 | 571.20 | 590.50 | 601.60 | 2,322.20 |

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

The quarterly accounts of the household final consumption expenditure basically follow the same course of calculations as the annual accounts[1]. Indicators are processed for some 390 branches of economy that are observed. Indicators with different time-lags to the reporting period are available for the calculations. Depending on the data base, the calculations for the individual economic activities are aggregated to a greater or lesser degree.

The most important basis for the quarterly accounts are the monthly or quarterly turnover figures available for retail trade (EVAS 45241), hotel and restaurant industry (EVAS 45411) and crafts (EVAS 53211) that represent the major part of sales of goods to households.

Retail trade, including motor vehicles and motorcycles, represents the largest share of sales of goods to households. The sales in the individual branches of economy are calculated on the basis of the monthly turnover index numbers of the trade or the hotel and restaurant industry statistics. Sales to households in the crafts sector are determined on the basis of the quarterly craft reports.

For certain goods, a direct calculation is made on the basis of available quantity information that is valuated with prices. For instance, private consumption of heating oil and motor fuels is extrapolated on the basis of energy balances using changes in monthly domestic provision. Similar is the calculation of the purchases of new motor vehicles that are based on the number of new registrations per month recorded by the Federal Office for Motor Vehicles (EVAS 46251) and valuated with the prices of the individual new registration types. Private consumption of gas and electricity is calculated from the monthly data provided by the energy suppliers by type of consumer.

For the private expenditure for services, the data bases are considerably more heterogeneous and less detailed. The expenditure for dwellings rented is based on the stock of dwellings (represented as living floor space) per quarter and the change of the rent index from the consumer price index. The basis for the stock of dwellings is the survey of buildings and dwellings that is extrapolated on the basis of the monthly building permissions statistics (EVAS 31111).

The calculation of private expenditure for transport is mainly based on the monthly information about the revenue of Bahn AG and the quarterly income shown in the passenger road traffic statistics (since 2005 estimate based on passenger-kilometres).

The consumption expenditure for hotels and restaurants is determined on the basis of the monthly survey in the hotel and restaurant industry (EVAS 45411). The expenditure for financial and insurance services is estimated on the basis of the change of output of these branches. The consumption expenditure for the other personal services is extrapolated on the basis of the trend of the quarterly results for persons in employment and the compensations of employees or the craft reports. In the field of health activities, the trend of private and statutory insurance benefits is used to estimate quarterly consumption expenditure.

1 Cf. Federal Statistical Office, subject-matter series 18, series S.22, Wiesbaden 2007, section 5.7.

Purchases of households from general government are calculated on the basis of the quarterly income of general government. Data on consumption expenditure of domestic households in the rest of the world and of non-residents in Germany are derived from the monthly results of the balance of payments of Deutsche Bundesbank (EVAS 83111).

The price-adjusted quarterly data result from deflating with subindices of the consumer price index. The calculation is carried out for around 360 classifications by purpose (COICOP)[1]. To this end, the results of the 390 branches of economy are broken down based on the expenditure structure of the most recent annual national accounts.

## 5.2 Government final consumption

Government final consumption expenditure is defined as that part of government production in the context of other 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 separately for the government subsectors (total of gross value added of general government in the field of non-market output plus intermediate consumption in the field of non-market output), less sales from other 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. 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 software as part of government non-market output for own final use is estimated via a model in 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).

Information from the functional breakdown of the annual results of the financial statistics, the results for the central government and the results of the social insurance branches are used for the classification of government final consumption expenditure into actual collective and actual individual consumption.

## 5.3 NPISH final consumption

Final consumption expenditure of the non-profit institutions serving households (NPISHs) is extrapolated quarterly by five 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 in each case 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 in employment for this sector and by industries, and in nominal terms via the rate of change of

[1] Classification of Individual Consumption by Purpose

the compensation of employees in that sector which is likewise available by sectors and industries. The deflator results implicitly as the quotient of nominal and price-adjusted result.

## 5.4 Gross capital formation

Fixed capital formation is according to ESA 1995 classified into tangible fixed assets and intangible fixed assets. In Germany, the latter are in the quarterly accounts combined for practical reasons with a (very small) part of tangible fixed assets, namely cultivated assets, under the term of "Other products". Thus a division into three of fixed capital formation arises: gross fixed capital formation in construction, gross fixed capital formation in machinery and equipment and other products. The different quarterly methods of calculation are described below.

### 5.4.1 Gross fixed capital formation

#### a) Gross fixed capital formation in construction

The calculation of **gross fixed capital formation in construction** is based on the data provided by enterprises that provide construction services and other services to be attributed to gross fixed capital formation in construction. The following areas of calculation can be distinguished: construction activities / civil engineering (primary construction), specialized construction activities, manufacturing services, own-account output and ancillary construction services (services provided by architects, real estate agents and similar). Furthermore, gross fixed capital formation in construction is broken down by eight construction types: residential and non-residential construction, the latter subdivided into agricultural buildings, commercial buildings, public buildings, buildings of non-profit institutions serving households, commercial civil engineering, public road construction and other public civil engineering.

In the first estimate for a past quarter, primary construction is determined broken down by the eight construction types based on the number of monthly hours worked shown in the monthly report on primary construction (EVAS 44111). The change in hours worked is supplemented by a change in productivity and the "Firmenkreissprung". The estimation for the productivity change is based on long series in which the annual construction services or the turnover in primary construction 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 is to be considered because every month only large enterprises are questioned about their hours worked. Only a first, rough estimate of the turnover trend for enterprises with 20 and more employees is available for the specialized construction activities. The other construction operations are estimated based on the trend in primary construction and specialized construction activities.

For the later quarterly estimates, turnover results for the specialized construction activities are available additionally from craft reports (EVAS 53211) and specialized construction statistics (EVAS 44131). Moreover, first results for the manufacturing output are available at that time from the quarterly production and foreign trade statistics (EVAS 42131, 51141, 51231). No information for this estimate also is available about ancillary construction services and own-account output. They are still based on the results for primary construction and specialized construction activities.

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 available not before that time. To a large extent, these surveys replace the estimate described above based on provisional indicators. This includes both the business survey and the cost structure statistics in primary construction (EVAS 44211, 44251) that inquires 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 primary construction. The value-added tax statistics (EVAS 73311) provide important annual figures for the specialized construction activities and the ancillary construction services. The distribution to quarters for the specialized construction is based on the results of the craft reports and the quarterly survey in the specialized construction activities. 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 trend of primary construction and specialized construction activities. Overview 5—1 shows the availability of the data for the individual areas of calculation of gross fixed capital formation in construction.

**Overview 5—1: Data base for the calculation of gross fixed capital formation in construction for the year 2006**

| GFCF - C total | primary construction | specialized construction activities | manufactoring | services, own account output |
|---|---|---|---|---|
| 100% | 32% | 34% | 8% | 26% |
| | **available information** | | | |
| 1. estimation quarters | hours worked | turn over › 20 employees | _ | _ |
| 2. estimation quarters | " | turn over › 1 employees | production, foreign trade | _ |
| final estimation years | construction per year, cost structure | turn over tax statistics | " | turn over 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

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 at present available on a quarterly basis, 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[1]. The quarterly results can be accumulated directly to form annual results. Although independent of this an annual investor calculation exists that is based on surveys, the CF results at least determine the sub-annual 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 manufacturer's are modelled from the differences 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. However, since this is done at the low level of the 2-digits product breakdown, structural shifts of the reference parameters enter the calculation nonetheless.

In contrast to the CF approach, the investment data on private cars result directly from physical quantities. The licensing figures of the Federal Motor Transport Authority (EVAS 46251) broken down by engine capacity classes and vehicle keeper groups are valuated with prices quarterly which are used in the determination of the household final consumption expenditure[2].

The above related to the full degree of detail of the CF pattern of the machinery and equipment calculations explained in detail in the methodological description mentioned above.[3] Directly

1 Cf. Federal Statistical Office subject-matter series 18, series S.22, Wiesbaden 2007, section 5.10.3.

2 Cf. also section 5.1 above.

3 Cf. the overview in: Federal Statistical Office, subject-matter series 18, series S.22, Wiesbaden 2007, S. 319.

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, that is 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. 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 purchased and own produced software, entertainment, literary and artistic originals, mineral exploration, land ownership transfer costs and cultivated assets. No specific quarterly data sources are available for any of these individual elements, so that the annual figures have to be split up based on best suitable in-year reference indicators. For instance, the entertainment, literary and artistic originals of the respective previous year's quarter are extrapolated by three subareas. Important indicators for the sound storage media (WZ 22) are last year's economic sector figures of "Bundesverband der Phonografischen Wirtschaft". The originals of the performing artists and the film and television productions (WZ 92) are estimated from the time series. The ownership transfer costs for undeveloped land are calculated in the context of gross fixed capital formation in construction and then separated. For the other subareas of other products either annual figures already forecast based on the same method are distributed to quarters or current quarterly updates are made in the current estimate. Due to the low weight of other products, the existing uncertainties in the quarterly estimate of other products have just very little influence on the quality of total quarterly GDP.

### 5.4.2 Changes in inventories and acquisitions less disposals of valuables

There are no collected data in Germany on the sub-annual changes of inventories (output and input inventories). 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, by means of the monthly results of the so-called ifo inventory assessment. The plausibility of the extrapolated result is then 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 External balance of goods and services

The external balance of goods and services is calculated by deducting imports from exports. Additionally, a distinction is made in the calculation between transactions in goods and transactions in services. The base statistics for the calculation of the exports in goods and services and of the associated imports are available monthly. Therefore, sources and methods of calculation correspond quarterly and annually. The calculation of the cross-border transactions in goods is based on the results of the foreign trade statistics (EVAS 51141, 51231), and the representation of the cross-border transactions in services on those of the balance of payments statistics (EVAS 83111) of Deutsche Bundesbank. The original data do not completely comply with the delimitations of the NA. Therefore, the information is modified by some conceptional adjustments[1].

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).

1 For detailed information on the method of calculation see Federal Statistical Office, subject-matter series 18, series S.22, Wiesbaden 2007, section 5.15.

## Quarterly calculations of gross domestic product

### 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) | 390 economic industries; 360 consumption 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) | Mainly estimates | No specific statistical sources | 7 types | Major part (software) D. with replacement price index (weighted together from hardware prices with product-specific software proximity) |
| 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 (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 as they have arisen in Germany. The table also forms the basis for the following description. Since operating surplus including mixed income cannot be independently determined in Germany, it in actual fact results as the remainder 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 nationals. 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 for the year 2006**

Thousand million euros

| | | 1st quarter | 2nd quarter | 3rd quarter | 4th quarter | Year |
|---|---|---|---|---|---|---|
| | Compensation of employees in Germany | 266.84 | 278.51 | 286.37 | 318.27 | 1,149.99 |
| | Wages and salaries | 214.08 | 223.56 | 231.31 | 257.39 | 926,34 |
| | Employers' social contributions | 52.76 | 54.95 | 55.06 | 60.88 | 223,65 |
| + | Gross operating surplus including mixed income (domestic) | 173.01 | 172.91 | 182.24 | 162.39 | 690.55 |
| + | Other taxes on production less other subsidies | 62.71 | 63.99 | 65.63 | 61.35 | 253.68 |
| = | Gross value added at basic prices | 502.56 | 515.41 | 534.24 | 542.01 | 2,094.22 |
| + | Taxes on products less subsidies on products | 56.34 | 55.79 | 56.26 | 59.59 | 227.98 |
| = | Gross domestic product | 558.90 | 571.20 | 590.50 | 601.60 | 2,322.20 |
| – | Consumption of fixed capital | 84.32 | 85.52 | 84.97 | 84.67 | 339.48 |
| = | Net domestic product | 474.58 | 485.68 | 505.53 | 516.93 | 1,982.72 |

## 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 seven industries (A6 plus manufacturing) and composed of wages and salaries and the employers' actual and imputed social contributions. According to the national concept, it consists of the remuneration received by nationals from domestic and foreign employers, while according to the workplace concept, in-commuters to Germany are to be included and out-commuters are to be excluded.

### a) 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 free-of-charge food for employees in agriculture.

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 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 a base value. Indicators from the monthly and quarterly business surveys in industry (EVAS 42111, 42251, 43111, 44111, 44131) are available for this. Collective agreements are evaluated for the quarterly extrapolation of the earnings in the service sector and for the agriculture and forestry sector. To the extent possible, part-time effects are taken account of by means of correction factors.

For the general government sector, the quarterly cash statistics of the financial statistics (EVAS 711) provide data on the amount of the compensation of employees. The wages and salaries paid in the general government sector are derived from these data and distributed to the industries with the help of the functional breakdown (see section 4.1).

### b) 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 these benefits. The social contributions are paid to institutions such as the social insurance institutions or insurance companies that grant social benefits in cash or in kind. Imputed social contributions represent the equivalent value of social benefits paid by employers to the beneficiaries directly without the intervention of any third party. Examples of this include the pensions of civil servants and occupational pensions. The beneficiaries may be current or former employees or other persons entitled such as surviving dependents.

ESA 1995 classifies social contributions not by social insurance institutions but by groups of contributors. 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 insurers only incompletely reveal the contributors, estimates have to be used for the breakdown by contributors. 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.

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 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 production taxes less other subsidies on production

Taxes on production paid to general government less the subsidies paid by general government represent the net taxes on production received by general government. Both items are calculated separately. The 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. The pure local government taxes are obtained from the quarterly results of the financial statistics (EVAS 71137). If necessary, the cash figures are shifted by one or two months to achieve accrual-based assignment in accordance with the payment periods provided for by relevant tax law. Taxes paid to the European Union are deducted from the total tax revenue. These data are based on the results of the balance of payments statistics (EVAS 83111).

Information on the subsidies paid by general government is obtained from the quarterly calculation results of the central government, the quarterly cash statistics of the financial statistics (EVAS 7113) and the in-year calculation results of the social insurance branches.

## 6.3 Gross operating surplus and mixed income

In the German NA, **gross operating surplus** and **mixed income** are determined as residual values both in the calculation by economic activities and by institutional sectors. From the point of view of the production approach, gross operating surplus is that part of gross value added that has accrued to the "capital" production factor and the entrepreneurial output. The gross operating surplus of the national economy consists of the gross operating surplus of the sectors non-financial and financial corporations, general government and private households including non-profit institutions serving households.

In the private households sector, a distinction is made between gross operating surplus and mixed income. **Gross operating surplus** in this sector is the gross operating surplus from owner-occupied dwellings. Added to this is the gross operating surplus of the non-profit institutions

serving households sector that is combined with the sector of private households for the presentation of results.

Legally unincorporated market producers, unless they are quasi-corporations, are assigned to the households sector. In Germany, this includes sole proprietors, self-employed freelancers, self-employed farmers and co-operation types below the level of a partnership such as civil law associations and joint practices of physicians, lawyers, architects and others. In the case of these sole proprietorships and self-employed persons of the households sector we speak of **mixed income** because this output quantity to a larger extent contains a remuneration for the proprietors' and the family workers' work that cannot be separated from profit. Furthermore, mixed income includes the services of paid domestic servants and the letting of dwellings by households. In addition to that, output produced for own final use in the form of agricultural production in gardens and own-account output in construction are components of mixed income.

## 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 vehicles and other machinery and equipment, eight construction types and three types of intangible fixed assets (the ownership transfer costs for undeveloped land are written off together with the respective construction types). On the basis of

- long investment series at constant prices of a base 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 constant prices of the base year is determined first, which is then distributed to quarters using an empirical formula[1] in such a way that a smooth trend results. After that, the quarterly figures at constant prices are converted into current prices and into previous year's prices using the quarterly price indices of the investments, with the product disaggregation described above.

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

[1] 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 values of the first to fourth quarter, D: annual figures, t: reporting year

| | |
|---|---|
| - General government sector: | For market and non-market producers by 10 industries and 4 subsectors |
| - Non-profit institutions serving households sector: | For market and non-market producers by 6 industries |
| - Financial corporations sector: | By 3 subsectors |
| - Dwellings: | By 5 sectors and 2 subsectors |
| - National economy: | By buildings (including land ownership transfer costs), including residential and non-residential buildings, machinery and equipment and intangible fixed assets |

## Quarterly calculations of gross domestic product

### 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, 4 sectors, 7 sub-sectors; for 2 sectors and 4 sub-sectors by 11 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

Population is represented in the NA based on the official current population statistics. The basis for the population update in the former territory of the Federal Republic was the result of the population census of 25 May 1987 and in the new Länder (including East Berlin) the figures from a copy of the former "Zentrales Einwohnerregister" (central register of residents) of 3 October 1990.

The population trend is the result of births and deaths lists, on the one hand, and of data about migration (moves to and from Germany), on the other. The legal basis is the Bevölkerungsstatistikgesetz (law regarding population statistics). Population figures are extrapolated on the basis of the births and deaths registered by the Civil Register Offices and the moves to and from Germany by the residents' registration offices at the municipal level registered. Later corrections of registrations are also taken into account.

The quarterly population averages represented in the NA are calculated for the respective quarter as the arithmetic mean of three monthly survey dates 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 statisics once they have been published.

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

**for the year 2006**

| | 1st quarter | 2nd quarter | 3rd quarter | 4th quarter | Year |
|---|---|---|---|---|---|
| **National concept** | | | Thousands | | |
| Population | 82,400 | 82,370 | 82,353 | 82,340 | 82,366 |
| Persons in employment | 38,404 | 38,875 | 39,151 | 39,594 | 39,006 |
| **Workplace concept** | | | Thousands | | |
| Agriculture, forestry and fishery | 777 | 863 | 880 | 846 | 841 |
| Industry including energy | 7,760 | 7,774 | 7,821 | 7,882 | 7,809 |
| Construction industry | 2,027 | 2,143 | 2,222 | 2,243 | 2,159 |
| Trade and transport | 9,616 | 9,759 | 9,832 | 9,912 | 9,783 |
| Financial, renting and business activities | 6,438 | 6,546 | 6,696 | 6,782 | 6,614 |
| Other service activities | 11,800 | 11,876 | 11,846 | 12,013 | 11,882 |
| Total employment | 38,418 | 38,961 | 39,297 | 39,678 | 39,088 |
| Employees | 34,064 | 34,558 | 34,885 | 35,270 | 34,696 |
| Self-employed including family workers | 4,354 | 4,403 | 4,412 | 4,408 | 4,392 |
| | | | Million hours | | |
| Hours worked by persons in employment[1] | 14,134 | 13,243 | 14,261 | 14,359 | 56,001 |
| Hours worked by employees[1] | 11,885 | 11,024 | 11,875 | 12,098 | 46,881 |

[1] Source of hours worked: Institute for Employment Research (IAB) of the Federal Employment Agency

## 7.2 Employment: persons

The quarterly data on employment in Germany are the result of a complex monthly calculation. Initial monthly and quarterly results are based on a flash estimate (see section 9.2.) that is published around 30 days after the end of the reporting period. Approximately 48 days after the end of a quarter, results are published additionally broken down by seven industries of the WZ 2003 (A6 plus manufacturing – as in the description of the production approach) and by status in employment (see Table 7—1).

Compared to the flash estimation, supplementary employment-statistical information is already available at the time these more detailed results are calculated. The calculations are then carried out broken down by 47 industries in combination with nine occupational statuses applying the bottom-up principle. Due to the level of detail of the calculations and the up-to-dateness resulting from the monthly calculation interval, the employment and the hours worked figures are partly used to calculate value added. For individual service branches for which no independent quarterly sources for the calculation of value added exist, they are a suitable indicator for extrapolating price adjusted GVA (see section 4.1.6).

The determination of the employment level is based on employment-statistical sources that feature a high degree of completeness and accuracy (e.g. resister-based statistics). In the ongoing calculations, the base values are extrapolated monthly with the respective relative change on the corresponding previous year's value of the primary base statistics. However, before the sources are incorporated into the calculation in this way, adjustments to the ESA 1995 have to be made due to differences as regards methodology, definitions and periods.[1]

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 among 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) and other reports of individual institutions (e.g. monthly reports of the Federal Ministry of Defence on the number of soldiers or of Bundesamt für Zivildienst on the number of conscripts on compulsory community service), 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), the quarterly business statistics of Bundesknappschaft on the trend of employees in marginal employment and the monthly results of the ILO telephone survey[2] on the activity status of the population (EVAS 13231). Overview 7—1 shows the employment-statistical sources for the monthly and quarterly calculation by industries and status in employment in detail.

1 Cf. Sigrid Fritsch: "Erwerbstätigkeit in Deutschland (Teil 1)", in: Wirtschaft und Statistik 09/2006, p. 939 et seq.

2 The survey has ended at the end of reporting month April 2007. It has been replaced by monthly additional evaluations of the microcensus that has been carried out continuously since 2005.

## Overview 7—1: Bases of calculation of the quarterly employment accounts

– by industries and status in employment –

| Areas of calculation in accordance with the Classification of Economic Activities (WZ 2003) | Employees[1)] | Self-employed including family workers |
|---|---|---|
| Agriculture and hunting | Employment statistics (ES); microcensus (MC); public service personnel statistics (PSP); ILO telephone survey (ILO-TS) | MC; ILO telephone survey |
| Forestry, logging and related service activities | ES; MC; ILO telephone survey | MC; ILO telephone survey |
| Fishing | | |
| Mining of coal and lignite, extraction of peat | ES; structural survey; MC; monthly report; ILO telephone survey | Structural survey; MC; ILO telephone survey |
| Extraction of crude petroleum and natural gas | | |
| Mining of uranium and thorium ores | | |
| Mining of ores | | |
| Other mining and quarrying | | |
| Manufacturing | Sum of subsectors; ES; MC; ILO telephone survey | MC; ILO telephone survey |
| Enterprises with 20 and more employees | Survey of investments; MC; monthly report; ES | MC;monthly report; ILO-TS |
| Enterprises with less than 20 employees | Structural survey; craft reports; ES | Structural survey |
| Electricity, gas, steam and hot water supply | ES; MC; monthly report; ILO telephone survey | MC; ILO telephone survey |
| Collection, purification and distribution of water | | |
| Site preparation, structural and civil engineering | ES; craft reports; MC; monthly report; ILO-TS | MC;monthly report; ILO-TS |
| Building installation work, other construction trades | ES; craft reports; MC; quarterly survey; follow-up survey; ILO telephone survey | MC; ILO telephone survey |
| Sale of motor vehicles and motorcycles; petrol stations | ES; MC; ILO telephone survey | |
| Repair of motor vehicles and motorcycles | ES; craft reports; MC; ILO telephone survey | |
| Commission trade | ES; MC; ILO telephone survey | |
| Wholesale trade; except of motor vehicles and motorcycles | ES; MC; monthly report; ILO telephone survey | |
| Retail trade; except of motor vehicles and motorcycles | | |
| Repair of personal and household goods | ES; craft reports; MC; ILO telephone survey | |
| Hotels and restaurants | ES; MC; monthly report; ILO telephone survey | |
| Bahn AG | ES; MC; monthly report Bahn; ILO telephone s. | – |
| Land transport; transport via pipelines | ES; MC; ILO telephone survey | MC; ILO telephone survey |
| Water transport | | |
| Air transport | | |
| Supporting and auxiliary transport activities; activities of travel agencies | | |
| Bahn AG (stations, service, rail network) | Monthly report Bahn | – |
| Post AG | ES; MC; monthly report Post; ILO telephone survey | – |
| Post and telecommunications (excluding Post AG) | ES; MC; ILO telephone survey; PSP | MC; ILO telephone survey |
| Financial intermediation; except insurance and pension funding | | – |
| Insurance and pension funding; except compulsory social security | | |
| Activities auxiliary to financial intermediation | | MC; ILO telephone survey |
| Real estate activities | | |
| Renting of machinery, equipment, personal and household goods | | |
| Computer and related activities | | |
| Research and development | | |
| Other business activities | | |
| Public administration; except soldiers | | – |
| Soldiers, conscripts on compulsory military or community service | Monthly report of Federal Ministry of Defence, Bundesamt für Zivildienst; MC; ILO-TS | |
| Compulsory and social security | ES; MC; ILO telephone survey; PSP | MC; ILO telephone survey |
| Education | | |
| Health and social work | | |
| Sewage and refuse disposal, sanitation and similar activities | | |
| Activities of membership organisations n.e.c. | ES; MC; ILO telephone survey; business reports of the individual denominations | |
| Recreational, cultural and sporting activities | ES; MC; PSP; ILO telephone survey | |
| Other service activities | ES; MC; ILO telephone survey | |
| Activities of households | | – |

[1)] Depth of calculation: Wage earners and salary earners excluding employees in marginal employment; wage earners and salary earners including employees in marginal employment; employees in marginal employment, employees in work opportunities (additional jobs), civil servants.

The monthly source base is supplemented by information from the Federal Employment Agency on labour market policy reform programmes, in so far as they affect the number of persons in employment.

The employment accounts are initially drawn up in accordance with the workplace concept. For the transition to the national concept, the commuter flows to and from Germany have to be taken account of. Commuters are those employees or self-employed persons who live in Germany and work abroad or who live abroad and work in Germany.

The estimation model for the commuting flows is based on various monthly data sources:

In-commuters to Germany

- Administrative data of Zentralstelle für Arbeitsvermittlungen of the Federal Employment Agency
- Data from the university statistics on the number of foreign students in employment
- Information from statutory pension insurance about the employees subject to pension insurance contributions living abroad

Out-commuters from Germany

- Information from the Federal Ministry of Finance about German nationals employed at foreign embassies and foreign armed forces
- Data from the education statistics on German students in employment abroad
- Information from national statistical offices of neighbouring countries in the EU; information about persons in employment working at international organisations can be obtained both from statistics of Deutsche Bundesbank and from Federal Employment Agency data.
- Labour force survey of the European Union

## 7.3 Employment: total hours worked

The working hours calculations[1] of the Institute for Employment Research of the Federal Employment Agency (IAB) have been integrated into the NA in 1997. These quarterly calculations are based on a components model in accordance with the bottom-up principle. The accounts are broken down by 17 industries (WZ 2003 classification of economic branches). The calculations continue to be divided into western and eastern Germany, because the different situation in both parts of Germany with regard to the hours worked necessitates separate calculations (e.g. different collectively agreed working hours, different usage of part-time work). Employees and self-employed persons including family workers are dealt with separately.

1 For a detailed documentation of the working hours calculation see Hans-Uwe Bach, Susanne Koch: "Working Time and the Volume of Work in Germany", in: Institue for Employment Research of the Federal Employment Services (publisher), 2003, IAB-Topics No. 53

### 7.3.1 Person component

The starting point of the working hours calculation is the number of employees, on the one hand, and the number of self-employed persons including family workers, on the other, as shown in the employment accounts. The number of part-time employees is determined by addition. They include part-time employees subject to social insurance contributions, marginal employment, civil servants and, additionally, employees with zero working hours (e.g. due to partial retirement).

### 7.3.2 Hours worked by employees

#### a) Potential number of working days

A five-day week is fundamentally used. The number of potential working days results from the number of calendar days minus Saturdays, Sundays and public holidays. It is assumed that employees who must work week-ends or public holidays are given compensatory time off. Public holidays that are not nationwide holidays are weighted with the average number of the employees subject to social insurance contributions at the "Länder" level.

#### b) Collective agreement components

The collectively agreed or customary work components are independent of the short-term economic trend and primarily reflect the long-term trend of working time. Various factors have to be taken into consideration:

- Working hours of full-time employees
- Working hours of part-time employees
- Collectively agreed annual leave
- Maternity leave
- Special leave

#### c) Status of employee's sickness

The benchmark figures for the calculation are the ascertained sickness level of compulsory members of the statutory health insurance who receive continued pay in case of sickness for at least six weeks. Not taken into account is absence due to sickness of up to three working days, which is compensated for by the fact that absence of employees who are not subject to social insurance tends to be shorter and by persons who work despite having a sick certificate.

#### d) Paid overtime, short-time work, working-time accounts

Paid overtime, short-time work and transitory overtime enable enterprises to cushion the impact of short-term and medium-term fluctuations in demand.

No sound statistical basis exists as to the number of unpaid overtime hours. The primary basis of calculation is the quarterly survey of earnings (EVAS 62321) which is supplemented by an annual IAB establishment panel. Additionally, it is supposed that e.g. persons in marginal employment and trainees do not work overtime.

There are hardly any empirical information about the addition and deduction of hours to/from working-time accounts. In principle, it may be supposed that similar influencing factors apply to transitory and to paid overtime hours. The proportion of paid to transitory overtime hours is

obtained from surveys made by the Institute for Social Research and Social Economy (ISO-Institut).

The number of short-time workers and the associated loss of work are taken over from the statistics of the Federal Employment Agency.

**e) Strikes and lockouts, bad weather**

Information about strikes and lockouts, with a sufficiently fine level of breakdown by economic industries, is available from the Federal Employment Agency. The same goes for loss of work due to bad weather.

**f) Hours worked in second jobs**

The volume of work not only includes main jobs, but also second employment, i.e. the calculation includes all modes of employment. The source tapped is the Federal Employment Agency's employment statistics which is supplemented by data about secondary employment in households that are settled using the household cheque procedure.

**g) Working-day elasticities**

Working-day elasticity means that a public holiday is not entered into the calculation model with zero hours worked. Rather, a certain amount of work is indispensable and done on a public holiday as well. For instance, this concerns certain activities in agriculture. For this, the production elasticities determined by Deutsche Bundesbank specifically for an economic activity are used in a slightly modified form.

### 7.3.3 Hours worked by self-employed persons and family workers

The number of weekly hours worked by this group of persons is extracted from the microcensus (normal hours worked in a reporting week). Half the value for employees is used for the calculation of vacation and level of sickness. In addition, self-employed second occupations (e.g. part-time farmers) are taken account of.

# Chapter 8 Transition from GDP to GNI (cross-border primary income)

## 8.1 Compensation of employees

Employees earning income from labour in another state as border or seasonal workers make a contribution to the gross national income of their home country. To determine the remunerations of the out-commuters and the in-commuters, the wages and salaries and the employers' social contributions are calculated separately and then added up. The wages and salaries basically result from the multiplication of average earnings by the number of out-commuters or in-commuters. Average social insurance contribution rates referred to the wages and salaries are used to estimate the employers' contributions.

### a) Remuneration of out-commuters

Out-commuters are mainly border workers, i.e. out-commuters to the rest of the world who more or less go abroad on a daily basis, nationals employed by allied armed forces (EVAS 13111), embassies of foreign countries (EVAS 13111) and international organisations in Germany and students working abroad for remuneration. Monthly data are available from the Federal Ministry of Finance for the nationals employed by allied armed forces, which account for a good 25% of all out-commuters. Almost 60% of the out-commuters are border workers. For most of this group, annual results are available from our neighbouring countries. If necessary, the quarterly trend is calculated by interpolation between the annual figures.

The average earnings of the border workers are extrapolated quarterly using data from the NA of the neighbouring countries. Annual data on the average earnings of nationals employed by allied armed forces (EVAS 13111) in Germany are available from the Federal Ministry of Finance. Earnings from international organisations are reported by Deutsche Bundesbank. The earnings of the students are estimated based on the maximal rates of state aid for students.

For the majority of the border workers, the social contributions data are provided by Deutsche Bundesbank. The employers' social contributions for employees of allied armed forces and embassies and diplomatic missions of foreign countries in Germany are determined on the basis of German contribution rates.

### b) Remuneration of in-commuters

In-commuters are mainly border workers (nearly 60%), seasonal workers (a good 30%) and foreign students in Germany. The number of foreign employees in German institutions abroad (EVAS 71132) is very small. For the seasonal workers, monthly data are available that are supplemented by additions, e.g. for illicit work. Quarterly data on border workers can be derived from annual data. Only annual data from the university statistics of the Federal Statistical Office are available for the foreign students.

The average earnings of the border workers and the seasonal workers are quarterly extrapolated in accordance with the domestic earnings trend and reconciled with the annual results of statutory pension insurance once they are available. For foreign employees of German diplomatic

missions or embassies abroad (EVAS 71132), data on compensations of employees paid are available directly from the annual federal budget. The earnings of the students are estimated based on the maximal rates of state aid for students.

The estimation of the employers' social contributions for border workers and seasonal workers is based on the average contribution rate of domestic employees that is related to the wages and salaries of the border workers. The employers' social contributions for foreign employees of German diplomatic missions or embassies abroad, the relative amount of which is insignificant, are estimated on the basis of the federal budget using the domestic contribution rates.

## 8.2 Taxes on production and imports; subsidies

The taxes on production and imports paid to the rest of the world are own resources of the European Union. They include the EU value-added tax share, customs duties, levies and monetary compensatory amounts, milk and cereals co-responsibility levies, taxes on production on sugar and (formerly) the European Coal and Steel Community levy. The calculation and the statistical sources are explained in section 4.3.

Subsidies from the rest of the world concern the payments of the European Union for market regulation in accordance with annex E "Marktordnungsausgaben der EU" of chapter 1004 "Marktordnung, Maßnahmen der Notfallvorsorge" of the federal budget. The calculation of the EU subsidies on products is detailed in section 4.3. The other subsidies from the EU are calculated from the same sources.

## 8.3 Property income

The data for the quarterly calculations of cross-border property income are based on the results of the monthly balance of payments statistics (EVAS 83111) of Deutsche Bundesbank. The only exceptions are cross-border imputed interest on insurance technical reserves and the calculation of the FISIM. Imputed interest is a small amount and estimated, while FISIM is determined based on a model.

# Chapter 9 Flash estimates

## 9.1 Flash GDP 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: econometric forecast, expert forecast and reconciled 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. The ARIMA models are selected and specified on the basis of ex-post forecasts for the twelve most recent quarters or 36 months.

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.

The reconciled forecast is based on the estimation results of the econometric forecast and the expert 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.

All in all, the three-pillar model developed to provide a GDP flash estimate as early as around 30 days after the end of a reporting quarter may be regarded as efficient as regards both content and organisation. The reliability of the approach has been proved in a large number of tests in practice.[1]

However, a final cost-benefit analysis following an intensive discussion with key users of the NA data has resulted in the decision not to publish the GDP flash estimate for the time being. The reasons for this are:

[1] For more detailed explanations see Federal Statistical Office: "Machbarkeitsstudie zu Schnellschätzungen für das Bruttoinlandsprodukt", study on behalf of the Statistical Office of the European Communities, contract no. 2004.41100002, Wiesbaden 2006, and also Hartmann, N./Schmidt, J./Oltmanns, E.: "Schnellschätzungen für das Bruttoinlandsprodukt: Ergebnisse einer Machbarkeitsstudie", in: Wirtschaft und Statistik no. 7/2005, p. 682 et seq.

- At any rate, a flash estimate is associated with additional estimation errors that add to the already existing uncertainties of quarterly GDP calculation. With regard to the availability of the data of important base statistics, precisely the shortening of the GDP publication period to t+30 days means a loss of information in respect of important indicators (just two months' data are available instead of three; e.g. production index, construction industry, foreign trade).
- The narrow time window does not allow the calculations to be checked as thoroughly as has been the practice hitherto. Since not only the rates of change of the original figures are calculated but also those of the seasonally and calendar-adjusted figures, it is necessary to revise and bring up to date the preceding quarters as well at the time t+30.
- A higher sensitivity of the corrections results, ceteris paribus, for the seasonally and calendar-adjusted results because the rates of change in a previous-quarter comparison are usually lower than in a previous-year comparison.
- A "GDP flash" (after t+30) would at any rate require recalculation after around t+55 days (with finer-level breakdown) because the information cannot be retained until the next quarter.
- Additional corrections of GDP attract much attention in the general public and are sometimes fiercely criticised. In most cases they entail corrections of the economic trend forecasts by a large number of other official and non-official institutions.
- More up-to-date information (with additional need for correction) might additionally increase the instability and volatility of the (financial) markets or have other undesirable effects.
- In view of an already very wide range of analyses and forecasts of the economic trend performed by numerous – including very qualified – institutions, the question is whether additional official GDP estimates are actually needed.

Irrespective of these considerations, however, internal GDP flash estimates are a very valuable instrument to improve the quality of the conventional quarterly accounts. The early availability of the consistent results of flash estimates makes a considerable contribution to improving the statistical basis of the flash report on gross domestic product released 45 days after the end of a reporting quarter. This indirectly also improves the quality of the GDP estimates for the EU or the euro area.

## 9.2 Flash employment estimate

The Federal Statistical Office publishes macroeconomic employment figures for Germany around 30 days after the end of a quarter. The employment figures are the result of the employment accounts that are integrated into the national accounts and based on a monthly calculation system (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 arrived at in different ways independently of each other are reconciled with each other using primary

data (e.g. the telephone survey on the ILO activity status[1] or the continuous microcensus) and brought together to form the final result 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. Irregular effects (e.g. due to revisions of laws that have an effect on employment policy) and peculiarities taken account of in the expert estimates can to some extent also be identified by means of comparisons using mathematical methods.

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

**1. Expert estimates**

At this early stage with a fragmentary source base, the estimates by experts only concern the national economy by status in employment (self-employed, family workers, wage and salary earners, employees in marginal employment, civil servants and conscripts on compulsory military service).

**2. Econometric forecasting method**

Two types of mathematical/statistical forecasting methods are used in the monthly employment accounts: On the one hand, ARIMA forecasts have been made since the beginning of 2005, since the end of 2006 for four statuses in employment at the macroeconomic level. On the other hand, an indicator-based ADL forecast is being tested at the macroeconomic level for the total persons in employment variable. 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 – 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 this basis. 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 is the first publication of the employment figures some 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. At the moment, benchmarking approaches are being tested in which incomplete base sources for the expert estimates are mathematically forecast based on their regular course. It is important that the mathematical/statistical estimation of the base sources is made independently of the macroeconomic one-step forecast, so that circular references are prevented. Likewise, the new econometric forecasting methods for total employment will continue to be checked and be adjusted if necessary. [2]

1 The survey has ended at the end of reporting month April 2007.

2 On the present flash estimate model see Sigrid Fritsch: "Erwerbstätigkeit in Deutschland (Teil 1)", in: Wirtschaft und Statistik 9/2006, p. 934 et seq.

# Chapter 10 Main data sources used

## 10.1 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 | – | Quarterly | t+4 months | Regular or occasional activity, marginal employment, status in employment, hours worked | – |
| 13111 | Stock count of employees subject to social insurance contributions | – | 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 | – | Monthly | t+0.9 months | Persons in employment | – |
| 31111 | Building permissions statistics | Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) no. 1158/2005 and no. 1503/2006 | Monthly | t+2 months | Building permissions, building owners by sectors; residential and non-residential buildings, useful floor space, living floor space, projected costs of the buildings and structures | – |
| 41322 | Poultry statistics: survey in poultry slaughterhouses | – | Monthly | t+1.5 months | Poultry, carcass weight | – |
| 41323 | Poultry statistics: survey in enterprises with layer management | – | Monthly | t+1.5 months | Eggs, hens | – |
| 41331 | Slaughter and carcass weight statistics | Directive 93/23/EWG, 93/24/EWG, 93/25/ EWG as amended from time to time | Monthly | t+2 months | Slaughter figures, carcass weight | – |
| 41341 | Milk production and usage statistics | Directive 96/16/EC as amended from time to time | Monthly | t+3 months | Milk quantity | – |
| 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. 1158/2005 and no.1503/2006 | 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 | Reg. (EC) no. 317/2006 regarding the drawing up of the Prodcom list as per Reg. (EC) no. 3924/91 | Quarterly | t+3 months | Production volume, output by around 6,000 commodities | – |
| 42152 | Indices of turnover in the field of manufacturing, mining and quarrying | Reg. (EC) no. 1165/98 regarding short-term economic statistics, as amended by Art. 2 of Reg. (EC) no. 1503/2006 | Monthly | t+1.2 months | Turnover index 2000 = 100 | – |
| 42153 | Indices of production in the field of manufacturing, mining and quarrying | Reg. (EC) no. 1165/98 regarding short-term economic statistics, as amended by Art. 2 of Reg. (EC) no. 1503/2006 | Monthly | t+1.3 months | Production index 2000 = 100 | If necessary, added estimate due to expected correction |

| 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 |
|---|---|---|---|---|---|---|
| 42251 | Cost structure survey in the field of manufacturing, mining and quarrying | Reg. (EC) no. 58/97 structural enterprise statistics, as amended by annex III | Annual | t+18 months | Overall output by components, costs by cost types, number of employees | – |
| 43111 | Monthly report on energy and water supply | Reg. (EC) no. 1165/98 short-term economic statistics, as amended by Reg. (EC) 1158/2005 and no. 1503/2006 | Monthly | t+3 months | Persons in employment, wages and salaries | – |
| 43311 | Monthly report on electricity supply | – | Monthly, annual | t+5 months | Electricity balance - industry (external procurement from public grid) | – |
| 43321 | Monthly report on gas supply | Since establishment of the EC, this has been part of the BMWi's scope of deliveries to Eurostat. | Monthly | t+3 months | Extraction and production | – |
| 44111 | Monthly report in primary construction (including orders received indices) | Reg. (EC) no. 1165/98, as amended by Reg. (EC) no. 1158/2005 and no. 1503/2006 | Monthly | t+6 weeks | Persons in employment, wages and salaries, hours worked, turnover | Added estimate productivity and "Firmenkreis-sprung" – employee size class delimitation |
| 44131 | Quarterly survey of the finishing trades | Reg. (EC) no. 1165/98, as amended by Reg. (EC) no. 1158/2005 and no. 1503/2006 | Quarterly | t+2 months | Number of employees, hours worked, turnover | Mark-up (turnover) |
| 44141 | Statistics on order book levels in primary construction | – | Quarterly | t+2 months | Volume index order book 2000 = 100 | – |
| 45211 | Monthly survey in wholesale trade and commission trade | Reg. (EC) no. 1165/98, as amended by Art. 2 of Reg. (EC) no. 1503/2006 | Monthly | t+1.5 months | Turnover, number of employees | Partly, added estimate due to expected correction |
| 45241 | Monthly survey in motor vehicle and retail trade and maintenance and repair of motor vehicles | Reg. (EC) no. 1165/98, as amended by Art. 2 of Reg. (EC) no. 1503/2006 | Monthly | t+1.5 months | Turnover, number of employees | Partly, added estimate due to expected correction |
| 45411 | Monthly survey in the hotel and restaurant industry | Reg. (EC) no. 1165/98, as amended by Art. 2 of Reg. (EC) no. 1503/2006 | Monthly | t+1.5 months | Turnover, number of employees | Partly, added estimate due to expected correction |
| 46141 | Long-distance passenger transport statistics of the railways | Reg. (EC) no. 91/2003, as amended by Reg. (EC) no. 1192/2003 | 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. 1192/2003 | Quarterly | t+3 months | Passengers, transport performance (passenger-kilometres), regular line traffic | – |
| 46231 | Road transport statistics | – | Monthly | t+3 months | Tonne-kilometres | – |
| 46251 | Statistics on number of motor vehicles and trailers in use, vehicle defects | – | Monthly | t+0.5 months | Changes of ownership, new registrations | – |
| 46321 | Statistics on inland water transport of goods | Reg. (EC) no. 1365/2006 of 6 September 2006 | Monthly | t+2 months | Goods transported, loading units | – |
| 46421 | Statistics on air transport services | Reg. (EC) 437/2003, as amended by Art. 4 of Reg. (EC) 1358/2003 | Monthly | t+1.8 months | Air passengers, freight and mail | – |
| 47251 | Statistics of deposits and borrowings, issued by Deutsche Bundesbank | – | Monthly | t+2 months | Deposits and borrowings by groups of banks | Transfers in the assignment to sectors |
| 51141 | Intra-Community trade | Regulations regarding statistics relating to intra-Community trade Reg. (EC) no. 638/2004 | Monthly | t+1.5 months | Import, export, arrival, dispatch | – |

| 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 |
|---|---|---|---|---|---|---|
| 51231 | Extra-Community trade | Regulations regarding statistics relating to extra-Community trade Reg. (EC) no. 1172/95, last amended by Reg. (EC) no. 1949/2005 | Monthly | t+1.5 months | Import, export, arrival, dispatch | – |
| 53211 | Quarterly craft reports | – | Quarterly | t+2 months | Turnover, number of employees | Mark-up (turnover) |
| 61111 | Consumer price index for Germany | Reg. (EC) no. 2494/95 regarding harmonised consumer price indices, last amended by Reg. (EC) no. 701/2006 | Monthly | t+15 days | Price index 2000 = 100 | – |
| 61131 | Retail price index | – | Monthly | t+15 days | Price index 2000 = 100 | – |
| 61141 | Price index for the hotel and restaurant industry | – | Monthly | t+15 days | Price index 2000 = 100 | – |
| 61211 | Index of producer prices for agricultural products | "Gentleman's Agreement" regarding the regular provision of (partial) price indices data as per EC manual on agricultural price statistics and decisions of the EU working party | Monthly | t+3 months | Price index 2000 = 100 | – |
| 61241 | Producer price index for industrial products (producer prices) | Reg. (EC) no. 1165/98, as amended by Art. 2 of Reg. (EC) no. 1503/2006 | Monthly | t+0.6 months | Price index 2000 = 100 | – |
| 61261 | Construction price indices | Reg. (EC) no. 1165/98, as amended by Reg. (EC) no. 1158/2005 and no.1503/2006 | Quarterly | t+50 days | Prices of construction services 2000 = 100 | – |
| 61281 | Wholesale price index | – | Monthly | t+0.6 months | Price index 2000 = 100 | – |
| 61311 | Price index for passenger and goods transport by air | EU Reg. 1158/2005 | Monthly | t+1 month | Price index 2000 = 100 | – |
| 61321 | Price index for passenger and goods transport by rail | EU Reg. 1158/2005 | Monthly | t+5 months | Price index 2000 = 100 | – |
| 61331 | Index of sea freight rates | EU Reg. 1158/2005 | Monthly | t+2 months | Price index 2000 = 100 | – |
| 61341 | Price index for national post services | EU Reg. 1158/2005 | Monthly | t+2 months | Price index 2000 = 100 | – |
| 61351 | Price index for telecommunications services | EU Reg. 1158/2005 | Monthly | t+1 month | Price index 2000 = 100 | – |
| 61361 | Producer price index for services | EU Reg. 1158/2005 | Quarterly | t+3 months | Price index 2000 = 100 | – |
| 61411 | Import price index | Reg. (EC) no. 1165/98, as amended by Art. 2 of Reg. (EC) no. 1503/2006 | Monthly | t+0.8 months | Price index 2000 = 100 | – |
| 61421 | Export price index | Reg. (EC) no. 1165/98, as amended by Art. 2 of Reg. (EC) no. 1503/2006 | Monthly | t+0.8 months | Price index 2000 = 100 | – |
| 61611 | International comparison of consumer prices | – | Monthly | t+0.9 months | Purchasing power parities | – |
| 62321 | Quarterly survey of earnings | – | Quarterly | t+2 months | Gross earnings, hours of work paid, economic activities | – |
| 71131 | Quarterly cash results for the public overall budget | – | Quarterly | t+4 months | Compensation of employees, intermediate consumption, social benefits in kind, sales, subsidies, taxes | Harmonisation with final calculation results, phase shifting of taxes |

| 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 |
|---|---|---|---|---|---|---|
| 71132 | Quarterly cash results for the Central Government | – | Quarterly | t+1 month | Compensation of employees, intermediate consumption, social benefits in kind, sales, subsidies | Harmonisation with final **calculation** results |
| 71133 | Quarterly cash results for the special assets of the Central Government | – | Quarterly | t+1 month | Compensation of employees, intermediate consumption, subsidies | Harmonisation with final calculation results |
| 71134 | Quarterly cash results for the EU shares | – | Quarterly | t+1 month | EU taxes | Harmonisation with final calculation results, phase shifting of taxes |
| 71135 | Quarterly cash results for the social insurance | – | Quarterly | t+1 to t+4 months | Compensation of employees, intermediate consumption, social benefits in kind, sales, subsidies | Harmonisation with final calculation results |
| 71136 | Quarterly cash results for the Länder | – | Quarterly | t+4 months | Compensation of employees, intermediate consumption, social benefits in kind, sales, subsidies | Harmonisation with final calculation results |
| 71137 | Quarterly cash results for the local government | – | Quarterly | t+4 months | Compensation of employees, intermediate consumption, social benefits in kind, sales, subsidies, municipal taxes | Harmonisation with final calculation results |
| 79111 | Statistics of excise duties on tobacco products | – | Quarterly | t+2 months | Purchase and issue of fiscal stamps | – |
| 79121 | Statistics of excise duties on beer and sparking wine | – | Monthly | t+2 months | Sales of beer (domestic consumption) | – |
| 83111 | Balance of payments statistics | – | Monthly | t+2 months | Import and export of goods and services, freight income (sea freight) | – |
| 84321 | Foreign exchange statistics | – | Monthly | t+0.9 months | Official exchange rates | – |
| 84331 | Interest rates statistics | Regulation EZB/2001/18 | Monthly | t+2 months | Average, effective interest rates | – |

## 10.2 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 | Federal tax report | BMF | Monthly | t+ 1/2 months | Community taxes, pure Federal and pure Länder taxes | Phase shifting |
| 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 | DERDATA | Monthly | t+ 0.5 months | Turnover trend | – |
| 9 | Petroleum products data | Mineralölwirt-schaftsverband (association of the German petroleum industry) | Monthly | t+ 0.5 months | Domestic provision of petrol, diesel oil and light fuel oil | – |
| 10 | ifo inventory assessment | ifo institute, Munich | Monthly | t + 15 days | Changes in inventories | Averaging |