Institute for Employment Research
The Research Institute of the Federal Employment Agency

IAB-Discussion Paper 21/2015

Articles on labour market issues

Measuring hours worked in Germany

Contents, data and methodological essentials of the IAB working time measurement concept

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ISSN 2195-2663

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Mit der Reihe „IAB-Discussion Paper“ will das Forschungsinstitut der Bundesagentur für Arbeit den Dialog mit der externen Wissenschaft intensivieren. Durch die rasche Verbreitung von Forschungsergebnissen über das Internet soll noch vor Drucklegung Kritik angeregt und Qualität gesichert werden.

The “IAB-Discussion Paper” is published by the research institute of the German Federal Employment Agency in order to intensify the dialogue with the scientific community. The prompt publication of the latest research results via the internet intends to stimulate criticism and to ensure research quality at an early stage before printing.

Contents

Abstract

This article presents the IAB working time measurement concept, which determines the hours worked in Germany and their individual components. These statistics are essential for a proper analysis of aggregate labour market trends and cyclical fluctuations. We outline the conceptual and methodological framework of the measurement, which evolves further due to its integration in the system of national accounts and due to innovations to the statistical procedures applied. An overview of single components and their data sources is given, while the resulting time series of hours worked and the volume of work are depicted according to their long run trends, cyclical variation and reaction in the 2008/09 financial and economic crisis.

Zusammenfassung

Der vorliegende Aufsatz stellt die IAB-Arbeitszeitrechnung vor, die die Arbeitszeit in Deutschland sowie deren einzelne Komponenten ermittelt. Diese Statistiken sind von großer Bedeutung für die umfassende Analyse von Arbeitsmarkttrends sowie von konjunkturellen Entwicklungen. Wir stellen den konzeptionellen Rahmen des Rechenwerks dar, der einerseits durch die Einbindung in die Volkswirtschaftlichen Gesamtrechnungen, andererseits durch Neuerungen in der statistischen Methode laufend weiterentwickelt wird. Es wird ein Überblick über die einzelnen Komponenten und deren Datenbasis gegeben, bevor die resultierenden Zeitreihen zu Arbeitszeit und Arbeitsvolumen bezüglich ihrer langfristigen Trends, ihres zyklischen Verhaltens, und ihrer Reaktion auf die Finanz- und Wirtschaftskrise 2008/09 untersucht werden.

JEL classification: C82, E01, J2

Keywords: IAB working time measurement concept; Hours worked; Volume of work; Components; Persons in employment; System of National Accounts

1 Introduction

Regular and trustworthy data on hours worked and their components over longer periods of time are indispensable when tracking major labour market trends, such as increasing flexibility of working-time arrangements, the replacement of paid overtime by transitory overtime hours, as well as the long-term increase in part-time employment. These developments are of significant importance for policy makers and provide interesting facts to be faced and explained by researchers.

Business cycle analysis is another area where high-quality measures of working-time matter. Traditionally, cyclical fluctuations of labour input and hourly productivity are used to assess the empirical validity of real business cycle theories; see e. g. Kydland/Prescott (1982) and Hansen (1985). More recently, the reaction of these indicators to identified shocks (see, e. g., Gali 1999), or equilibrium deviations like the so-called 'labour wedge' (Chari et al. 2007; Shimer 2010) have been studied in order to identify empirically tenable theories. Likewise, the accounting of the reactions to the 2008/09 Great Recession draws heavily on hours worked data; cf. Burda/Hunt (2011). Ohanian/Raffo (2012) highlight the importance of internationally comparable data and compile a data set for OECD countries using official national accounts statistics where available.

The current contribution presents the *Working Time Measurement Concept (Arbeitszeitrechnung, AZR)* of the Institute for Employment Research (IAB). The AZR is the key data product on working time in Germany and underlies the German national accounts figure on labour input. In the AZR, changes in working hours due to collective agreements and economic fluctuations are brought together with shifts in employment structure, producing a differentiated picture of the scope, structure and development of the annual working time of gainfully employed persons. The results of the AZR offer a unique basis for the evaluation of labour market developments and further perspectives.

The AZR is regularly revised due to changed concepts in the system of national accounts to preserve international comparability, in response to changes in available data sources, and in order to overhaul the statistical measurement and nowcasting methodology. The general revision 2014 was a major step in all respects, and has led to substantial improvements which we present in this paper. We provide an up-to-date overview for possible data users, and allow the reader to contrast the current concept to the previous version detailed in Wanger (2013).

Since the revision 2014, state space methods are applied for the statistical measurement of several components in the AZR. Without striving for a technical treatment of the procedures, the current paper discusses the use and advantages of these methods in the measurement of working time. Since the approach is relevant also in other branches of economic and labour market statistics, we attempt to provide a contribution also to the methodological literature on official statistics.

The paper is organized as follows. After presenting the basic concept and scope of the AZR in section 2, the single components of working time are presented along with their data sources and measurement concepts. Section 4 gives selected results on working time, such as long term trends, cyclical properties, and the reaction in the 2008/09 crisis, before section 5 provides a short summary.

2 Basic concept of the AZR

2.1 Task of the AZR

Official statistics on hours worked in Germany are calculated by the IAB, where working time measurement has a long tradition: As early as in 1969, a differentiated approach was developed to record yearly hours actually worked per employed person and the labour volume, which is the product of hours worked per employed person and the number of persons in employment (Reyher/Kohler 1986; Kohler/Reyher 1988).[1] The development of a working time measurement concept occurred against the background that the statistical recording of actual working hours was initially far from satisfactory. Only statistical fragments of varying quality and definition were available, which is one of the reasons why empirical analyses on diverse issues related to working time and the volume of work did not meet elementary requirements for a long time, and why shortcomings persist.

Over the years, changing labour market policies, the increasing flexibility of working time, but also improved data availability entail continuous conceptual development of the AZR (cf. Bach 2001; Koch 2001; Bach/Koch 2002; Wanger 2003; Wanger 2013; Wanger/Weigand/Zapf 2014). The AZR was refined, deepened and adjusted to changes in working time reality. It has gradually evolved to become an important basis of national and international empirical economic and labour market research. Thus, the aggregated results of the AZR have been included into the quarterly national accounts of the German Federal Statistical Office since 1996. Consequently, they are also a component of Germany's data transmissions to the Statistical Office in the European Union (Eurostat).

The two key indicators provided by the AZR to the national accounts are hours worked per employed person and the labour volume. The labour volume comprises the hours actually worked by all persons in employment who perform a gainful activity within Germany as employees, self-employed persons or as family workers. This includes all hours worked by persons who have several jobs at the same time. However, hours paid but not worked, for example because of annual leave, parental leave, holidays, short-time work or sick leave, are not part of the labour volume.

[1] Other terms for labour volume which are synonymously used in this article are volume of work, hours worked by all employed persons, overall hours worked in the economy, yearly hours actually worked etc.

2.2 Integration in the national accounts and statistical concepts and definitions

Due to the integration of the AZR in the national accounts, and to enhance international comparability, the „European System of National and Regional Accounts 2010" (ESA 2010) is essential for the calculation of hours worked. The ESA 2010 prescribes the concepts, definitions, classifications and accounting rules to be applied by statistical agencies of the European Union (EU) when compiling national accounts.[2] In addition, it contains the frequency and timing of the transmission program. As a European regulation, the ESA 2010 is directly legally binding for all EU Member States, and hence comparable harmonized data exist throughout Europe to support political and economic decisions (cf. Federal Statistical Office 2014).

The AZR draws on national accounting figures of the Federal Statistical Office, particularly on *Employment Accounts* (cf. Lüken 2012), and on the *Production Accounts of Gross Domestic Product (GDP)* (cf. Mai 2010) to deduce figures such as hourly productivity.

The *Employment Accounts* merge the information available from various sources of employment statistics into a complete picture of employment. Here, persons in employment include all persons engaged in gainful activity within the production boundary as employees[3] or as self-employed persons (including unpaid family workers), while the duration of the activity is of no importance for the classification. In addition, persons in employment also include persons with a formal job attachment who are currently not working, such as persons on parental leave or in the release phase of partial retirement. By contrast, persons with several jobs are only included once, that is with their main job according to the working time (person-related concept).[4] The domestic concept or place-of-work concept is applied, so that the working time of inward commuters is taken into account, while the hours worked outside Germany of the outward commuters remain unconsidered. At the same time, a classification of persons in employment by industry is carried out according to the main kind of activity of the respective enterprise (enterprise concept).

Likewise, the definition of hours worked and labour volume is based on ESA 2010, where binding requirements are provided in line with the recommendations of the

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2 ESA 2010 replaced the previous ESA 1995 in September 2014. ESA 2010 is based on the global „System of National Accounts 2008" (SNA 2008) of the United Nations, but it includes some more precise rules for the EU countries, as EU countries are more homogeneous in economic terms. This worldwide standard is needed to achieve the greatest possible comparability of macroeconomic data (European Commission 2013a). See also: Regulation (EU) No 549/2013 of the European Parliament and the Council of 21 May 2013 on the European system of national and regional accounts in the Community (European Commission 2013b).

3 Wage earners and salaried employees, marginally employed persons as well as public officials and soldiers (civil servants) are considered as employees in the sense of the national accounts.

4 On the contrary the working time in secondary jobs is included (see Section 3.10).

International Labour Organisation (ILO) (ILO 2008). Hours to be included in the measurement are listed in Section 11 of ESA 2010 (see Appendix A). These requirements are taken into account when calculating the hours worked based on the concept of component account in the AZR.

National accounts figures are subject to regular revisions, which are distinguished into ongoing revisions and major revisions, also referred to as “general revisions” (cf. Räth/Braakmann 2014). Ongoing revisions are possible to each date of delivery, but they are only carried out for the recent past. At the main calculation date in August of each year, the data revision is limited to the last four years. In contrast, major revisions also comprise re-calculations for the whole period to avoid breaks in the time-series.

Due to the close link of the AZR with the national accounts fundamental revisions and further methodological developments in the former are synchronized with the general revisions of the national accounts, and these are usually carried out at intervals of five to ten years (cf. Lüken 2012).

The major national accounts revisions are used in particular to

a) check the calculations,
b) adopt new concepts and definitions, which fit international conventions,
c) adopt new classifications in the calculations, which restructure the results,
d) incorporate results from censuses or statistics only carried out at intervals of several years or available with large temporal gap,
e) integrate new statistical data bases, which have not been available or used in the calculations so far, as well as
f) implement new methods and processes (cf. Räth/Braakmann 2014).

An overview of the changes and adjustments in the AZR due to major revisions since the integration of AZR in the national accounts in 1997 provides Appendix B.

Especially the recent general revision 2014 led to fundamental changes regarding the concept, method and therefore resulting time series of the AZR. A key part of the methodological changes was due to the introduction of modern techniques of time series analysis, particularly state space methods. Another important innovation was the addition of the new component „unpaid overtime“, which has become necessary due to the changeover to ESA 2010. In the course of the revision also the components paid overtime and working-time accounts were revised and based on model-based estimations. The 2014 revision also introduced a correction for artificial variation in the official sick leave ratio. Furthermore, we took into account several data revisions of the *Employment Statistics* of the Federal Employment Agency (BA). A detailed account on the revision is given by Wanger/Weigand/Zapf (2014).

Due to the integration of the AZR in the national accounts, a regular data exchange is carried out, which is organized in cooperation between the IAB, the Federal Statistical Office as well as the „*Arbeitskreis Erwerbstätigenrechnung des Bundes und der Länder*[5]“. At binding delivery dates, sectoral data for hours worked and volume of work are transmitted to the national accounts. Currently, first results are provided to the Federal Statistical Office 30 days after the end of the reporting quarter. Not all necessary basic data are yet available at this date. Hence, results are initially calculated from the data sets available by then and in part complemented with current estimates (or “nowcasts”) based on available data. These preliminary results are then continuously updated in different deliveries by gradually including the newly available data into the calculations. These ongoing revisions lead to current time series differing from previous releases.

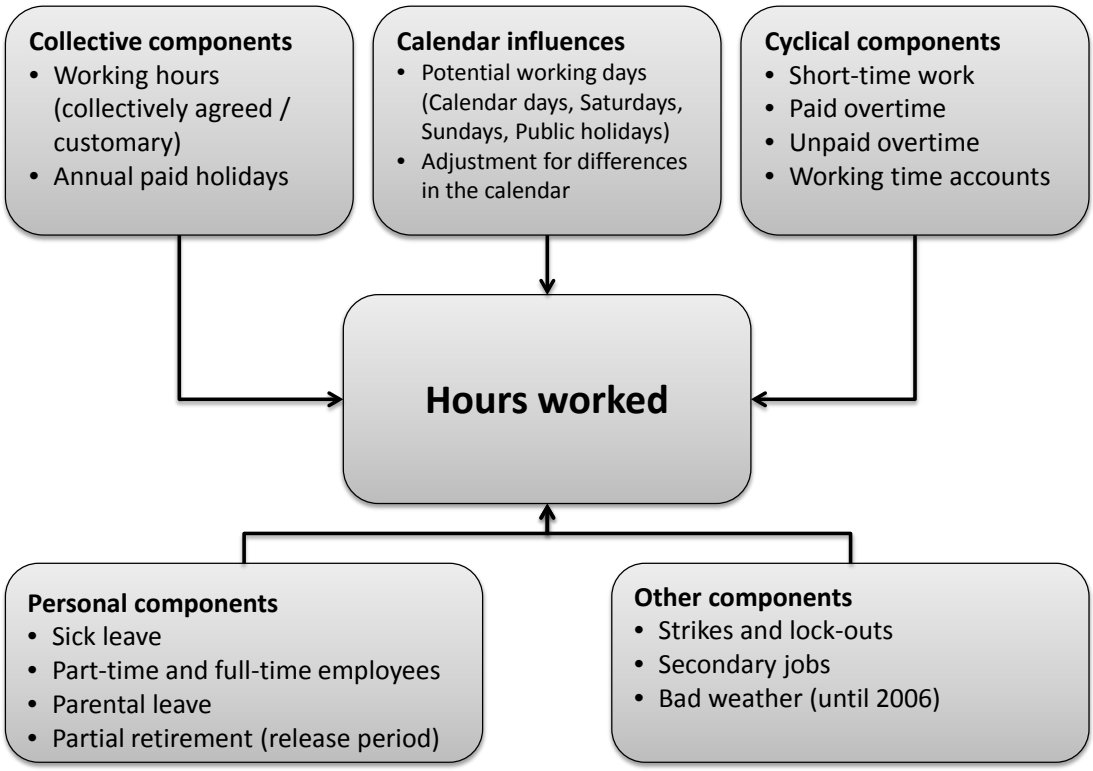
2.3 Component accounting

The calculation of hours worked and the volume of work within the framework of the AZR is based on a differentiated componentwise accounting concept[6], where calendar effects, collectively agreed standards, business cycle influences as well as personal and other components are considered (Figure 1). Thus, the contribution and relevance of numerous different developments can be presented in an overall figure such as the annual change of average hours worked. Single extending or shortening factors can therefore be analysed separately, which allows to analyse their influence. The comprehensive measurement concept contributes significantly to a precise estimation of the overall and industry-specific volume of work.

5 This working group consists of the statistical offices of the 16 German states (“Länder”), the Federal statistical office as well as the German association of Cities and Towns and has the task to calculate and publish regional official employment statistics. These employment statistics of the federal government and state governments show the average number of gainfully employed persons and the number of hours they worked during a particular reporting period for the individual states and urban and rural districts, broken down by sector (http://www.aketr.de/).

6 For the collection and measurement of yearly working hours various approaches can be used. Eurofound (Cabrita 2014) calculates a collectively agreed yearly working time on the basis of collective agreements for all EU member states for comparison purposes. Measurements of hours worked and volume of work can also be derived from direct surveys and interviews (Labour-Force-Survey, earning surveys, statutory accident insurance etc.), but the findings are limited on special groups of persons or companies. Furthermore the impact of the different components of working time cannot be set out separately.

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



Source: own illustration

Due to the numerous components and the dimensions to be considered in the AZR, a total of 20 different statistics and surveys are processed in the AZR (Table 1) to cover all areas with sufficient information. Differing sources, periodicities, types of surveys and degrees of coverage are faced by the measurement concept. Additionally, some of the data sources are available only with a substantial publication lag, which explains the need of model-based estimation procedures for some components (see section 2.4). The componentwise concept allows selecting suitable methods for the estimation of each component. As a further advantage of the component-based accounts in the AZR, the contribution of the individual components to the total result can be appropriately quantified.

Table 1
The most important data sources of the working time measurement concept

Components of hours worked	Data Source	Organization
Employees	Employment Accounts	Federal Statistical Office
Part-time and full-time	Employment Accounts	Federal Statistical Office
	Employment Statistics	Federal Employment Agency
	Statistics on Public Service Personnel	Federal Statistical Office
	Microcensus	Federal Statistical Office
Weekly workings hours	Index of Agreed Earnings and Working Hours Calculation	Federal Statistical Office
	WSI Collective Agreement Archive	Hans Böckler Foundation
	IAB Establishment Panel	Institute for Employment Research
	Microcensus Register of Collective Agreements	Federal Statistical Office Federal Ministry of Labour and Social Affairs
Annual paid holidays	Microcensus	Federal Statistical Office
	WSI Collective Agreement Archive	Hans Böckler Foundation
	Monthly Tourism Survey	Federal Statistical Office
	Birth Statistics	Federal Statistical Office
Sick leave	Statutory Health Insurance Statistics	Federal Ministry of Health
	Health Reports	Statutory health insurance companies
Paid and unpaid overtime	German Socio-Economic Panel (GSOEP) Microcensus	German Institute for Economic Research Federal Statistical Office
	Ifo Business Survey	Ifo Institute
Short-time work	Statistics on Short-Time Work of Businesses and Short-Time Workers	Federal Employment Agency
Strikes and lock-outs	Strike Statistics	Federal Employment Agency
Working-time accounts	IAB Establishment Panel	Institute for Employment Research
	German Socio-Economic Panel	German Institute for Economic Research
Secondary jobs	Employment Statistics	Federal Employment Agency
	Microcensus	Federal Statistical Office
Adjustments for differences in the calendar	Production Elasticities	German Bundesbank
Self-employed persons including family workers	German Employment Account Microcensus	Federal Statistical Office Federal Statistical Office

Source: own presentation

Currently, the AZR provides quarterly consistent time series for the development of hours worked and their components for Germany since 1991. Working hours of gainfully employed persons are calculated separately for dependent employees as well as for the self-employed persons and family workers. Furthermore, the AZR calculates all components broken down into full-time and part-time employment, into West and East Germany, and into 38 economic sectors, known as the A*38 breakdown according to the WZ 2008 classifications of economic branches (see Appendix C, Table 8). Additionally, hours worked are calculated separately for men and women as well as age groups in a subsystem (cf. Wanger 2006; Wanger 2011; Wanger 2015). Table 2 gives an overview of the subdivision of the AZR.

Overall, the calculation of the aggregate volume of work follows a bottom-up concept. Information specific to the economic sector is calculated for the single components and the calculations of hours worked are established separately for each branch of industry. The results are subsequently aggregated to a macroeconomic outcome. This bottom-up approach is demanding in terms of the availability of sector-specific data on working time, but has a great potential for structural sector research. For components, where sufficiently rich sector-specific data are not available, a top-down approach is used and the macroeconomic aggregate is disaggregated to industry figures (e. g. for the components paid and unpaid overtime, working-time accounts and sick leave).

Table 2
Overview of the subdivision of the IAB working time measurement concept

Hours worked and volume of work by	
Status in employment	Persons in employment
	Employees (full-time, part-time)
	Self-employed persons including family workers
Industries	By 21 industries (quarters)
	By 38 industries (years)
Region	Germany
	West Germany
	East Germany (incl. Berlin)
"Subsystems"	By gender
	By nine age-groups
Time series	1991 up to the current year

Source: own presentation

2.4 Model-based statistical methods

For several components of hours worked, the data basis is incomplete, or it hinders a straightforward design-based computation for some other reason. Missing data points may occur if the source does not range back to 1991, if the original data are of a lower, e. g., yearly, frequency, or if the data are collected according to reference dates rather than in a continuous way. Finally, long publication lags of some survey or administrative data intricate the computations at the current edge. Besides, data gaps as well as statistical breaks occur if data sources undergo revisions or surveys are restructured. In contrast to these cases of missing information, there is often more than one primary source for a specific component to measure. Likewise, this poses a challenge for the statistician wishing to honour the available sources properly.

Under such circumstances, a model-based estimation strategy is called for, which helps estimate the unknown quantities by making efficient use of the available data. Recently, state space methods have become a valuable tool in official statistics; see e. g. Durbin/Koopman (2012) for a textbook treatment and Pfefferman/Tiller (2006) as well as Krieg/van den Brakel (2012) for recent applications in official statistics. The state space approach combines assumptions on the dynamics of the underlying

series with a suitable model for the measurements by observed data. Corresponding filtering and smoothing algorithms produce estimates of the underlying time series, which borrow strength from several data sources, related variables and from its own past.

During the recent revision of the AZR, state space models have been installed as a major methodological innovation. For the most part, univariate or multivariate structural time series models, with separately modelled trend, seasonal, cyclical and irregular components, are used as dynamic specification. Since that revision, the application of such models, for example, helps to face the publication delay of secondary jobs, allows us to treat missing data periods and statistical breaks in the part-time ratio of regularly employed persons, and enables us to construct quarterly sick leave estimates from official data available for reference dates and additional sources; see Wanger/Weigand/Zapf (2014) for more details on the specific models for each component.

The most comprehensive use of state space models in the AZR is for the business cycle related components overtime hours and net flows on working-time accounts. There, Weigand/Wanger/Zapf (2015) propose and implement a model in which the information of several primary surveys, but also several additional business cycle and labour market indicators are exploited. This is made possible by using a factor structure in the statistical model.

2.5 Publication of the results of the AZR

Results of the AZR are published regularly in different media. Comprehensive quarterly and annual results of the components of the AZR are available via press releases on the webpages of the IAB. The current statistical data and long-time series of the components of the AZR (see Appendix D) can be freely retrieved from the IAB web page (www.iab.de) following the menu navigation “Data – Current data and indicators of labour market trends – Average working hours and their components“.

These results are an important source for analyses and projections of the macroeconomic development, because the number of employed persons reflects only one aspect of the labour demand. For that reason the results and estimates of hours worked are incorporated into the labour market short-time projections of the IAB which are published biannually (cf. Fuchs et al. 2015).

As a third source for data retrieval, the Federal Statistical Office regularly publishes quarterly and annual results on the average number of hours worked and the labour volume in Germany together with employment figures and the GDP (Fachserie 18

National Accounts)[7]. Detailed results and long-time series on hours worked and on labor volume are available free of charge from the GENESIS-Online database. Further data on regional level (individual states as well as urban and rural districts) broken down by sectors are published on the internet sites of the "*Arbeitskreis Erwerbstätigenrechnung des Bundes und der Länder*" (http://www.ak-etr.de).

3 Single components of the AZR

3.1 Part-time and full-time employees

In order to calculate the average actual hours worked and the volume of work, the number of gainfully employed persons needs to be calculated and its structure needs to be considered. The number of gainfully employed persons comprises employees subject to social security contributions, marginally employed persons, civil servants, and persons in work opportunities (*Personen in Arbeitsgelegenheiten,* so-called One-Euro-Jobs) as well as self-employed persons and family workers (further details regarding the different forms of gainful employment are described in Appendix E). The quarterly and annual figures stem from the *Employment Accounts* (cf. Lüken 2012). Based on the federal benchmark figures of this statistic, the "*Arbeitskreis Erwerbstätigenrechnung des Bundes und der Länder*" calculates annual regional results for Länder, districts and independent cities which are used to differ between employees in West and East Germany in the AZR.

As there is no specific subdivision in the *Employment Accounts* according to working time, one fundamental element of the AZR is the allocation of employees into part-time or full-time employees. In the sense of the AZR regularly employed part-time employees subject to social security contributions, part-time employees solely in marginal employment including persons in One-Euro-Jobs and part-time civil servants are considered as part-time employees. For calculating the part-time rate different statistics are combined in the AZR.

The register-based *Employment Statistics* of the Federal Employment Agency is the basis for calculating the number of the part-time and full-time employees subject to social security contributions. It is based on standardised social security notifications, which includes all employees (including those in vocational training) subject to compulsory health insurance, compulsory pension insurance or compulsory insurance in accordance with the German Social Code, Book III (SGB III). With this notification, employers also provide information on whether the employee has a full-time or a part-time job. Part-time employment is defined by contractual hours of work below the company's customary hours due to the labour contract. However, the regular weekly working hours of the employees are not submitted. Breaks in the time-series

[7] For this purpose see Fachserie 18, Series 1.4 Volkswirtschaftliche Gesamtrechnungen, Inlandsproduktsberechnung - Detaillierte Jahresergebnisse (only available in German) / Fachserie 18, Series 1.2 National Accounts - Domestic Product - Quarterly results / Fachserie 18, Series 1.3 Domestic Product Seasonally adjusted quarterly results using Census X-12-ARIMA and BV4.1, available via https://www.destatis.de.

of the *Employment Statistics* due to changes in the notification procedure (cf. Dundler/Frank 2012; Bertat et al. 2013) or a modernized data processing (cf. Frank/ Grimm 2014) have been adjusted by a structural time-series model (cf. Wanger/ Weigand/Zapf 2014).

A special form of part-time employees are the marginally employed persons. They are not subject to social insurance contributions, but considered as gainfully employed persons following the labour force concept of the ILO if they performed at least one hour of paid work within the reporting period. Marginal employees are calculated by the *Employment Accounts*. Here, three groups of marginal employed persons are summarized: marginally gainful employed persons (so-called Mini-Jobs), marginally short-term employed persons and persons in One-Euro-Jobs.

Since civil servants are not subject to compulsory health and pension insurance, and compulsory insurance in accordance with SGB III, they are not included in *Employment Statistics*. Currently, the number of part-time civil servants is taken from the Fachserie 14, Series 6 "*Personal des öffentlichen Dienstes*" published by the Federal Statistical Office. By adding the regularly part-time employees subject to social security contributions, the marginal part-time employees and the part-time civil servants we receive the number of all part-time employees. Thus, the part-time rate represents persons employed part-time as a percentage of all employees.[8] Furthermore, persons on parental leave and persons in the release period of partial retirement (cf. Wanger 2009) are considered as part-time employees. These persons are included as employed in the statistics but they perform zero hours of work. Therefore they must be considered in order to avoid an overestimation of the macroeconomic volume of work.

3.2 Potential working days

One further elementary component for calculating the hours worked is the number of potential working days. In the calculations, basically, a five-day week is presumed, assuming that employees are given compensatory time off on other days when they work on Saturdays, Sundays, or on public holidays. The number of potential working days therefore results from the number of calendar days minus Saturdays, Sundays, and public holidays. Regional holidays that do not apply throughout Germany are weighted with the number of employees subject to social security contributions with-

[8] The part-time rate determined in the AZR (2013: 38.5 %) differs markedly from the part-time rate calculated on the basis of the Microcensus (2013: 25.5 %). One reason is the underestimation of marginally employed persons in the Microcensus (Köhne-Finster/Lingnau 2008). This is confirmed by the Employment statistics of the Federal Employment Agency (Körner et al. 2011). Another reason is the survey concept for part time work in the Microcensus. The respondents are allocated in part-time/full-time based on a self-classification, but above an hours threshold of 32 hours automatically a full-time-job is assumed.

in the states (*Bundesländer*) level to calculate averages.[9] The different numbers of annual working days have a substantial effect on annual hours worked. In addition to the resulting number of days, the effect of working days on the collectively agreed annual working time is presented in Table 9 (see Appendix D). The corresponding line in the lower part of Table 9 shows the percentage change of collectively agreed working time compared with the previous year due to an increase or decrease of the potential working days.

3.3 Collectively agreed or customary working hours

Another essential component in the measurement of hours worked that is independent of business cycle influences are the collectively agreed or customary weekly working hours. It is the major source of the long-term development of hours worked. Collectively agreed hours worked are collected in the *Index of Agreed Earnings and Working Hours Calculation* (cf. Bick/Decker 2013). The development of collectively agreed income and hours worked of employees in Germany is measured with indices of agreed earnings. In January 2009, the coverage was expanded to all economic sectors except for agriculture, forestry, fishing and pisciculture as well as for private households. Former gaps in the indices of agreed earnings are covered with information from the *Collective Agreement Archive* of the Institute of Economic and Social Research of the Hans-Böckler Foundation (WSI) and the *Register of Collective Agreements* of the Federal Ministry of Labour and Social Affairs. Though, many industries have agreed on labour-related opening clauses and flexible working time regulations in the collective bargaining process. Due to the fact that the actual use of such numerous variations on enterprise level are not recorded or evaluated in the statistics, in particular the collectively agreed working hours must be regarded as reference level for a certain period.

However, the data cover only the weekly hours worked by employees in establishments with collective agreements. Results from the *IAB Establishment Panel* show that in establishments with collective agreements the weekly working hours are fewer than in those without collective agreements. Collective bargaining coverage decreased over the past years (cf. Ellguth/Kohaut 2014). Thus, the customary working hours in establishments which are not bound by collective agreements gain importance. This must be considered in the AZR since otherwise the component of collectively agreed or customary working hours is estimated too low. Through spe-

[9] The result of this calculation of working days most closely corresponds to that of the Federal Statistical Office in the national accounts (the working days are published in Fachserie 8, Series 1.3). Because of the different weighting of the holidays on Christmas Eve and New Year's Eve there exist slight deviations. These days are treated as weekend or public holidays when falling on a weekday (Monday to Friday) by Federal Statistical Office with respect to their output effects. There-fore they are not counted as working days. In the AZR, they are each weighted as half a working day. Studies by the WSI confirm our approach since the analysis of collective agreements of many industries reveal that on average half a working day must be worked on each of these days.

cial evaluations from the *IAB Establishment Panel*, a correction factor is estimated which compensates for this effect.

Information on collectively agreed or customary working hours always refers to full-time employment. Information from the *Microcensus*[10] is used to obtain the average weekly hours worked by part-time employees. For the different economic sectors, the ratio of hours worked by regular and marginal part-time employees to those of full-time employees is calculated. The results are applied to the collectively agreed or customary working hours by full-time employees in the individual economic sectors. For One-Euro-Jobs, information on average weekly hours worked are obtained from a statistic from the Federal Employment Agency. Because there is no differentiation according to economic activities, the variation of the working time of One-Euro-Jobbers in the different economic sectors is assumed to be proportional to that of marginal employees.

3.4 Annual holiday leave

The extent of the annual paid holiday leave influences the annual working time of employees. In accordance with the Federal Holidays Act (*Bundesurlaubsgesetz*), the minimum entitlement to paid recreational holiday is 20 working days per year based on a five-day work week. Many collective or individual agreements, however, include more favourable regulations. Normally, the annual leave entitlement for workers covered by collective agreements in Germany is six weeks per year (cf. Schnitzlein 2011). The *Collective Agreement Archive* of the WSI reports the collectively agreed annual paid holiday leave of employees, and distinguishes basic and actual total leave by industries. Collective agreements can determine basic leave for an employee, which is then raised in one or more stages to the actual total leave. Requirements for an increase can be age, duration of affiliation with the enterprise, wage bracket, etc. Details provided by WSI on average basic and actual total leave are weighted on a 40/60 basis, which is a plausible proportion according to evaluations on basis of the German Socio-Economic Panel Study *(GSOEP)*[11].

The quarterly distribution of the annual holiday leave is estimated with the help of the *Monthly Tourism Survey* (Federal Statistical Office), which includes the guest-nights by nationals in places of accommodation. The *Collective Agreement Archive* of the WSI additionally provides information on special leave in some economic sectors that are also included in the AZR.

[10] The Microcensus is an annual household survey covering roughly 1 % of the Population in Germany. The Microcensus provides official representative statistics of the population and the labour market in Germany. The Labour Force Survey of the European Union (EU Labour Force Survey) forms an integral part of the Microcensus (see https://www.destatis.de/EN/Meta/abisz/Mikrozensus_e.html).

[11] The German Socio-Economic Panel (GSOEP) is a longitudinal survey of approximately 11.000 private households in the Federal Republic of Germany from 1984 to 2013, and eastern German Länder from 1990 to 2013. GSOEP is produced by DIW Berlin (http://www.diw.de/de/soep). Variables include household composition, employment, occupations, earnings, health and satisfaction indicators.

Besides the collectively agreed annual paid holiday leave, also times of maternity leave are considered in the AZR. The number of births by female employees is estimated via the ratio of female employees to the female population (age 20 to 40 respectively). Basis is the *Birth Statistic* of the Federal Statistical Office. The corresponding volume of lost working hours can be calculated via the times of protection of six weeks before and eight weeks after giving birth. The ratio of female employees to the female population is established with special evaluations of the *Microcensus*. Furthermore, special effects of additional leave for heavy or hazardous work, school holidays for teachers, and additional leave for the severely handicapped, are also taken into account. Rough calculations indicate an average of about one day per year on average per employee.

3.5 Sick leave

Sick leave belongs to the personal components and influences the level, development, and structure of hours worked additionally. The benchmark figure for the calculation is the monthly sick leave ratio, which is measured in percent of compulsory members of the state health insurance scheme with continued payment of wages of at least six weeks.[12] The sick leave ratio is an official recording by the *Statutory Health Insurance Statistics* of the Federal Ministry of Health based on reporting dates. It comprises compulsory members that reported unfit for work at the first of each month. The periods of short-term incapacity for work lasting up to three days, which are under-recorded in this series, are possibly offset by non-compulsory insured persons (employees not covered by the agreed pay scale, civil servants, and marginal part-time employees) with lower levels of lost working hours. Cases in which people resume work while still certified unfit for work by a physician have a similar effect.

However, the reference of sick leave statistics to a single date creates problems if the first day of the month is on a weekend or a floating public holiday. Then, the number of sick leaves is well below the level found for normal working days, and artificial fluctuations both in the originally as well as in the seasonally adjusted time series occur. To avoid such problems we adjust the time-series to sick leave using usual weekday and holiday effects and modify the series to fit the seasonal patterns of sick leave as reported by the major statutory health insurers AOK and BKK. For these calculations, we make use of statistical state space methods (cf. Wanger/Weigand/Zapf 2014).

Since the monthly statistics are not broken down into economic sectors, the annual health reports of statutory health insurance companies (cf. Knieps/Pfaff 2014; Meyer

[12] Today, approximately one third of the German population are obligatory members of the statutory health insurance. Together with retired persons and family members the share increases to 87 percent according to the National Association of Statutory Health Insurance Funds. Another 11 percent are members of a private health insurance (German Federation of Private Health Insurers).

et al. 2014) are used as additional sources. They indicate days of sick leave for different economic branches, which are adjusted to gain representativeness for all employees subject to social security contributions. These statistics provide sector-specific differences in the sick leave in relation to the overall economy.

3.6 Definitive and transitory overtime hours

Overtime hours belong to the cyclical components of working time and are used by establishments to react to short- or mid-term fluctuations in demand by adjusting the amount of labour input. They allow for adjustments without recourse to the external labour market, e. g., by hirings and firings. In general, overtime hours are defined as working hours exceeding the contractually agreed regular working hours of employees (cf. Brinkmann et al. 1986; Kohler/Spitznagel 1996). Two types of overtime work can be distinguished: definitive and transitory overtime work (cf. Zapf 2012).

Definitive overtime work comprises paid and unpaid overtime work (cf. chapter 3.6.1), both of which extend the working time of an employee without an inherent balancing mechanism. For paid overtime, employees receive a financial compensation for the additional hours worked (cf. Bauer et al. 2004; Bundesmann-Jansen et al. 2000). In addition to the contractually defined hourly rates, the compensation can also include a premium, as this is regulated in many collective agreements in Germany (cf. Bispinck 2005). In many cases, there is a premium of 25 per cent on normal working days and 50 per cent on Sundays and public holidays (cf. Anger 2006). In contrast, unpaid overtime hours are not compensated at all. There is neither a financial compensation nor the possibility to compensate the longer working hours at a later point in time by working fewer hours (cf. Brinkmann et al. 1986; Kohler/Spitznagel 1996).

Transitory overtime hours (cf. chapter 3.6.2) are additional hours worked that can be used up later by employees, so that they can take time off in lieu of overtime. Therefore, transitory overtime hours only change the allocation of the working time, i. e., the beginning and ending of working days as well as the distribution of working hours over a certain period of time, while the number of working hours over a longer reference period is unaffected (cf. Bundesmann-Jansen et al. 2000; Kohler/Reyer 1988). During the last years, transitory overtime hours got more important. This growing importance can also be attributed to the increasing deployment of working-time accounts in establishments. Working-time accounts are used to regulate and document the accumulation and using up of transitory overtime hours (cf. Zapf 2012).

By using working-time accounts, establishments can adjust the working time of employees to variations in production and to deal with seasonal or cyclical fluctuations in demand. Working-time accounts can also be a (temporary) alternative to the implementation of short-time work. Additionally, they can help establishments to reduce idle time, to increase productivity and to obtain substantial cost advantages, as overtime premiums are reduced or completely avoided. For employees, working-

time accounts can improve short-run time sovereignty in the sense that workers can also change the length of their working time according to their own needs (cf. Herzog-Stein/Zapf 2014).

3.6.1 Paid and unpaid overtime

Paid and unpaid overtime hours are calculated mainly on the basis of the yearly *GSOEP* while also the *Microcensus* enters the accounts for computations on recent years. The *GSOEP* contains information about the number of weekly overtime hours and its compensation form (compensated with time-off; partly paid, partly compensated with time-off; paid; not compensated at all). On that basis, the number of annual paid and unpaid overtime hours can be calculated. Problems arise due to the assignment of partly paid overtime hours. Since 2001, these overtime hours can be assigned by using the additional question on the number of paid overtime hours last month under several assumptions, as on the assignment of "partly paid" hours: In recent years since 2001, these otherwise undetermined cases are made unambiguous through information on the additional question on "paid overtime last month", while the resulting fraction of paid hours among the ambiguous cases is extrapolated to previous years. Certain groups of employees (marginally employed, apprentices and employees with zero working hours, e. g., on parental leave) do not work paid overtime according to their contract, which we take into account in the calculations.

Since 2010, the *Microcensus* regularly contains questions on paid and unpaid overtime hours. Average figures can be calculated on a quarterly basis as the survey is carried out during the whole year and enter the accounts through a statistical model-based approach. The model also allows us to take into consideration several related surveys and other indicators containing information on overtime fluctuation. They improve the estimates especially at the current edge, where the main survey sources are not yet available; see Weigand/Wanger/Zapf (2015). One major additional indicator for the calculation of overtime hours is the *Ifo Business Survey*, where establishments indicate whether employees work overtime at the moment, and whether overtime hours are unusually high. Additionally, the GDP, new orders for all manufacturing industries, the industrial production index, the number of persons in employment, registered unemployment, compensation for employees, the willingness to buy from the GfK, the business expectations and situation from the Ifo Institute, as well as the Ifo employment barometer are integrated in the calculations.

To obtain the number of paid overtime hours separately for industries, West and East Germany and for full-time and part-time employees, data of the *Structure of the Earnings Survey* of the Federal Statistical Office are used additionally to the *GSOEP* and the *Microcensus*.

3.6.2 Working-time accounts

As outlined above, a second major cyclical component of hours worked is the changing hours on working-time accounts. Deviations from regular or collectively

agreed working hours lead to savings or deficits on these accounts. Such credit or debit of hours has to be balanced during a certain period of time. Typically, the accounts cannot exceed an upper or lower limit (cf. Seifert 1998, 2001).

Although different datasets contain information about the distribution of working-time accounts among establishments and employees, there exist few data sources on the accumulation and reduction of working hours on these accounts. Especially, regularly surveyed information about working hours on working-time accounts is very sparse.

As mentioned above, the *GSOEP* comprises information about overtime hours which are compensated with time-off later. These can be viewed as the accumulation of time credits on working-time accounts, as the compensation with time-off needs a formal or informal documentation and recording of the additional hours worked. However, until 2014 where an according question has been introduced, there is no information on the reduction of time credits, i. e., the compensation of additionally hours worked with time-off. Thus, an estimation of the net flows on working-time accounts cannot be conducted solely on basis of the *GSOEP*. For this reason, we draw additional information from the *Microcensus*. Survey participants are asked about their regular working time, the actual working hours in the last week before the survey and the main reason why they worked more or less than the regular working time. One reason for fewer working hours is a compensation for additional hours worked (e. g. flexible working hours), while a possible reason for additional hours worked is the accumulation of time credits or reduction of time deficits. These variables are the basis for the estimation of time series models for the changes of balances on working-time accounts.

The accuracy of the level of account flows obtained from the *Microcensus* is questionable, since working-time account flows are only captured if they are the *main* reason for varying working hours, and hence the flows are likely to be biased downwards. To avoid this problem, we rather extract the percentage transitory fluctuations of these flows around their long-term trends from the *Microcensus*. The longer-term trends in the gross inflows on and outflows from working-time accounts are theoretically identical, so that we identify these trends from the *GSOEP* data on inflows only. The trend is then combined with the cycles to obtain gross in- and outflows and the net flow on working-time accounts per period is obtained from the difference between the latter; see Weigand/Wanger/Zapf (2015) for more details on the implementation.

Since the second quarter of 2013, the *IAB Job Vacancy Survey* provides a new and important data source for the estimation of changes of balances on working-time accounts. It is a quarterly, representative survey among establishments in Germany, where human resource managers are asked about the number of hours on working-time accounts. The answers enable a simple estimation of the changes of balances. Up to now, the time period is too short to benefit the calculation of the long time se-

ries in a relevant way. However, the results of this survey will be included as an additional source in a future revision of the AZR. The state-space-model gives a flexible frame for the inclusion in the model.

3.7 Short-time work

In contrast to paid or unpaid overtime hours that allow an upward adjustment of working time, the use of short-time work leads to a temporary reduction of the actual hours worked. Short-time work is used to relief the pressure from enterprises by reducing the payroll costs during temporary times of low business (cf. Crimmann et al. 2010). For this purpose the Federal Employment Agency grants short-time working allowances. Subsidization of short-time work aims at reducing lay-offs by allowing employers to temporarily reduce hours worked while compensating workers for the induced loss of income. There is evidence that short-time compensation programs stabilize permanent employment and reduce unemployment during downturns (see Balleer et al. 2013).

Since the rearrangement of short time work in 2007, the German system distinguishes three kinds of short-time work: besides short-time work for economic reasons and seasonal short time work, the so-called “transfer-short-time work” is possible for firms which face a permanent loss of employment due to restructuring measures at the firm level.

When calculating hours lost due to short time work, data published by the BA[13] is considered. The lost working hours per short-time worker are calculated from the statistically documented percentage loss, assuming that the percentage loss of working hours per short-time worker is not different between part-time and full-time workers.

Until 2006 a component „bad weather“ was also part of the AZR. The number of lost hours and the affected employees due to bad weather were recorded to the extent that the BA paid benefits until 2006. The loss of working hours through bad-weather was by definition only possible in the construction sector. In 2007 the bad weather promotion (*Winterbauförderung*) was replaced by the seasonal short time working allowance (see above). Therefore the time-series on working hours lost due to bad weather end in 2006 (see Appendix D, Table 9) and are captured in line with the total short time working allowance component from 2007 on.

[13] Until March 2010, the statistic on short-time work of enterprises and short-time workers was compiled from information in the enterprise reports that enterprises had to fill out. This procedure was discontinued in order to relieve enterprises and the statistic was compiled on the basis of settlements lists that are attached to the applications for short-time allowance anyway. The new results can be regarded as being more valid (Klamroth 2010).

3.8 Strikes and lock-outs

After failed negotiations for new collective agreements, strikes are usually taking place. However, they are quite rare as centralized agreements prevail in the German economy. Lockouts are defined as the refusal of an employer to give the employee access to their workplace and refusal to pay wage at the same time during a strike. It is typically the answer of the employers' side on strike and is supposed to increase the cost for the trade unions by paying more strike-benefits. In Germany lock-outs are also rarely used.

The *Strike Statistics*[14] provides sufficiently deep economic and temporal breakdowns for the strikes and lock-outs and can be directly converted into volumes using the collectively or customary hours worked. In the *Strike Statistics* labour disputes are only shown if they are lasting longer than one day and at least 10 employees are involved (affected) or generating a loss of more than 100 working days. All other disputes are classified as small claims (*Bagatellstreitigkeiten*) and are listed for information only. As far as they are reported to the BA they are also considered in the calculation.

3.9 Adjustments for differences in the calendar

As described in section 3.2, differences in the potential number of working days occur depending on the weekdays of public holidays or on whether the current year is a leap year. The deviations from the average number of working days over many years are compensated to some extent by adjustments to overtime and working-time accounts (Deutsche Bundesbank 2012). However, it must be assumed that a portion of the effects on working time are not covered by this (such as shorter breaks when there are fewer potential working days and unobserved flexibility in working time). Therefore, working days elasticities specific to economic branches are applied to approximate this effect. These shall measure by how many hours the annual hours worked change when more or less working days are available, and hence the latter are not included in annual hours worked one-to-one. This approach also takes into account, for example, the fact that movable holidays most likely have much less effect on time worked in agriculture than on time worked in the industry. Since data suitable to estimate these effects are sparse, we take the elasticities to correspond to production elasticities calculated by the German Bundesbank (Table 3). The production elasticities indicate the percentage by which the production can increase if the factor input labour is extended by one percent due to an additional working day.

For determining the compensatory hours, we first calculate the long-term working time, which is the product of the average of potential working days by quarters over the last 20 years and the collectively agreed working time in the given year. By sub-

[14] This statistic of the Federal Employment Agency show companies and employees affected by strikes and lockouts as well as a result of that the days lost.

tracting the collectively agreed working hours of the year from these long-term annual hours we obtain a deviation in hours from the long-term average. These additional or less hours compared to the long-term average are not included to 100 percent in the annual hours worked, but only in proportion to the production elasticities. The inverse hours result in the compensatory hours, which must be taken into account within the component “adjustment for differences in the calendar“. This procedure is carried out sector-specific.

Table 3
Working day elasticities

Industry	Working day elasticities in %
Agriculture and forestry	0.2
Manufacturing	0.7
Construction	0.6
Trade, hotels and restaurants, transport	0.4
Services	0.2

Source: Production elasticities from the German Bundesbank.

3.10 Secondary jobs

Besides the time worked by employees at their main (or only) job also the volume of work from second or third jobs has to be taken into account in the working time measurement. Up to 2003, the only source for the number of employees and average hours worked in secondary jobs was the *Microcensus*. Since then, it is also possible to use the sector-specific BA statistics on secondary employment of employees subject to social security contributions. These additional information in the *Employment Statistics* are the result of legal changes regarding secondary employment[15].

Since the *Employment Statistics* provide no information on the duration or length of working hours, we use basic information from the *Microcensus* to obtain the average weekly hours worked by employees in the side job. With economy-specific evaluations provided by the Federal Statistical Office, the ratio of the average number of hours worked by side employees to the average number of hours worked by full-time employees is calculated.

3.11 Hours worked of self-employed and unpaid family workers

In addition to the hours worked by gainfully employed persons, the aggregated calculation of hours worked must also reflect the hours worked of the self-employed and unpaid family workers. Since patterns of hours worked of self-employed per-

[15] Until 1999 marginal secondary employment with a regular working week of 15 hours were exempt for social security contributions. This changed in 1999: marginal secondary employment was completely liable to tax and social security contributions. But from 2003 on marginal secondary employment besides a main job has become more appealing again, because no social security contributions are payable when the income does not exceed an income limit. This income limit currently amounts to Euro 450.

sons themselves and their unpaid family members differ fundamentally, both groups are treated separately in the AZR. The calculations of hours worked differ methodologically from those for employees because a large part of the components of hours worked are not relevant for self-employed and unpaid family workers.

The most important source for average hours worked of self-employed and unpaid family workers is the *Microcensus* taking the hours (normally) worked per calendar week into consideration It is assumed that the hours worked are distributed evenly over the whole year. The only exception is the agriculture and forestry sector, where working hours outside the high season is presumed to be lower. Thus, we use a 30 Percent lower working time for the first and fourth quarter.

According to *GSOEP* (cf. Saborowski et al. 2004 and own calculations), self-employed persons only take half of the number of holidays as compared to employees, which we use to estimate the holiday leave for self-employed persons of each specific industry. For the seasonal distribution of leave, we assume that there is no difference between self-employed persons and employees. For the former, also the extent of sick leave is substantially lower than for employees. The statistics of statutory health insurance companies indicate that the number of sick leave days is between one third and one half of those of employees (cf. Küsgens/Vetter/Yoldas 2002), so that we assume half the sick leave rate of employees. Based on results of the *Microcensus*, the volume of work of persons self-employed in their second job is considered with self-employed persons.

3.12 Combining the components in the AZR

The AZR brings together the components of hours worked in a unified database. On the basis of the available data, for each component of hours worked we calculate a loss or additional volume in million hours and convert it to an annual effect per employee in hours. The results for all single components are brought together in one overall figure getting the hours worked per employee as well as for all employees (the labour volume). With the results of the AZR we can map the various determinants of annual working time over time.

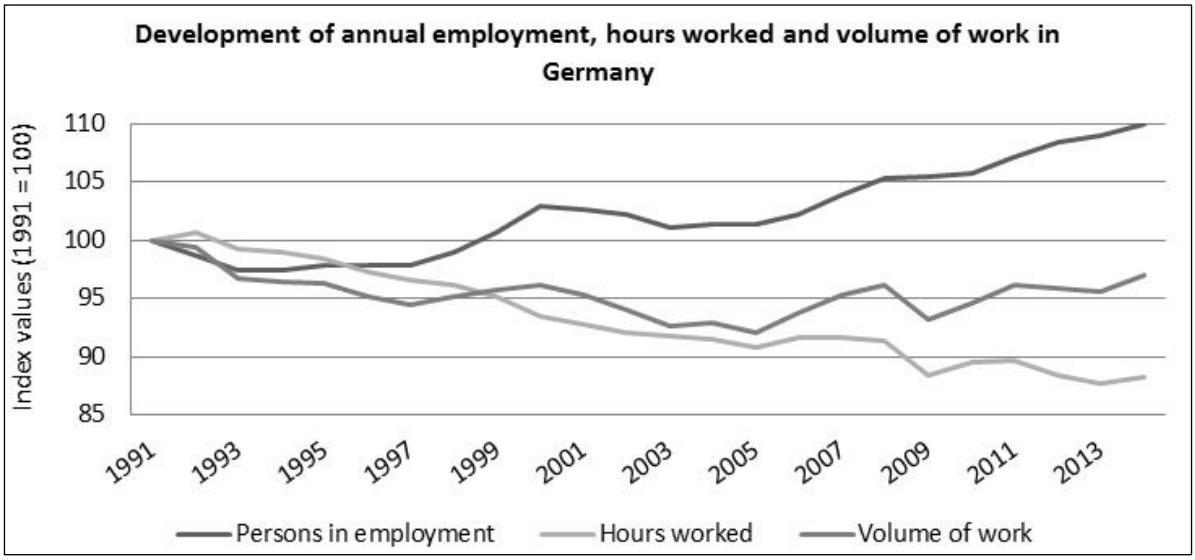
4 Selected results from the AZR

In this section, we present selected results of the AZR. We aim to illustrate the overall development of different groups of employment, of hours worked and of the volume of work in Germany during the last 25 years, as well as the influence of the different components on that longer-term development. Moreover, emphasis is given to the business cycle properties of hours worked in Germany and to the development in the 2008/09 financial and economic crisis. Detailed results for the reference period 1991 to 2014 can be found in Table 9 (see Appendix D). The results presented in this paper refer to the data version of March 2015.

4.1 Employment by status

In 2014 around 42.7 million persons were in employment, which is a 10 per cent increase as compared to 1991 (Figure 2). Behind the increasing number of persons in employment there are different developments of full-time and part-time employment as well as the number of self-employed persons and family workers (Figure 4 to Figure 6). In 2014, the number of employees was around 3 million persons higher than in 1991 (Figure 3). However, the so-called “normal employment relationship” (*Normalarbeitsverhältnis*) determines the development of employment to a fewer extend as employment relationships get more diverse. Contracts with less working hours are more and more widespread, as e. g. regular part-time work and marginal employment. In contrast, the number of persons in full-time employment decreased in tendency. In the reference period the number of part-time workers has more than doubled (from 6.3 million to 14.8 million persons), whereas the number of full-time workers decreased by around 5.4 million persons (Figure 4 and Figure 5). Since 2006, however, the number of full-time employees increased slightly – with the exception of a decline due to the financial and economic crisis in 2008/09. The contrary developments of full-time and part-time employment led to an increasing part-time rate, which rose from 17.9 per cent in 1991 to 38.6 per cent in 2014. From this rate, 15 percentage points can be attributed to persons in marginal employment.

Figure 2
Development of employment, hours worked and volume of work in Germany; Annual average 1991–2014, index values (1991 = 100)



Source: IAB working time measurement concept

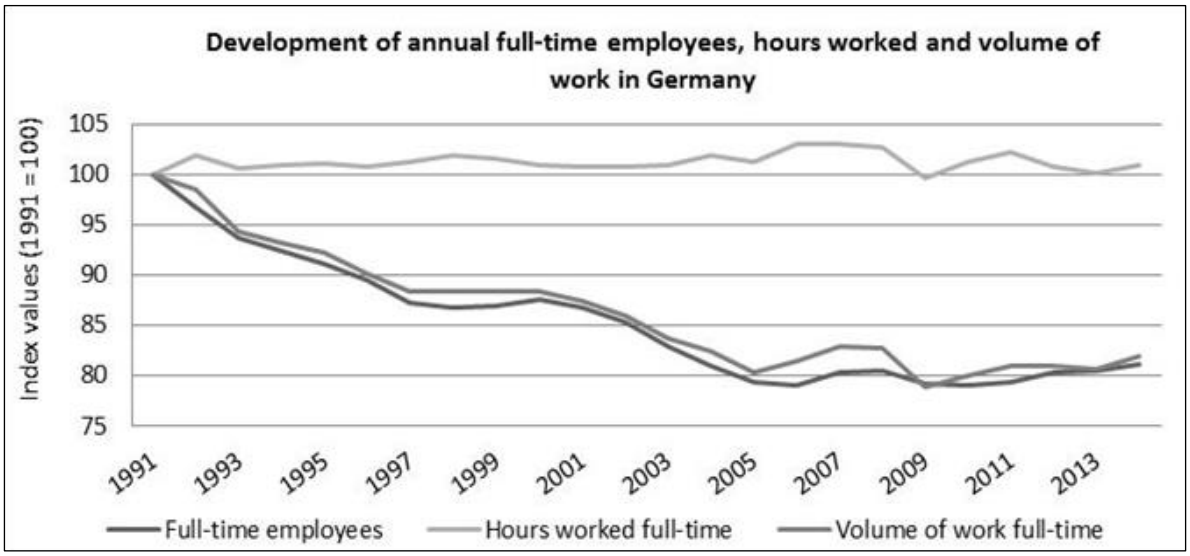
Figure 3
Development of employees, hours worked and volume of work in Germany; Annual average 1991–2014, index values (1991 = 100)

Source: IAB working time measurement concept

Figure 4
Development of part-time employees, hours worked and volume of work in Germany; Annual average 1991–2014, index values (1991 = 100)

Source: IAB working time measurement concept

Figure 5
Development of full-time employees, hours worked and volume of work in Germany; Annual average 1991–2014, index values (1991 = 100)



Source: IAB working time measurement concept

In 2014, around 4.4 million persons were self-employed or family workers. In comparison to 1991 their number increased by 24 per cent (Figure 6). The share of family workers within this group was around 4 per cent in 2014, with their importance decreasing rapidly since 1991 (12 per cent), especially due to the strong decline in the agricultural sector. Two thirds of all family workers are women.

Figure 6
Development of self-employment, hours worked and volume of work in Germany; Annual average 1991 - 2014, index values (1991 = 100)

Source: IAB working time measurement concept

The increase of self-employed and family workers since 2002 can be mainly attributed to the increase of self-employed workers without employees (*Solo-Selbständige*). In 2014, their share was 56 per cent. The increase of self-employed

workers without employees is supported by government aid. It can be assumed that one part of the increase of self-employed workers since 2003 can be attributed to the intensified use of labour market policy instruments, like interim payment (*Überbrückungsgeld*) and grants for business start-ups (Existenzgründungszuschuss). Since 2006, these labour market policy instruments are combined as start-up subsidies (*Gründungszuschuss*). Since 2011, the financial support of the Federal Employment Agency for self-employed workers declined considerably. The share of women among self-employed workers is considerably lower than among employees (33 per cent and 49 per cent, respectively).

4.2 Working time

4.2.1 Components of hours worked

In this section, results for the single working time components are presented (see Table 9). The effects of different working time components in the AZR vary a lot and changes in their importance have different impacts on the amount of hours worked and the volume of work.

Of major importance of the components in the AZR is the collectively agreed or customary weekly working hours of employees. It is the reference point for all working time agreements beyond full-time employment. In 2004, the collectively agreed or customary weekly working hours for full-time employees reached its lowest level with 37.9 hours on average, and increased slightly since then. Due to reductions during the financial and economic crisis (cf. Bogedan et al. 2009), however, the collectively agreed or customary weekly working hours declined temporarily.

Differences exist between regions and industries concerning the collectively agreed or customary weekly working hours. The gap between East and West Germany is still remarkable (0.8 hours), but it has already declined considerably since 1991, when the difference was 2.4 hours. There are also noteworthy differences between industries. In public service and in the construction industry the collectively agreed or customary weekly working hours increased, whereas it decreased in non-public parts of the service sector and in the manufacturing industry.

The number of annual paid holidays (and other related release times) has a further impact on the amount of hours worked and the volume of work. Until the mid 1990's the claim for paid holidays mainly increased due to the adaption of the number of collectively agreed regular holidays in East Germany to West German conditions. On average, the number of holidays and other releases is 31 days per employee and year.

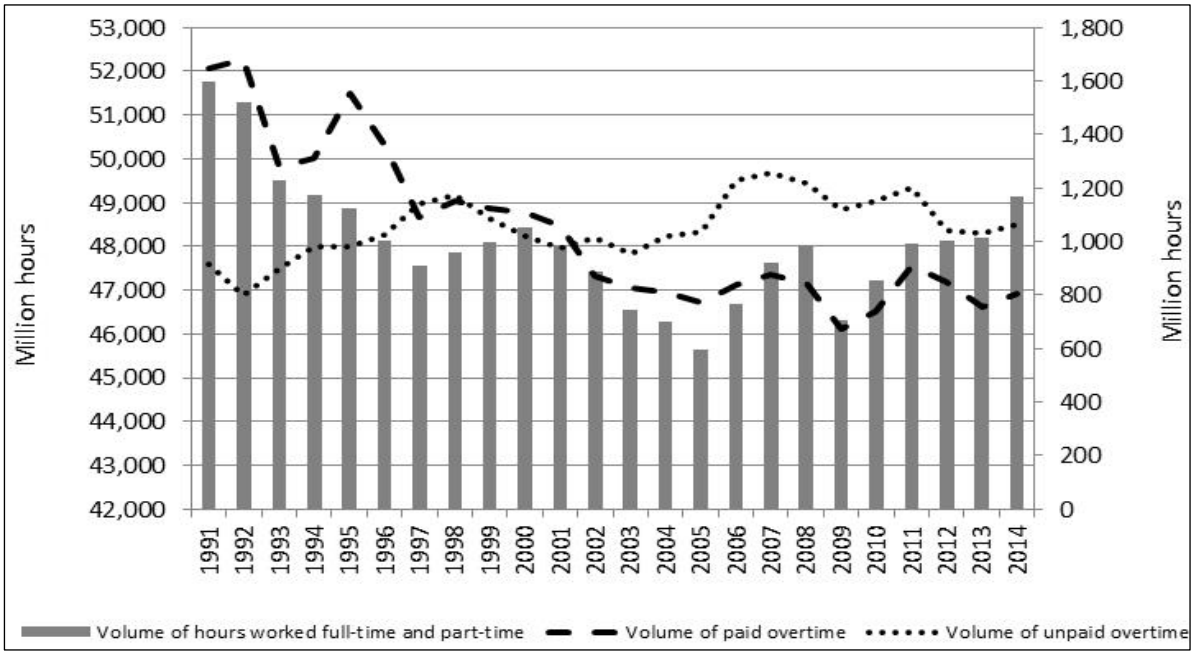
Besides the number of holidays, also absences from work due to illness decrease the annual working time. Until 2007, sick leave in hours worked decreased on a historical low level of 49 hours per employee and since then, it increased again. At the beginning of the 1990s sick leave in hours worked comprised around 90 hours per employee and year. The long-term decline of sick leave can be partly attributed to

structural shifts in employment to industries and occupations with fewer physical burdens for employees. Additionally, it can also be explained by changes in behaviour on the establishment side, like e. g. better safety regulations and health management (cf. Knieps/Pfaff 2014).

Paid and unpaid overtime work increase the annual working time of employees. However, during the last two decades the importance of paid overtime decreased sharply. In 1991, the volume of paid overtime hours was 1.6 billion hours (Figure 7), while it declined to 0.9 billion hours in 2007, before the financial and economic crisis. In 2009, the volume of paid overtime work reached its lowest level due to the crisis (0.7 billion hours) and was at 0.8 billion hours in 2014. Employees worked on average 21.1 paid overtime hours in 2014. The decline of paid overtime hours and the volume of paid overtime can be explained by several reasons: On the one hand, groups of employees gain importance, who traditionally works less paid overtime hours, e. g., women. And also sectors get more important, in which paid overtime work is less widespread, e. g., the service sector. On the other hand, flexible working time arrangements like working-time accounts are increasingly popular.

Instead of being paid for overtime hours, several employees work longer without a financial compensation. In 2014, the volume of unpaid overtime hours was 1.1 billion hours (Figure 7) and hence higher than the volume of paid overtime hours. Employees worked on average 27.8 unpaid overtime hours in 2014. Unpaid overtime hours are mainly worked by employees with a higher qualification level and by employees with managerial responsibility (cf. Weber et al. 2014b). The employees' offer for unpaid overtime can be explained by several reasons. For example, employees can signal a high value of their work with unpaid overtime hours in order to get promotions and pay rises and in order to reduce the possibility of lay-offs (cf. Anger 2006). According to Brautzsch/Drechsel/Schultz (2012) men are working more unpaid overtime hours than women and also full-time employees work more unpaid overtime hours in comparison to part-time employees.

Figure 7
Volume of work and volume of (un-)paid overtime work

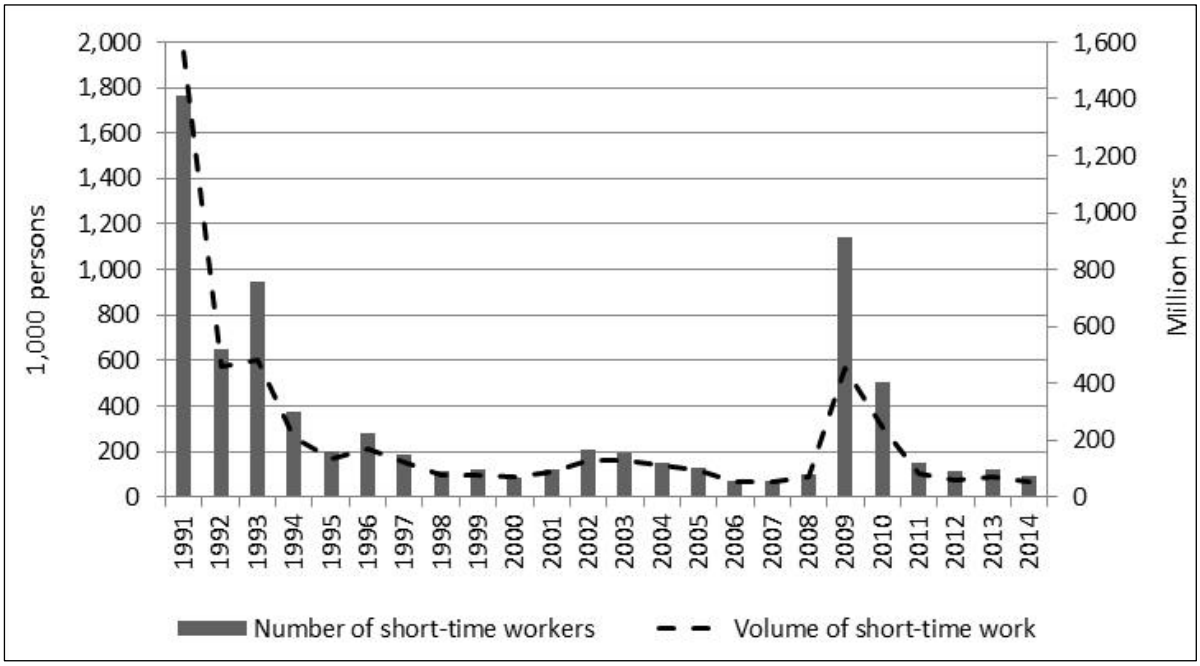


Source: IAB working time measurement concept

As was explained in section 3.6.2, one major part of additional hours worked are not categorized as paid or unpaid overtime hours, but can be accumulated on working-time accounts and are used up later by working fewer hours. Due to the financial and economic crisis, the number of accumulated hours on working-time accounts was reduced by 9.1 hours per employee over the whole economy. In such a context, working-time accounts can stabilize employment as establishments use it as an instrument of internal flexibility to vary working hours of employees instead of varying the number of employees.

Whereas paid and unpaid overtime hours increase the annual hours worked of employees, it decreases by short-time work. At the beginning of the 1990s the use of short-time work increased sharply due to the German reunification and it has lost importance since the middle of the 1990s (Figure 8). One reason for the long-term decline is the increasing working time flexibility in establishments. In 2009, however, the number of short-time workers sharply increased to 1.1 million on average. The intensive use of short-time work during the financial and economic crisis can partly be explained by the eased utilization. The government extended the period to use short-time work and employers were relieved from social security contributions. Typically, around one quarter of the normal working time of short-time workers is lost. As a result in terms of hours, the loss was 12.5 hours per employee on average in 2009, while it amounted 2.4 hours from 1999 to 2008 and only 1.8 hours from 2011 to 2014 on average.

Figure 8
Number of short-time workers and overall volume of short-time work



Source: IAB working time measurement concept

Among the components of hours worked, the importance of secondary jobs increased. From 1991 to 2014, the number of persons with a secondary job shot up from 0.9 million to 2.8 million people, with the share of persons with secondary job increasing to 7.2 per cent (1991: 2.5 per cent). Only from 2000 to 2002 the number of persons with a secondary job decreased due to the introduction of compulsory insurance. In 2003, the new regulations of marginal employment promoted the increase of secondary jobs: the legal framework allows an additional income of 450 Euro largely exempted from taxation and social security.

Since 1991, the effect of secondary jobs on hours worked has nearly doubled from 8.9 hours to 17.0 hours in 2014 per employee. The reasons for a secondary job are manifold. Persons are voluntarily searching for flexible forms of employment, those having a honorary post and persons in need of additional income offer different perspectives on this phenomenon. However, the majority of secondary jobs are characterized by a high qualification level (see e. g. Brenke 2009; Heineck 2009). Additionally, Schmidt and Voss (2014) show that employees who would like to work longer in their main job and women with a lower income are more likely to perform a secondary job.

All other components of hours worked and their effects, like, e. g., the bad weather effect and labour disputes are of minor importance for the overall economy and are consequently left from our review of results.

4.2.2 Hours worked

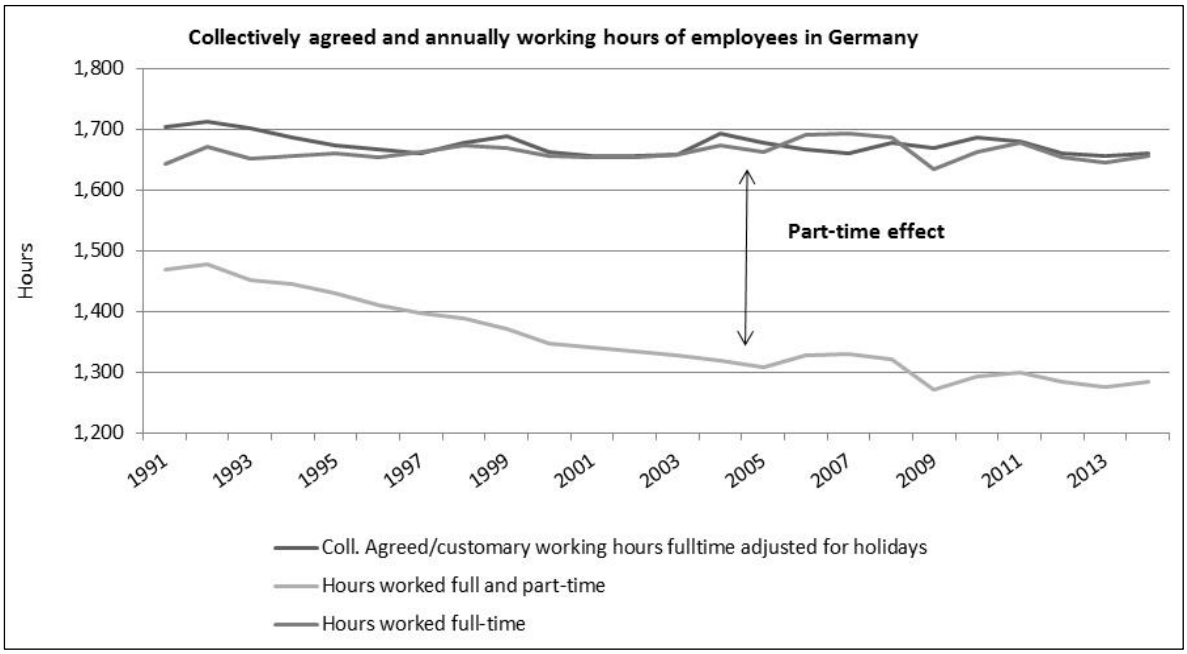
Under consideration of all components, the average annual working time per employee is calculated which is strongly determined by the relationship between full-time and part-time employees and their internal structure: Regular part-time employees work around half of the working hours of full-time employees, whereas persons in marginal employment only have around a quarter of the working time of a full-time employee. Therefore, changes in this internal structure can have major consequences on the average hours worked of all part-time employees and also on the average hours worked of all employees. As a consequence, a high number of employees do not necessarily lead to a higher overall volume of work if the structure of employees is changing at the same time (Figure 3).

In 2014, the average annual working time of full-time employees was 1,657 hours and hence slightly higher than in 1991 (1,643 hours), when short-time work was highly used due to the German reunification (Figure 5). The average annual working time of part-time employees was also higher in 2014 as compared to 1991 (Figure 4). But at the end of the 1990s and at the beginning of the 2000s it mainly decreased due to the increasing importance of marginal employment. That increasing importance can be partly attributed to the Hartz-II reforms[16] which took effect in 2003. The ratio of annual working hours of part-time employees to the annual working hours of full-time employees decreased to 36.5 per cent until 2004. Since then this ratio increased again and in 2014 it was 41.8 per cent. Due to the enormous increase of the part-time rate the average hours worked of all employees (without secondary jobs) decreased from 1,470 hours in 1991 to 1,285 hours in 2014 (-185 hours or 12.6 per cent).

If the average working time of all employees is compared with the average working time of full-time employees, then the increasing importance of the part-time effect is clearly visible (Figure 9). From 1991 to 2014, the part-time effect increased from 173 to 372 hours. In 2014, the effect was 178 hours for men and 502 hours for women, so that the overall effect mainly results from the high part-time rates among women (chapter 4.1).

[16] More information about the Hartz reforms in Germany gives Möller (2014).

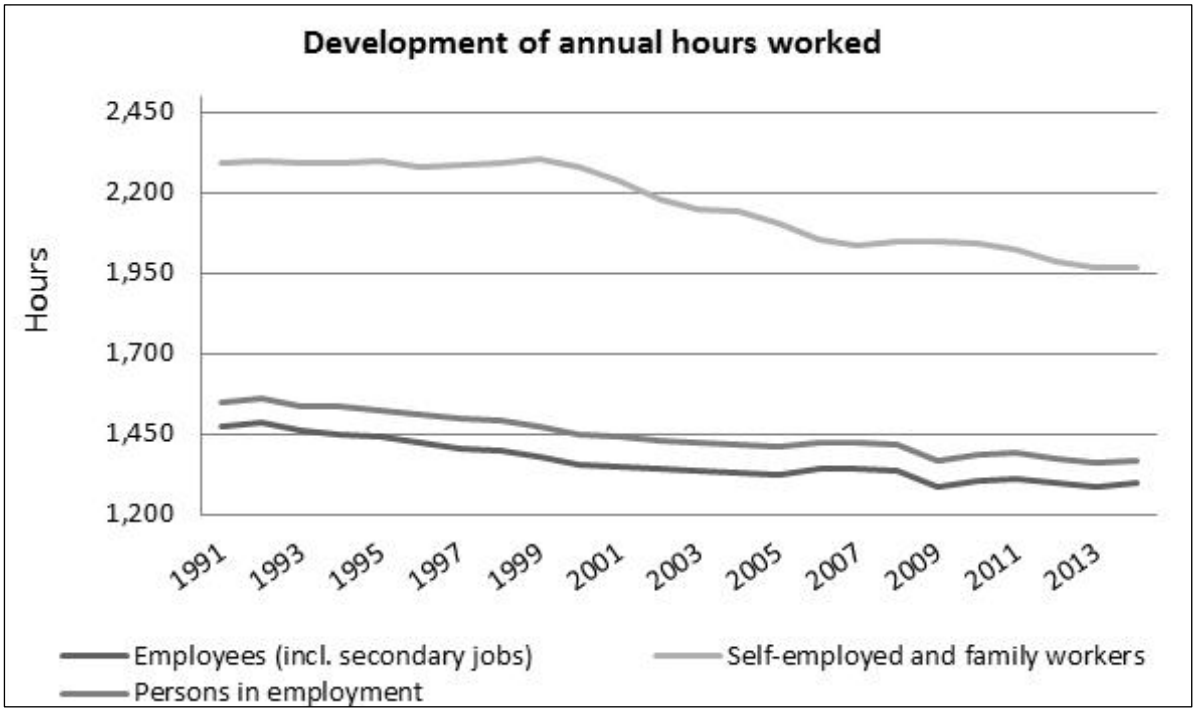
Figure 9
Development of hours worked of employees in Germany, Annual average 1991 – 2014 in hours



Source: IAB working time measurement concept

As a consequence, the decline of the average annual hours worked of all employees in the last 25 years is not the result of pure working time reductions, but rather results from structural changes in employment.

Figure 10
Development of hours worked, Annual average 1991 – 2014 in hours



Source: IAB working time measurement concept

The working time of self-employed workers and family workers exceeds the annual hours worked of employees to a great extent (Figure 10). In 2014, self-employed and family workers performed on average 1,973 hours. In the 1990s the annual working time of self-employed workers and family workers was on average 320 hours higher, but since 2001 it declines. This decline is due to the increasing share of self-employed workers without employees, with one third of them working part-time. In contrast, among self-employed workers with employees, only 7 per cent work part-time. Family workers have the highest part-time share (72 per cent).

On average, the weekly working hours of self-employed workers without employees comprises only three quarters of the working hours of self-employed workers with employees. Altogether, the part-time rate among self-employed workers highly increased between 1991 and 2014. One reason for this increase is the larger use of subsidized founding until 2011. Recent studies show that the working time in those newly founded establishments is lower than among traditional self-employed workers, and that self-employment in part-time seemed to be realised with this instrument (cf. Caliendo et al. 2009). Other studies also show that the foundation process in Germany seems to change from self-employment in full-time to part-time self-employment (cf. Brenke 2013).

The annual hours worked of all persons in employment consists of the annual working time of employees and the annual working time of self-employed and family workers. The development of the annual working time of all employed persons is mainly driven by the annual working time of employees.

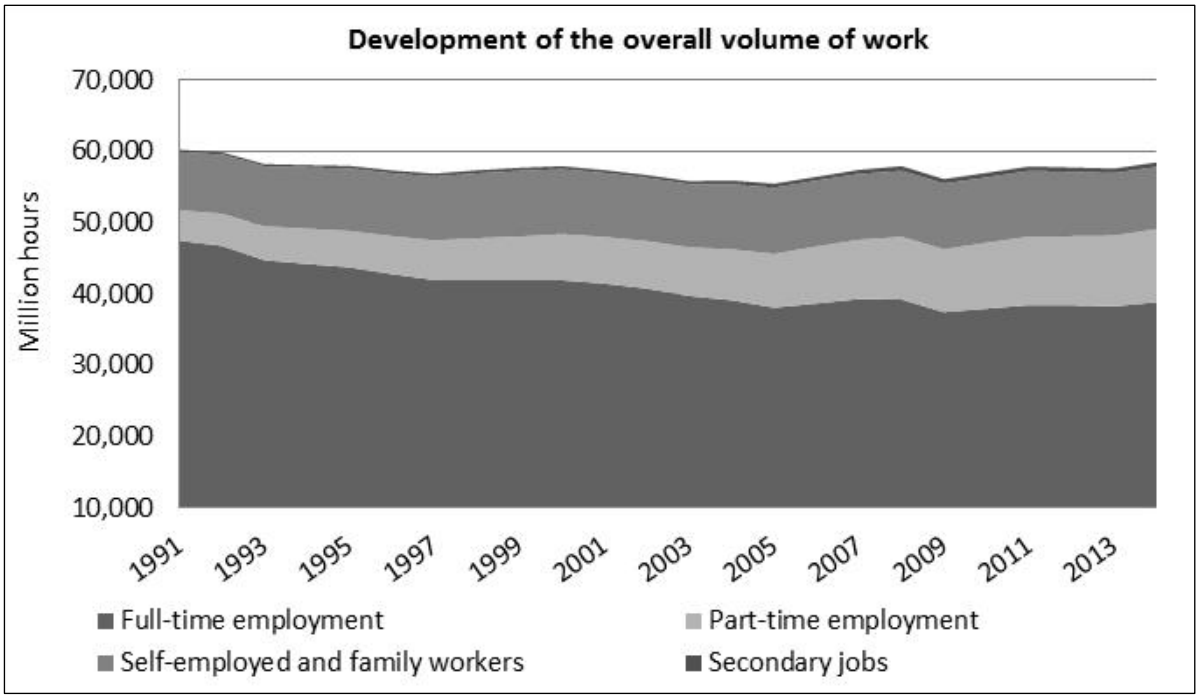
4.3 Volume of work

As the relevant labour input measure of the economy, the volume of work of employees is the product of the number of employees and their annual working time. In 2014, the volume of work of employees was 49.8 billion hours, which is 2.3 billion hours or 4.4 per cent lower than in 1991. This decrease results from the period before 2005 and especially from the 1990s, while since 2006 the volume of work is increasing again with a short interruption during the financial and economic crisis (Figure 3). However, the volume of work of full-time employees decreased by 8.6 billion hours (18.1 per cent), whereas that of part-time employees more than doubled: In 2014, it was 10.2 billion hours and made 20.6 per cent of the overall volume of work of all employees (Figure 4 and Figure 5). These results reflect the overall development in gainful employment: Compared to 1991 a lower volume of work is distributed among more employees (Figure 3).

In the 1990s, the development of the volume of work of self-employed workers and family workers was mainly driven by the changes of their number, whereas the actual annual working time mainly remained constant (Figure 6). Since 1991, the volume of work increased by 0.5 billion hours, respectively 6.4 per cent to 8.7 billion hours. This corresponds to a share of 14.9 per cent to the overall volume of work in the economy.

Between 1991 and 2014, the volume of work of all persons in employment decreased by 3.0 per cent. In 2014, it made up 58.5 billion hours as compared to 60.3 billion hours in 1991 (Figure 2 and Figure 11). As mentioned earlier, this decline results from the decreasing number of full-time employees until the year 2005. The decreasing volume of work of full-time employees (Figure 5) could only be partly compensated by the increasing volume of work of part-time employees (Figure 4) and the volume of work of self-employed workers and family workers (Figure 6).

Figure 11
Development of the volume of work



Source: IAB working time measurement concept

4.4 Cyclical behaviour of labour input and productivity

We conduct a cyclical analysis of working hours and related measures in Germany. More precisely, we investigate the fluctuations of labour input and productivity around their long-run trends, assessing the size of such fluctuations as well as their co-movements with real GDP and among each other. Summary statistics of this kind are of vital importance for the empirical assessment and calibration of business cycle models. At the same time, they allow cross-country comparisons of cyclical labour market behaviour and an identification of changes in the dynamic properties. To make the outcomes comparable with previous studies, we use the method of Hodrick/Prescott (1997) to subtract the trend from the logarithmic series. The standard smoothing parameter for quarterly data, $\lambda = 1600$, is applied. The results of Ohanian/Raffo (2012) serve as a benchmark for international comparisons. There, the AZR data before the major revision enter the assessments, which are mostly aggregated over EU countries.

Table 4 gives summary results for the series of real GDP, labour volume (H), persons employed (Empl), hours worked per person employed (H/Empl), productivity per hour (Y/H) and productivity based on persons employed (Y/Empl) for quarterly data from 1991Q1 to 2014Q4. The main diagonal shows the standard deviation of the trend adjusted series relative to the volatility of GDP.

Table 4
Cyclical volatility relative to GDP (main diagonal) and correlations (off diagonal), 1991Q1-2014Q4

	GDP	H	Empl	H/Empl	GDP/H	GDP/Empl
GDP	1.00					
H	0.84	0.69				
Empl	0.59	0.71	0.52			
H/Empl	0.50	0.62	-0.09	0.49		
GDP/H	0.73	0.26	0.16	0.18	0.54	
GDP/Empl	0.84	0.58	0.08	0.71	0.81	0.80

Source: Federal Statistical Office, IAB working time measurement concept and own calculations

The relative standard deviations reveal that labour input as measured by the volume of hours worked is more volatile than the employment-based figure. The cyclical fluctuation is relatively small in an international comparison, where the average is about 1, at least in the sample from 1985 to 2007; see Ohanian/Raffo (2012, Table 4).

The labour input is strongly pro-cyclical in Germany, with a cyclical correlation of 0.84 with GDP. This is the result from both persons employed and hours per person being positively associated with output. The latter components are hardly correlated with each other, which correspond to the results for other OECD and particularly European countries; see Figure 3 of Ohanian/Raffo (2012). The difference between the hours-based and employment-based labour input is mirrored by a difference between the productivity measures, where the latter have a stronger cyclicality and output co-movement than hourly productivity. The correlation between productivity and labour input is relatively weak, both measured in terms of hours and in terms of employment. This pattern was observed also in other countries and has been interpreted as evidence against a single source of business cycle fluctuations. For our German dataset, the correlations are 0.26 and 0.08, respectively.

Table 5 separates the summary statistics for the timespan before the 2008/2009 financial and economic crisis (see the upper panel) and a range during and after the crisis (see the lower panel). In terms of employment, labour market fluctuations seem to have alleviated, while they have increased in terms of hours worked. The decreased correlations between both measures of labour input and production are one aspect of the persistent decoupling of GDP and employment analysed by Klinger/Weber (2015). Likewise, the output correlation of hourly productivity has increased, but not the correlation based on employment. Since the 2008/09 crisis, GDP fluctuations are almost perfectly correlated to productivity changes if the employment-based measure of the latter is used. The correlation between labour input

and productivity changes most notably when the hours based figures are considered. There, the correlation becomes negative and amounts to -0.44 in the crisis period and thereafter.

Overall, considering the labour volume in hours instead of employment as a proxy for labour input yields a significantly different view on labour market fluctuations at business cycle frequencies.

Table 5
Cyclical volatility relative to GDP (main diagonal) and correlations (off diagonal), upper panel: 1991Q1-2007Q4, lower panel: 2008Q1-2014Q4

1991-2007	GDP	H	Empl	H/Empl	GDP/H	GDP/Empl
GDP	1.00					
H	0.83	0.76				
Empl	0.76	0.82	0.68			
H/Empl	0.19	0.41	-0.18	0.48		
GDP/H	0.63	0.11	0.20	-0.13	0.53	
GDP/Empl	0.70	0.41	0.07	0.55	0.74	0.65
2008-2014						
GDP	1.00					
H	0.63	1.08				
Empl	0.60	0.13	0.47			
H/Empl	0.47	0.97	-0.12	1.04		
GDP/H	0.41	-0.44	0.65	-0.61	1.03	
GDP/Empl	0.97	0.67	0.40	0.57	0.29	0.84

Source: Federal Statistical Office, IAB working time measurement concept and own calculations

4.5 The development of hours worked during the 2008/09 financial and economic crisis

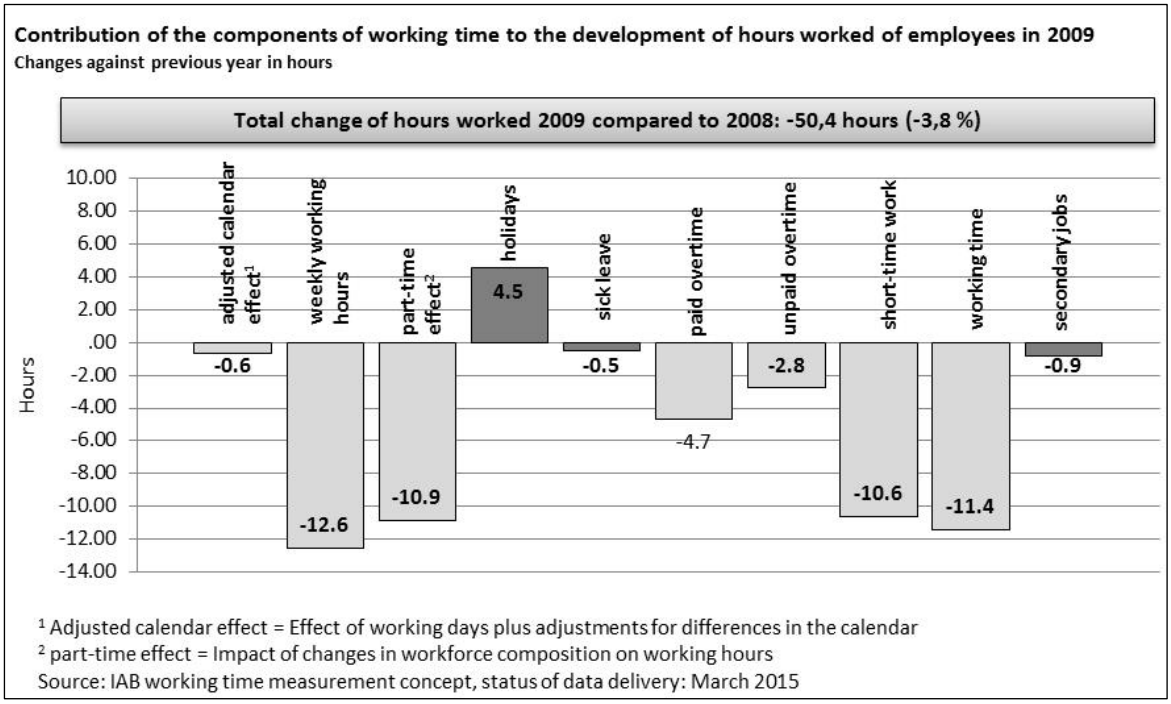
In 2008/09, the German economy was severely hit by the global financial and economic crisis which has been referred to as the Great Recession. Especially export-dependent establishments in the industrial sector were strongly affected. In 2009, the GDP shrank by 5.6 per cent. Economic forecasters predicted an increase in unemployment of more than 1.4 million people between 2008 and 2010. However, the repercussions of the economic slump for the labour market were quite modest and in 2009 total employment even increased slightly (cf. Herzog-Stein/Zapf 2014). This development was so unexpected that it was often described as the “German Labour Market Miracle” (cf. Möller 2009; Burda/Hunt 2011). In the industrial sector jobs were still lost, but to a lesser extent than expected. At the same time part-time employment increased and contributed to the overall increase of employment.

The remarkable development of the German labour market during the Great Recession can be partly attributed to the establishments’ extensive use of internal flexibility and strategies of labour hoarding to protect and retain firm-specific human capital. To achieve a hoarding of labour, establishments can either reduce working hours of employees or decrease work intensity and hence labour productivity (cf. Herzog-Stein/Zapf 2014).

The results from the AZR show that working time reductions played an important role in Germany. In 2009, the average annual working time of employees was reduced by 50.4 hours or 3.8 per cent as compared to 2008 (Figure 12). In addition to the temporary reductions in standard working hours within collective agreements or company-level pacts (*betriebliche Bündnisse*) (-12.6 hours or 24.9 per cent of the overall decrease), short-time work (-10.9 hours or 21.1 per cent) reductions in paid overtime (-4.7 hours or 9.3 per cent) and unpaid overtime (-2.8 hours or 5.5 per cent), the reductions on working-time accounts played an important role, too, as compared to earlier recessions (-11.4 hours or 22.6 per cent). Also the part-time effect contributed to the decrease of the annual working time (-10.9 hours or 21.6 per cent), whereas holidays contributed to an extension of the working time in 2009 in comparison to 2008 (+4.5 hours or -9.0 per cent). This positive contribution of holidays to the development of the working time in 2009 can be explained by the fact that employees partially used up holidays for that year already in 2008.

Besides the reduction of the working time of employees the remarkable reaction of the German labour market seems also to be attributable to a better institutional framework and structural changes during the last years. The important role of the latter can be traced back to the Hartz-reforms and a moderate wage policy (cf. Klinger/Rothe/Weber 2013). More detailed analyses concerning the robust development of the German labour market during the Great Recession as well as the important role of working time reductions on basis of the results of the AZR can also be found in Möller (2009), Dietz et al. (2010), Gartner/Klinger (2010), Walwei (2010) and Burda/Hunt (2011).

Figure 12
Contribution of the working time components to the development of hours worked by employees in 2009



Source: IAB working time measurement concept

5 Summary

Measuring hours actually worked in Germany and their single components is a complex task. This is mirrored by the AZR which we outlined in this paper. The results cover time series on hours worked and the volume of work at an aggregate level, but also allows for discrimination along several criteria such as groups of employed persons and economic sectors. The componentwise approach which allows us to identify, among others, collective, calendar, personal and cyclical influences is a particularly effective and informative way of collecting and presenting statistical information on this topic.

The availability of high-quality and detailed data on hours worked in Germany is likely to spur further empirical research in several fields, such as macroeconomics and sociology. The current paper is meant to spur further scientific work by both providing a comprehensive summary on the data product and an outline of elementary results.

Meeting the multiple demands of data users also requires a permanent process of revision in the AZR. Recently, changes in data availability, ongoing trends in the world of work, legal changes in definitions and concepts, but also an increasing methodological toolkit have promoted innovations in the measurement. Communicating these progresses we also aim at advancing the discussion among official statisticians concerned with national accounts and related data products.

The increasing flexibility of working (time) arrangements is still imposing challenges for a proper measurement of hours worked. Gathering additional information regarding temporary establishment-side instruments such as working-time corridors for parts of a business, but also on flexible individual arrangements such as trust-based working time, sabbaticals or home offices, appears especially worthwhile. Future developments in the AZR have to face these challenges.

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Appendix A
European System of Accounts (ESA) 2010
(Chapter 11 – Definition and specifying total hours worked)

Total hours worked

Definition (see ESA 11.27): total hours worked represents the aggregate number of hours actually worked as an employee or self-employed person during the accounting period, when their output is within the production boundary. Given the broad definition of employees which covers persons temporarily not at work but with a formal attachment, and part-time workers, the appropriate measure for productivity calculation is not a head count but total hours worked.

Total hours worked is the most appropriate measure of labour inputs for the national accounts.

Specifying hours actually worked

Total hours actually worked (see ESA 11.28) represents those hours of labour that have contributed to production and can be defined with reference to the production boundary of national accounts. The ILO standard contained in the Resolution concerning the measurement of working time, adopted by the 18th ICLS in December 2008, defines hours actually worked as the time persons spend in the performance of activities that contribute to the production of goods and services during a specified reference period. The resolution defines hours worked as follows:

1. hours actually worked occur in all types of jobs under varying work and compensation arrangements paid or unpaid, that can be performed at all types of location;
2. hours actually worked are not linked to administrative or legal concepts and therefore apply to all working persons and may occur within normal or contractual hours or as overtime;
3. statistics for hours actually worked shall include:
   a) hours actually worked during normal periods of work and directly contributing to production;
   b) paid time spent on training;
   c) time worked in addition to hours worked during normal periods of work, known as overtime. Note that overtime hours worked shall be included even if they are unpaid;
   d) time spent working on tasks such as the preparation of the workplace, repairs and maintenance, preparation and cleaning of tools, and the preparation of receipts, time sheets and reports;
   e) time spent waiting or standing-by during short-term disruptions during the workday for such reasons as lack of supply of work, breakdown of machinery, or accidents, or time spent at the place of work during which no work is done but for which payment is made under a guaranteed employment contract;

f) time corresponding to short periods of rest during the workday, including tea and coffee breaks;

g) on-call work arrangements. Where this occurs away from the work-place, for example at home, the time is included in hours actually worked according to the degree to which the person's nonwork activities and movements are restricted;

h) hours worked by defence force personnel, including conscripts, shall be included even if they are outside the scope of a country's labour force survey;

4. statistics for hours actually worked shall exclude:

a) hours paid for but not worked, such as paid annual leave, paid public holidays, paid sick leave, parental leave, strikes, 'short leave' for medical visits etc., bad weather shutdowns;

b) meal breaks;

c) time spent on travel between home and work, although any work undertaken while com-muting shall be included;

d) education other than training.

More exhaustive definitions of these criteria can be found in the ICLS Resolution concerning the measurement of working time of December 2008.

Total hours worked (see ESA 11.29) is the aggregate number of hours actually worked during the accounting period in employee and self-employment jobs within the economic territory:

a) including work outside the economic territory for resident employer institutional units who have no centre of economic interest there;

b) excluding work for foreign employer institutional units who have no centre of economic interest within the economic territory.

Source: European Commission 2013a

Appendix B
Revision work to the AZR since the 1990s

Year	***Subject of revision / Further development of the AZR***
1997	▪ Integration of AZR in the national accounts
1999	▪ Modification of the national accounts to ESA 1995 and conversion of the 1979 classification of economic activities to European NACE Rev. 1 ▪ Enlargement of the AZR by economic industry with a sectoral breakdown to A*6 quarterly and yearly, pursuant to the Classification of Economic Activities, 1993 edition (WZ 1993)
2000	▪ Takeover for the first time of the data available from the reporting procedure for social insurance for marginally gainful employed persons from the Em*ployment Accounts* ▪ Consideration and estimation of effects of working-time accounts in the AZR (Koch 2001)
2005	▪ Enlargement of the AZR by economic industry with a sectoral breakdown to A*17 (quarters) and A*31 (years) according to the Classification of Economic Activities 2003 (WZ 2003) ▪ Integration of persons with „One-euro-jobs“ (work opportunities for welfare recipients) and separate calculation of the number of persons with marginal short-term emp*loyment for Employment Accounts* ▪ Takeover of the marginally gainful employed persons in secondary jobs from the reporting procedure for social insurance and separate presentation of secondary jobs *in the AZR* ▪ Consideration of customary working hours for employees in enterprises not bound by collective agreements
2011	▪ Modification of the national accounts to conversion of the 2008 classification of economic activities to European NACE Rev. 2 ▪ Enlargement of the AZR by economic industry with a sectoral breakdown to A*38 quarterly and yearly, pursuant to the Classification of Economic Activities, 2008 edition (WZ 2008) (cf. European Commission 2008)
2014	▪ Modification of the national accounts to ESA 2010 (Braakmann 2013; Brümmerhoff/Grömling 2014) ▪ Consideration and estimation of unpaid overtime in the AZR and consistent database and estimation models for components of hours worked paid and unpaid overtime as well as working-time accounts (Wanger/Weigand/Z*apf 2014)* ▪ Adjustment of quota of sick leave ▪ Takeover of revised data of reporting procedure for employees subject to social security contributions and estimation model for past time-series

Source: own presentation

Appendix C
Statistical classification of economic activities in the European Community, 2008 edition (WZ08)

Table 6
High-level aggregation A*10/11 of NACE Rev. 2

	Section	Title	Divisions
1	A	Agriculture, forestry and fishing	01 – 03
2	B, C, D and E	Manufacturing, mining and quarrying and other industry	05 – 39
2a	C	*Of which:* manufacturing	10 – 33
3	F	Construction	41 - 43
4	G, H and I	Wholesale and retail trade, transportation and storage, accom-modation and food service activities	45 - 56
5	J	Information and communication	58 - 63
6	K	Financial and insurance activities	64 - 66
7	L	Real estate activities*	68
8	M and N	Professional, scientific, technical, administration and support service activities	69 - 82
9	O, P and Q	Public administration, defence, education, human health and social work activities	84 - 88
10	R, S, T and U	Other services	90 - 99*

* including imputed rents of owner-occupied dwellings

** All of U and part of T (division 98) are outside the national accounts production boundary, and will be empty for national accounts data reporting, but are included for completeness.

Source: European Commission 2008

Table 7
Broad Structure of NACE Rev. 2

	Section	Title	Divisions
1	A	Agriculture, forestry and fishing	01 – 03
2	B	Mining and quarrying	05 – 09
3	C	Manufacturing	10 – 33
4	D	Electricity, gas, steam and air conditioning supply	35
5	E	Water supply; sewerage, waste management and remediation activities	36 – 39
6	F	Construction	41 – 43
7	G	Wholesale and retail trade; repair of motor vehicles and motor-cycles	45 – 47
8	H	Transportation and storage	49 – 53
9	I	Accommodation and food service activities	55 – 56
10	J	Information and communication	58 – 63
11	K	Financial and insurance activities	64 – 66
12	L *	Real estate activities	68
13	M	Professional, scientific and technical activities	69 – 75
14	N	Administrative and support service activities	77 – 82
15	O	Public administration and defence; compulsory social security	84
16	P	Education	85
17	Q	Human health and social work activities	86 – 88
18	R	Arts, entertainment and recreation	90 – 93
19	S	Other service activities	94 – 96
20	T **	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	97 – 98**
21	U **	Activities of extraterritorial organisations and bodies	99**

* including imputed rents of owner-occupied dwellings

** All of U and part of T (division 98) are outside the national accounts production boundary, and will be empty for national accounts data reporting, but are included for completeness.

Source: European Commission 2008

Table 8
Intermediate aggregation A*38

	Section	Title	Divisions
1	A	Agriculture, forestry and fishing	01 - 03
2	B	Mining and quarrying	05 - 09
3	CA	Manufacture of food products, beverages and tobacco products	10 - 12
4	CB	Manufacture of textiles, apparel, leather and related products	13 - 15
5	CC	Manufacture of wood and paper products, and printing	16 - 18
6	CD	Manufacture of coke, and refined petroleum products	19
7	CE	Manufacture of chemicals and chemical products	20
8	CF	Manufacture of pharmaceuticals, medicinal chemical and botanical products	21
9	CG	Manufacture of rubber and plastics products, and other non-metallic mineral products	22 - 23
10	CH	Manufacture of basic metals and fabricated metal products, except machinery and equipment	24 - 25
11	CI	Manufacture of computer, electronic and optical products	26
12	CJ	Manufacture of electrical equipment	27
13	CK	Manufacture of machinery and equipment n.e.c.	28
14	CL	Manufacture of transport equipment	29 - 30
15	CM	Other manufacturing, and repair and installation of machinery and equipment	31 - 33
16	D	Electricity, gas, steam and air-conditioning supply	35
17	E	Water supply, sewerage, waste management and remediation	36 - 39
18	F	Construction	41 - 43
19	G	Wholesale and retail trade, repair of motor vehicles and motorcycles	45 - 47
20	H	Transportation and storage	49 - 53
21	I	Accommodation and food service activities	55 - 56
22	JA	Publishing, audiovisual and broadcasting activities	58 - 60
23	JB	Telecommunications	61
24	JC	IT and other information services	62 - 63
25	K	Financial and insurance activities	64 - 66
26	L *	Real estate activities*	68
27	MA	Legal, accounting, management, architecture, engineering, technical testing and analysis activities	69 - 71
28	MB	Scientific research and development	72
29	MC	Other professional, scientific and technical activities	73 - 75
30	N	Administrative and support service activities	77 - 82
31	O	Public administration and defence, compulsory social security	84
32	P	Education	85
33	QA	Human health services	86
34	QB	Residential care and social work activities	87 - 88
35	R	Arts, entertainment and recreation	90 - 93
36	S	Other services	94 - 96
37	T **	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	97 - 98**
38	U **	Activities of extra-territorial organisations and bodies	99**

* including imputed rents of owner-occupied dwellings

** All of U and part of T (division 98) are outside the national accounts production boundary, and will be empty for national accounts data reporting, but are included for completeness

Source: European Commission 2008

Appendix D
Development of hours worked and its components

Table 9
Development of hours worked and its components in Germany from 1991 to 2014

		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
A. Employees											
Persons											
Employees	1,000	35,227	34,675	34,120	34,052	34,161	34,115	34,036	34,447	35,046	35,922
Full-time	"	28,911	27,970	27,098	26,696	26,355	25,860	25,240	25,055	25,119	25,309
Part-time	"	6,316	6,705	7,022	7,356	7,806	8,255	8,796	9,392	9,927	10,613
Part-time rate	%	17.9	19.3	20.6	21.6	22.9	24.2	25.8	27.3	28.3	29.5
Persons with secondary jobs	1,000	884	904	949	969	1,187	1,230	1,258	1,293	1,322	1,269
Potential working days											
Calendar days	days	365	366	365	365	365	366	365	365	365	366
Saturdays/Sundays	"	104	104	104	105	105	104	104	104	104	106
Public holidays	"	12.9	10.4	8.9	9.2	10.3	12.0	11.7	9.4	7.9	10.3
Potential working days	days	248.1	251.6	252.1	250.8	249.7	250.0	249.3	251.6	253.1	249.7
Collectively agreed/customary working hours											
Weekly working hours Full-time	hours	39.09	38.71	38.49	38.34	38.24	38.03	38.03	37.99	37.99	37.98
Part-time	"	16.33	15.92	16.04	15.98	15.50	15.20	14.90	14.75	14.53	14.36
Weekly working hours (all employees)	hours	35.01	34.31	33.87	33.51	33.04	32.51	32.05	31.65	31.34	31.00
Coll. Agreed/customary working hours	hours	1,737.2	1,726.5	1,707.6	1,680.7	1,650.1	1,625.7	1,597.8	1,593.0	1,586.5	1,548.1
Holidays											
Holidays and other release times	days	30.3	30.6	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.0
of these coll. agreed regular holidays	"	28.2	28.5	29.0	29.0	29.2	29.2	29.2	29.2	29.2	29.2
Sick leave											
Sick leave by persons	%	5.15	5.07	4.88	4.97	5.22	4.82	4.31	4.26	4.30	4.31
Sick leave in working days	days	12.8	12.8	12.3	12.5	13.0	12.0	10.8	10.7	10.9	10.8
Sick leave in hours worked	hours	89.4	87.5	83.4	83.5	86.1	78.3	68.9	67.8	68.3	66.8
Effective working days											
Working days without holidays and sick leave	days	205.0	208.3	208.7	207.2	205.5	206.9	207.5	209.8	211.1	207.9
Overtime											
Paid overtime per employee	hours	46.7	48.4	37.5	38.4	45.5	39.9	32.0	33.5	32.0	30.8
Paid volume of overtime	Mio. hours	1,644	1,680	1,278	1,309	1,553	1,363	1,090	1,153	1,123	1,106
Unpaid overtime per employee	hours	26.0	23.1	26.3	28.8	28.7	30.0	33.6	34.1	30.9	28.4
Unpaid volume of overtime	Mio. hours	916	800	897	982	981	1,025	1,143	1,175	1,083	1,022
Effect of working time accounts											
Changes in balance	hours	+0.2	+0.9	+0.0	-0.6	-0.2	+0.4	+0.6	-0.0	-1.3	-1.4
Short-time work											
Short-time workers	1,000	1,761	653	948	372	199	277	183	115	119	86
Hours lost per short-time worker	%	58.5	46.2	34.0	37.9	45.6	42.2	46.2	46.9	42.8	55.0
Hours lost per short-time worker	hours	889.0	702.1	510.6	561.1	664.7	614.3	672.8	687.9	629.2	795.1
Volume of hours lost	Mio. hours	1,566	458	484	209	132	170	123	79	75	68

		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Short-time work effect	hours	44.4	13.2	14.2	6.1	3.9	5.0	3.6	2.3	2.1	1.9
Other hours worked lost											
Bad weather effect	hours	2.3	2.0	3.1	1.6	2.1	2.5	1.5	1.1	1.6	1.2
Labour dispute effect	"	0.03	0.31	0.13	0.05	0.05	0.02	0.01	0.00	0.02	0.00
Adjustment for differences in the calendar											
Effect	hours	+8.2	-6.9	-8.8	-3.0	+4.5	+2.9	+6.1	-3.4	-9.2	+4.4
Effective working time											
Hours worked **full- and part-time**	hours	1,469.8	1,479.1	1,451.4	1,444.5	1,430.7	1,411.1	1,396.9	1,389.2	1,372.1	1,348.1
Changes against previous year	%		+0.6	-1.9	-0.5	-1.0	-1.4	-1.0	-0.6	-1.2	-1.7
Volume of work	Mio. hours	51,777	51,288	49,522	49,188	48,874	48,140	47,545	47,854	48,087	48,426
Changes against previous year	%		-0.9	-3.4	-0.7	-0.6	-1.5	-1.2	+0.6	+0.5	+0.7
Hours worked **full-time**	hours	1,642.8	1,672.6	1,652.3	1,657.5	1,660.4	1,655.7	1,663.2	1,674.0	1,669.3	1,657.9
Changes against previous year	%		+1.8	-1.2	+0.3	+0.2	-0.3	+0.5	+0.6	-0.3	-0.7
Volume of work	Mio. hours	47,494	46,783	44,773	44,249	43,759	42,818	41,979	41,942	41,930	41,959
Changes against previous year	%		-1.5	-4.3	-1.2	-1.1	-2.2	-2.0	-0.1	-0.0	+0.1
Hours worked **part-time**	hours	677.8	671.9	676.4	671.2	655.3	644.8	632.9	629.3	620.1	609.4
Changes against previous year	%		-0.9	+0.7	-0.8	-2.4	-1.6	-1.9	-0.6	-1.5	-1.7
Volume of work	Mio. hours	4,281	4,505	4,750	4,938	5,115	5,323	5,567	5,910	6,156	6,468
Changes against previous year	%		+5.2	+5.4	+4.0	+3.6	+4.1	+4.6	+6.2	+4.2	+5.1
Hours worked in secondary jobs	hours	355.0	352.6	339.7	325.3	317.7	330.0	318.7	316.5	326.3	322.8
Volume of work	Mio. hours	314	319	322	315	377	406	401	409	431	410
Effect of secondary jobs	hours	8.9	9.2	9.4	9.3	11.0	11.9	11.8	11.9	12.3	11.4
Hours worked **including secondary jobs**	hours	1,478.7	1,488.3	1,460.9	1,453.7	1,441.8	1,423.0	1,408.7	1,401.0	1,384.4	1,359.5
Changes against previous year	%		+0.6	-1.8	-0.5	-0.8	-1.3	-1.0	-0.5	-1.2	-1.8
Volume of work	Mio. hours	52,089	51,606	49,844	49,502	49,252	48,546	47,947	48,262	48,517	48,837
Changes against previous year	%		-0.9	-3.4	-0.7	-0.5	-1.4	-1.2	+0.7	+0.5	+0.7
For information: Effect of working days	%		+1.4	+0.2	-0.5	-0.4	+0.1	-0.3	+0.9	+0.6	-1.3
Daily hours worked	"		-0.7	-2.0	+0.0	-0.4	-1.4	-0.7	-1.5	-1.8	-0.5
B. Self-employed and family workers											
Persons	1,000	3,563	3,608	3,666	3,746	3,797	3,854	3,911	3,960	3,985	3,995
Hours worked	hours	2,293.4	2,299.2	2,292.8	2,296.6	2,303.8	2,284.9	2,290.9	2,298.6	2,308.3	2,283.6
Changes against previous year	%		+0.3	-0.3	+0.2	+0.3	-0.8	+0.3	+ 0.3	+0.4	-1.1
Volume of work	Mio. hours	8,171	8,295	8,405	8,603	8,748	8,806	8,960	9,103	9,199	9,123
Changes against previous year	%		+1.5	+1.3	+2.4	+1.7	+0.7	+1.7	+ 1.6	+1.1	-0.8
C. Persons in employment											
Persons	1,000	38,790	38,283	37,786	37,798	37,958	37,969	37,947	38,407	39,031	39,917
Hours worked	hours	1,553.5	1,564.7	1,541.6	1,537.3	1,528.0	1,510.5	1,499.6	1,493.6	1,478.7	1,452.0
Changes against previous year	%		+0.7	-1.5	-0.3	-0.6	-1.1	-0.7	- 0.4	-1.0	-1.8
Volume of work	Mio. hours	60,261	59,902	58,250	58,105	57,999	57,352	56,907	57,364	57,716	57,960
Changes against previous year	%		-0.6	-2.8	-0.2	-0.2	-1.1	-0.8	+ 0.8	+0.6	+0.4

Source: IAB working time measurement concept

Status of data delivery: March 2015

Table 9
Development of hours worked and its components in Germany from 1991 to 2014 (continued)

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
A. Employees											
Persons											
Employees	1,000	35,797	35,570	35,078	35,079	34,916	35,152	35,798	36,353	36,407	36,533
Full-time	"	25,062	24,639	23,966	23,394	22,923	22,866	23,230	23,271	22,902	22,825
Part-time	"	10,735	10,931	11,112	11,685	11,993	12,286	12,568	13,082	13,505	13,708
Part-time rate	%	30.0	30.7	31.7	33.3	34.3	34.9	35.1	36.0	37.1	37.5
Persons with secondary jobs	1,000	1,254	1,228	1,290	1,635	1,781	1,888	2,037	2,201	2,277	2,333
Potential working days											
Calendar days	days	365	365	365	366	365	365	365	366	365	365
Saturdays/Sundays	"	104	104	104	104	105	105	104	104	104	104
Public holidays	"	12.0	12.0	11.7	8.0	8.3	10.4	12.0	10.4	9.4	8.0
Potential working days	days	249.0	249.0	249.3	254.0	251.7	249.6	249.0	251.6	251.6	253.0
Collectively agreed/customary working hours											
Weekly working hours Full-time	hours	37.96	37.96	37.97	37.93	37.97	38.05	38.04	38.02	37.78	37.93
Part-time	"	14.27	14.31	14.33	14.17	14.69	14.93	15.15	15.44	15.25	15.31
Weekly working hours (all employees)	hours	30.86	30.70	30.48	30.02	29.97	29.97	30.00	29.89	29.42	29.44
Coll. Agreed/customary working hours	hours	1,536.9	1,528.9	1,519.5	1,524.8	1,508.8	1,496.4	1,494.2	1,504.2	1,480.5	1,490.0
Holidays											
Holidays and other release times	days	31.0	31.0	30.9	30.9	30.8	30.8	30.7	31.0	30.7	30.7
of these coll. agreed regular holidays	"	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3
Sick leave											
Sick leave by persons	%	4.25	4.08	3.68	3.41	3.64	3.29	3.26	3.41	3.50	3.71
Sick leave in working days	days	10.6	10.2	9.2	8.7	9.2	8.2	8.1	8.6	8.8	9.4
Sick leave in hours worked	hours	65.3	62.4	55.9	52.0	55.0	49.3	48.7	51.4	51.8	55.2
Effective working days											
Working days without holidays and sick leave	days	207.4	207.9	209.2	214.5	211.7	210.7	210.2	212.1	212.1	213.0
Overtime											
Paid overtime per employee	hours	29.6	24.5	23.6	23.2	22.1	23.8	24.5	23.1	18.5	20.3
Paid volume of overtime	Mio. hours	1,061	873	829	812	773	838	876	841	673	742
Unpaid overtime per employee	hours	27.3	28.5	27.1	29.0	29.7	35.0	35.1	33.5	30.7	31.6
Unpaid volume of overtime	Mio. hours	977	1,014	951	1,018	1,038	1,230	1,255	1,218	1,119	1,153
Effect of working time accounts											
Changes in balance	hours	+1.1	+2.5	+0.5	-3.5	-6.5	+5.4	+4.7	+1.9	-9.5	+1.0
Short-time work											
Short-time workers	1,000	123	207	195	150	125	67	68	101	1,144	503
Hours lost per short-time worker	%	48.9	43.2	44.8	50.9	51.1	53.1	55.9	46.6	28.0	34.2
Hours lost per short-time worker	hours	703.9	621.6	646.3	749.1	743.4	768.3	806.4	672.2	398.0	488.8
Volume of hours lost	Mio. hours	87	129	126	113	93	51	55	68	455	246
Short-time work effect	hours	2.4	3.6	3.6	3.2	2.7	1.5	1.5	1.9	12.5	6.7

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Other hours worked lost											
Bad weather effect	hours	1.2	1.2	1.5	1.0	1.3	1.2	0.0	0.0	0.0	0.0
Labour dispute effect	"	0.00	0.06	0.03	0.01	0.00	0.07	0.06	0.03	0.01	0.00
Adjustment for differences in the calendar											
Effect	hours	+6.8	+6.7	+5.9	-12.4	-3.5	+4.3	+6.4	-3.1	-3.4	-8.1
Effective working time											
Hours worked **full- and part-time**	hours	1,341.4	1,333.7	1,327.4	1,319.6	1,307.3	1,328.5	1,330.2	1,321.4	1,271.9	1,292.2
Changes against previous year	%	-0.5	-0.6	-0.5	-0.6	-0.9	+1.6	+0.1	-0.7	-3.7	+1.6
Volume of work	Mio. hours	48,018	47,440	46,563	46,290	45,646	46,699	47,618	48,037	46,306	47,208
Changes against previous year	%	-0.8	-1.2	-1.8	-0.6	-1.4	+2.3	+2.0	+0.9	-3.6	+1.9
Hours worked **full-time**	hours	1,655.4	1,655.1	1,658.8	1,673.3	1,662.6	1,692.2	1,693.1	1,686.8	1,635.8	1,663.5
Changes against previous year	%	-0.1	-0.0	+0.2	+0.9	-0.6	+1.8	+0.1	-0.4	-3.0	+1.7
Volume of work	Mio. hours	41,489	40,780	39,756	39,146	38,112	38,694	39,331	39,255	37,463	37,971
Changes against previous year	%	-1.1	-1.7	-2.5	-1.5	-2.6	+1.5	+1.6	-0.2	-4.6	+1.4
Hours worked **part-time**	hours	608.3	609.3	612.7	611.5	628.2	651.7	659.3	671.5	654.9	673.8
Changes against previous year	%	-0.2	+0.2	+0.5	-0.2	+2.7	+3.7	+1.2	+1.8	-2.5	+2.9
Volume of work	Mio. hours	6,530	6,660	6,808	7,146	7,534	8,006	8,286	8,784	8,845	9,236
Changes against previous year	%	+1.0	+2.0	+2.2	+5.0	+5.4	+6.3	+3.5	+6.0	+0.7	+4.4
Hours worked in secondary jobs	hours	320.9	320.4	317.6	321.6	319.7	282.5	285.5	299.5	276.2	273.6
Volume of work	Mio. hours	402	393	410	526	569	533	582	659	629	638
Effect of secondary jobs	hours	11.2	11.1	11.7	15.0	16.3	15.2	16.2	18.1	17.3	17.5
Hours worked **including secondary jobs**	hours	1,352.7	1,344.8	1,339.1	1,334.6	1,323.6	1,343.7	1,346.4	1,339.6	1,289.2	1,309.7
Changes against previous year	%	-0.5	-0.6	-0.4	-0.3	-0.8	+1.5	+0.2	-0.5	-3.8	+1.6
Volume of work	Mio. hours	48,421	47,834	46,973	46,817	46,215	47,234	48,199	48,698	46,937	47,846
Changes against previous year	%	-0.9	-1.2	-1.8	-0.3	-1.3	+2.2	+2.0	+1.0	-3.6	+1.9
For information: Effect of working days	%	-0.3	+0.0	+0.1	+1.9	-0.9	-0.8	-0.3	+1.0	-0.0	+0.6
Daily hours worked	"	-0.2	-0.6	-0.5	-2.2	+0.1	+2.3	+0.5	-1.5	-3.7	+1.0
B. Self-employed and family workers											
Persons	1,000	4,012	4,060	4,122	4,258	4,410	4,483	4,527	4,503	4,485	4,487
Hours worked	hours	2,238.1	2,185.1	2,153.6	2,143.9	2,105.4	2,059.8	2,040.7	2,054.7	2,050.5	2,043.0
Changes against previous year	%	-2.0	-2.4	-1.4	-0.5	-1.8	-2.2	-0.9	+0.7	-0.2	-0.4
Volume of work	Mio. hours	8,979	8,871	8,877	9,129	9,285	9,234	9,238	9,252	9,196	9,167
Changes against previous year	%	-1.6	-1.2	+0.1	+2.8	+1.7	-0.5	+0.0	+0.2	-0.6	-0.3
C. Persons in employment											
Persons	1,000	39,809	39,630	39,200	39,337	39,326	39,635	40,325	40,856	40,892	41,020
Hours worked	hours	1,441.9	1,430.9	1,424.8	1,422.2	1,411.3	1,424.7	1,424.4	1,418.4	1,372.7	1,389.9
Changes against previous year	%	-0.7	-0.8	-0.4	-0.2	-0.8	+0.9	-0.0	-0.4	-3.2	+1.3
Volume of work	Mio. hours	57,401	56,705	55,850	55,946	55,500	56,467	57,437	57,950	56,133	57,013
Changes against previous year	%	-1.0	-1.2	-1.5	+0.2	-0.8	+1.7	+1.7	+0.9	-3.1	+1.6

Source: IAB working time measurement concept

Status of data delivery: March 2015

Table 9
Development of hours worked and its components in Germany from 1991 to 2014 (continued)

		2011	2012	2013	2014
A. Employees					
Persons					
Employees	1,000	37,024	37,489	37,824	38,247
Full-time	"	22,921	23,211	23,279	23,468
Part-time	"	14,103	14,278	14,545	14,779
Part-time rate	%	38.1	38.1	38.5	38.6
Persons with secondary jobs	1,000	2,461	2,563	2,674	2,771
Potential working days					
Calendar days	days	365	366	365	365
Saturdays/Sundays	"	105	105	104	104
Public holidays	"	8.3	11.4	12.0	11.7
Potential working days	days	251.7	249.6	249.0	249.3
Collectively agreed/customary working hours					
Weekly working hours Full-time	hours	37.98	37.91	38.03	38.07
Part-time	"	15.36	15.49	15.73	15.89
Weekly working hours (all employees)	hours	29.36	29.38	29.46	29.50
Coll. Agreed/customary working hours	hours	1,477.9	1,466.7	1,467.2	1,470.4
Annual paid holidays					
Holidays and other release times	days	30.7	30.8	31.4	31.2
of these coll. agreed regular holidays	"	29.3	29.4	29.7	29.7
Sick leave					
Sick leave by persons	%	3.84	3.71	3.83	3.81
Sick leave in working days	days	9.7	9.3	9.5	9.5
Sick leave in hours worked	hours	56.8	54.5	56.3	56.0
Effective working days					
Working days without holidays and sick leave	days	211.3	209.5	208.1	208.6
Overtime					
Paid overtime per employee	hours	24.6	22.6	20.0	21.1
Paid volume of overtime	Mio. hours	911	848	758	806
Unpaid overtime per employee	hours	32.4	27.8	27.2	27.8
Unpaid volume of overtime	Mio. hours	1,201	1,041	1,030	1,062
Effect of working time accounts					
Changes in balance	hours	+6.1	+0.0	-3.0	+1.3
Short-time work					
Short-time workers	1,000	148	111	124	93
Hours lost per short-time worker	%	39.4	39.9	40.5	42.9
Hours lost per short-time worker	hours	555.1	554.4	559.5	592.6
Volume of hours lost	Mio. hours	82	62	69	55
Short-time work effect	hours	2.2	1.6	1.8	1.4

		2011	2012	2013	2014
Other hours worked lost					
Bad weather effect	hours	0.0	0.0	0.0	0.0
Strikes and lock-outs effect	"	0.01	0.02	0.03	0.03
Adjustment for differences in the calendar					
Effect	hours	-3.3	+3.9	+6.1	+5.4
Effective working time					
Hours worked **full- and part-time**	hours	1,298.4	1,283.7	1,274.6	1,284.6
Changes against previous year	%	+0.5	-1.1	-0.7	+0.8
Volume of work	Mio. hours	48,072	48,125	48,210	49,132
Changes against previous year	%	+1.8	+0.1	+0.2	+1.9
Hours worked **full-time**	hours	1,678.2	1,655.7	1,645.1	1,657.0
Changes against previous year	%	+0.9	-1.3	-0.6	+0.7
Volume of work	Mio. hours	38,466	38,432	38,296	38,886
Changes against previous year	%	+1.3	-0.1	-0.4	+1.5
Hours worked **part-time**	hours	681.2	679.0	681.6	693.4
Changes against previous year	%	+1.1	-0.3	+0.4	+1.7
Volume of work	Mio. hours	9,607	9,694	9,914	10,248
Changes against previous year	%	+4.0	+0.9	+2.3	+3.4
Hours worked in secondary jobs	hours	255.0	238.2	233.0	234.4
Volume of work	Mio. hours	628	610	623	650
Effect of secondary jobs	hours	17.0	16.3	16.5	17.0
Hours worked **including secondary jobs**	hours	1,315.4	1,300.0	1,291.1	1,301.6
Changes against previous year	%	+0.4	-1.2	-0.7	+0.8
Volume of work	Mio. hours	48,701	48,736	48,833	49,783
Changes against previous year	%	+1.8	+0.1	+0.2	+1.9
For information: Effect of working days	%	-0.5	-0.8	-0.2	+0.1
Daily hours worked	"	+1.0	-0.4	-0.4	+0.7
B. Self-employed and family workers					
Persons	1,000	4,546	4,544	4,457	4,405
Hours worked	hours	2,026.1	1,986.4	1,968.7	1,973.3
Changes against previous year	%	-0.8	-2.0	-0.9	+0.2
Volume of work	Mio. hours	9,211	9,026	8,775	8,692
Changes against previous year	%	+0.5	-2.0	-2.8	-0.9
C. Persons in employment					
Persons	1,000	41,570	42,033	42,281	42,652
Hours worked	hours	1,393.1	1,374.2	1,362.5	1,371.0
Changes against previous year	%	+0.2	-1.4	-0.9	+0.6
Volume of work	Mio. hours	57,912	57,763	57,608	58,476
Changes against previous year	%	+1.6	-0.3	-0.3	+1.5

Source: IAB working time measurement concept

Status of data delivery: March 2015

Appendix E
Special forms of employment in Germany

- ***Employees subject to social insurance contributions***

The concept of employees subject to social insurance contributions ("Sozialversicherungspflichtig Beschäftigte") covers all employees incl. those undergoing vocational training who are subject to health, pension and long-term care insurance and/or to contributions pursuant to employment promotion law or for whom employers pay shares of contribution pursuant to employment promotion law. Conscripts performing compulsory military or community service are regarded as employees subject to social insurance contributions provided they were employed at the time they began their service, the employment relationship continues and they do not receive remuneration payments purely for the reason of performing that service. Public officials, self-employed persons and family workers are however not covered by the concept of employees subject to social insurance contributions.

The statistics of employees subject to social insurance contributions are secondary statistics. The statistics are based on a Common procedure for reporting data for statutory health, long-term care, pension and unemployment insurance purposes. This procedure requires employers to report, in an electronic and harmonised form, data for all employees subject to social insurance contributions (complete enumeration) which are of relevance to insurance matters. The Federal Employment Agency (BA) stores the data in individual insurance records. These records form the basis for reference date-related evaluations for statistical purposes.

Source: Federal Statistical Office 2009

- ***Marginal employment***

There are two basic types of marginal employment to be distinguished: (1) Employment for which the wage is regularly not exceeding Euro 450 per month and (2) employment which – during a calendar year – is restricted to three months or 70 working days (irrespective of the earnings). The first type is usually referred to as marginal employment with low pay ("geringfügig entlohnte Beschäftigung"), the second one as short-term (marginal) employment ("kurzfristige Beschäftigung").

For the marginal employment with low pay, the threshold of Euro 450 refers to the "regular" monthly wage. This means that the amount can in certain cases be higher than Euro 450 in individual months, but not regularly.

Marginal employment can be carried out either as the sole employment a person holds, or as a side job combined with either a further marginal job or an employment subject to full social insurance contributions ("sozialversicherungspflichtige Beschäftigung"). Each of the combinations are subject to a differentiated treatment in terms of social contributions and taxation.

Workers (and their employers) whose "mini-jobs" is their main job contribute to the national retirement pension insurance in Germany. The employee pays 3.7 % and the employer pays 15 %. They do not contribute to either the national health insurance funds or for unemployment coverage. They can either be covered by the health insurance of the higher earning partner (or parents for Students up to 25 years) or they can contribute on a voluntary basis.

Source: Körner/Puch 2012

- ***Persons in work opportunities (One-Euro-Jobs)***

One-Euro-Jobs („Arbeitsgelegenheiten in der Mehraufwandsvariante“) are work opportunities providing additional jobs in the sense that they would not be undertaken without the subsidy and are of public interest for welfare recipients who are especially hard-to-place in employment. While participating in One-Euro-Jobs, welfare recipients continue to receive welfare benefits plus 1 to 2 Euros per hour worked. One-Euro-Jobs aim to raise the employability of the long-term unemployed and increase their chances of finding regular employment. Welfare recipients’ willingness to work is also tested under the programme. Furthermore, One-Euro-Jobs aim to socially integrate welfare recipients.

Source: Dengler 2013

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ANNOUNCEMENT

Survey

on the Relaunch of the IAB website

Online Survey of the IAB web presence

The IAB is conducting an Online Survey of its German- and English-language web presence until September 2015. The aim is to gather information on the quality and variety of what IAB offers, on comprehensibility, motivation for use, and new user requirements, with a view to improving IAB's web presence even further. For this purpose we would like to hear your opinion, wishes and suggestions. We kindly ask you to take about ten minutes to take part in this Online Survey.

Click here to get to the Online Survey.
Information for survey participants.

Imprint

IAB-Discussion Paper 21/2015

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http://www.iab.de

Download of this Discussion Paper
http://doku.iab.de/discussionpapers/2015/dp2115.pdf

ISSN 2195-2663

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